



**FORECASTING FOREIGN CURRENCY EXCHANGE RATES FOR AIR  
FORCE BUDGETING**

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MARCH 2015

Nicholas R. Gardner, Captain, USAF

AFIT-ENV-MS-15-M-178

**DEPARTMENT OF THE AIR FORCE  
AIR UNIVERSITY**

**AIR FORCE INSTITUTE OF TECHNOLOGY**

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**Wright-Patterson Air Force Base, Ohio**

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FORCE BUDGETING**

THESIS

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Air University

Air Education and Training Command

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Cost Analysis

Nicholas R. Gardner, BS

Captain, USAF

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Nicholas R. Gardner, BS

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Committee Membership:

Lt Col Jonathan Ritschel, PhD  
Chair

Lt Col Andrew Wallen, PhD  
Member

Dr. Edward White  
Member

**Abstract**

This thesis examines the current method of forecasting foreign currency exchange rates for the annual US Air Force budget. Using 5 methods against the status quo of a center-weighted average, the paper evaluates the absolute percent error (APE) over three time periods extending from Fiscal Year (FY) 1979 to FY 2014. The results strongly indicate that four of the alternative methods outperform the status quo over the shorter time period, and one method for all three time periods. Furthermore, a non-parametric comparison of the median APE demonstrates statistical similarities between the four methods over the short term, and allows for the Air Force to choose which method to exercise for future forecasting. Overall, the paper recommends using the settlement price of the average option contract in October to decrease the median APE by 3.475% and avoiding a \$36 million opportunity cost.

## **Acknowledgments**

I would like to express my gratitude to my family for their patience and understanding for all the nights spent working on this thesis. I would also like to convey my sincere appreciation to my faculty advisor, Lt Col Jonathan Ritschel, for his guidance and support throughout the course of this thesis effort. The insight and experience was certainly appreciated. I would, also, like to thank my sponsor, Lt Col Andrew Wallen, the Senior Economist for the Secretary of the Air Force – Financial Management for both the support and latitude provided to me in this endeavor. Finally, I am in debt to Dr. White for teaching me about robust statistical analysis and the application of those methods to this thesis.

Nicholas R. Gardner

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# **FORECASTING FOREIGN CURRENCY EXCHANGE RATES FOR AIR FORCE BUDGETING**

## **I. Introduction**

The Department of Defense (DoD) obligates roughly \$5 billion every year in 9 different foreign currencies<sup>1</sup> (Office of the Undersecretary of Defense (Comptroller), 2014). Foreign currency is necessary to pay for the daily operations, maintenance, construction and personnel costs of overseas bases and operations. As part of the federal budget process, the DoD must annually estimate the amount of foreign currency needed to fund these daily activities. Simply estimating \$5 billion every year does not reflect realistic requirements. The Air Force (AF) is therefore seeking improvement in its foreign currency exchange rate forecasting methodology, which is the focus of this thesis. This chapter outlines the background of the DoD budget process and how the foreign currency exchange rate integrates into that process. It then defines the problem statement, research objective and focus, investigative questions, and assumptions. The chapter ends with a brief discussion on the methodology applied in the thesis.

## **Background**

The DoD submits an annual budget to Congress to fund the investment and operation activities of the United States military. These activities represent approximately 18% of annual federal government outlays (or over half of discretionary spending (Office of Management and Budget, 2014)). For fiscal year 2013, the requested total obligation authority is \$620 billion (Office of the Undersecretary of Defense (Comptroller), 2012).

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<sup>1</sup> The currencies are Denmark's Krone, the European Union's Euro, Iceland's Krona, Japan's Yen, Norway's Krone, Singapore's Dollar, South Korea's Won, Turkey's Lira, and the United Kingdom's Pound.

As part of this budget submission, the DoD provides an estimate of required funding needed for expenses paid in foreign currencies. A specific account for absorbing foreign currency variability is also included and represents an opportunity cost to the DoD. Recent financial reports show an opportunity cost of \$1.1 billion in 2013 and \$1.4 billion in 2012 (Office of the Undersecretary of Defense (Comptroller), 2013). Over the course of 2013, the DoD's foreign exchange rate forecasts averaged a 9.61% difference from the actual average exchange rate. This gives a \$105.7 million opportunity. Thus, small improvement can have significant impacts. For example, by deriving a new foreign currency estimating methodology that results in a narrowing of the difference by just 1% to 8.61%, the DoD can free an additional \$10.6 million of budgetary authority.

Prior to 2005, the DoD formulated the budget's foreign exchange rates by selecting the most favorable rate observed in the months preceding the annual budget submission (Government Accountability Office, 2005). The most favorable rate provided the highest amount of foreign currency per dollar, and did not provide a realistic assessment of funding requirements. A Government Accountability Office (GAO) investigation in 2005 guided the DoD exchange rate forecasting process into a more rigorous statistical methodology excluding subjective judgment in picking the most favorable exchange rate. Since the 2005 report, the DoD has used a centered weighted average technique to estimating, resulting in more accurate forecasting in choosing exchange rates.

An austere budget environment (e.g. sequestration) forces the DoD to evaluate the opportunity cost of the current forecasting method. New research and data may provide a more precise formula for minimizing the difference between predicted and actual rates.

A shadow, though, is cast over the entire field by a seminal paper in 1983 (Meese & Rogoff, 1983). An examination of empirical exchange rate models of the 1970s did not fit out-of-sample data any better than a Random Walk model, and subsequent papers in the 1990's and 2000's seem to carry this claim (Moosa, 2013). The debate is not over, though, as some researchers find opportunities in measuring success through different avenues than out-of-sample testing (Engel, Mark, & West, 2007).

### **Problem Statement**

This thesis aims to develop an unbiased forecast methodology, free from the estimator's subjective judgments, with the least variance between predicted currency exchange rates and actual currency exchange rates.

### **Research Objectives/Questions/Hypotheses**

The following objectives guide this thesis. The thesis will perform a general survey of applicable forecasting methodologies, remove any methodologies based on unrealistic assumptions or an analyst's bias, and compare the methodologies by their variance of predicted opposed to actual exchange rates given a sample data set. In order to not repeat the mistakes identified in the GAO report (Government Accountability Office, 2005), special attention is given to minimizing subjective influence or biases in the methodologies.

The purpose of the research is to answer three questions:

- Which is the best method for the Air Force to apply in formulating a budget rate of foreign exchange in terms of variance?

- Which is the best method for the Air Force to apply in formulating a budget rate of foreign exchange in terms of simplicity?
- What is the probability that a given method will budget too little and require funds from the Foreign Currency Fluctuation account?

### **Research Focus**

The focus of this research is on current forecast estimating methodology. The thesis reviews variables used in forecasting, assumptions in forecasting, and how to measure the variance between predicted and actual exchange rates. The forecasting period is from fiscal year (FY) 1979 to FY2014 divided into three separate time frames based on the available methods (FY79-FY12, FY91-FY12, and FY06-FY14).

### **Methodology**

The thesis used a statistics based approach to compare the projected exchange rates to the actual exchange rate. The statistics based approach focuses mainly on variance and the measure of the margin of error between projected and actual exchange rates. The different methodologies derived from the literature forecasted a budgeted exchange rate and was compared to the actual exchange rate as reported in either the FRB H.10 average monthly exchange rate for the longer time period, or the USD(C) adjusting rates for the more recent time period.

### **Assumptions/Limitations**

The foremost assumption in the thesis is that past behavior influences future behavior. In theory, an exchange rate can range from zero to infinity; however, the day-

to-day exchange rates do not vary by such wide scales. Furthermore, while the exchange rates are discrete and positive, the percent change from day-to-day is continuous, can be positive or negative, and may have a bell-curve distribution around a mean of zero. Continuous data and a bell-curve distribution lead to assuming the change in exchange rates, as a percentage, is normally distributed. Another assumption is the varying exchange rates within a day. The thesis simplifies the intraday variability by assuming one exchange rate for the day, as given by the Federal Reserve Foreign Exchange Rate – H.10 data.

The nature of forecasting and the DoD budget process guide limitations to this thesis. Forecasting can be notoriously difficult due to unforeseen circumstances, rare events, and small disturbances with oversized impacts (think of the waves from a stone dropped into a pond). These difficulties are compounded by limitations in data. More than one rate exists for exchanging currencies depending on the location, time, and bank. The thesis, therefore, limits itself to the Federal Reserve Foreign Exchange Rate – H.10. Process limitations arise in how the DoD budgets for the foreign currency fluctuation account. The budget contains only one rate per currency, while the actual exchange rate varies according to the market. The thesis limits the exchange rate to a daily rate as reported in the Federal Reserve Foreign Exchange Rate – H.10.

## **Implications**

Given the average error in 2013, the size of the opportunity is \$105.7 million. While finding a perfect forecast model is implausible, a 1% increase in accuracy could allow for more realistic budgets. Furthermore, the GAO investigated and found past

methodologies lacking in scientific rigor or too reliant on the analyst's subjectivity (Government Accountability Office, 2005). This thesis adds to the robustness of the DoD's forecasting process. Lastly, the successful narrowing of variance between a projected and actual exchange rate may allow for opportunities to effectively use limited resources in an era of declining budgets.

## **Summary**

This chapter outlined the background of the DoD budget for foreign currency exchange. While not a significant portion of the overall DoD budget, the magnitude of foreign currency expenses and estimating represent an area to investigate with clear impact on the budget. After defining the problem statement, research objective and focus, investigative questions, methodology, limitations, and assumptions, the chapter ended with a brief discussion on the implications of the research to include the size of the opportunity, proper governance and robustness of DoD budgets, and the more efficient use of limited resources in an era of declining budgets.

The remaining sections of this thesis explore the topic in greater detail. After reviewing basic DoD budget processes, Chapter Two reviews the literature of private firm foreign currency mitigation techniques, forecasting, economic forecasting, and foreign currency exchange forecasting. Chapter Three explains the specific procedure in comparing the different methodologies and the data compiled for analysis. Results are given in chapter four giving way to a conclusion in chapter five. The conclusion synthesizes the accomplished work and recommends a course of action for the Air Force.

## **II. Literature Review**

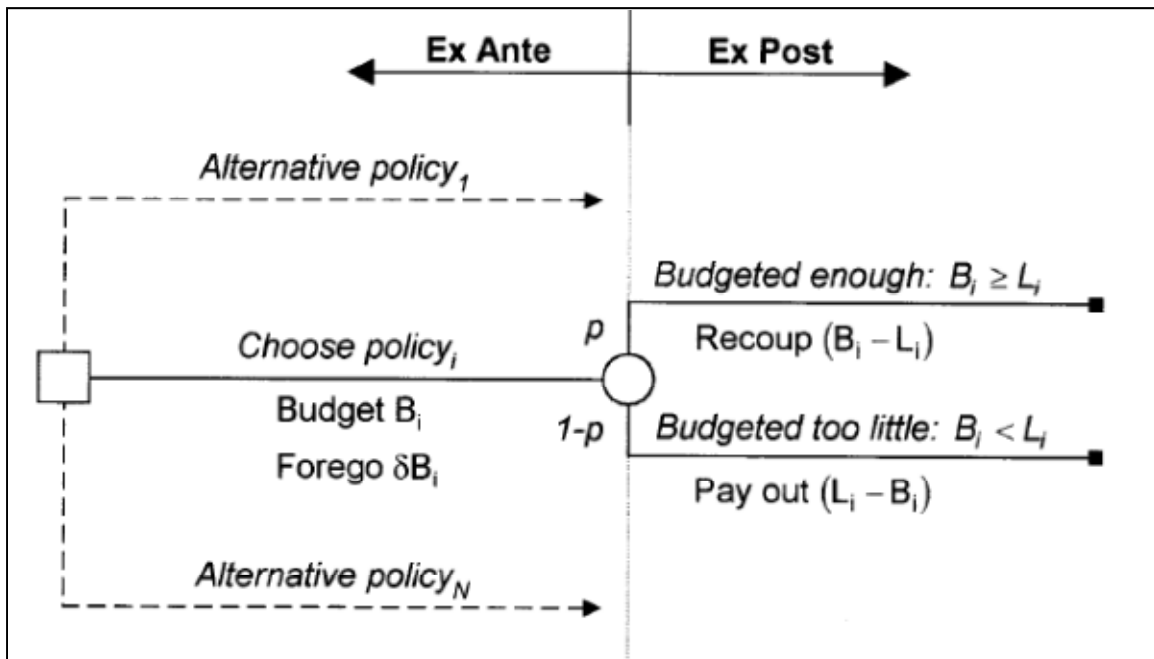
While precisely forecasting future exchange rates is unattainable, understanding the federal budget process, forecasting techniques and previous exchange rate research mitigates the magnitude of error in forecasting the budgeted exchange rate. The following section explains the federal budget process along with the DoD's foreign currency role in the budget process. Private, international firms must also confront exchange rate volatility. A review of private firm mitigating actions against foreign currency fluctuation provides insight into options for the DoD. The section then gives a framework of basic forecasting. Next, economic forecasting is defined before exploring current research on foreign currency exchange rate forecasting in business and the DoD. The chapter ends with a review of the main points of the federal budget process, forecasting, economic forecasting, and the DoD's efforts at forecasting foreign currency exchange rates.

### **The Federal Budget Process**

The federal government receives tariffs, taxes, fees, and other collections throughout the fiscal year (1 October – 30 September). The executive branch obtains most of the collections for the federal government (e.g. the IRS is in the executive branch) while the legislative branch, Congress, defines the amount and activities to receive funding. The executive branch must formally request the funding and authority to use the collections from Congress through the budget process. The term "budget" is defined as the President's Budget. It is the financial plan for prioritizing and allocating resources due every February to Congress and accounts for all government agency

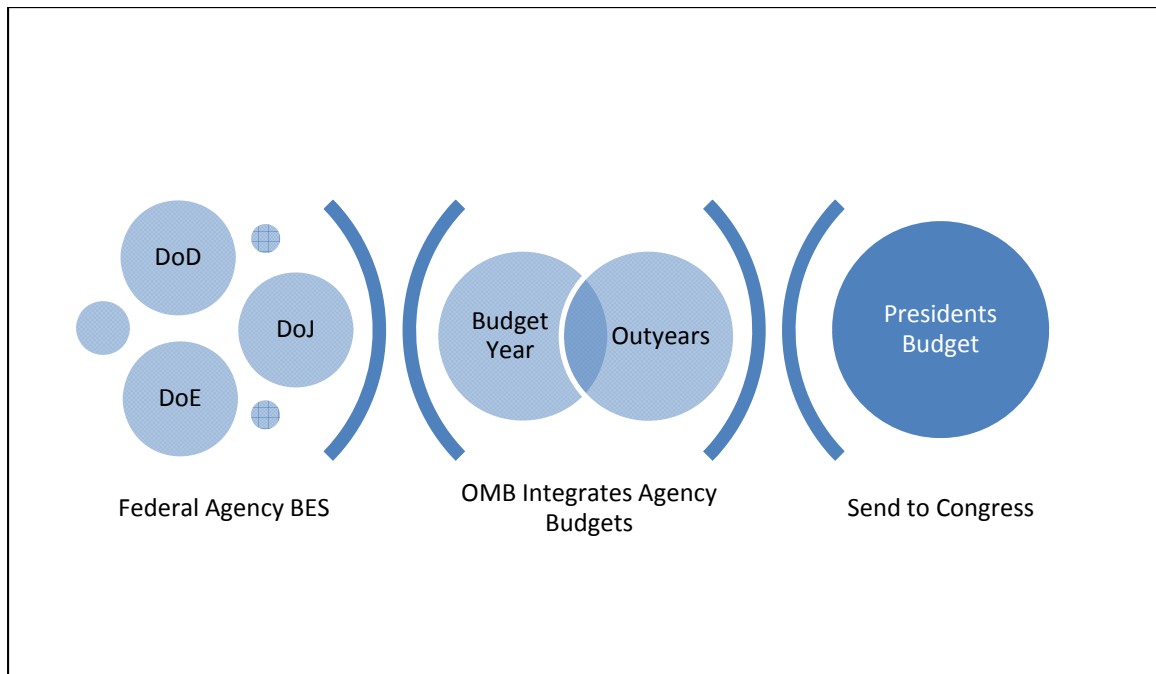
requirements for the next fiscal year (Office of Management and Budget, 2013). Policy guides the budget as policy dictates requirements for funding.

Figure 1 presents a representative decision tree of choosing a policy and its associated budget ( $B_i$ ) with the uncertainty of requesting enough or too little funding. Ex ante, the executive branch provides a budget estimate according to the current policy (e.g. in ex ante the DoD forecasts the foreign currency exchange rate). Ex post is after the uncertainty of the true budget requirement is known. The sum of the probability of budgeting enough ( $P$ ) and budgeting too little ( $1-P$ ) is 1. The liquidation of the budget ( $L_i$ ) provides the basis from which to judge whether the budget is enough ( $B_i \geq L_i$ ). In terms of public finance, a recoup is when the executive branch asked for too much funding while a payout requires addition funding from Congress or a transfer from other appropriations. With respect to foreign currency, the goal is to minimize  $B_i - L_i$  and  $L_i - B_i$ .



**Figure 1 Decision Tree for Choosing a Budget (Groshek and Felli, 2000)**

The entire Federal budget process encompasses three main phases: formulation, congressional deliberation, and execution (liquidation) (Office of Management and Budget, 2013). Foreign currency exchange rates affect the formulation and execution phases. DoD analysts forecast foreign currency exchange rates in the months preceding the budget submission during the formulation phase. Along with the other forecasted defense requirements, the DoD incorporates the forecasted exchange rates into a Budget Estimate Submission (BES). The Office of Management and Budget (OMB) integrates the BES along with the other federal agency budget estimates (e.g. the Department of Justice (DoJ) and the Department of Energy (DoE)). Budget estimates primarily focus on the budget year but also include the 9 years following the budget year (outyears) (Office of Management and Budget, 2013). Figure 2 represents the budget formulation in chronological order from the federal agency budget submission to the President’s Budget.



**Figure 2 Budget Formulation Process**

Congressional deliberation begins after receiving the President's Budget on the first Monday in February (Office of Management and Budget, 2013). The House of Representatives and the Senate deliberate separately on budget proposals. Each branch's appropriation committee reviews the BES's and calls for hearings from the federal agencies. The method of forecasting foreign currency plays an important role at this juncture, since previous inaccurate forecasts cast doubt about the cost of requirements in the budget estimate. The committees call conferences to adjudicate difference in the House and Senate committee recommendations before passing the authorization and appropriation bills. The authorization bill gives legal justification to obligate the federal government for sanctioned programs while the appropriations bill supplies funding to execute those programs (The Judge Advocate General's Legal Center and School, 2014). The President then signs the bills into law.

The execution phase follows the fiscal year beginning on 1 October and ending on 30 September. The forecasted exchange rates, then, are almost one year old by the time the fiscal year begins. During execution, each military department records foreign currency obligations at the budgeted rate. DoD's accounting office, Defense Finance and Accounting Service (DFAS), collects each military department's foreign currency obligations and compares the US dollar equivalent amount using the budgeted rate and the actual rate. The difference between the actual US dollar amount obligated and the budgeted dollar amount is the accrued variance (Department of Defense, 2011). DFAS then projects the variance to the end of the fiscal year (30 September) to analyze any significant variance for the remainder of the execution phase. Funding is transferred from the DoD's foreign currency fluctuation allotment to the military department (i.e.

Army, Navy, AF) by DFAS should the monthly report show a negative balance. With less variance, the DoD can lower the amount of funding required for the foreign currency fluctuation allotment. Better forecasting techniques helps the DoD lower the variance, and hence lowering opportunity cost by requiring less funding in a holding account.

**Private Firm Foreign Exchange Rate Exposure Mitigation**

The federal budget process neither flows flawlessly from one step to the next, nor is the objectives of all the stakeholders the same. Investing public dollars rests on analysis that is not solely based on monetary standards. Some examples of non-monetary standards include the benefits of sidewalk beautification projects or avoiding conflict through deterrence. Private firms, in contrast, normally quantify their investments in terms of present worth or the rate of return (Eschenbach, 2010). Table 1 highlights differences between public and private sectors. A closer review of private sector methods provides additional insights for DoD foreign currency forecasting.

**Table 1 Differences in Investments Public and Private Sectors (Eschenbach, 2011)**

<b>Factor</b>	<b>Public Sector</b>	<b>Private Sector</b>
Data	Benefits must be 1. Quantified and 2. Equated to money	Most benefits are monetary
Probability	Rare events often crucial (1 chance in 100 to 1 in a billion)	1 chance in 10 often the limit
Objectives	Multiple	Maximize present worth or rate of return
Stakeholders' Perspectives	Often conflicting	All want successful firm
Interest Rate	Complicated by nonmonetary benefits	Derived as an opportunity cost or from cost of borrowing

Private firms face the same exposure to foreign currency fluctuations as the DoD but they have more options to mitigate the risk of an unfavorable rate. Globalization and

open markets enables private firms to seek new markets, raw materials, production centers, warehousing, and other supply chain functions in various countries and currencies. Dispersing supply chain functions across countries increases the risk of unfavorable exchange rate changes through transaction and operation exposure (Bodnar, 2014). Increasing forecasting accuracy is also an option when firms cannot mitigate risk through transaction or operation exposures.

Transaction exposure is the exchange rate risk a contract possesses over a well-defined and relatively short time horizon. Firms mitigate the exposure through the use of forward contracts, future contracts, money market hedge, and options (Bodnar, 2014). Forward contracts and future contracts operate in a similar manner; a firm enters an agreement that specifies a price and date at which it can buy a fixed amount of foreign currency. Futures contracts differ in that they are exchange traded requiring initial collateral. Money market hedges use a forward contract to determine the present value of the foreign currency obligation in the home country currency to reduce exchange risk. Lastly, currency options provide the owner the right to buy a currency at a specific quantity, price, and date for an upfront fee.

Operations exposure is the exchange rate fluctuation impact on a firm's business model. While transaction exposure concerns contract instruments, operations exposure focuses on marketing, product pricing, supply chains, and production (Bodnar, 2014). A firm can choose which market to sell in depending on the exchange rate as well as adjust pricing and promotional strategies to offset short term exchange rate fluctuations. For longer term exchange rate fluctuations, a firm may choose to diversify sources of inputs (i.e. the supply chain) in order to manage costs. Locating plants and other production

resources in various countries also allows flexibility in choosing to manufacture product in low cost areas. The mix of production at those locations can then change according to currency fluctuations as needed.

Private firms can choose from a plethora of options; most of the options available to private firms do not apply to the DoD. Currency options and the use of derivatives are prohibited by law (Groshek and Felli, 2000). Appropriations must be obligated in the year of execution for current requirements in order to satisfy the bona fide needs rule (The Judge Advocate General's Legal Center and School, 2014). This precludes the DoD from purchasing options contract during budget formulation. The DoD may use forward contracts because the DoD does not obligate funding until the time of purchase.

Furthermore, stakeholders outside of the DoD control the ability to locate military bases. National priorities, international alliances, and strategic importance outweigh the cost efficiency of locating military bases. Congress, the President, and the State Department influence these decisions alongside DoD recommendations. The lack of available exchange rate mitigation options directs the DoD to employ exchange rate forecasts.

## **Forecasting**

One must understand the elements of forecasting in order to help lower variance between the budgeted exchange rate and the actual exchange rate. In general, forecasting is notoriously complex. A survey on forecasting research uncovered 139 principles in 16 categories (Armstrong, 2001). Forecasting techniques can be subdivided into three categories as shown in Table 2. Forecasting foreign currency exchange rates focus on quantitative methods. Quantitative forecasting requires numerical information about

historical data that one can assume will continue a pattern into the future (Makridakis et al., 1998).

**Table 2 Categories of Forecasting Methods and Examples of Their Application (Makridakis et al. , 1998)**

Forecasting Method	<i>Explanation and Example</i>
Quantitative	<i>Sufficient quantitative data exists</i> Time Series: continuation of historical patterns Explanatory: Understanding the effects of independent variables
Qualitative	<i>Little or no quantitative information is available, but sufficient qualitative knowledge exists</i> Predicting the speed of telecommunications are the year 2036
Unpredictable	<i>Little or no information is available</i> Predicting the effects of interplanetary travel

Generally, the forecasting task can be divided into five areas: formulating the problem, collecting data, selecting methodology, evaluating methodology, and using the forecast.

Formulating a problem requires understanding the need for a forecast and the involvement of responsible parties. A forecast’s necessity derives from the effect the forecast will have on a decision; one should not forecast if the result will not change a decision. Responsible parties ultimately control the decision and must be updated with forecasting results to guide the decision making process.

An understanding of the problem at the beginning directs the type of data required for analysis. Theory guides the search for explanatory variables and may uncover analogous studies. Data, though, must be unbiased and should come from sources without a vested interest in the forecast’s outcome. Other sources of error can come from the procedures used to collect the data as well as measurement error from the instruments (for foreign currency an example of measurement error using only one exchange rate per

day when the rate really floats throughout the trading period). After collecting the data, a formal process removes defects (i.e. erroneous observations) and transforms the data into a useful medium of analysis. Transforming data may be as simple as transcribing paperwork into a digital format or more complex like converting rates into a logarithmic function. Another adjustment prevalent in economics is the seasonality at the time of collection (e.g. seasonally adjusted unemployment figures). Analysts should adjust data according to empirical evidence of seasonality to reduce error in the data (Makridakis et al., 1998).

The type of data collected and purpose of the forecast guide methodology selection. At this point in forecasting, understanding the problem should have led to hypothesized causal relationships. The possible causal relationships inform the analyst of the data required and appropriate methodology for the investigation. The chosen method, or methods, ability to influence the decision at hand must also be considered and communicated to the decision maker. Generally, the use of a simple method is preferred unless prior research identified a more accurate complex method (Allen and Fildes, 2001). Quantitative methods are also generally preferred as they reduce the bias in analysis. If the problem has high uncertainty and questionable data, a qualitative judgmental method may be applied (such as expert opinion or surveys). Incorporating both quantitative and judgmental methods can further assist in weighing data according to importance or selecting quantitative methods. Finally, combining more than one method integrates information and reduces the risk of bias from using a particular method.

After method selection, an evaluation reviews the risks and uncertainty within the process. The analyst should test the assumptions of each method to confirm the validity

of the method to the data and the problem. An independent observer should review the methodology and agree with its logic. If using more than one method, the analyst should compare the results of each method to measure the error between each method. Different scales of measurement as well as outliers affect variability in the results of one method as opposed to the other.

Using forecasts is the final step. After completing the previous steps, the analyst should present findings in a format tailored to the decision maker. Assumptions, data, and methods must be clearly presented to reduce the appearance of bias and give confidence in the forecast. Using the forecast on a regular basis allows the analyst to learn how to improve the forecast. Assimilating the improvements, an analyst can improve the forecast and reduce variability.

### **Economic Forecasting**

What works in an experimental setting (holding all other variables constant beyond the independent variables) can produce failures when applied to real world situations (Meese and Rogoff, 1983). While it is known as the “dismal science,” economics gives insights into the allocation of limited resources such as time and money. Forecasting, then, is a natural fit in economics as firms want to maximize the use of their limited resources.

Economists began using forecasting as the combination of statistical analysis and economic theory (Allen and Fildes, 2001). The main principle is to use a simple model to describe the relationship between dependent variables and a relatively small set of independent variables. The favored test regarding the usefulness of a simple model is

whether the model can predict relatively accurate results with out-of-sample data (data not used in formulating the model). Testing with out-of-sample data may not give the “true” model, since any simplified model derived from a data set is a misspecification of the data. Estimating the causal independent variables induces prediction error, even with a data set created with known variables and estimated parameters (Gilbert, 1995).

Another test is not how well the model predicts the dependent variable but in predicting when the dependent variable will change from growth to decline or decline to growth (Engel et al., 2007). With that said the standard remains out-of-sample validity of the model’s predictions since this thesis is interested in predicting a budget rate and not the timing of foreign currency exchange rate increases or decreases in value against the US dollar.

Economists generally use a regression model to predict the dependent variable (Allen and Fildes, 2001). The use of Vector Auto Regression (VAR) and Error Correcting Models (ECM) are prominent in economics. VAR uses economic theory to narrow the number of independent variables required for predicting a dependent variable. VAR then measures the interdependencies of the independent variables to the dependent variables across a time series (a sequence of data points in temporal order). ECM ascertains a dependent variable’s equilibrium value and estimates the rate at which the dependent variable returns to equilibrium through the influence of independent variables. The equilibrium can be a value or the rate at which the dependent variable changes (a vector). Both models assume constancy of exogenous variables throughout the time series and are limited by the data provided in formulating the model (in-sample data). These two models contain subsets for particular areas within economics. The focus of

this research is for foreign currency exchange rate forecasting and will focus on models pertaining to that subset.

### **Foreign Currency Exchange Rate Forecasting**

The Meese and Rogoff paper casts a shadow over the ability to predict exchange rates as tested against out-of-sample data. They found the Random Walk model (the dependent variable is a function of the last observation plus an error term) performs no worse than the univariate time series models, unconstrained VAR, or candidate structural models in forecasting real exchange rates (Meese and Rogoff, 1983). The paper states the last known observation is just as likely a predictor of future values as using other independent variables. Their conclusion demonstrated the impracticality of using independent variables based on money supply, demand, and commodity prices to predict exchange rates. The findings from 1983 still hold true as forecasts based on ex ante (before the exchange rate is set) expected changes perform poorly (Evans and Lyons, 2005). Some have suggested the use of the root mean square error (RMSE) to measure forecasting accuracy is incorrect, but measuring by time-varying coefficients with the same data do not overturn Meese and Rogoff's conclusion (Moosa and Burns, 2014).

Judging forecast methodology through other means than the actual value against predicted value leads to different conclusions about the effectiveness of exchange rate forecast models. Moosa and Burns demonstrate that a few models outperform the Random Walk when measuring forecast accuracy in terms of rate direction and in terms of profitability (Moosa and Burns, 2014). Engel, Mark, and West emphasize the Random Walk benchmark is improper as models should have low predictive power of this type

(Engel et al., 2007). They further state models incorporating news about macroeconomic fundamentals (for example GDP growth) may well account for observed exchange rate volatility. Lastly, the authors use expected present values from survey forecasts and demonstrate an increase of out-of-sample forecasting power through panel estimation and long-horizon forecasts. New forecasting methods also increase the accuracy of modeling. The short-horizon predictive ability, using Bayesian model averaging, shows large gains over the Random Walk benchmark (Corte et al., 2008). Artificial neural networks (self-learning algorithms trained on historical data) show robust exchange rate predictions in midst of outliers (Majhi et al., 2012). The results of the above research lead to the possibility of positive results compared to the Meese and Rogoff original study.

Auction theory provides another method of forecasting exchange rates. The international exchange market for currencies acts as an auction, and the future options on currencies may give insight into forecasting the exchange rate. If there are many traders for the currency, the option market can aggregate each trader's estimated price on the underlying asset (Pendorfer and Swinkels, 2000). The option price then acts as a signal of the market's approximation for the currency's future exchange rate. If the options price mirrors the actual exchange rate well enough, it may be possible to use the options price as the budgeted rate in the DoD budget.

### **Foreign Currency Exchange Rate Forecasting in the DoD**

In fiscal year 1979, Congress authorized an appropriation for the DoD to establish a centrally managed allotment (CMA) to alleviate the adverse effect of significant currency fluctuations in authorized operations and maintenance (O&M) and military

personnel appropriations (Department of Defense, 2011). The Foreign Currency Fluctuations, Defense (FCF, D) account provided the control structure to account for all transfers of net gains and losses incurred throughout the execution year. In fiscal year 1987, Congress authorized an additional appropriation, Foreign Currency Fluctuations, Construction, Defense (FCF, C, D), for the family housing and military construction appropriations. Prior to the FCF, D and FCF, C, D, the DoD could not use the additional budget authority from previous high estimates to cover the cost of current deficits. Current deficits would require transferring funding from other programs or requesting additional funds from Congress.

In 1998, Gerald M. Groshek and James C Felli of the Naval Postgraduate School examined two methods of reducing risk in the DoD to foreign currency fluctuations against the status quo (Groshek and Felli, 2000). The authors applied forward foreign exchange contracts and currency options against the naïve based approach (the status quo) from 1985 to 1998. Forward foreign exchange contracts allow the DoD to determine the required budgeted amount by applying forward rates to the estimated foreign amounts. The authors utilized Air Force O&M commitments as the budgeted amount in US dollars and Eurocurrency interest rates as the forward rates at the time of budget formulation. Under the currency options approach, the authors considered call options with an at-the-money forward strike prices. The naïve based approach simply picked an observed foreign exchange rate at some point in the budget formulation as the budgeted rate. Using the above methods, the DoD could expect a cost reduction of 3.5% of current outlays with forward contracts and 6.4% reduction using options with a 2.9% upper bound on option premiums (the premium is the cost of buying an option) over the

naïve approach. The authors recommend the forward contracts since the option contracts require authorization from Congress.

Fiscal law prohibits the use of authorized funding in time periods other than the stated period in the appropriation (The Judge Advocate General's Legal Center and School, 2014). Operations and maintenance (O&M) funding is available for one year only; the government can only incur obligations against the O&M appropriation from 1 October to 30 September of the year of appropriation. To use forward rates, the US Treasury must authorize the use of a forward contract as stated in volume 5 of the Financial Management Regulations (Department of Defense, 2011). The treasury would need to have a forward pricing rate agreement across fiscal years between the US government and the foreign government or private firm for the disbursement to be made at the rate determined by the forward rate method.

The GAO investigated the DoD's foreign currency forecasting methodology in 2005 (Government Accountability Office, 2005). Despite Groshek and Felli's findings, the DoD still used the naïve based approach by using an observed rate from the Wall Street Journal in the budget process. In 2005, the DoD changed methodologies to a statistical based approach after considering the method of forecasting applied in other federal agencies, a commercial company to forecast, and various statistical methods. The statistical method, center-weighted-average, allowed universal replication without subjective judgment (Secretary of the Air Force - Financial Management Directorate of Economics and Business Management, 2010). Based on historical and current data, the chosen statistical method weighted the five year average exchange rate with the exchange rate 12 months prior. Weights range from 0 to 1 with a weight of 0 implying a budgeted

rate equal to the rate 12 months previous. Excel's Solver optimizes the weights by minimizing the sum of squared errors (SSE) between forecasted and actual rates over the previous 60 months. By weighing each rate equally at the start, the process creates a forecast for each month over the previous 60 months and calculates the SSE. Solver then adjusts the weight and recalculates the SSE over the previous 60 months. The process is repeated until Solver discovers the minimum SSE. Lastly, the DoD reviews the forecasts for long term trends in developing the five year average (i.e. the Kuwaiti Dinar's pegging to a basket of currencies in May, 2007). The GAO approved of the center-weighted-average approach as it, "Provides a straightforward statistical calculation of historical data that can be easily replicated with no hidden assumptions and is not dependent on subjective judgment (Government Accountability Office, 2005)."

Another paper researched a future exchange rates predictor for the DoD in 2013 (Freund and O'Neal, 2013). The authors compared the center-weighted-average approach to five different models: moving average, prior year average, trend-lines, extending current rates, and a multivariate model. The moving average, prior year average and trend line incorporated historical exchange rates from 1, 3, 5, and 10 years in the past while extending the current rate used the recent 12 month average. The multivariate model incorporated historical exchange rate with economic factors to include historic gross domestic product (GDP), consumer price index (CPI), unemployment rates, and economically active population rates. Applying multiple regressions to account for covariance and statistical significance, the authors created a model for each currency exchange rate from the economic factors. The researchers compared all five models to the center-weighted-average by the mean squared error (MSE) between the forecasted

and actual exchange rates from 1999 to 2012. Of the five models, the one year prior year average produced the minimal MSE when used across all currencies. Each currency, though, possessed a best specific model (i.e. the three year trend line had the lowest MSE for the Euro and Denmark Kroner while the five year 10 year prior year average was best for the South Korean Won). The paper recommended using the one year prior year average for formulating the fiscal year 2015 budgeted rate.

## **Summary**

This research aims to improve the DoD budgeting process for foreign exchange rates. Budget processes, timelines, and decision authority differ from standard business firm models, but the need for accurately forecasting future requirements remains. Fiscal law precludes the DoD from many of the strategies available for private firms to mitigate exposure to foreign currency fluctuations. Forecasting, although complicated, follows five basic steps: formulating the problem, collecting data, selecting methodology, evaluating methodology, and using the forecast. Economic forecasting is a subset of forecasting that has traditionally used theory to define independent variables capable of predicting dependent variables and measures the success by out-of-sample variance. For exchange rates, the literature revealed the forecasting potential of theoretical independent variables is no better than using a Random Walk model. Meese and Rogoff's conclusion has had lasting effects throughout the decades. Some researchers have chosen to frame the problem in a new light and use new statistical methods to forecast exchange rates. A few have shown promise over the short term using artificial neural networks, shortening the time frame for a forecast, or using an aggregation of surveys and future expectations.

Others still claim the Random Walk benchmark is improper as the models do explain some variability. From the above research foundation, a few chosen methodologies will be tested for use in the DoD environment. The DoD specific research offers a starting point from which to judge new methodologies.

### **III. Methodology**

Chapter 3 seeks the optimum method to forecast foreign exchange rates for the DoD budget. The chapter begins by defining the data sources and the suitability of the data to predicting exchange rates for the DoD. The chapter then explains the six different methods (including status quo) before describing how those methodologies will be compared. A summary of the chapter briefly reviews the material covered in this chapter.

#### **Data Sources**

There are five sources of field data for this thesis: the Federal Reserve Foreign Exchange Rate – H.10, the Global Insight forecasts, the Chicago Mercantile Exchange (CME) as taken through the website Quandl, the adjusting rates of exchange from the USD, Comptroller, and the long term interest rates as reported by the Organization for Economic Co-operation and Development (OECD). The Federal Reserve Foreign Exchange Rate – H.10 is a weekly report providing the exchange rates in foreign currency units per U.S. dollar for each day of the previous week (Board of Governors of the Federal Reserve System, 2015). Table 3 is a sample of the report taken from the Federal Reserve Board’s Economic Research & Data website. Because the Federal Reserve produces the report on a weekly basis, the data were combined into one spreadsheet. The Federal Reserve data are pertinent to the research, as the rates represent the spot rate used at the time of disbursement of funds from the DFAS.

**Table 3 Sample H.10 Report on 15 Sep 2014**

**Release Date: September 15, 2014**

Foreign Exchange Rates -- H.10 Weekly  
(Rates in currency units per U.S. dollar except as noted)

COUNTRY	CURRENCY	Sep. 8	Sep. 9	Sep. 10	Sep. 11	Sep. 12
*AUSTRALIA	DOLLAR	0.9300	0.9207	0.9153	0.9115	0.9047
BRAZIL	REAL	2.2498	2.2825	2.2956	2.2882	2.3301
CANADA	DOLLAR	1.0933	1.1010	1.0954	1.1032	1.1075
CHINA, P.R.	YUAN	6.1400	6.1362	6.1284	6.1295	6.1344
DENMARK	KRONE	5.7492	5.7661	5.7660	5.7535	5.7446
*EMU MEMBERS	EURO	1.2948	1.2909	1.2908	1.2936	1.2955
HONG KONG	DOLLAR	7.7504	7.7502	7.7503	7.7505	7.7505
INDIA	RUPEE	60.2900	60.6000	60.9500	60.9300	60.9500
JAPAN	YEN	105.6500	106.3200	106.7600	106.8700	107.2400
MALAYSIA	RINGGIT	3.1730	3.1885	3.2000	3.1920	3.1960
MEXICO	PESO	13.0755	13.2040	13.2090	13.2120	13.2485
*NEW ZEALAND	DOLLAR	0.8285	0.8245	0.8245	0.8187	0.8156
NORWAY	KRONE	6.3123	6.3503	6.3509	6.3753	6.3617
SINGAPORE	DOLLAR	1.2564	1.2627	1.2626	1.2630	1.2631
SOUTH AFRICA	RAND	10.7780	10.9245	10.9265	10.9545	10.9930
SOUTH KOREA	WON	1024.0000	1034.0500	1034.2000	1035.9000	1034.9000
SRI LANKA	RUPEE	130.1800	130.1800	130.2000	130.2500	130.2500
SWEDEN	KRONA	7.0877	7.1136	7.0987	7.1179	7.1326
SWITZERLAND	FRANC	0.9317	0.9348	0.9382	0.9349	0.9337
TAIWAN	DOLLAR	29.9300	29.9700	30.0000	30.0200	30.0400
THAILAND	BAHT	32.0400	32.0900	32.1400	32.1900	32.2000
*UNITED KINGDOM	POUND	1.6141	1.6088	1.6134	1.6225	1.6243
VENEZUELA	BOLIVAR	6.2842	6.2842	6.2842	6.2842	6.2842
<b>Memo:</b>						
UNITED STATES	DOLLAR					
1) BROAD	JAN97=100	104.0397	104.5099	104.5065	104.5710	104.7427
2) MAJOR CURRENCY	MAR73=100	79.2266	79.6254	79.5726	79.6552	79.7607
3) OITP	JAN97=100	130.2691	130.8061	130.8657	130.9038	131.1510

ND = No data for this date.

For more information on exchange rate indexes for the U.S. dollar, see "Indexes of the Foreign Exchange Value of the Dollar," Federal Reserve Bulletin, 91:1 (Winter 2005), pp. 1-8 ([http://www.federalreserve.gov/pubs/bulletin/2005/winter05\\_index.pdf](http://www.federalreserve.gov/pubs/bulletin/2005/winter05_index.pdf)). Weights for the broad index can be found at <http://www.federalreserve.gov/releases/H10/Weights>; weights for the major currencies index and the other important trading partners (OITP) index are derived from the broad index weights. The most recent annual revision of the currency weights and dollar indexes took effect with the May 2010 release of this report. The source for exchange rates not listed in the table above but used in the calculation of the broad and OITP indexes is Bloomberg L.P.

\* U.S. dollars per currency unit.

The second set of data was produced by a private company, IHS Global Insight (IHS Inc, 2015). The DoD uses the company's materials price forecasts in developing cost estimates for procurement or operations and support (e.g. shipbuilding) (Horowitz et al., 2012). This company also provides an analysis service of how world economic events, trends, and developments affect businesses and countries to include forecasts of foreign exchange rates. Using past forecasts, this research compared the actual to

predicted exchange rates from the company. Forecasts from the company, though, do not provide insight into the company’s methodology, which may not be sufficient for a GAO inquiry. Table 4 is an example of the 2004 fourth quarter forecast for the Japanese Yen per US dollar by quarter (highlighted) and annual forecast in Table 5.

**Table 4 Global Insight Japanese Yen to US Dollar Quarterly Forecast**

Table IC6 Japan (Fourth Quarter 2004 Forecast)															
<a href="#">Table of Contents</a>															
	2004:2	2004:3	2004:4	2005:1	2005:2	2005:3	2005:4	2006:1	2006:2	2006:3	2006:4	2007:1	2007:2	2007:3	2007:4
<b>Aggregate Indicators (1997=100)</b>															
Consumer Price Index	97.5	97.6	97.5	97.5	97.6	97.7	97.8	98.1	98.3	98.7	99.1	99.4	99.8	100.3	100.7
%	-0.7	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4
Producer Price Index	95.5	95.0	94.6	94.4	94.1	94.0	93.9	93.8	93.9	93.9	94.0	94.2	94.4	94.6	94.9
%	0.2	-0.5	-0.4	-0.3	-0.2	-0.2	-0.1	-0.1	0.0	0.1	0.1	0.2	0.2	0.3	0.3
Industrial Production	102.0	102.8	103.2	103.3	103.5	103.6	103.8	104.0	104.2	104.5	104.7	105.0	105.2	105.4	105.7
%	3.2	0.7	0.4	0.1	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2
<b>U.S. Dollar Exchange Rate</b>	<b>109.7</b>	<b>107.1</b>	<b>104.2</b>	<b>102.8</b>	<b>101.9</b>	<b>100.9</b>	<b>100.0</b>	<b>99.1</b>	<b>98.5</b>	<b>98.1</b>	<b>97.8</b>	<b>97.7</b>	<b>97.5</b>	<b>97.3</b>	<b>96.9</b>
%	2.4	-2.4	-2.6	-1.4	-0.8	-1.0	-0.9	-0.9	-0.6	-0.4	-0.3	-0.1	-0.2	-0.3	-0.3

**Table 5 Global Insight Japanese Yen to US Dollar Annual Forecast**

Table IA6 Japan (Fourth Quarter 2004 Forecast)													
<a href="#">Table of Contents</a>													
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>Aggregate Indicators (1997=100)</b>													
Consumer Price Index	98.4	98.1	97.7	97.7	98.5	100.1	101.9	103.9	106.1	108.5	111.0	113.6	116.3
%	-0.9	-0.2	-0.5	0.0	0.9	1.6	1.8	2.0	2.1	2.2	2.3	2.3	2.4
Producer Price Index	95.7	95.0	95.1	94.1	93.9	94.5	95.7	97.1	98.8	100.6	102.4	104.1	105.8
%	-2.1	-0.8	0.1	-1.1	-0.2	0.7	1.3	1.5	1.7	1.9	1.8	1.6	1.6
Industrial Production	92.3	95.3	101.7	103.6	104.4	105.3	106.3	107.4	108.6	109.9	111.2	112.6	113.9
%	-1.3	3.3	6.8	1.8	0.8	0.9	0.9	1.0	1.1	1.2	1.2	1.2	1.2
<b>U.S. Dollar Exchange Rate</b>	<b>125.2</b>	<b>115.9</b>	<b>107.1</b>	<b>101.4</b>	<b>98.4</b>	<b>97.3</b>	<b>95.9</b>	<b>94.4</b>	<b>93.1</b>	<b>92.2</b>	<b>91.5</b>	<b>91.0</b>	<b>90.8</b>
%	3.0	-7.4	-7.7	-5.3	-3.0	-1.1	-1.5	-1.6	-1.4	-1.0	-0.8	-0.5	-0.3

The Quandl data contains daily futures prices on currencies from the CME. Table 6 gives an example of data containing the open, high, low, and settle prices for the contract as well as the volume of contracts traded and the bids amount of contracts available from the previous day. The futures contract prices differ according to time and contract expiration day. In order to create a historical futures series, the contracts must be combined into a continuous futures contract by combining. Combining the individual futures contracts (or ‘rolling’ the contracts) can follow different rules depending on the analysis. Economic forecasting uses the “first day of month” and “calendar-weighted

rolling” rules. The “first day of month” roll method combines futures on the first day of the contract delivery month or on the contract end date, whichever is sooner (Quandl, 2015). The “calendar-weighted rolling” is a price adjustment to negate the discontinuities in contract prices of the successive underlying futures contracts. The method allows for transitioning from one contract to the next over 5 days where the first contract is weighed 100% on day 1 and 0% on day 5. The opposite is true for the second contract. The percent shifts by 20% each day between the first and second contract. Using the “first day of month” and “calendar-weighted rolling rules” provides a continuous data set for analysis. This research used the average of daily settlement prices to forecast exchange rates.

**Table 6 Example of Euro Futures Data Pulled from Quandl**

Date	Open	High	Low	Settle	Volume	Prev. Day	Open Interest
2014-11-06	1.248	1.2537	1.2376	1.239	346745		457437
2014-11-05	1.2553	1.2571	1.246	1.2483	250553		456281
2014-11-04	1.2492	1.2581	1.2491	1.256	217552		452793
2014-11-03	1.2515	1.2515	1.2442	1.2494	224986		452251
2014-10-31	1.2616	1.2619	1.2489	1.253	355317		443446
2014-10-30	1.2639	1.2643	1.2548	1.2616	248190		437202
2014-10-29	1.2737	1.2775	1.2636	1.2649	190485		434187
2014-10-28	1.2702	1.2769	1.2688	1.2739	176909		435325
2014-10-27	1.2677	1.2727	1.2669	1.2712	142141		435029
2014-10-24	1.265	1.27	1.2638	1.2668	145110		438942
2014-10-23	1.265	1.268	1.2617	1.2653	168530		439199
2014-10-22	1.2717	1.2744	1.2641	1.2648	205927		433426

Adjusting exchange rates are published monthly on the USD Comptroller website (Office of the Undersecretary of Defense (Comptroller), 2014). The publication lists the budgeted rate for the fiscal year in question along with the monthly foreign currency rate as the adjusting rate. The budgeted rate column provides the status quo estimate and the adjusting rate column provides the actual rates for the study period between FY06 to

FY14. The adjusting rate serves as the actual rate in calculating the error for all the methodologies in the FY06-FY14 time period. For the longer periods (FY79-FY12) the arithmetic mean of daily exchange rates from the FRB H.10 report supply the adjusting rates. Appendix F demonstrates the adjusting rates from the monthly USD currency fluctuation publication and the H.10 average monthly rates are statistically the same. Table 7 below is an example of the USD monthly report on currency fluctuations.

**Table 7 USD Comptroller Monthly Report on Currency Fluctuations**

ADJUSTING RATES OF EXCHANGE FOR "FOREIGN CURRENCY FLUCTUATIONS, DEFENSE," "FOREIGN CURRENCY FLUCTUATIONS, CONSTRUCTION" AND "DEFENSE MILITARY CONSTRUCTION AND FAMILY HOUSING" For Month Ended 9/30/04							
COUNTRY	MONETARY UNIT	O&M (DOD) FY 2004 BUDGET RATE		MILCON & FH FY 2004 BUDGET RATE		ADJUSTING RATE **	
		U.S. DOLLARS FOR ONE UNIT OF FOREIGN CURRENCY	UNITS OF FOREIGN CURRENCY FOR ONE U.S. DOLLAR	U.S. DOLLARS FOR ONE UNIT OF FOREIGN CURRENCY	UNITS OF FOREIGN CURRENCY FOR ONE U.S. DOLLAR	ADJUSTING RATE (IN U.S. DOLLARS)	ADJUSTING RATE (IN FOREIGN CURRENCY)
		BELGIUM	FRANC	0.0240346	41.6066	0.0240346	41.6066
DENMARK	KRONE	0.1282117	7.7996	0.1282117	7.7996	0.1670007	5.9880
EUROPEAN UNION*	EURO	0.9695559	1.0314	0.9695559	1.0314	1.2436264	0.8041
FRANCE	FRANC	0.1478087	6.7655	0.1478087	6.7655		
GERMANY	DEUTSCHE MARK	0.4957367	2.0172	0.4957367	2.0172		
GREECE	DRACHMA	0.0028454	351.4496	0.0028454	351.4496		
ITALY	LIRA	0.0005007	1,997.0690	0.0005007	1,997.0690		
JAPAN	YEN	0.0079688	125.4900	0.0079688	125.4900	0.0090901	110.0100
NETHERLANDS	GUILDER	0.4399666	2.2729	0.4399666	2.2729		
NORWAY	KRONE	0.1309003	7.6394	0.1309003	7.6394	0.1490002	6.7114
PORTUGAL	ESCUDO	0.0048361	206.7771	0.0048361	206.7771		
SINGAPORE	DOLLAR	0.5544159	1.8037	0.5544159	1.8037	0.5936127	1.6846
SOUTH KOREA	WON	0.0007968	1,255.0000	0.0007968	1,255.0000	0.0008684	1,151.5400
SPAIN	PESETA	0.0058271	171.6105	0.0058271	171.6105		
TURKEY	LIRA	0.0000006	1,694,915.0000	0.0000006	1,694,915.0000	0.0000007	1,492,537.0000
UNITED KINGDOM	POUND	1.5344484	0.6517	1.5344484	0.6517	1.8122508	0.5518

\* On January 1, 1999, the euro became the official currency of 11 member states of the European Union with a fixed conversion rate against their national currencies. The euro was adopted by Greece on January 1, 2001. The value of the euro fluctuates according to market conditions against the dollar and all other currencies. Euro notes and coins were introduced to replace national notes and coins on January 1, 2002. The above foreign currency budget rates are based on PBD 660, dated December 9, 2002.

\*\* Adjusting exchange rates for the individual euro-area currencies are no longer provided. Use the fixed conversion rates as follows: 1 Euro = 40.3399 Belgian Francs, 6.55957 French Francs, 1.95583 German Marks, 1936.27 Italian Lire, 2.20371 Netherlands Guilders, 200.482 Portuguese Escudos, 166.386 Spanish Pesetas, 340.750 Greek Drachmas.

Lastly, the OECD provided the long term interest rates required for the forward rates methodology (OECD, 2015). OECD data were available from the online database StatExtracts and provided the long term interest rates as a percent per annum from the monthly monetary and financial statistics. An example of the data is shown in Table 8.

**Table 8 OECD Long Term Interest Rates, Percent Per Annum Example**

Subject		Long-term interest rates, Per cent per annum				
Frequency		Monthly				
Time		Sep-2004	Oct-2004	Nov-2004	Dec-2004	Jan-2005
<b>Country</b>						
Denmark	i	4.3755	4.229	4.0932	3.8462	3.7348
Japan	i	1.393	1.483	1.452	1.397	1.31
Korea	i	4.14	4.05	3.96	3.85	4.42
Norway	i	4.23	4.19	4.05	3.94	3.9
United Kingdom	i	4.9109	4.7683	4.6903	4.5316	4.5419
United States	i	4.13	4.1	4.19	4.23	4.22
Euro area (18 countries)	i	4.114	3.9794	3.8687	3.6893	3.6336

## Methods

This research compared six techniques for determining the budgeted foreign exchange rate. They are the forecasts from Global Insight, the status quo, forward rates, ARIMA, the Random Walk model, and futures contract settlement prices. Each technique provides a different approach to forecasting an exchange rate or highlighted in the literature (the Random Walk model is a special type of ARIMA).

## Global Insight

Global Insight provides a web-based application from which to view the company's forecasted foreign exchange rates. Included in this application are archived tables from past forecasts. Global Insight publishes forecasts quarterly with quarterly forecasts two years from the published date and annual forecasts nine years from the published date. This thesis applied the annual forecasts as a simulated budgeted rate and compares that rate with the actual monthly rates of the year in question. For example, the FY06 Japanese Yen forecast derived from Table 5 used the 2005 annual exchange rate forecast as the Global Insight 1 year forecast, the 2006 annual exchange rate forecast as

the Global Insight 2 year forecast, and the mean of the two as the Global Insight 1-2 year average forecast. This is done for each year and currency in the forecast period.

### **Status Quo**

The current method to determine the budgeted rate consists of a center-weighted-average technique. This technique pulls the average monthly exchange rate for the past five years and the exchange rate 12 months prior from the Federal Reserve's H.10 foreign exchange report. Each of these is weighted equally and combined to form a budgeted exchange rate. The next step is to calculate the forecast error for the five year average and the rate 12 months prior. The forecast error is the sum of squared errors (SSE) between the forecasted rate and the actual rate from previous forecasts. The formula is

$$SSE = \sum (R_{Forecasted} - R_{Observed})^2$$

where  $R_{Forecasted}$  is the forecasted exchange rate and  $R_{Observed}$  is the actual exchange rate. The summation is over from the most recent observed exchange rate to 60 months previous (e.g. from September 2005 to August 2010). To minimize the forecast error, the weights of the five year and 12 months prior are determined by Excel's add-in Solver. Solver optimizes the weight to minimize the forecast error, the dependent variable, by iteratively changing the weights, as the independent variables. Finally, the results are reviewed for any long term trends or changes to the currency. Adjustments are made to account for fundamental changes (e.g. changing the peg of the Kuwaiti Dinar from the US dollar to a basket of currencies in May 2007 caused the five year average to be a three average in 2010).

## Forward Rate

Groshek and Felli found the use of forward contracts can reduce expected costs on the order of 3.5% rather than using a naïve approach (Groshek and Felli, 2000). Their approach is used in this research to compare with the other methods in validating whether forward rate contracts should be used in mitigating currency exchange risks. The forward rate approach begins by determining the total US dollar equivalent of the DoD's foreign commitments by applying forward rates to the estimated foreign currency requirement. The technique assumes the amount budgeted for foreign currency equals the amount liquidated. Next, the technique calculates the difference in values between using the former naïve based approach and the forward rates based approach (represented as  $V_N^F$ ) with the following equation:

$$V_N^F = \sum_{j=1}^C \sum_{k=1}^T S_k^j \left\{ r_B^j \left( 1 + \frac{k(1-\delta)(i_B^0 - i_B^j)}{T} \right) - r_{L_k}^j \right\}$$

$C$  is the number of foreign currencies in the analysis assigned to an index from 1,2,...,C, and  $T$  designates the number of periods in the budget cycle.  $S_k^j$  is the sum of money in currency  $j$  (the US is  $j=0$ ) the DoD must liquidate at the end of period  $k$ . The budgeted spot rate for country  $j$  is  $r_B^j$  while the liquidation spot rate at the end of period  $k$  is  $r_{L_k}^j$ . The variable  $\delta$  represents the annual discount rate. The difference in the annual interest rate between the US ( $j=0$ ) and country  $j$  is  $(i_B^0 - i_B^j)$ . Interest rates came from *The Economist* in weekly observations. The authors then completed 25,000 Monte Carlo simulations to judge the effectiveness of the model.

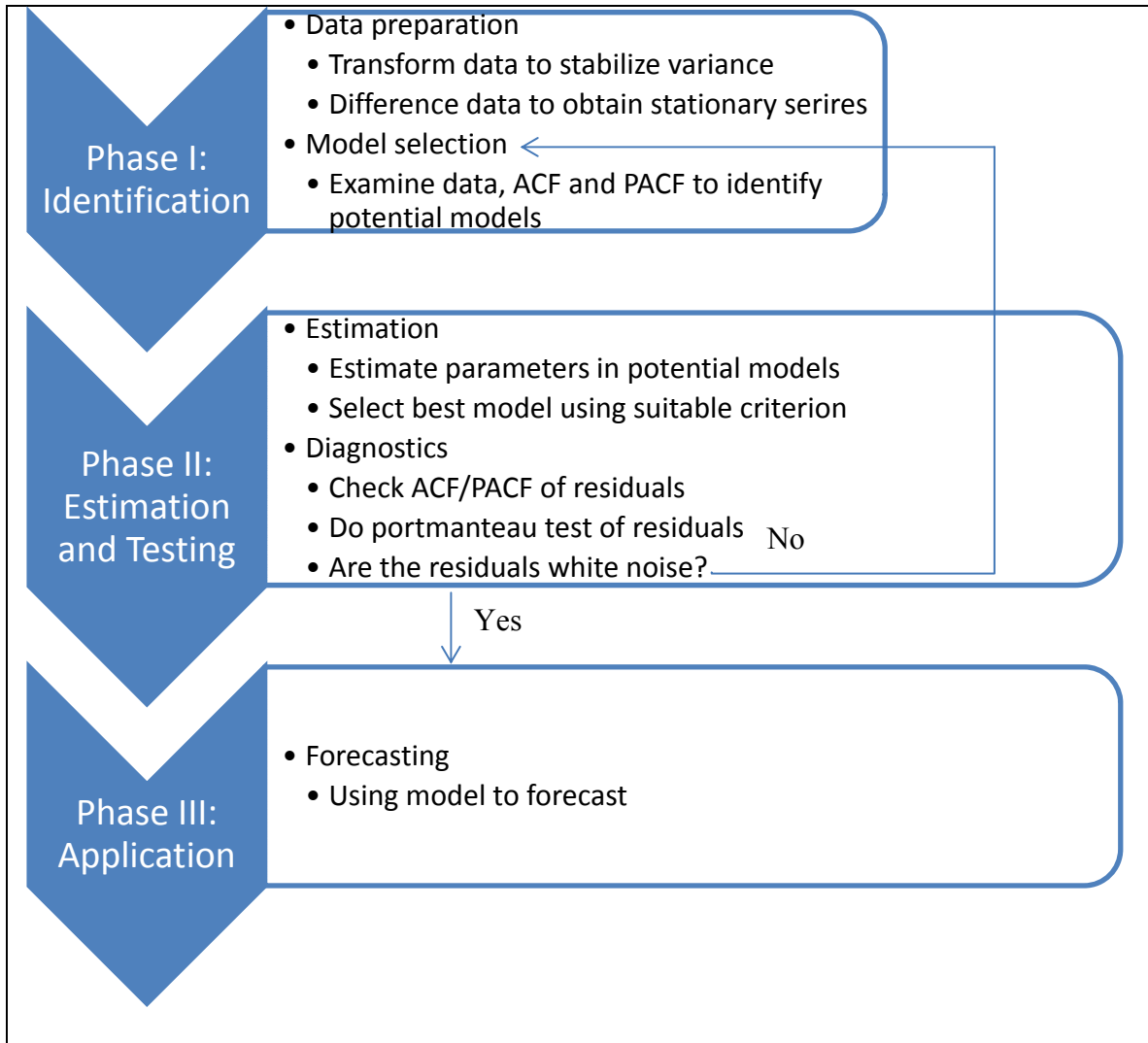
This research uses a less complex version for calculating forward rates due to not having the amount of funding required for each year in our study. The following equation was employed to calculate the forward exchange rate used for the budgeted rate:

$$r_j = r_K^{j=0} \frac{1 + i_j}{1 + i_{j=0}}$$

The equation gives the forward exchange rate,  $r_j$ , for country  $j$  using the US dollar spot rate,  $r_K^{j=0}$ , in annual terms of year  $k$  and the interest rate,  $i_j$ , of country  $j$  in the month of December before the fiscal year of interest (Feenstra and Taylor, 2008). As an example, for FY06 the Euro forward rate is 0.720868049 as calculated with an  $r_K^{j=0}$  of 0.803988 Euro to US dollars annual exchange rate from the FRB H.10 report, an  $i_j$  of 3.6893 and a  $i_{j=0}$  of 4.23 as the long-term interest rates per annum in December from the OECD monthly monetary and financial statistics dataset.

## **ARIMA**

The ARIMA method integrates an auto regressive, moving average, and differencing parameters to predict future points in a time series. Figure 3 represents the Box and Jenkins process for applying a univariate, time series ARIMA model. It encompasses three phases: identification, estimating and testing, and application.



**Figure 3 Box-Jenkins process for time series modeling (Makridakis et al, 1998)**

Identification consists of data preparation and model selection. Under data preparation, the data are arranged in a time series plot and stabilized, meaning the data must be roughly horizontal along the time axis (x-axis). Plotting the data allows assessment on the stationarity of the data. Stationarity is the lack of change in the mean or variance of the data over time. Stationarity is assessed with the Dickey-Fuller test (Makridakis et al., 1998). The test estimates the following regression model

$$Y'_t = \varphi Y_{t-1} + b_1 Y'_{t-1} + b_2 Y'_{t-2} + \dots + b_p Y'_{t-p}$$

with  $Y'$  as the differenced series  $Y_t - Y_{t-1}$ . If  $Y_t$  is stationary, then the estimated value of  $\varphi$  will be negative. A  $\varphi$  value close to zero means  $Y_t$  needs differencing. Ordinary least squares are used to estimate  $\varphi$  from the regression model. The autocorrelation function (ACF) and partial autocorrelation function (PACF) also test stationarity. The ACF gauges how successive  $Y$  values relate to each other and is calculated by:

$$r_k = \frac{\sum_{t=k+1}^n (Y_t - \bar{Y})(Y_{t-k} - \bar{Y})}{\sum_{t=1}^n (Y_t - \bar{Y})^2}$$

PACF removes the effects of other time lags in the time series to measure the degree of association between  $Y_t$  and  $Y_{t-k}$ . PACF's formula is:

$$Y_t = b_0 + b_1 Y_{t-1} + b_2 Y_{t-2} + \dots + b_k Y_{t-k}$$

To show stationarity, the ACF and PACF quickly converge on zero. Should the data appear non-stationary, differencing the data may induce stationarity in the mean. Below is the equation for differencing:

$$Y'_t = Y_t - Y_{t-k}$$

Stationarity in the variance can be achieved by transforming the data through a logarithmic or power function. After achieving stationarity, the ACF and PACF are examined for patterns. The patterns may indicate choosing a model for seasonality, auto regression, moving averages, or a mixture. Parameters for the selected are then estimated for the chosen model using the method of least squares. The ARIMA general equation is

$$(1 - \varphi_1 B)(1 - B)Y_t = c + (1 - \theta_1 B)e_t$$

This is an ARIMA(1,1,1) model with  $\varphi_1$  as the auto regressive parameter,  $\theta_1$  as the moving average parameter, and  $(1-B)$  as the differencing parameter.  $B$  represents the lag

operator to incorporate the previous time series element ( $BY_t = Y_{t-1}$  for all  $t > 1$ ). The  $e_t$  variable is an error term and is assumed to be independent and identically distributed along a normal distribution with a mean of zero. The constant,  $c$ , is an overall level for the dependent variable and represents stationarity (the data's mean and/or variance are approximately horizontal along the time axis). The parameter estimates are then tested for significance using the coefficient's standard error. Standard error analysis provides a P-value from which we can calculate statistical significance (a two-sided test was used with an  $\alpha = 0.05$ ). Given the parameter estimates are statistically significant, a diagnostic analysis is done on the ACF/PACF and portmanteau residuals to check for "white noise." The ACF and PACF residuals are plotted and scaled so that variance equals one. Any residuals less than -3 or greater than 3 are outliers. A portmanteau test is an additional analysis of residuals. The portmanteau test uses the Box-Pierce test Q statistic:

$$Q = n \sum_{k=1}^h r_k^2$$

where  $h$  is the maximum lag being considered and  $n$  is the number of observations in the series (Makridakis et al, 1998). If the ARIMA model's residuals are "white noise", then the Q statistic has a chi-squared distribution with  $(h-m)$  degrees of freedom ( $m$  is the number of parameters in the model). A significant test result from the residual diagnostic indicates an inadequate model, and the process revisits the identification step to discern a better ARIMA model. A model that successfully passes the residual diagnostic is ready for forecasting application.

When choosing between ARIMA models, the Akaike Information Criterion (AIC) provides a measure in choosing the most adequate model (Burnham and Anderson, 2004). The AIC is an estimate of the information loss in a model and is calculated by:

$$AIC = -2\text{LogLikelihood} + 2k$$

The term  $k$  is the number of estimated parameters, including intercept and error terms in the model. A lower AIC value guards against information loss and the better the model at estimating (SAS Institute Inc, 2014).

For this research,  $Y_t$  is the forecasted exchange rate of interest and  $t$  is the time period of interest.  $Y_t$  is calculated for a budget forecast rate and compared to the actual rate to calculate the APE. Time-lagged foreign exchange rates make up the explanatory variables for estimating the ARIMA parameters. Annual forecasts were done using the JMP ARIMA model grouping. The model group allow for testing 27 separate ARIMA models for each currency by fiscal year (from ARIMA(0,0,0) to ARIMA (2,2,2) or 3<sup>3</sup> possibilities). The model with the lowest AIC provided the estimate for the budgeted rate. The immediate estimate from the model gave the 1 year estimate while the  $Y_{t+1}$  provided the 2 year estimate. These two estimates were then averaged to arrive at a 1-2 year average estimate as another budgeted rate to test against.

### **Random Walk**

The Random Walk method is a special type of ARIMA model. ARIMA(0,1,0) represents the Random Walk and lacks an autoregressive and moving average parameters but maintains a difference (Nau, 2014). Random Walks can have extended periods of

apparent trends which unpredictably change direction. The mathematical representation is:

$$Y_t = Y_{t-1} + \varepsilon_t$$

where the forecasted value,  $Y_t$ , equals the previous value,  $Y_{t-1}$ , plus an error term,  $\varepsilon_t$ . In order to generate a budgeted rate, the thesis uses historical exchange rates to derive an error term. This error term is added to the last data point for the exchange rate to create a budgeted exchange rate. The immediate estimate from the model gave the 1 year estimate while the  $Y_{t+1}$  provided the 2 year estimate. These two estimates were then averaged to arrive at a 1-2 year average estimate as another budgeted rate to test against.

### **Futures**

The futures method uses the settle rate from Table 6 as the key input in producing a budgeted rate. The intuition of using futures data is the price of the futures contract aggregates the information of the buyers and sellers of the contract in divining the true value of the underlying currency. The data contains daily settle prices, which we averaged annually from January 1<sup>st</sup> to December 31<sup>st</sup> and for the month of October as the budgeted rate for the following fiscal year. For example, the settle prices from 1 January 2004 to 31 December 2004 were averaged for the Futures Annual Mean 1 Year forecast of FY06. The average settle price for the month of October 2004 was used as the Futures October Mean for FY06.

### **Comparison**

The comparison uses the median of the Absolute Percent Error (APE):

$$APE = \left| \frac{X_{actual} - X_{forecasted}}{X_{actual}} \right|$$

To compute the median, the APEs are arranged from lowest to largest APE from  $APE_1$ ,  $APE_2$ , ...,  $APE_n$  before choosing the APE at  $\frac{n}{2}$  as the median. If  $\frac{n}{2}$  does not provide a whole number (e.g. if  $n=9$ ,  $\frac{9}{2} = 4.5$ ), then the average between the two nearest APEs serves as the median (e.g.  $\frac{APE_4 + APE_5}{2}$ ). After calculating the median APE of all six methods, the thesis compares the accuracy of forecasting exchange rates. The lowest median indicates the more accurate method of forecasting as the forecast is relatively closer to the actual rate. Other considerations include the frequency of over estimating against under estimating the actual rate. Ideally, the forecast would match the actual rate although, given the uncertainty of requesting additional funds from Congress during the execution phase, over estimating the required amount of currency is preferred to under estimating

After calculating the APE for each currency by method, the thesis performed a bootstrap analysis on the median to examine whether the methods are from the same population in a statistically significant manner. The bootstrap method resample's each method's APEs with replacement to create a large number of sample statistics (Singh and Xie, 2008). In this case, the median is resample 10,000 times, and find a 95% percentile confidence interval (using  $\alpha=2.5\%$  two-tailed interval). The bootstrap sample medians with confidence intervals are then compared to the other methods by overlapping confidence intervals. Should one method's confidence interval overlap another method, the two methods may come from the same population, and are therefore not significantly different. The JMP<sup>®</sup> program draws on the entire APE distribution as the bootstrap

sample for every bootstrap iteration (i.e. an APE sample of 752 means each bootstrap sample will also have 752 samples but with replacement for each sample taken from the original APE sample) (Ramsey, 2013). Fractional weighting was not used from the original sample APE's distribution for the bootstrap.

Finally, the thesis compares methods by how often the budgeted rate is greater than the actual rate. Each month will show which rate is higher. Assuming a risk adverse DoD, a higher actual rate is preferred. For example, a ¥1,000 requirement in US dollars at 110 Yen per dollar budgeted rate equals a budget of \$9.09. If the actual rate were 100 yen per dollar at the time of execution, the amount needed to cover the requirement is \$10. For each method and each time period, the chance of budgeting too little is calculated by dividing the number of months the budgeted rate is greater than the actual rate by the total number of months in that period. A lower percent decreases chance of budgeting too little.

### **Long Term Study**

Given the small time frame, a broader understanding of the problem required greater data points to reach a firm decision. From FY06 to FY14 only offered nine opportunities to calculate a budgeted rate. Extending the study period to FY91 offered 16 additional years and to FY79 offered 28 additional opportunities at formulating and testing budgeted rates through the various methods. These additional study periods, however, could not use all of the currencies and methods as the FY06 to FY14 study period.

### **Study Period from FY91 to FY12**

The study period from FY91 to FY12 encompasses a total of 22 years, or 22 attempts at forecasting a budgeted rate. While data for some countries extend to this date and beyond, only the Japanese Yen and United Kingdom Pound were examined. These two currencies could be used for each method compared in this time period. Methods for this time period compose of ARIMA, Random Walk, futures, forward rates, and the status quo. The Global Insight database did not extend as far back as FY91. Each methodology forecasted a budgeted rate for FY91 which was then compared to the FRB H.10 monthly averages to derive an APE for that month. The monthly APEs were then averaged for the fiscal year. The mean and median were both recorded in order to compare the different methods. To identify whether methods were statistically different, a bootstrap with 10,000 samplings for each method's median provided a distribution of the median to compare against other methods. Any median distribution overlapping the median distribution of a different method could be considered statistically the same.

### **Study Period from FY79 to FY12**

The study period from FY79 to FY12 encompasses a total of 34 attempts at forecasting a budgeted rate. During this period, the Japanese Yen and United Kingdom Pound are again the currencies examined. The methods compose of ARIMA, Random Walk, futures, and the status quo. The long term interest rates data did not contain the rate for Japan before 1989 precluding the use of the forward rates methodology earlier than FY91. Each methodology forecasted a budgeted rate for FY91 which was then compared to the FRB H.10 monthly averages to derive an APE for that month. The monthly APEs were then averaged for the fiscal year. The mean and median were both

recorded in order to compare the different methods. To identify whether methods were statistically different, a bootstrap with 10,000 samplings for each method's median provided a distribution of the median to compare against other methods. Any median distribution overlapping the median distribution of a different method could be considered statistically the same.

## **Summary**

Using five sets of data sources, the thesis compares six methodologies in order to recommend the one with the lowest median APE. The forecasts from Global Insight are the first of six forecast methodologies tested. The other five include the status quo forward rate, ARIMA, the Random Walk, and futures settlement prices. The thesis contrasts these forecasts against the actual rate to find the monthly APE. The median APE allows comparison of the six techniques in terms of accuracy. Objectivity and complexity of the techniques provide additional criteria to compare the six techniques. After reviewing the APE, simplicity, and risk in budgeting too little, the thesis will recommend a technique for use by the DoD.

## IV. Results

Chapter 4 states the results of applying each methodology. The chapter provides each method's MAPE compared to the status quo, before providing a comparison of all methodologies. A summary of the chapter briefly reviews the material covered in this chapter.

### Global Insight

Table 9 compares the Global Insight 1 year, 2 year, and 1-2 year average forecast rate mean APE (MAPE) against the status quo MAPE from Fiscal Year 2006 to FY 2014 (FY06 to FY14).

**Table 9 Global Insight 1 Year, 2 Year, 1-2 Year Average and Status Quo MAPE for FY06 - FY14 and Probability of Budgeted Rate Greater than the Adjusted Rate**

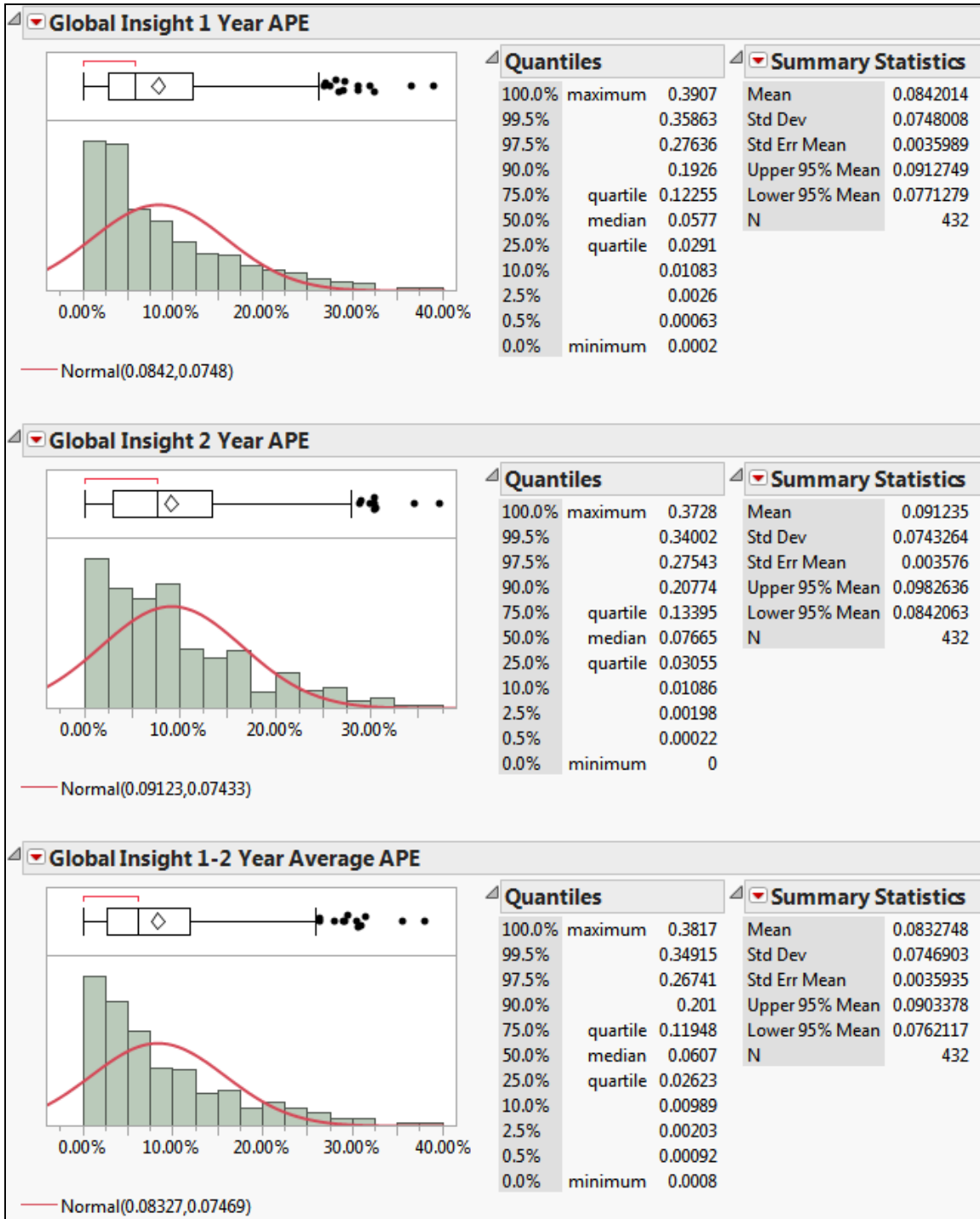
FY	Status Quo MAPE	Status Quo Percent Budget Rate > Adjusted Rate	Global Insight 1 Year MAPE	Global Insight 1 Year Percent Budget Rate > Adjusted Rate	Global Insight 2 Year MAPE	Global Insight 2 Year Percent Budget Rate > Adjusted Rate	Global Insight 1-2 Year Average MAPE	Global Insight 1-2 Year Average Percent Budget Rate > Adjusted Rate
6	10.18%	83.33%	9.07%	60.42%	9.22%	62.50%	9.14%	62.50%
7	14.05%	75.00%	8.63%	52.08%	12.38%	56.25%	9.41%	70.83%
8	11.85%	87.50%	5.48%	50.00%	4.41%	41.67%	4.32%	43.75%
9	16.69%	50.00%	18.45%	50.00%	15.99%	43.75%	17.20%	50.00%
10	9.98%	62.50%	7.02%	64.58%	7.55%	45.83%	7.02%	54.17%
11	10.53%	60.42%	5.57%	56.25%	8.42%	43.75%	6.54%	45.83%
12	7.06%	31.25%	3.65%	41.67%	5.96%	39.58%	4.72%	45.83%
13	6.51%	12.50%	7.69%	27.08%	8.05%	22.92%	6.74%	31.25%
14	6.56%	72.92%	10.22%	27.08%	10.14%	10.42%	9.86%	16.67%
Average	10.38%	59.49%	8.42%	47.69%	9.12%	40.74%	8.33%	46.76%

For example, the 2004 4<sup>th</sup> Quarter Cost International Forecast Table provided the Global Insight 1 and 2 year forecast for FY06 (2005 and 2006 forecasted exchange rates).

Furthermore, the table includes the percentage of forecasted exchange rates exceeding the actual exchange rates. This percentage is the probability of budgeting enough funding for requirements given the applied forecasted rate as the budgeted rate as shown in Figure 1.

Lastly, the countries for this data include the EU, Japan, South Korea, and the UK.

Averaging the 1 year and 2 year forecasted rates provides the best MAPE of the Global Insight data while the status quo has the highest percentage of a higher budgeted rate than adjusted rate. The distribution of Global Insight APEs gave reason to doubt the mean as a true gauge of the resulting data's central tendency. Figure 4 provides the distribution of APEs along with a box plot and normal curves. The median (50.0% quantile) is less than the mean for each of the Global Insight forecasted budgeted rates. Since normality is not present, nonparametric measures are the appropriate approach to comparing methods. The medians provide a closer approximation of the central tendency of the results, while the use of a mean would consistently skew the data to the right of the results central mass. Also, since the results are not normally distributed, the use of standard deviations does not lend itself to an adequate measure of dispersion. The inter-quartile range (IQR) is the preferred method in this research in determining the dispersion of the results.



**Figure 4 Printout of the Global Insight APE Distribution**

## Forward Rate

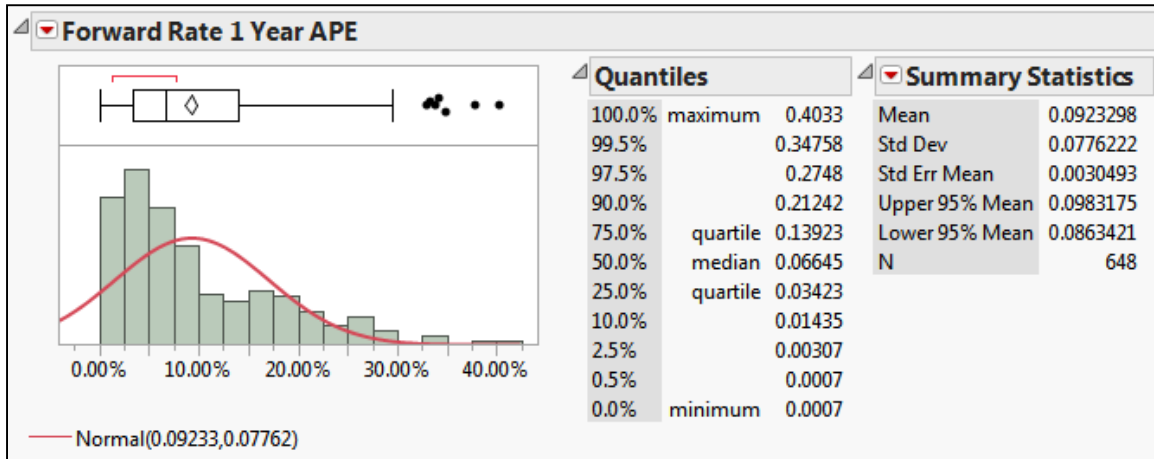
Table 10 compares the forward rate 1 year forecast rate MAPE against the status quo MAPE from FY06 to FY14. For example, the ratio of December 2004 long-term annual interest rates multiplied by the Annual FRB H.10 rate calculates the FY06 forecasted rate. Furthermore, the table includes the percentage of forecasted exchange rates exceeding the actual exchange rates. This percentage gives the probability of budgeting enough funding for requirements given the applied forecasted rate as the budgeted rate. Lastly, the countries for this data include Denmark, the EU, Japan, Norway, South Korea, and the UK.

**Table 10 Forward Rate and Status Quo MAPE for FY06 - FY14 and Probability of Budgeted Rate Greater than the Adjusted Rate**

FY	Status Quo MAPE	Status Quo Percent Budget Rate > Adjusted Rate	Forward Rate 1 Year MAPE	Forward Rate 1 Year Percent Budget Rate > Adjusted Rate
6	8.10%	80.28%	6.11%	54.93%
7	14.19%	83.33%	7.62%	81.94%
8	16.27%	91.67%	14.45%	87.50%
9	13.43%	56.94%	16.85%	34.72%
10	9.06%	68.06%	10.96%	23.61%
11	9.15%	66.67%	8.95%	81.94%
12	6.09%	41.67%	4.54%	76.39%
13	5.61%	19.44%	5.35%	13.89%
14	5.58%	54.79%	8.26%	63.01%
Average	9.72%	62.54%	9.23%	57.55%

The forward rate calculation has a lower MAPE and percentage of a higher budgeted rate than adjusted rate compared to using the status quo. Similar to the Global Insight results, the APEs for the forward rate calculation also do not show a normal

distribution. Figure 5 provides a graph of the APE distribution. Again the median is lower than the mean and provides a better gauge of the central tendency of the results.



**Figure 5 Printout of the Forward Rate APE Distribution**

## ARIMA

Table 11 compares the ARIMA 1 year, 2 year, and 1-2 year average forecasted rate MAPE against the status quo MAPE from FY06 to FY14. For each year and each currency, 27 different ARIMA models were made from ARIMA (0,0,0) to ARIMA (2,2,2) and ranked by AIC. The model with the lowest AIC was then chosen to forecast a budgeted rate for that currency for that year. The process was then repeated for each year and currency. For example, the time series of annual FRB H.10 foreign exchange rates until 2004 provides the data for an ARIMA model to forecast 1 year and 2 year rates for FY06 (2005 and 2006). Furthermore, the table includes the percentage of forecasted exchange rates exceeding the actual exchange rates. This percentage gives the probability of budgeting enough funding for requirements given the applied forecasted

rate as the budgeted rate. Lastly, the countries for this data include Denmark, the EU, Japan, Norway, Singapore, South Korea, and the UK.

**Table 11 ARIMA 1 Year, 2 Year, 1-2 Year Average and Status Quo MAPE for FY06 - FY14 and Probability of Budgeted Rate Greater than the Adjusted Rate**

FY	Status Quo MAPE	Status Quo Percent Budget Rate > Adjusted Rate	ARIMA 1 Year MAPE	ARIMA 1 Year Percent Budget Rate > Adjusted Rate	ARIMA 2 Year MAPE	ARIMA 2 Year Percent Budget Rate > Adjusted Rate	ARIMA 1-2 Year Average MAPE	ARIMA 1-2 Year Average Percent Budget Rate > Adjusted Rate
6	8.03%	83.13%	6.68%	59.04%	9.76%	66.27%	8.17%	61.45%
7	13.82%	85.71%	11.85%	85.71%	16.60%	85.71%	14.22%	85.71%
8	16.19%	92.86%	17.60%	86.90%	21.51%	84.52%	19.55%	86.90%
9	12.52%	63.10%	15.08%	35.71%	16.83%	40.48%	15.70%	35.71%
10	9.15%	72.62%	7.24%	28.57%	10.46%	46.43%	7.25%	36.90%
11	10.21%	71.43%	14.68%	98.81%	18.83%	100.00%	16.75%	100.00%
12	7.13%	50.00%	4.52%	88.10%	6.41%	76.19%	5.38%	80.95%
13	5.80%	30.95%	7.52%	14.29%	7.54%	33.33%	6.71%	30.95%
14	5.17%	54.12%	8.97%	63.53%	10.81%	65.88%	9.81%	65.88%
Average	9.78%	67.10%	10.46%	62.30%	13.19%	66.53%	11.51%	64.94%

The status quo has a lower MAPE and a greater chance of a higher budgeted rate than adjusted rate compared to using ARIMA 1 year, 2 year, and 1-2 year average forecasts. As in the above methods, the APEs from the ARIMA results do not show a normal distribution. Figure 6 provides the APE distributions for each ARIMA method. The medians for each ARIMA method are also lower than the mean and provide a measure closer to the center mass of the APE distribution.

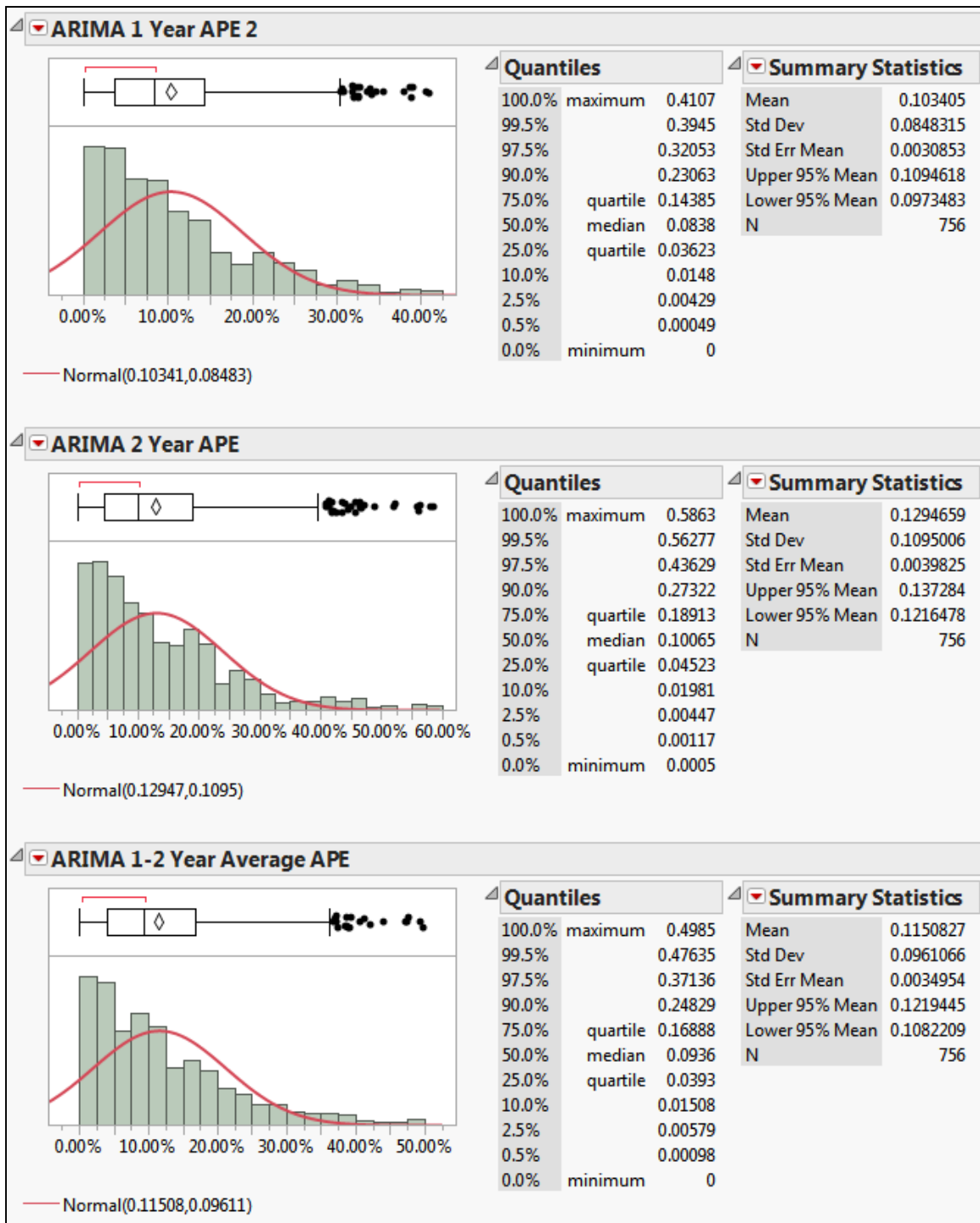


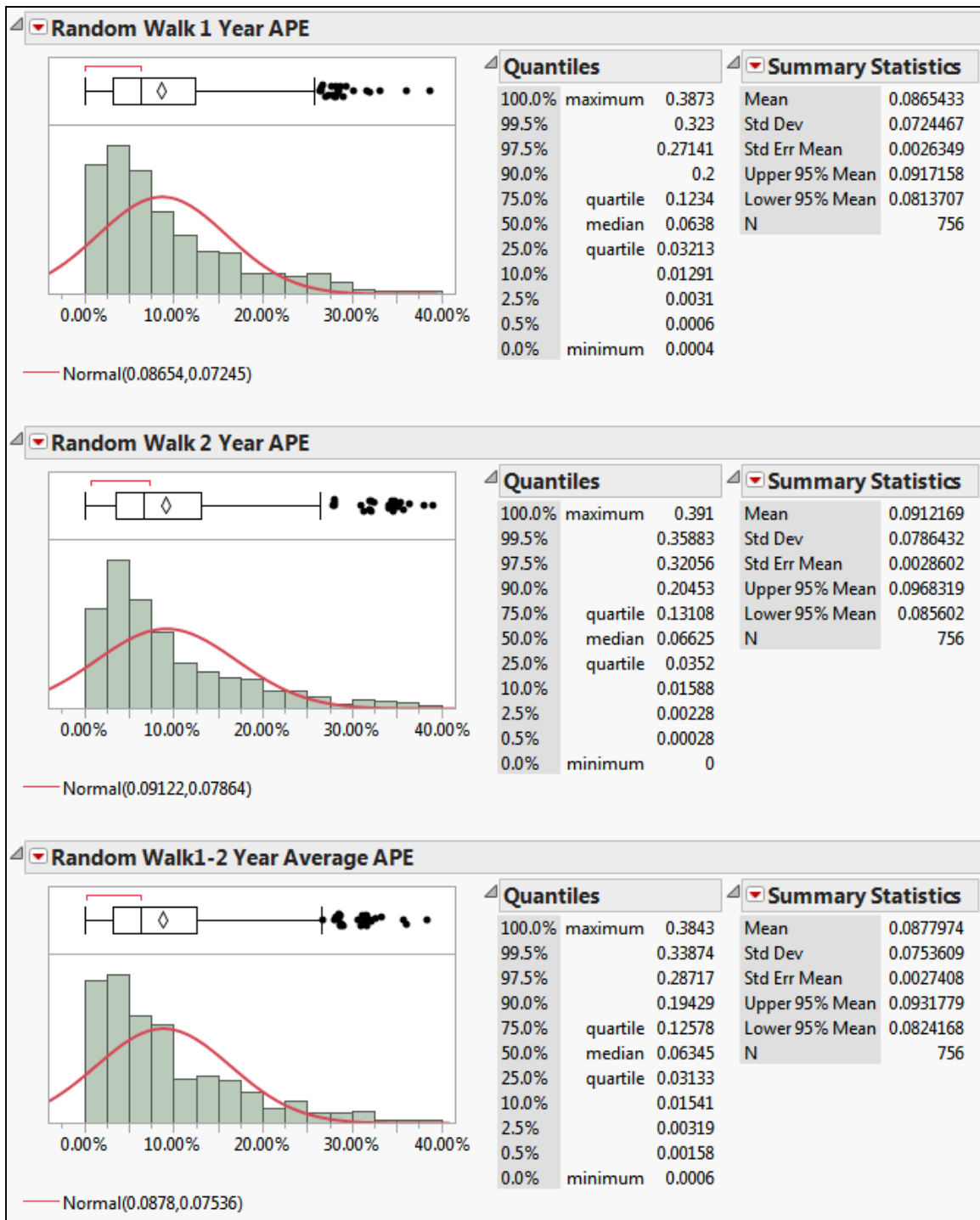
Figure 6 JMP® Printout of the ARIMA APE Distribution

## Random Walk

Table 12 compares the Random Walk model 1 year, 2 year, and 1-2 year average forecasted rate MAPE against the status quo MAPE from FY06 to FY14. For example, the time series of annual FRB H.10 foreign exchange rates until 2004 provides the data for an ARIMA(0,1,0) model to forecast 1 year and 2 year rates for FY06 (2005 and 2006). Furthermore, the table includes the percentage of forecasted exchange rates exceeding the actual exchange rates. This percentage gives the probability of budgeting enough funding for requirements given the applied forecasted rate as the budgeted rate. Lastly, the countries for this data include Denmark, the EU, Japan, Norway, Singapore, South Korea, and the UK.

**Table 12 Random Walk 1 Year, 2 Year, 1-2 Year Average and Status Quo MAPE for FY06 - FY14 and Probability of Budgeted Rate Greater than the Adjusted Rate**

FY	Status Quo MAPE	Status Quo Percent Budget Rate > Adjusted Rate	Random Walk 1 Year MAPE	Random Walk 1 Year Percent Budget Rate > Adjusted Rate	Random Walk 2 Year MAPE	Random Walk 2 Year Percent Budget Rate > Adjusted Rate	Random Walk 1-2 Year Average MAPE	Random Walk 1-2 Year Average Percent Budget Rate > Adjusted Rate
6	8.03%	83.13%	7.33%	49.40%	8.88%	48.19%	8.10%	49.40%
7	13.82%	85.71%	8.68%	83.33%	9.20%	82.14%	8.92%	83.33%
8	16.19%	92.86%	12.32%	85.71%	11.67%	77.38%	11.81%	82.14%
9	12.52%	63.10%	13.08%	34.52%	12.41%	28.57%	12.71%	30.95%
10	9.15%	72.62%	8.21%	23.81%	8.07%	14.29%	8.02%	21.43%
11	10.21%	71.43%	8.74%	82.14%	8.34%	69.05%	8.35%	77.38%
12	7.13%	50.00%	4.03%	73.81%	4.96%	58.33%	3.98%	63.10%
13	5.80%	30.95%	6.84%	19.05%	8.84%	19.05%	7.81%	17.86%
14	5.17%	54.12%	8.66%	54.12%	10.00%	52.94%	9.32%	54.12%
Average	9.78%	67.10%	8.65%	56.21%	9.12%	49.99%	8.78%	53.30%



**Figure 7 JMP® Printout of the Random Walk APE Distribution**

The 1 year forecasted rate provides the best MAPE of the Random Walk model while the status quo has the highest percentage of a higher budgeted rate than adjusted

rate. The Random Walk model has an APE distribution skewed right similar with the above results. The mean is higher than the median, as shown in Figure 7, with the median as a better representation of the central tendency.

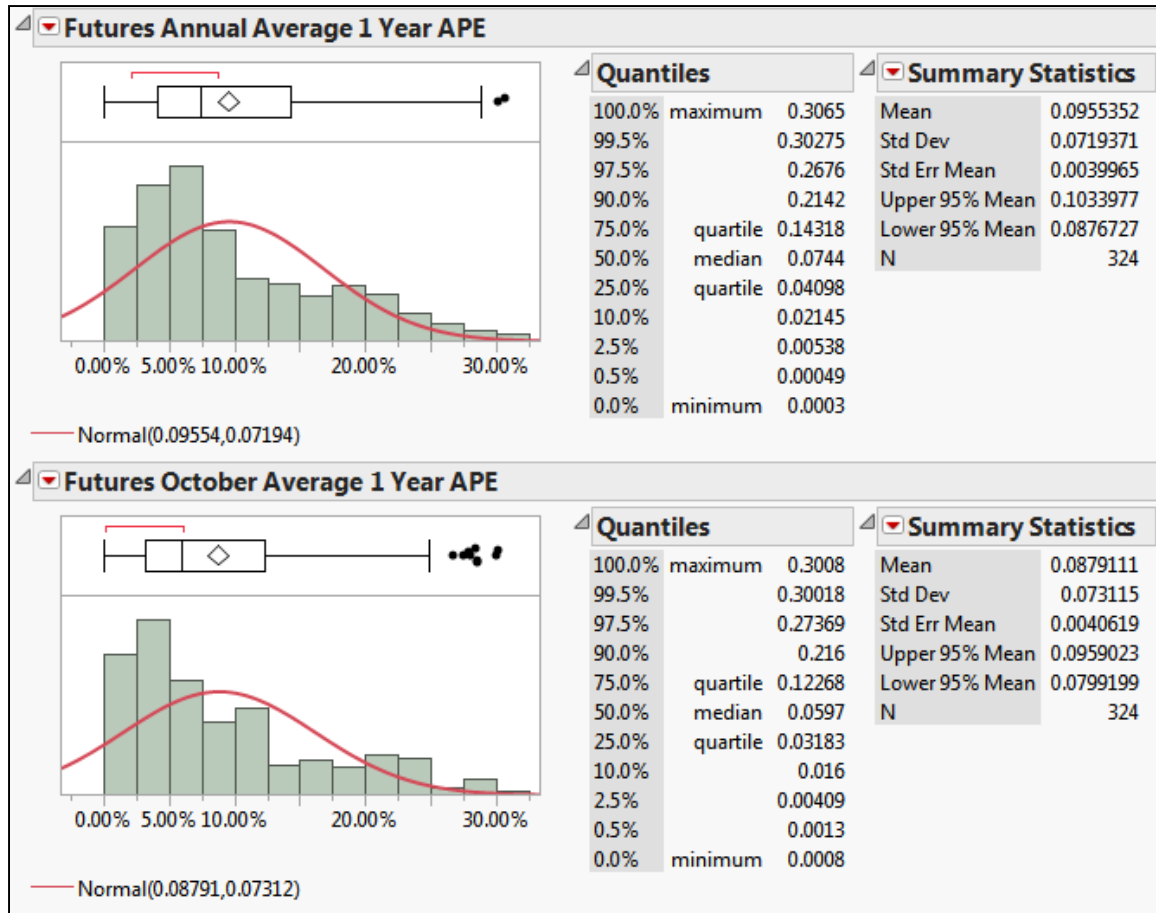
## Futures

Table 13 compares future markets annual average and October average forecasted rate MAPE against the status quo MAPE from FY06 to FY14. For example, the futures data uses the average price of the following month's futures contract from 2004 as the forecast rate for FY06 (2005 and 2006). Furthermore, the table includes the percentage of forecasted exchange rates exceeding the actual exchange rates. This percentage gives the probability of budgeting enough funding for requirements given the applied forecasted rate as the budgeted rate. Lastly, the countries for this data include Denmark, the EU, Japan, and the UK.

**Table 13 Futures Annual and October Average and Status Quo MAPE for FY06 - FY14 and Probability of Budgeted Rate Greater than the Adjusted Rate**

FY	Status Quo MAPE	Status Quo Percent Budget Rate > Adjusted Rate	Futures Annual Average 1 Year MAPE	Futures Annual Average 1 Year Percent Budget Rate > Adjusted Rate	Futures October Average 1 Year MAPE	Futures October Average 1 Year Percent Budget Rate > Adjusted Rate
6	5.73%	77.78%	4.52%	30.56%	4.33%	33.33%
7	10.96%	66.67%	8.23%	66.67%	9.15%	66.67%
8	13.52%	94.44%	11.54%	94.44%	11.59%	94.44%
9	13.96%	66.67%	16.91%	50.00%	16.97%	41.67%
10	12.36%	58.33%	12.84%	38.89%	8.02%	55.56%
11	12.47%	52.78%	7.55%	77.78%	6.58%	50.00%
12	8.48%	41.67%	5.63%	77.78%	3.83%	47.22%
13	8.03%	0.00%	7.88%	11.11%	8.37%	11.11%
14	6.26%	63.89%	10.89%	63.89%	10.27%	61.11%
Average	10.20%	58.02%	9.55%	56.79%	8.79%	51.23%

The October average forecasted rate provides the best MAPE of the futures contracts model while the status quo has the highest percentage of a higher budgeted rate than adjusted rate. The APEs for this method also skew right with the mean above the median as shown in Figure 8. For comparison, using medians rather than the mean gives a better assessment of the differences between methodologies.



**Figure 8 JMP® Printout of the Futures APE Distribution**

### Comparison

Table 14 presents each methodology's MAPE according to country over the time period. A highlighted MAPE is the lowest error between all available methods for that

country. Overall, Global Inisght’s 1-2 year average forecast provides the lowest MAPE. Only the ARIMA 2 year and 1-2 year average had worse MAPEs than the status quo.

**Table 14 Average MAPE for Each Country by Methodology from FY06 to FY14 with the Lowest MAPE Highlighted**

MAPE from FY06 to FY14													
Country	Status Quo	Global Insight 1 Year	Global Insight 2 Year	Global Insight 1-2 Year Mean	Random Walk 1 year	Random Walk 2 year	Random Walk 1-2 Mean year	Forward Rates	ARIMA 1 year	ARIMA 2 year	ARIMA 1-2 Year Mean	Futures Annual Mean 1 Year	Futures October Mean 1 Year
DENMARK	8.36%				6.70%	6.73%	6.71%	7.10%	9.70%	15.17%	11.98%		
EU	8.28%	6.57%	5.83%	5.69%	6.99%	8.10%	7.50%	6.33%	12.79%	20.73%	16.56%	6.70%	7.21%
ICELAND	19.66%												
JAPAN	13.55%	12.20%	12.28%	11.99%	13.15%	14.35%	13.08%	14.89%	14.01%	15.42%	14.71%	14.07%	12.21%
NORWAY	8.45%				8.28%	8.37%	8.32%	8.51%	9.10%	10.81%	9.79%		
SINGAPORE	10.13%				5.79%	5.51%	5.62%		6.04%	6.71%	6.28%		
SOUTH KOREA	10.93%	8.66%	11.46%	9.33%	11.42%	12.25%	11.83%	10.46%	11.43%	12.31%	11.86%		
TURKEY	14.67%												
UK	8.76%	6.25%	6.92%	6.30%	8.24%	8.55%	8.39%	8.10%	9.32%	9.49%	9.35%	7.89%	6.95%
Average	11.42%	8.42%	9.12%	8.33%	8.65%	9.12%	8.78%	9.23%	10.34%	12.95%	11.51%	9.55%	8.79%

Table 15 presents a comparison between the methods using only the currencies from the EU, Japan, and the UK. Every methodology calculated a forecast for these countries and provides a fairer comparison as opposed to Table 14. The Global Insight 1 year forecast provided the best estimates for the UK Pound while the Global Insight 1-2 year average was the best forecast for the Euro, Japanese Yen, and overall average.

**Table 15 Average MAPE for the EU, Japan, and the UK by Methodology from FY06 to FY14 with the Lowest MAPE Highlighted**

MAPE from FY06 to FY14													
Country	Status Quo	Global Insight 1 Year	Global Insight 2 Year	Global Insight 1-2 Year Mean	Random Walk 1 year	Random Walk 2 year	Random Walk 1-2 Mean year	Forward Rates	ARIMA 1 year	ARIMA 2 year	ARIMA 1-2 Year Mean	Futures Annual Mean 1 Year	Futures October Mean 1 Year
EU	8.28%	6.57%	5.83%	5.69%	6.99%	8.10%	7.50%	6.33%	12.79%	20.73%	16.56%	6.70%	7.21%
JAPAN	13.55%	12.20%	12.28%	11.99%	13.15%	14.35%	13.08%	14.89%	14.01%	15.42%	14.71%	14.07%	12.21%
UK	8.76%	6.25%	6.92%	6.30%	8.24%	8.55%	8.39%	8.10%	9.32%	9.49%	9.35%	7.89%	6.95%
Average	10.20%	8.34%	8.34%	7.99%	9.46%	10.33%	9.66%	9.77%	12.04%	15.21%	13.54%	9.55%	8.79%

As mentioned above, the mean is not the best measure of central tendency for each month’s results. The APE distributions are skewed to the right. Comparing medians offer a better approach to choosing the lowest APE methodology. Table 17

examines the median APE for currencies with every available methodology, and, as in Table 15, the overall best method is the average October futures contract.

Table 16 recreates Table 14 with medians rather than means. Judging by the average (mean) of each country's median, the best overall method is the Global Insight forecast 1 year forecast as opposed to the average 1-2 year forecast. Table 17 examines the median APE for currencies with every available methodology, and, as in Table 15, the overall best method is the average October futures contract.

**Table 16 Median APE for Each Country by Methodology from FY06 to FY14 with the Lowest Median APE Highlighted**

Median APE from FY06 to FY14													
Country	Status Quo	Global Insight 1 Year	Global Insight 2 Year	Global Insight 1-2 Year Mean	Random Walk 1 year	Random Walk 2 year	Random Walk 1-2 year	Forward Rates	ARIMA 1 year	ARIMA 2 year	ARIMA 1-2 Year Mean	Futures Annual Mean 1 Year	Futures October Mean 1 Year
DENMARK	4.67%				5.63%	5.48%	5.57%	5.50%	7.64%	15.00%	11.14%		
EU	5.32%	4.93%	5.11%	4.65%	5.94%	7.90%	6.61%	4.56%	10.42%	17.71%	11.66%	5.21%	5.28%
ICELAND	16.50%												
JAPAN	15.42%	11.74%	10.59%	11.80%	12.61%	10.28%	13.24%	15.20%	13.90%	16.45%	14.97%	13.27%	10.80%
NORWAY	6.91%				6.36%	6.85%	6.55%	6.34%	6.70%	7.79%	7.55%		
SINGAPORE	10.12%				4.85%	4.87%	4.64%		4.55%	6.03%	5.29%		
SOUTH KOREA	7.34%	5.34%	9.83%	7.04%	9.27%	10.11%	9.71%	8.08%	8.88%	8.68%	8.73%		
TURKEY	14.10%												
UK	8.97%	4.18%	5.09%	3.90%	5.87%	6.82%	6.34%	5.45%	8.96%	8.84%	8.86%	5.15%	3.93%
Average	9.93%	6.55%	7.66%	6.85%	7.22%	9.12%	7.52%	9.23%	10.34%	12.95%	9.74%	7.88%	6.67%

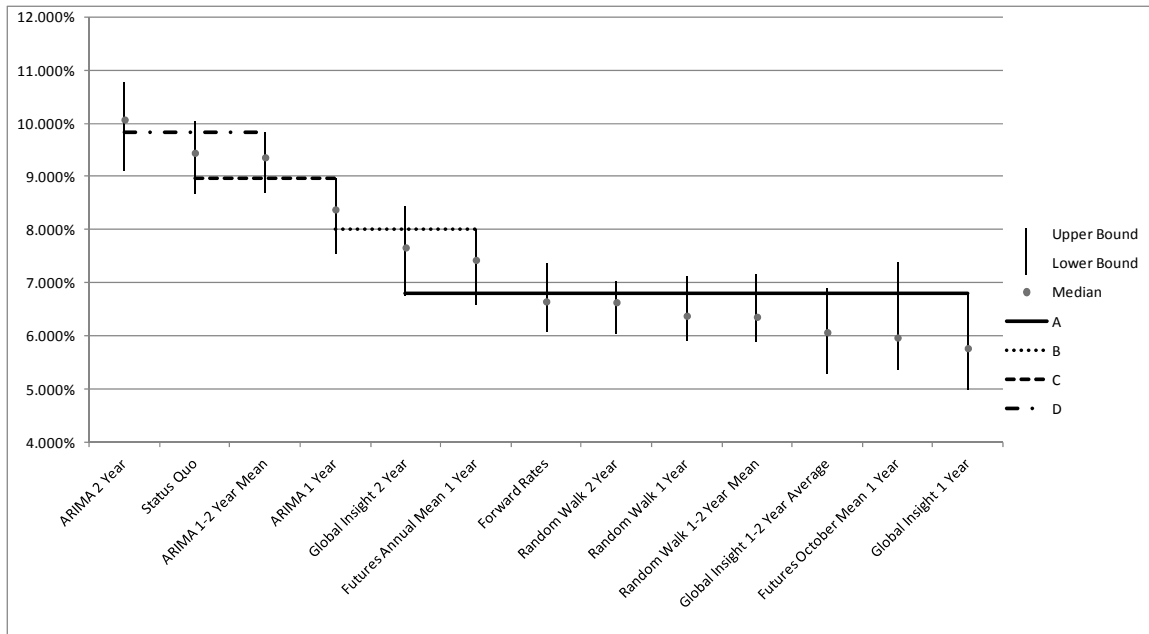
**Table 17 Median APE for the EU, Japan, and the UK by Methodology from FY06 to FY14 with the Lowest Median APE Highlighted**

Median APE from FY06 to FY14													
Country	Status Quo	Global Insight 1 Year	Global Insight 2 Year	Global Insight 1-2 Year Mean	Random Walk 1 year	Random Walk 2 year	Random Walk 1-2 year	Forward Rates	ARIMA 1 year	ARIMA 2 year	ARIMA 1-2 Year Mean	Futures Annual Mean 1 Year	Futures October Mean 1 Year
EU	5.32%	4.93%	5.11%	4.65%	5.94%	7.90%	6.61%	4.56%	10.42%	17.71%	11.66%	5.21%	5.28%
JAPAN	15.42%	11.74%	10.59%	11.80%	12.61%	10.28%	13.24%	15.20%	13.90%	16.45%	14.97%	13.27%	10.80%
UK	8.97%	4.18%	5.09%	3.90%	5.87%	6.82%	6.34%	5.45%	8.96%	8.84%	8.86%	5.15%	3.93%
Average	9.90%	6.95%	6.93%	6.78%	8.14%	8.33%	8.73%	8.40%	11.09%	14.33%	11.83%	7.88%	6.67%

Finally, a medians comparison was accomplished via a bootstrap to distinguish which methods are statistically the same or different. Figure 9 illustrates the results of

the bootstrap analysis based on a 95% confidence interval (the upper bound is 97.5% and the lower bound is 2.5%) across all APEs for all the countries available to a method. Methods that can be considered statistically similar are connected by horizontal lines. The medians are different from Table 16 and Table 17 due to aggregating each country's APE for the entire time frame, rather than country specific. Line "A" connects the average futures contract settlement prices in October or annually, the Global Insight forecast, a Random Walk model, or forward rates can be statistically no different than any other, and each has a lower median APE interval than the status quo. The ARIMA models can be thought of as statistically the same as the status quo (line "C" or "D") with care given to including or excluding the ARIMA 1 year or ARIMA 2 year forecast methods. All methods connected by line "A" have a lower median APE than the status quo. Table 18 is the amount of percentage points the median of each method on line "A" is lower than the status quo median as taken from Table 17 examines the median APE for currencies with every available methodology, and, as in Table 15, the overall best method is the average October futures contract.

Table 16 It also shows the opportunity cost of the status quo of using the status quo over the method (using the overall median APE from each method against all of the currencies in the FY13 FCF account).



**Figure 9 Medians Comparison between Methodologies Based with 95% Confidence Bounds**

**Table 18 The Median APE Percent of Line A Methods and the Associated Opportunity Cost of the Status Quo Over Each Method FY06-FY14**

	Global Insight			Random Walk			Forward Rate	Futures	
	1 Year	2 Year	1-2 Year	1 Year	2 Year	1-2 Year		Annual	Oct
Percent Lower than Status Quo	3.38	2.27	3.08	2.71	0.81	2.41	0.70	2.05	3.26
Opportunity Cost (\$M)	36.1	25.0	33.9	29.8	8.9	26.5	7.7	22.5	34.8

### Long Term Comparison

The long term comparisons only include the currencies for Japan and the United Kingdom. This is due to the unavailability of data for each method for the other currencies. Furthermore, the Global Insight data is not available for the time period and that method is excluded from the analysis. Using the results from the short term study

period, median APEs are used as the primary metric in comparing methods as opposed to the MAPE.

### Comparison from FY91 to FY12

The FY91 to FY12 period uses the status quo, Random Walk model, forward rates, ARIMA, and futures data as the methods of comparison. The lowest median is highlighted in yellow. Consistent with the shorter time period findings, the average futures contract settlement price in October provides the lowest median APE as shown in Table 19. A comparison of the method medians by currency in Table 20 also highlights the average futures contract in October as the lowest median APE for the Pound while the Random Walk 2 year forecast has the lowest median for the Yen.

**Table 19 Median APE Combining All Countries from FY91 to FY12 with Inter-Quartile Range**

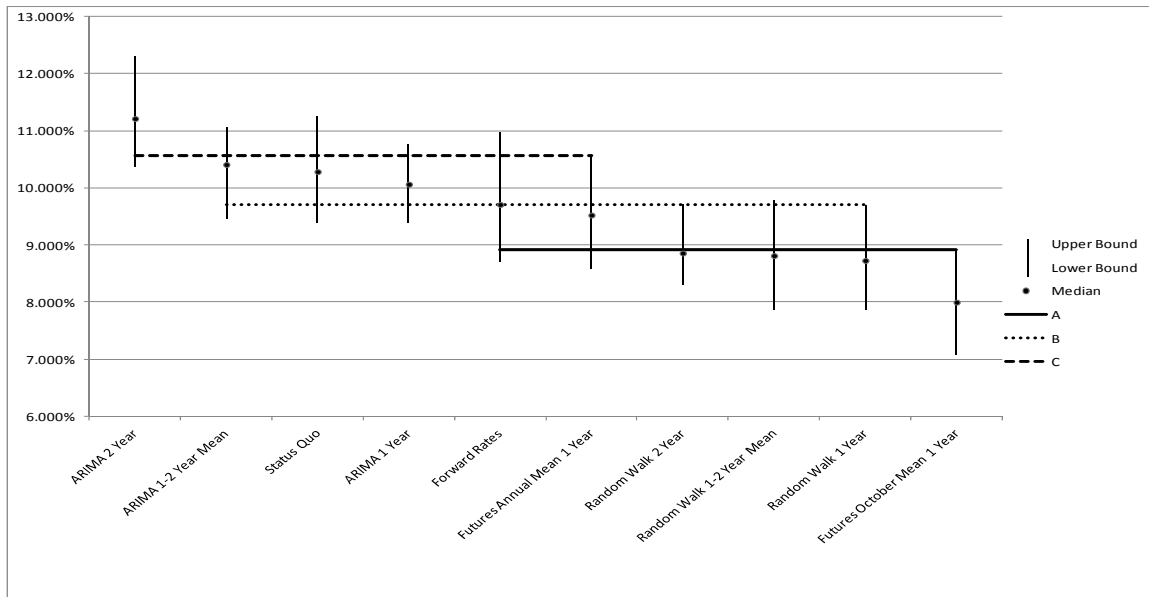
Median APE for All Countries										
	Status Quo	Random Walk 1 year	Random Walk 2 year	Random Walk 1-2 Mean year	Forward Rates	ARIMA 1 year	ARIMA 2 year	ARIMA 1-2 Year Mean	Futures Annual Mean 1 Year	Futures October Mean 1 Year
Median (IQR)	10.285 (5.728-15.643)	8.73 (4.04-14.725)	8.86 (4.213-16.43)	8.815 (3.695-15.09)	9.69 (3.91-16.458)	10.065 (6.02-16.258)	11.215 (6.718-17.163)	10.41 (6.498-16.76)	9.525 (4.243-14.908)	7.975 (3.54-12.82)

**Table 20 Median APE by Country from FY91 to FY12 with Inter-Quartile Range**

Median APE for Countries with All Methods										
Country	Status Quo	Random Walk 1 year	Random Walk 2 year	Random Walk 1-2 Mean year	Forward Rates	ARIMA 1 year	ARIMA 2 year	ARIMA 1-2 Year Mean	Futures Annual Mean 1 Year	Futures October Mean 1 Year
JAPAN	12.22 (5.94-18.93)	10.31 (5.23-15.97)	9.27 (4.09-20.58)	9.92 (3.58-17.61)	13.63 (6.15-19.033)	12.00 (6.59-19.79)	13.85 (6.84-22.88)	13.19 (6.83-21.18)	12.10 (6.59-18.14)	9.45 (4.2-14.045)
UK	9.04 (5.55-13.52)	7.86 (3.52-12.56)	8.53 (4.26-12.96)	8.15 (3.73-12.94)	6.065 (2.745-13.488)	8.95 (4.92-13.29)	9.60 (6.26-13.58)	8.64 (6.44-13.23)	6.81 (3.18-12.36)	6.315 (3.123-11.325)

Next, a medians comparison was accomplished to distinguish which methods are statistically different. Figure 10 illustrates the results of the bootstrap analysis based on a

95% confidence interval. Methods that can be considered statistically similar are connected by horizontal lines. The best methods are the average futures contract in October and the Random Walk models. Horizontal lines connect the annual average futures contract and the forward rate method to every other model, therefore those methods were not considered different than the status quo. The ARIMA 2 year forecast performed the worst and could be considered by itself, or with the forward rates, status quo, annual average futures contract, and ARIMA 1 year and 1-2 year average forecasts. Table 21 is the amount of percentage points the median of each method on line “A” is lower than the status quo median as taken from Table 19. It also shows the opportunity cost of using the status quo over the lower APE methods (using the overall median APE from each method against all of the currencies in the FY13 FCF account).



**Figure 10 FY91-FY12 Medians Comparison Between Methodologies Based with 95% Confidence Bounds**

**Table 21 The Median APE Percent of Line A Methods and the Associated Opportunity Cost of the Status Quo Over Each Method FY91-FY12**

	Random Walk			Futures Oct
	1 Year	2 Year	1-2 Year	
Percent Lower than Status Quo	1.56	1.43	1.47	2.31
Opportunity Cost (\$M)	17.1	15.7	16.2	25.3

Table 22 presents the number of months the method’s budgeted exchange rate is greater than the actual exchange rate. Should the actual exchange rate be lower, the US dollars allocated would not cover the requirement. For example, a ¥1,000 requirement in US dollars at 110 Yen per dollar equals a budget of \$9.09. If the actual rate were 100 yen per dollar at the time of execution, the amount needed to cover the requirement is \$10. The table provides the chance the method’s budget would allocate enough funding to cover the actual expenses during the year of execution. Highlighted in yellow, the Random Walk 2 year forecast provides the lowest chance of the budgeted rate being higher than the actual rate.

**Table 22 Comparison of Each Methods Chance of a Greater Budgeted Rate than the Actual Rate from FY91 to FY12**

FY	Status Quo	Random Walk 1 Year	Random Walk 2 Year	Random Walk 1-2 Year Mean	Forward Rates	ARIMA 1 Year	ARIMA 2 Year	ARIMA 1-2 Year Mean	Futures Annual Mean 1 Year	Futures October Mean 1 Year
Percent Budget Rate > Actual Rate	57.58%	57.01%	44.70%	51.70%	63.64%	52.46%	48.30%	50.57%	62.88%	55.49%

**Comparison from FY79 to FY12**

The FY79 to FY12 period uses the status quo, Random Walk model, ARIMA, and futures data as the methods of comparison. Forward rates for the Bank of Japan were

unavailable before 1989 from the OECD data file. The lowest median is highlighted in yellow. The average futures contract settlement price in October provides the lowest median APE as shown in Table 23. A comparison of the method medians by currency in Table 24 also highlights the average futures contract in October as the lowest median APE.

**Table 23 Median APE Combining All Countries from FY79 to FY12 with Inter-Quartile Range**

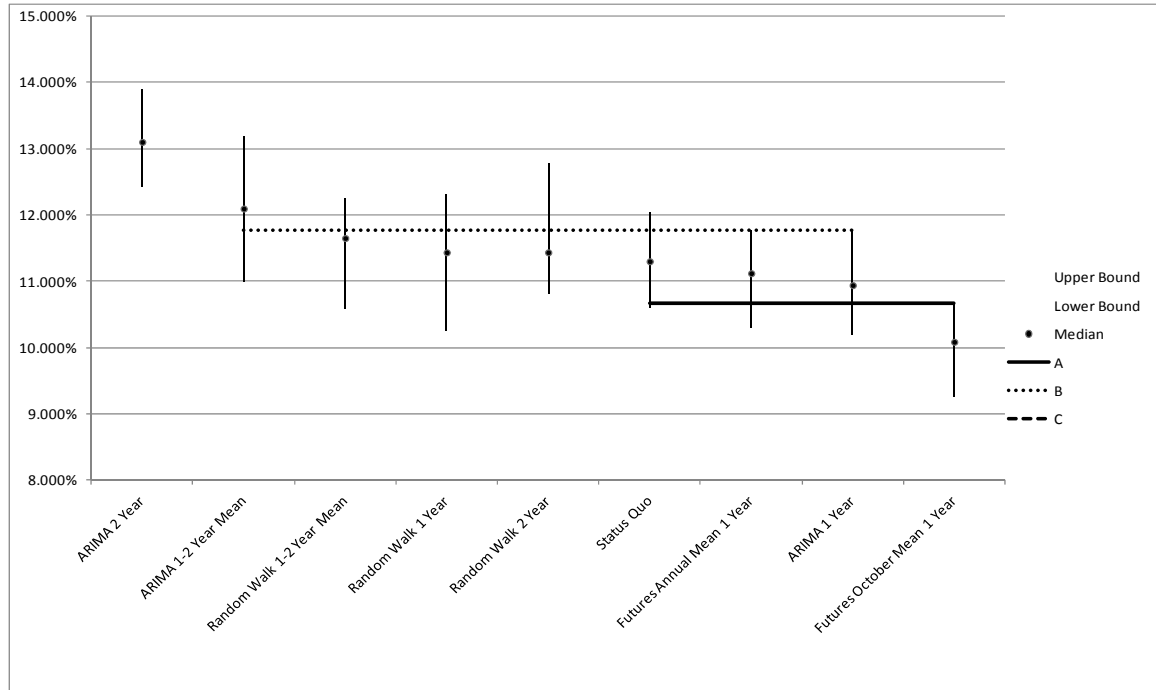
Median APE for All Countries									
	Status Quo	Random Walk 1 year	Random Walk 2 year	Random Walk 1-2 / Mean year	ARIMA 1 year	ARIMA 2 year	ARIMA 1-2 Year Mean	Futures Annual Mean 1 Year	Futures October Mean 1 Year
Median (IQR)	11.3 (6.018-18.508)	11.435 (5.275-18.013)	11.435 (5.403-20.568)	11.66 (4.713-18.708)	10.945 (6.063-18.758)	13.1 (7.148-24.16)	12.095 (6.805-21.443)	11.12 (6.805-21.443)	10.085 (4.723-16.22)

**Table 24 Median APE by Country from FY79 to FY12 with Inter-Quartile Range**

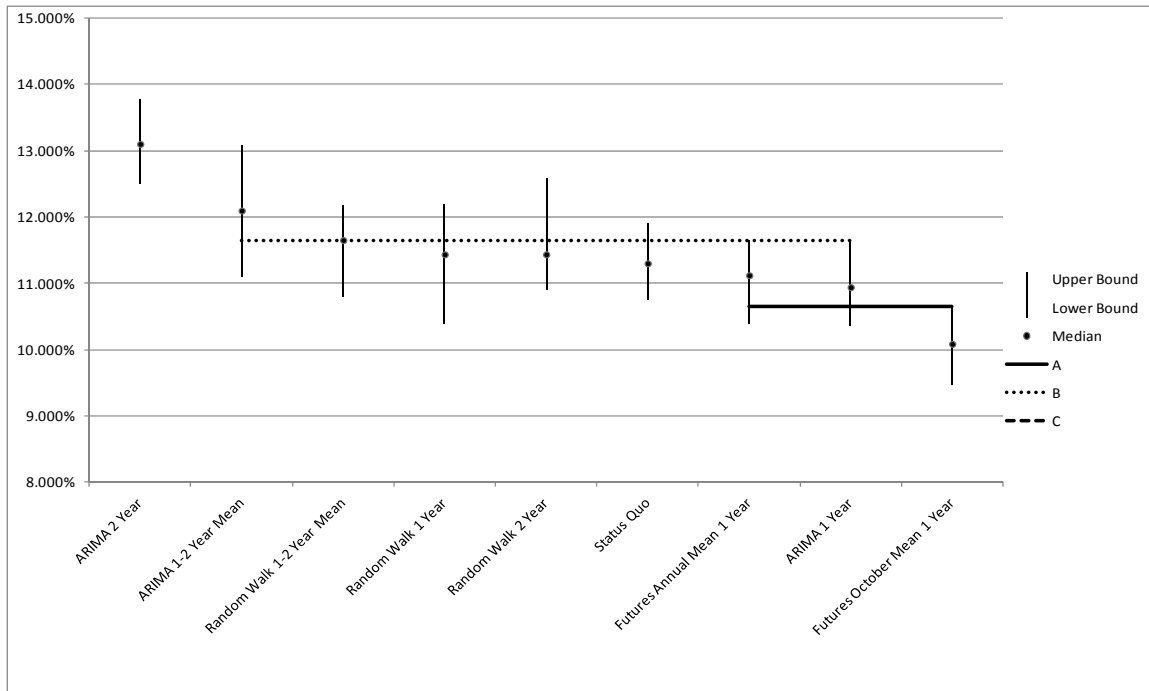
Median APE for Countries with All Methods									
Country	Status Quo	Random Walk 1 year	Random Walk 2 year	Random Walk 1-2 / Mean year	ARIMA 1 year	ARIMA 2 year	ARIMA 1-2 Year Mean	Futures Annual Mean 1 Year	Futures October Mean 1 Year
JAPAN	11.81 (5.07-23.00)	12.17 (5.59-18.61)	12.97 (5.46-22.76)	12.17 (4.69-19.94)	12.18 (6.71-22.10)	16.12 (7.47-31.71)	14.71 (7.28-25.80)	11.89 (6.24-18.95)	10.82 (5.56-16.718)
UK	10.96 (6.53-16.05)	10.68 (4.71-17.71)	10.90 (5.32-18.06)	10.79 (4.86-17.78)	9.68 (5.07-16.84)	11.26 (6.98-17.96)	9.84 (6.45-17.29)	10.37 (4.44-17.04)	9.005 (4.153-15.343)

Next, a medians comparison was accomplished to distinguish which methods are statistically different. Figure 11 illustrates the results of the bootstrap analysis based on a 95% confidence interval. Methods that can be considered statistically similar are connected by horizontal lines. The average futures contract in October is statistically similar to the ARIMA 1 year forecast, the average annual futures contract settlement price, and the status quo. The ARIMA 2 year forecast is not connected by horizontal line to another method and can be considered statistically different. The Random Walk models, status quo, annual average futures contract, and ARIMA 1 year and 1-2 year average forecasts are not statistically different from each other. The median APE of the

futures contracts in October method is 1.2% lower than the status quo median resulting in \$13.7 million opportunity cost (assuming the median of the method applied to all currencies in the FY13 FCF). At a 90% confidence interval, Figure 12, the futures contract methods and ARIMA 1 year forecast are statistically different from the status quo.



**Figure 11 FY79-FY12 Medians Comparison Between Methodologies Based with 95% Confidence Bounds**



**Figure 12 FY79-FY12 Medians Comparison Between Methodologies Based with 90% Confidence Bounds**

Table 25 presents the number of months the method’s budgeted exchange rate is greater than the actual exchange rate. Highlighted in yellow, the Random Walk 2 year forecast provides the lowest chance of the budgeted rate being higher than the actual rate.

**Table 25 Comparison of Each Methods Chance of a Greater Budgeted Rate than the Actual Rate from FY79 to FY12**

FY	Status Quo	Random Walk 1 Year	Random Walk 2 Year	Random Walk 1-2 Year Mean	ARIMA 1 Year	ARIMA 2 Year	ARIMA 1-2 Year Mean	Futures Annual Mean 1 Year	Futures October Mean 1 Year
Percent Budget Rate > Actual Rate	59.68%	54.53%	45.10%	50.61%	51.72%	49.14%	50.61%	60.05%	55.02%

**Summary**

The Global Insight’s forecasts provide the lowest MAPE and median APE. The average futures contract in October provided the lowest median APE when comparing the methods with only against the Euro, Pound, and Yen. Both can be considered

statistically the same along with the Random Walk and forward rate methods using a 95% confidence interval around each method's medians. All of those models have lower median APEs than the status quo. The ARIMA models performed no better, or worse, than the status quo.

When viewed over a longer time horizon, the average futures contract in October consistently displays lower median APEs than the other methodologies while the ARIMA 2 year forecast is consistently higher. From FY91-FY12, the medians of the October futures contracts, forward rate, and Random Walk models were statistically the same but were different in the FY79-FY12 period. ARIMA 1 year forecasts and the status quo were not statistically different from the average futures contract models for the longer time period. Overall, the October futures contracts beat the status quo at each level of analysis except for the longer period. For both long term periods, the Random Walk 2 year forecast had the lowest chance of putting too little funding due to the difference in budgeted versus actual exchange rate.

## **V. Conclusion**

This chapter reviews the research questions outlined in Chapter 1 and provides answers garnered from Chapter 4. Next, limitations in the data are explored as well as how to use the methodology in real world application. Future research naturally follows data limitations as the start of new avenues of inquiry. The chapter then summarizes the research.

### **Research Questions Revisited**

The goal of the research is to provide a review of different forecasting methods as compared to the status quo. Specifically, this thesis examined each method in terms of variance or the deviation of the budgeted exchange rate from the actual exchange rate (as measured by the APE). After finding the mean of each method, further investigation revealed the use of the median as a more appropriate due to the skewed nature of the results. Using a bootstrap method, a 95% confidence interval was developed around each method's medians to see whether one method was statistically different from the other. Comparing these medians, the Air Force could use the Global Insight, futures contracts, forward rates, or a Random Walk model to replace the status quo method. Each method had a lower variance than the status quo and is statistically the same. Doing a longer term comparison, the Random Walk models, forward rates, and futures contracts are statistically significant and lower than the status quo from FY91 to FY12. For FY79 to FY12 the futures contracts and ARIMA 1 year forecasts are not statistically different from the status quo at 95% confidence, but are different at the 90% level. These results somewhat fit the literature. We would expect the Random Walk to perform as well as

most methods, while Groshek and Felli experienced positive results with futures contracts and forward rates. The period from FY79 to FY12 was depressing in that the futures contracts broke were no long significantly different from the status quo. This research favors using an average of the October futures contract settlement prices as the budgeted rate.

Reviewing these methods in terms of simplicity is based on the method required to attain a budgeted exchange rate as well as the ability to explain the method's logic to the GAO, Inspector General, or an auditor. Upfront, Global Insight is the simplest method as it only requires using the 4<sup>th</sup> quarter's forecast of next year's annual rate. The most complicated is the ARIMA model as it requires either a computer program or knowledgeable technician to implement. The Random Walk models used the same computer program as the ARIMA models, but the Random Walk model could be implemented with a simple formula with an estimate for the error term ( $Y_t = Y_{t-1} + \varepsilon_t$ ). The same could be said for the forward rate, but it also requires another data source for the interest rates. The futures data is a simple average of the settle prices, but the settle prices of various contracts expiring at different dates need combined (or "rolled" together) into a continuous series. Therefore, in terms of simplicity, the Global Insight method is the simplest to formulate.

The last research question focused on the probability of budgeting too little from Figure 1. As stated, a moderately lower rate is preferred so that the DoD will not have to take additional funding from the FCF account. This would lead to an overall lowering of the current FCF and reduce the opportunity cost of maintaining such a reserve. With that said, an ideal probability would be less than 50%. Over the short term, Global Insight

was consistently under 50% across all three techniques while the Random Walk 2 year forecast was also under by 0.01%. Over the long term comparison, only the Random Walk 2 year and ARIMA 2 year forecasts managed to have a probability less than 50%. Since Global Insight has a lower median APE, and is simple to retrieve, the research supports this method in terms of the probability of having a higher budgeted rate than actual rate.

The research questions summarize to a variety of possible replacements to the status quo. In terms of variance, the futures contracts consistently provides lower medians than the status quo over the long term, but is not statistically different from the Global Insight methods in the short term. Global Insight is also the simplest method to explain, but may not have the academic literature background of the Random Walk, future contracts, and forward rate methods. Therefore it could be questionable to an auditor of the process, since the Air Force is using a rate without fully understanding how Global Insight calculates the rate (it would be a “black box” process). Finally, Global Insight consistently calculates a budgeted rate below the actual rate over the short term while the 2 year Random Walk forecast was consistent over the long term. This is preferable than a smaller budget requirement. This leads the research to recommend the average of futures contracts in October as the method to use in creating a budgeted rate. Formulating a budget rate via this method should give a 3.26% reduction to the median APE and avoid a \$34.8 million opportunity cost (assuming the median APE holds for all currencies in the FY13 FCF account).

## **Data Limitations**

Limitation in the data affected how we performed our analysis and the methods chosen. Each data set did not have all the currencies of interest over the required time periods. Global Insight data covered only the shorter period while the OECD interest rates for Japan only went back to 1989. Currency futures for other countries were available from the Chicago Mercantile Exchange (CME) Group although we did not have access to their historical data. The ideal data set would have each countries data (whether future contract prices, interest rates, or exchange rates) for the FY79 to FY14 timeframe. The OSD began publishing the adjusting rates in FY2000, and we could not use those adjusting rates to compare against each method. We therefore used the monthly average rate from the FRB H.10 report as the adjusting rates. The OSD adjusting rates and FRB H.10 monthly average do not give the exact same rate for each currency; however, they can be considered statistically the same in the median monthly rate (see Appendix F).

## **Future Research**

The data for the futures contracts only contained three currencies and the contract were for next month, rather than for next year. The CME Group has additional currencies of interest to the DoD (such as the South Korean Won). Furthermore, CME Group data contains contracts with a variety of maturities to where an analyst could compare which contracts provide the lowest APE (e.g. using a contract with maturities at 3, 6, 9, or 12 months into the future, rather than one month). Funding, though, would be required to secure a subscription before the DoD would know if having the additional data would be economical.

Additional research into this area may focus on using more advanced forecasting techniques or the cost of changing fiscal law to allow risk mitigation techniques employed by private companies. Some research into forecasting exchange rates had success using artificial neural networks. Also, it would be interesting to see an application of the Kalman filter to exchange rate prediction. As for changing fiscal law, the ability to buy actual futures contracts does away with the need to forecast a currency rate. The DoD may have a higher exchange rate at the time of execution, but the budget would accurately reflect the requirement. The FCF could also be liquidated as the DoD would get the exact amount of currency required. Investigating the possible ramifications incurred by not allowing purchase of futures contracts would allow for a cost/benefit analysis.

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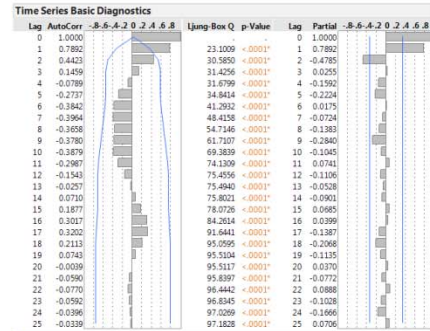
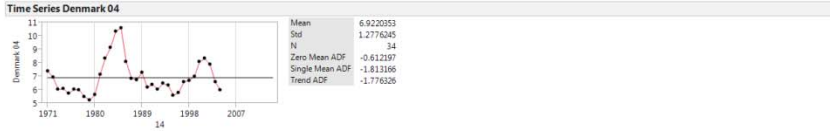
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## Appendix

**Appendix A: ARIMA**

**FY06-FY14**

**Denmark**



**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logLH	Weights	2.A.6.B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	31	0.4733299	75.50537	80.084018	0.732	69.50537	0.224145		7.887191	0.548729
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	30	0.4290269	75.58862	81.664104	0.748	67.58862	0.218270		7.665933	0.529158
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	31	0.4856175	76.81652	81.440714	0.722	70.81652	0.115497		7.948614	0.555896
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	30	0.482279	77.37179	83.477219	0.732	69.37179	0.088162		7.745340	0.530939
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	29	0.5066792	77.594851	83.580881	0.715	69.594851	0.078877		8.186461	0.568752
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	31	0.5176562	78.32284	82.900365	0.707	72.32284	0.054840		8.019509	0.563410
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	29	0.4946755	78.71465	86.346268	0.739	68.71465	0.045033		7.484618	0.520067
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	31	0.6029322	79.054093	82.047108	0.661	75.054093	0.038016		8.501217	0.587841
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	31	0.6151848	79.701737	82.694752	0.655	75.701737	0.027500		8.492477	0.588053
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	30	0.6070781	80.39939	84.759452	0.669	74.29939	0.020699		8.385430	0.579319
<input type="checkbox"/>	<input type="checkbox"/>	MA(1, 2)	30	0.614631	80.697128	85.156651	0.666	74.697128	0.010971		8.430305	0.582352
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	29	0.5930401	80.736328	86.722358	0.687	72.736328	0.016394		8.119438	0.585853
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	30	0.6193229	80.878408	85.347981	0.663	74.878408	0.012399		8.484780	0.586429
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	28	0.5394234	81.119903	89.320441	0.696	71.819903	0.009536		7.731966	0.539804
<input type="checkbox"/>	<input type="checkbox"/>	MA(2, 2)	29	0.6440821	82.598810	86.990018	0.634	76.59881	0.004640		8.872787	0.613470
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	32	0.6948569	82.820851	84.117358	0.598	80.620851	0.006389		8.898599	0.629582
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	29	0.6578917	82.252421	87.226259	0.630	76.92421	0.005487		8.864470	0.612333
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	32	0.6329872	83.828044	86.880796	0.612	78.828044	0.003484		8.597980	0.616032
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	28	0.6514881	83.907169	89.770113	0.642	75.907169	0.003358		8.798822	0.606485
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	28	0.6637085	84.254282	90.117226	0.637	76.254282	0.002823		8.889746	0.612949
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	27	0.6912499	86.993921	94.022010	0.632	76.693921	0.002824		8.948539	0.618028
<input type="checkbox"/>	<input type="checkbox"/>	MA(2, 1)	30	0.8310099	87.057275	89.988747	0.548	83.057275	0.000995		9.471690	0.658137
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	31	0.8841111	87.854587	89.320323	0.504	85.854587	0.000467		11.559993	0.787304
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	29	0.8442477	88.422327	92.818445	0.556	82.422327	0.000351		10.229189	0.700144
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	30	0.8804074	88.706665	91.681817	0.522	84.706665	0.000305		10.798178	0.719384
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	32	0.7724009	90.471367	93.524088	0.551	86.471367	0.000126		10.022893	0.706087
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	33	1.6817887	115.14799	116.67435	0.000	113.14799	0.000000		13.754370	0.980708

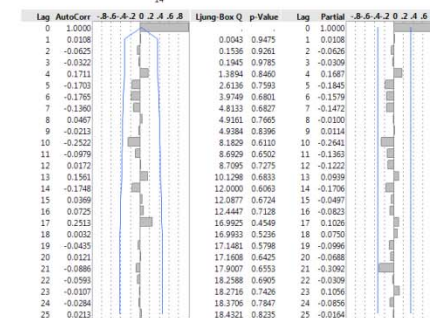
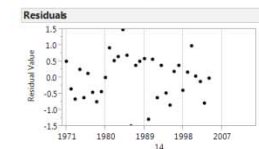
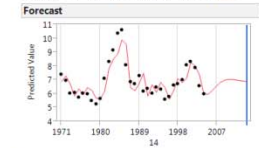
**Model: AR(2)**

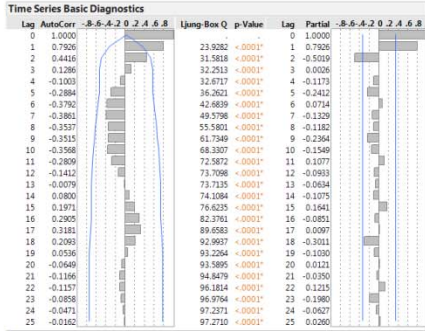
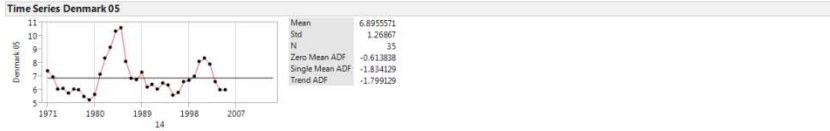
**Model Summary**

DF	31	Stable	Yes
Sum of Squared Errors	14.6732266	Invertible	Yes
Variance Estimate	0.4733298		
Standard Deviation	0.6879874		
Akaike's AIC Information Criterion	75.505369		
Schwarz's Bayesian Criterion	80.0840184		
RSquare	0.7318195		
RSquare Adj	0.71451754		
MAPE	7.88719138		
MAE	0.54872036		
-2LogLikelihood	69.505369		

**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
AR1	1	1.196777	0.1439667	8.31	<.0001*	2.12460551
AR2	2	-0.504341	0.1418775	-3.55	<.0001*	
Intercept	0	6.907800	0.3600180	19.19	<.0001*	





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logLH	Weights	2.A.6.B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	32	0.4585305	76.489463	81.155508	0.736	70.489463	0.229334		7.671349	0.533559
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	31	0.4156605	76.513482	82.734874	0.752	68.513482	0.226597		7.514791	0.518472
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	32	0.4704235	77.887387	82.547851	0.726	71.887387	0.114221		7.758730	0.541884
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	31	0.4696442	78.561394	84.582756	0.737	70.81264	0.089446		7.561723	0.526032
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	30	0.4897994	78.644861	84.750303	0.719	70.644861	0.078001		7.973743	0.553638
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	32	0.5022575	79.458515	84.124559	0.711	73.458515	0.051969		7.875001	0.552023
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	30	0.4732704	79.778822	87.452562	0.743	69.673822	0.046653		7.294490	0.507447
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	32	0.584209	80.323449	83.761070	0.666	76.323449	0.033723		8.300910	0.573476
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	30	0.5350994	80.887212	88.992854	0.698	72.887212	0.025440		8.101044	0.565963
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	32	0.5980986	81.926784	84.145615	0.658	77.926784	0.022953		8.378205	0.578819
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	31	0.5874633	81.498741	85.077822	0.674	74.98741	0.018788		8.147436	0.562809
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	31	0.5958176	81.963935	86.543017	0.670	75.963935	0.014849		8.271740	0.570006
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	31	0.5999588	82.161729	86.740811	0.668	76.161729	0.013451		8.310296	0.573613
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	29	0.5227799	83.28511	90.660334	0.696	73.28511	0.008720		7.634814	0.530628
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	30	0.6230482	83.934769	88.424282	0.639	77.934769	0.005543		8.667727	0.598681
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	32	0.6738716	84.052484	85.578845	0.603	82.052484	0.005226		8.659579	0.612339
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	30	0.6385103	84.408698	88.896220	0.633	78.408698	0.004074		8.737934	0.620443
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	33	0.6145696	85.316108	88.302394	0.637	81.191608	0.002957		8.435969	0.603712
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	29	0.6288678	85.209499	91.195529	0.647	77.209499	0.002950		8.571490	0.590505
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	29	0.6418513	85.618009	91.604040	0.642	77.618009	0.002389		8.698993	0.599123
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	28	0.6706295	86.20086	95.690624	0.625	78.20086	0.005054		8.844677	0.609605
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	31	0.8125335	89.117347	92.110362	0.549	85.117347	0.000415		9.329207	0.647205
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	32	0.867347	89.938046	91.434553	0.505	87.938046	0.000276		11.498384	0.781128
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	30	0.8249634	90.348070	94.835593	0.557	84.34807	0.000225		10.172764	0.693805
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	31	0.8688182	90.979137	93.948152	0.519	86.979137	0.00164		10.890737	0.74284
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	33	0.7595105	92.464686	95.575682	0.552	88.464686	0.000078		9.964163	0.701018
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	34	1.6568625	117.98354	119.53888	0.000	115.98354	0.000000		13.651875	0.972358

Model: AR(2)

Model Summary

DF	32	Stable	Yes
Sum of Squared Errors	14.6731665	Invertible	Yes
Variance Estimate	0.4585304		
Standard Deviation	0.6771532		
Akaike's A' Information Criterion	76.4894634		
Schwarz's Bayesian Criterion	81.1555076		
RSquare	0.7351135		
RSquare Adj	0.71930169		
MAPE	7.67134912		
MAE	0.5335986		
-2LogLikelihood	70.4894634		

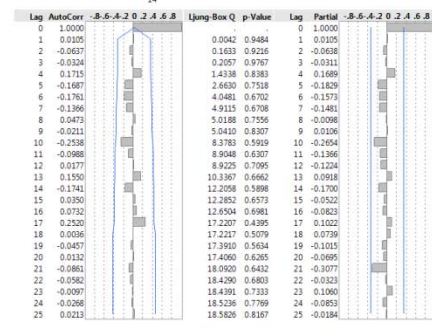
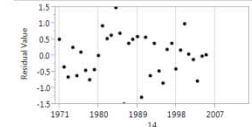
Parameter Estimates

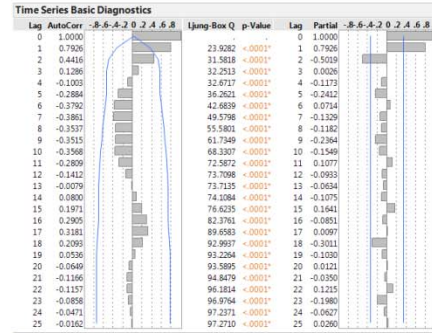
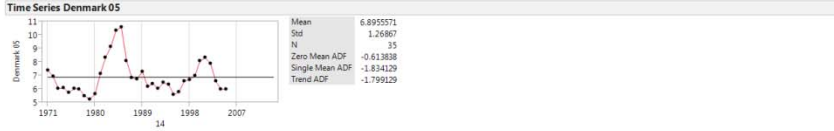
Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
AR1	1	1.197096	0.1405805	8.52	<.0001*	2.12586452
AR2	2	-0.504759	0.1395907	-3.62	<.0001*	
Intercept	0	6.909717	0.3498560	19.75	<.0001*	

Forecast

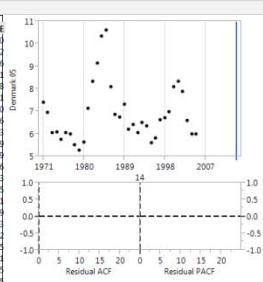


Residuals





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	J.A.B.#	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	32	0.458365	76.489463	81.155508	0.736	70.489463	0.229334		7.671349	0.533559
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	31	0.4156605	76.513482	82.734874	0.752	68.513482	0.226597		7.514791	0.518472
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	32	0.470425	77.886807	82.447851	0.726	71.886807	0.114021		7.758730	0.541059
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	31	0.4696422	76.361304	84.582756	0.737	70.361304	0.089948		7.561233	0.526031
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	30	0.4897994	78.644661	84.750303	0.719	70.644661	0.078060		7.973743	0.553638
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	32	0.5022575	79.458515	84.124559	0.711	73.458515	0.051969		7.875001	0.525262
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	30	0.4731704	78.877822	87.452562	0.743	69.877822	0.046603		7.294480	0.505749
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	32	0.584329	80.323449	83.761707	0.666	76.323449	0.033723		8.300910	0.573476
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	30	0.5350994	80.887212	86.992054	0.698	72.887212	0.025440		8.101044	0.565962
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	32	0.5980988	81.926294	84.458625	0.658	77.926294	0.022953		8.376205	0.578829
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	31	0.5874831	81.488741	86.077822	0.674	75.488741	0.018738		8.147436	0.562809
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	31	0.5958176	81.963935	86.543037	0.670	75.963935	0.014849		8.271740	0.570066
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	31	0.5999988	82.161729	86.740811	0.668	76.161729	0.013451		8.310196	0.573613
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	29	0.5227979	83.285131	90.600334	0.682	73.285131	0.006720		7.634814	0.530622
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	30	0.6230482	83.943769	88.424262	0.639	77.943769	0.005543		8.667727	0.598868
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	33	0.6738716	84.052484	85.578845	0.603	82.052484	0.005226		8.859579	0.612339
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	30	0.6385103	84.408098	88.898220	0.633	78.408098	0.004774		8.737934	0.602412
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	33	0.6145896	85.191608	88.302394	0.637	81.191608	0.002957		8.435569	0.603112
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	29	0.6288678	85.204989	91.195529	0.647	77.204989	0.002950		8.571490	0.590565
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	29	0.6416513	85.618309	91.604040	0.642	77.618309	0.002389		8.698993	0.599124
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	28	0.6706395	88.200288	95.695602	0.532	82.000288	0.000554		8.844677	0.609465
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	31	0.8125335	89.117347	92.110362	0.549	85.117347	0.000415		9.329107	0.647205
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	32	0.867347	89.938046	91.434553	0.505	87.938046	0.000276		11.498384	0.781128
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	30	0.8249634	90.340070	94.835593	0.557	84.340070	0.000225		10.172764	0.693803
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	31	0.8688812	90.979137	93.964152	0.519	86.979137	0.000164		10.890717	0.742895
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	33	0.7595105	92.464686	95.575682	0.552	88.464686	0.000078		9.964163	0.701018
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	34	1.6568625	117.98354	119.53888	0.000	115.98354	0.000000		13.651875	0.972308



Model: AR(2)

Model Summary

DF	32	Stable	Yes
Sum of Squared Errors	14.6731665	Invertible	Yes
Variance Estimate	0.4583645		
Standard Deviation	0.6771532		
Alaika's 'A' Information Criterion	76.4894634		
Schwarz's Bayesian Criterion	81.1555076		
RSquare	0.7351335		
RSquare Adj	0.71930169		
MAPE	7.6713492		
MAE	0.5335486		
-2LogLikelihood	70.4894634		

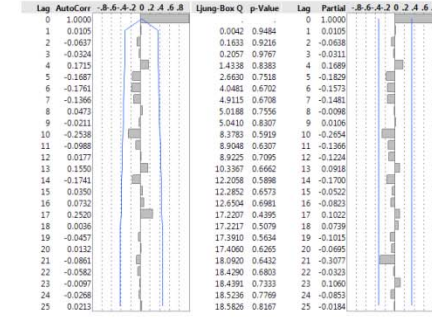
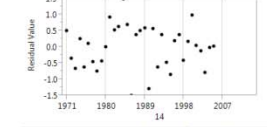
Parameter Estimates

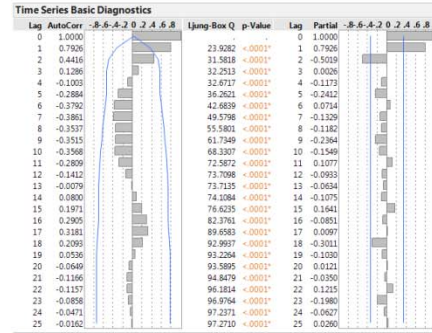
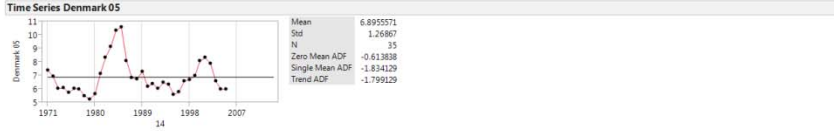
Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.197096	0.140580	8.52	<.0001*		2.12586452
AR2	2	-0.504759	0.139697	-3.62	<.0001*		
Intercept	0	6.909717	0.3498560	19.75	<.0001*		

Forecast

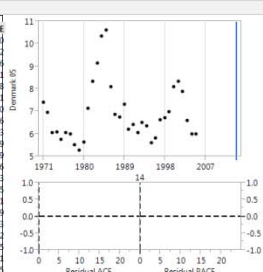


Residuals





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	J.A.B.#	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	32	0.458365	76.489463	81.155508	0.736	70.489463	0.229334		7.671349	0.533559
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	31	0.4156605	76.513482	82.734874	0.752	68.513482	0.226597		7.514791	0.518472
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	32	0.470425	77.886807	82.547851	0.726	71.886807	0.114021		7.758738	0.541859
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	31	0.4696422	76.561304	84.582756	0.737	70.561304	0.089948		7.561723	0.526031
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	30	0.4897994	78.644661	84.750303	0.719	70.644661	0.078060		7.973743	0.553638
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	32	0.5022575	79.458515	84.124559	0.711	73.458515	0.051969		7.875001	0.525262
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	30	0.4731704	78.877822	87.452662	0.743	69.877822	0.046693		7.294480	0.505749
<input type="checkbox"/>	<input type="checkbox"/>	MA(1, 1)	32	0.584329	80.323449	83.761707	0.666	76.323449	0.033723		8.300910	0.573476
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	30	0.5350994	80.887212	86.992054	0.698	72.887212	0.025440		8.101044	0.565962
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	32	0.5980988	81.926294	84.145615	0.658	77.926294	0.022953		8.376205	0.578619
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	31	0.5874631	81.468741	86.077822	0.674	75.468741	0.018738		8.147436	0.562809
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	31	0.5958176	81.963935	86.543017	0.670	75.963935	0.014849		8.271740	0.570066
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	31	0.5999988	82.161729	86.740811	0.668	76.161729	0.013451		8.310196	0.573613
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	29	0.6227979	83.285131	90.600334	0.682	73.285131	0.006720		7.634814	0.530622
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	30	0.6230482	83.934769	88.424262	0.639	77.934769	0.005543		8.667727	0.598868
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	33	0.6738716	84.052484	85.578845	0.603	82.052484	0.005226		8.659579	0.612319
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	30	0.6385103	84.408698	88.898220	0.633	78.408698	0.004774		8.737934	0.610243
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	33	0.6145896	85.191608	88.302394	0.637	81.191608	0.002957		8.435569	0.603112
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	29	0.6288678	85.204989	91.195529	0.647	77.204989	0.002950		8.571490	0.590655
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	29	0.6416513	85.618309	91.604040	0.642	77.618309	0.002389		8.698993	0.599123
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	28	0.6706395	88.200288	95.695602	0.515	82.000288	0.000554		8.844677	0.608465
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	31	0.6125335	89.117347	92.110362	0.549	85.117347	0.000415		9.329107	0.647205
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	32	0.867347	89.938046	91.434553	0.505	87.938046	0.000276		11.498384	0.781128
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	30	0.8249634	90.340070	94.835593	0.557	84.340070	0.000225		10.172764	0.693803
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	31	0.8698182	90.979117	93.964152	0.519	86.979117	0.000164		10.890717	0.742895
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	33	0.7595105	92.464686	95.575682	0.552	88.464686	0.000078		9.964163	0.701018
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	34	1.6568625	117.98354	119.53888	0.000	115.98354	0.000000		13.651875	0.972358



Model: AR(2)

Model Summary

DF	32	Stable	Yes
Sum of Squared Errors	14.6731665	Invertible	Yes
Variance Estimate	0.4583645		
Standard Deviation	0.6771532		
Alaika's 'A' Information Criterion	76.4894634		
Schwarz's Bayesian Criterion	81.1555076		
RSquare	0.7351335		
RSquare Adj	0.71930169		
MAPE	7.6713492		
MAE	0.5335086		
-2LogLikelihood	70.4894634		

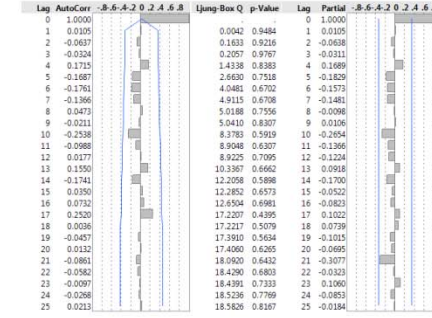
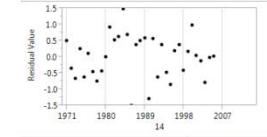
Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.197096	0.140580	8.52	<.0001*		2.12586452
AR2	2	-0.504759	0.139697	-3.62	<.0001*		
Intercept	0	6.909717	0.3498560	19.75	<.0001*		

Forecast

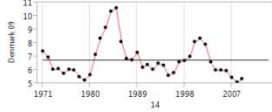


Residuals



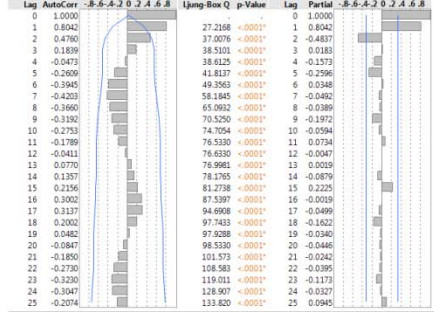


**Time Series Denmark 09**



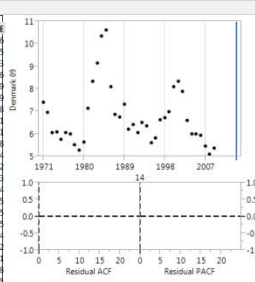
Mean	6.7480487
Std	1.2824243
N	39
Zero Mean ADF	-0.737695
Single Mean ADF	-1.758042
Trend ADF	-1.777192

**Time Series Basic Diagnostics**



**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	Rsquare	-2LogH	Weights	Z.A.6.#	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	36	0.4315239	82.450976	87.441661	0.753	76.450976	0.250656		7.702785	0.525926
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	35	0.4362091	83.937464	90.592171	0.756	75.937464	0.113034		7.499918	0.513285
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	34	0.4518296	84.110047	90.603291	0.743	76.110047	0.109493		7.558976	0.516373
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	35	0.4442629	84.449207	91.153454	0.753	76.449207	0.091253		7.698336	0.525976
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	36	0.4519158	84.668138	89.658222	0.739	78.668138	0.082723		7.921409	0.542839
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	34	0.4368349	85.046187	93.379665	0.761	75.046187	0.067941		7.175235	0.490439
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	36	0.4647831	85.158109	90.148794	0.733	79.158109	0.064769		7.704370	0.531544
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	36	0.5290091	85.756395	89.031367	0.701	81.756395	0.048013		7.899034	0.538521
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	36	0.5429411	86.718731	89.991903	0.693	82.718731	0.029702		7.995948	0.544744
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	34	0.5330461	86.659909	91.772667	0.708	80.659909	0.027650		7.779290	0.530208
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	34	0.5180254	87.201350	93.731894	0.722	79.201350	0.023100		7.714904	0.525261
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	35	0.5382352	87.399136	92.311894	0.704	81.399136	0.021115		7.892744	0.537182
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	35	0.541611	87.599430	92.512188	0.702	81.599430	0.019103		7.911703	0.538923
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	33	0.4719923	84.295139	96.224070	0.729	78.295139	0.015561		7.270065	0.499234
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	34	0.5596964	89.550206	94.383680	0.677	83.550206	0.007200		8.194864	0.559005
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	37	0.611794	90.154267	91.791853	0.645	88.154267	0.005325		8.288370	0.577325
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	34	0.5752038	90.242123	95.073977	0.671	84.242123	0.003099		8.301084	0.564859
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	33	0.5626411	90.767118	97.209890	0.683	82.767118	0.003622		8.125022	0.552834
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	33	0.5744617	91.258531	97.702203	0.679	83.258531	0.003066		8.236757	0.560222
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	37	0.5698785	91.779464	95.108588	0.666	87.779464	0.002363		8.224133	0.578844
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	32	0.5996969	94.025020	102.02629	0.572	84.025020	0.007688		8.431609	0.572796
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	34	0.6445733	94.383707	97.607233	0.615	90.383707	0.006422		8.661022	0.599975
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	34	0.7402854	96.944856	101.77761	0.603	90.944856	0.000179		9.589782	0.646969
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	36	0.7877753	97.161620	98.772538	0.554	95.161620	0.000160		10.891529	0.731041
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	35	0.7878789	98.128627	101.35966	0.567	94.128627	0.000098		10.307516	0.694061
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	37	0.7492173	102.23990	105.56702	0.564	98.239901	0.000013		10.154083	0.699406
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	38	1.6878914	132.07988	133.74344	0.000	130.07988	0.000000		14.035977	0.976088



**Model: AR(2)**

**Model Summary**

DF	36	Stable	Yes
Sum of Squared Errors	15.5348959	Invertible	Yes
Variance Estimate	0.4115239		
Standard Deviation	0.6500478		
Alaika's 'A' Information Criterion	82.450976		
Schwarz's Bayesian Criterion	87.4416609		
Rsquare	0.7529374		
Rsquare Adj	0.73884895		
MAPE	7.7027805		
MAE	0.52592639		
-2LogLikelihood	76.450976		

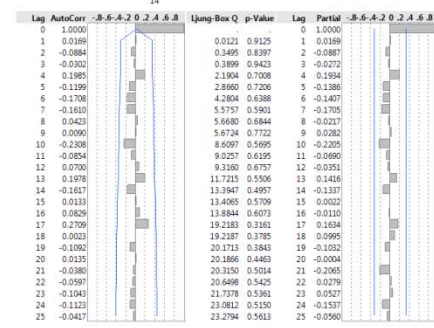
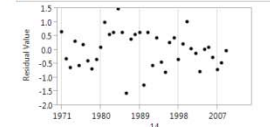
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Pr> t	Constant	Estimate
AR1	1	1.224207	0.1345283	9.10	<0.0001		1.882095217
AR2	2	-0.503383	0.1358225	-3.70	<0.0001		
Intercept	0	6.765853	0.3566321	18.97	<0.0001		

**Forecast**

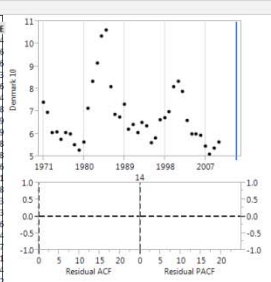


**Residuals**





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	Z.A.6.#	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	37	0.4215136	83.515033	88.581991	0.756	77.515033	0.249441		7.606166	0.518844
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	36	0.4260473	85.011355	91.766673	0.759	77.011355	0.118057		7.413623	0.506576
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	35	0.4348158	85.079814	91.730160	0.747	77.079814	0.114296		7.699654	0.525899
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	36	0.4313941	85.513016	92.268334	0.756	77.513016	0.091850		7.601507	0.518853
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	37	0.4415272	85.810663	90.937701	0.742	79.871063	0.076801		7.817443	0.534996
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	35	0.4254482	86.037247	94.481644	0.765	76.037247	0.070677		7.068593	0.482694
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	37	0.4524626	86.172111	91.212870	0.738	80.172111	0.066668		7.556779	0.520888
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	37	0.5154741	86.949990	90.277113	0.706	82.949990	0.044780		7.783361	0.529539
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	35	0.4721719	87.188830	93.822876	0.732	79.188830	0.040142		7.531133	0.518839
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	37	0.5293538	87.939414	91.280537	0.698	83.939414	0.027031		7.895054	0.536939
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	36	0.5159785	87.992485	92.982930	0.713	81.992485	0.028920		7.835486	0.519728
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	36	0.5237077	88.558827	93.549612	0.709	82.558827	0.020031		7.756729	0.527056
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	36	0.5272223	88.780235	93.770920	0.707	82.780235	0.017933		7.789388	0.529671
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	34	0.509202	89.702065	98.068173	0.730	79.702065	0.012460		7.561891	0.514668
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	35	0.5447655	90.809875	95.722633	0.682	84.809875	0.006500		8.064973	0.550103
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	35	0.5599724	91.527896	96.440655	0.676	85.527896	0.004539		8.189235	0.555733
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	38	0.5988989	91.635796	93.299258	0.650	89.635796	0.004001		8.219359	0.570129
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	34	0.5464611	91.949516	98.516261	0.699	83.949516	0.003947		7.991169	0.542794
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	34	0.5584338	92.494427	99.044771	0.684	84.494427	0.002800		8.108336	0.550587
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	38	0.5548921	92.990628	96.368387	0.672	88.990628	0.002185		8.029695	0.564471
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	33	0.5818777	95.776022	103.46395	0.578	85.776022	0.006997		8.299200	0.562764
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	36	0.716449	97.508602	100.78323	0.601	93.508602	0.000228		8.826151	0.601862
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	35	0.7198345	98.418987	103.33175	0.610	92.418987	0.000145		9.406723	0.633868
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	37	0.7664938	98.720647	100.35823	0.562	96.720647	0.000124		10.614068	0.712313
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	36	0.7457015	99.697893	102.84267	0.575	95.697893	0.000078		10.073703	0.678641
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	38	0.7380055	104.19820	107.57596	0.567	100.19820	0.000008		10.091369	0.693687
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0, 0, 0)	39	1.6760589	135.16018	136.84906	0.000	133.16018	0.000000		14.015542	0.972388



Model: AR(2)

Model Summary

DF	37	Stable	Yes
Sum of Squared Errors	15.5960033	Invertible	Yes
Variance Estimate	0.4215136		
Standard Deviation	0.64924079		
Alaika's 'A' Information Criterion	83.5150531		
Schwarz's Bayesian Criterion	88.5819915		
RSquare	0.75590661		
RSquare Adj	0.74279629		
MAPE	7.6061656		
MAE	0.51884098		
-2LogLikelihood	77.5150331		

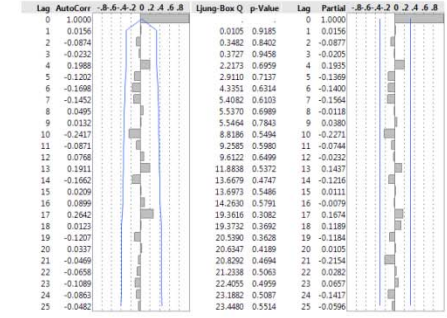
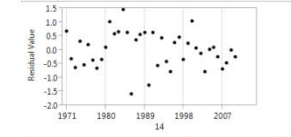
Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.224879	0.133228	9.19	<.0001*		1.83086485
AR2	2	-0.491901	0.133606	-3.72	<.0001*		
Intercept	0	6.743228	0.356344	18.92	<.0001*		

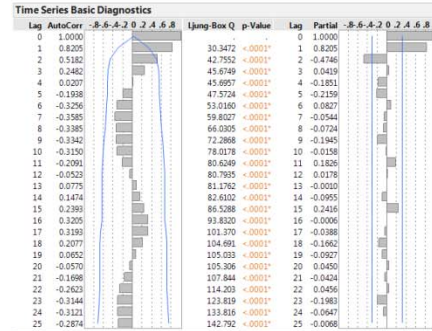
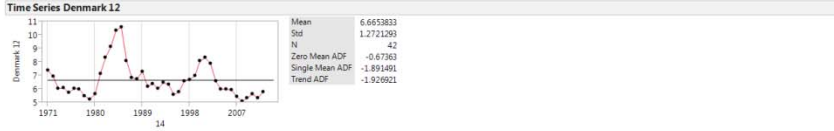
Forecast



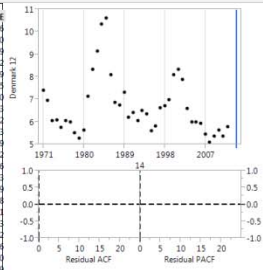
Residuals







Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	Z.A.B.#	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	39	0.4135837	86.656049	91.869058	0.757	80.656049	0.241224		7.616438	0.515174
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	37	0.4278962	88.011900	94.866278	0.750	80.011900	0.122456		7.695241	0.520644
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	38	0.4169719	88.026267	94.869645	0.761	80.026267	0.120793		7.464414	0.505119
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	38	0.4241421	88.272366	95.778045	0.757	80.627266	0.092022		7.604913	0.514462
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	39	0.4385171	88.956756	94.169765	0.742	82.956756	0.076353		7.543563	0.515479
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	37	0.4158102	89.030512	97.718860	0.766	79.030512	0.073589		7.138876	0.482015
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	39	0.4878248	89.400815	94.613824	0.312	83.400815	0.061153		7.904166	0.536080
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	37	0.4558919	89.969959	96.823883	0.737	81.969959	0.046014		7.534277	0.514403
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	39	0.5040794	90.087263	93.514407	0.710	86.087263	0.043385		7.800820	0.526042
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	39	0.513488	91.109780	94.526024	0.703	87.109780	0.023020		7.908587	0.532787
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	38	0.5024031	91.242847	96.383304	0.716	85.242847	0.024351		7.604790	0.518813
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	38	0.5095425	91.801589	96.942305	0.712	85.801589	0.018411		7.804480	0.525522
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	38	0.5118123	91.956262	97.096978	0.711	85.956262	0.017041		7.816466	0.526669
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	36	0.5000241	93.160710	101.2423	0.329	83.160710	0.009095		7.501621	0.503377
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	35	0.455621	93.932973	102.3737	0.713	83.932973	0.006342		7.877286	0.525299
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	37	0.5274866	94.04037	99.106676	0.687	88.04037	0.006012		8.092521	0.545838
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	40	0.5759588	94.692149	96.405721	0.658	92.692149	0.004039		8.125441	0.559313
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	37	0.5416452	94.778172	99.644810	0.681	88.778172	0.004156		8.107025	0.551875
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	36	0.5306004	95.329801	102.07942	0.692	87.329801	0.003164		8.038069	0.541042
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	36	0.5404877	95.774709	102.53023	0.689	87.774709	0.002525		8.128432	0.546956
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	40	0.5332725	95.849233	99.315862	0.305	91.849233	0.002444		7.928626	0.553309
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	38	0.6958453	99.130523	102.50801	0.630	95.130523	0.004072		8.455761	0.577619
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	37	0.6934513	101.96678	107.03342	0.617	95.96678	0.000114		9.305218	0.626238
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	39	0.7475516	102.86429	104.55317	0.567	100.86429	0.000073		10.643603	0.708949
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	38	0.7431012	103.61756	106.99932	0.580	99.61756	0.000096		10.059366	0.712154
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	40	0.7228422	108.39585	111.87119	0.571	104.39585	0.000005		9.957895	0.680077
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	41	1.6577841	141.40898	143.14665	0.000	139.40898	0.000000		14.015194	0.966875



Model: AR(2)

Model Summary

DF	39	Stable	Yes
Sum of Squared Errors	16.1297634	Invertible	Yes
Variance Estimate	0.4135836		
Standard Deviation	0.64310472		
Akaike's A Information Criterion	86.6560492		
Schwarz's Bayesian Criterion	91.8690581		
RSquare	0.7562072		
RSquare Adj	0.74434999		
MAPE	7.61643849		
MAE	0.51517594		
-2LogLikelihood	80.6560492		

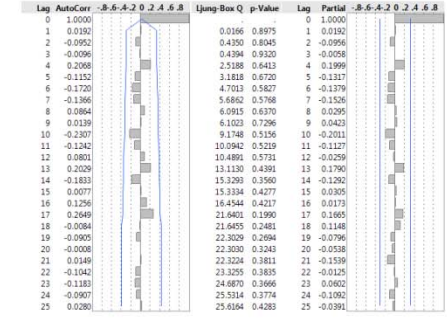
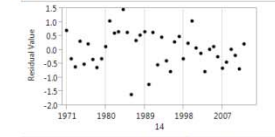
Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.219448	0.1318183	9.25	<.0001*		1.75334799
AR2	2	-0.481156	0.1321826	-3.64	<.0001*		
Intercept	0	6.699629	0.3573538	18.75	<.0001*		

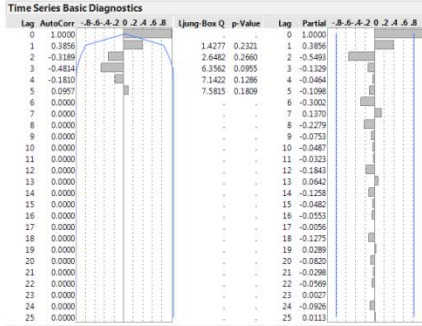
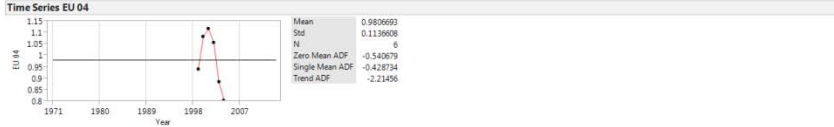
Forecast



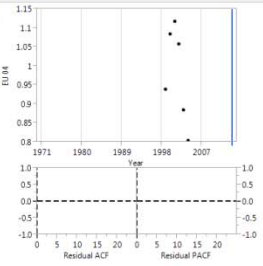
Residuals



## **European Union**



Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	2 .4 .6 .8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	1	0.000531	-16.2325	-17.2746	0.752	-26.2325	0.414283		3.296629	0.034495
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	2	0.006658	-15.87125	-16.70421	0.749	-23.87125	0.345692		3.608240	0.037251
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	3	0.0015505	-14.60531	-15.2823	0.729	-20.60531	0.183401		4.210007	0.042591
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	4	0.007826	-8.54190	-8.957541	0.460	-12.54190	0.008850		7.632362	0.07429
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	3	0.016158	-6.13375	-6.93997	0.584	-14.13375	0.007896		5.420814	0.052623
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0)	5	0.0155025	-7.067182	-7.275422	0.000	-9.067182	0.004236		11.071756	0.105334
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	3	0.008957	-7.040883	-7.665605	0.516	-13.04088	0.004180		6.069259	0.059812
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	2	0.0076179	-6.753008	-7.585970	0.618	-14.75301	0.003620		4.613273	0.045601
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	4	0.0148026	-6.119173	-7.010216	0.272	-10.619173	0.003380		8.616959	0.062451
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1.1)	1	0.0051839	-6.297163	-7.859411	0.626	-14.29716	0.002882		5.769810	0.058964
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	3	0.010323	-6.128161	-6.741867	0.533	-8.128161	0.002649		8.475424	0.075533
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	4	0.0148586	-6.039964	-6.432526	0.222	-8.039964	0.002534		9.599239	0.092601
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	2	0.008666	-6.037628	-7.209314	0.568	-12.03763	0.002531		6.812779	0.067336
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1.2)	0	-5.966074	-7.918885	-6.633	-15.96607	0.002442		5.255754	0.054863	
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	3	0.0131853	-5.517006	-6.296120	0.383	-9.517006	0.001951		7.711803	0.075708
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	3	0.0142354	-5.216079	-6.000203	0.336	-9.228079	0.001689		8.637441	0.085762
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	2	0.0078946	-5.224062	-6.451474	0.672	-9.224062	0.001685		7.601945	0.069149
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	2	0.0088222	-5.197234	-6.388921	0.494	-11.19723	0.001693		7.835487	0.078097
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	2	0.0124632	-4.630037	-5.657448	0.575	-8.430037	0.001133		8.236659	0.073785
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1.1)	2	0.0181237	-3.804436	-4.976123	0.401	-9.804436	0.000829		8.589312	0.084559
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	1	0.0079988	-3.578935	-4.420051	0.737	-9.578935	0.000740		6.765405	0.062282
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	1	0.0251291	-2.545440	-3.886557	0.564	-8.54544	0.000442		8.137753	0.072977
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2.1)	1	0.0309696	-2.128161	-3.969278	0.523	-8.128161	0.000358		8.475424	0.075533
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1.2)	1	0.0306359	-2.033490	-3.595739	0.443	-10.03349	0.000342		6.100087	0.059711
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2.2)	0	-1.426209	-3.881031	-6.697	-9.426209	0.000252		7.364682	0.067385	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2.1)	0	1.361982	-3.820705	-7.70395	0.737	-9.361982	0.000245		7.175638	0.069433
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2.2)	1	-0.012274	0.571064	-2.497464	0.700	-9.428936	0.000093		7.323949	0.067214



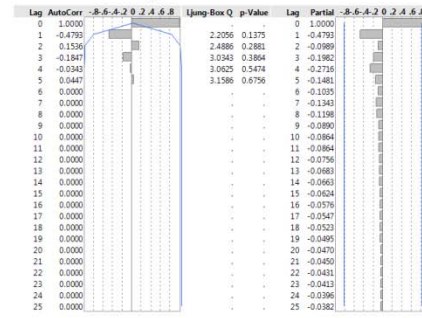
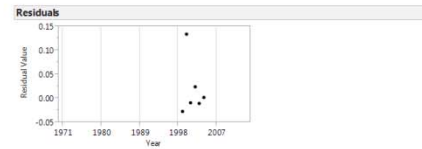
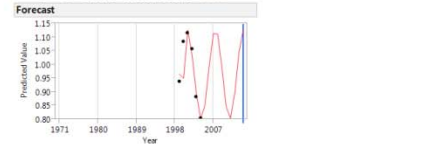
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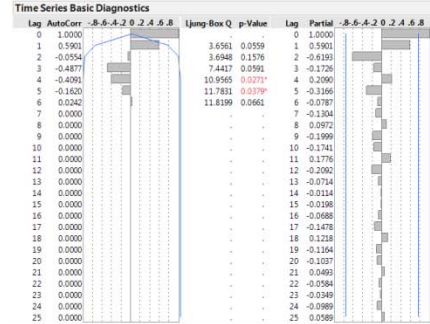
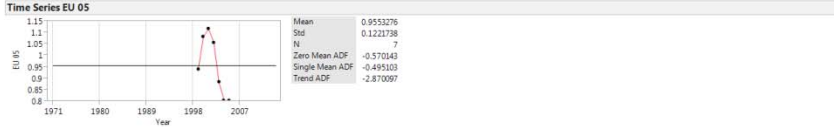
**Model Summary**

DF	1	Stable	Yes
Sum of Squared Errors	0.00051308	Invertible	Yes
Variance Estimate	0.00051308		
Standard Deviation	0.02261127		
Akaike's AIC Information Criterion	-16.232525		
Schwarz's Bayesian Criterion	-17.274458		
RSquare	0.75211845		
RSquare Adj	-0.2394077		
MAPE	3.29662915		
MAE	0.03445522		
-2LogLikelihood	-26.232525		

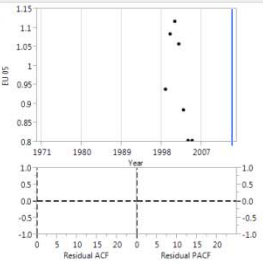
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Estimate
Constant						0.80060181
AR1	1	1.170410	0.0786188	14.89	0.0427	
AR2	2	-0.999040	0.0021991	-45.3	0.0014	
MA1	1	1.637674	0.8095178	2.00	0.2953	
MA2	2	-0.999982	0.7970806	-1.25	0.4284	
Intercept	0	0.966175	0.0085820	112.58	0.0017	





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	2	0.0003289	-21.80720	-22.07765	0.805	-31.8072	0.636701	3.025195	0.051021
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	3	0.0003119	-20.04472	-20.28108	0.784	-28.0472	0.266416	3.073755	0.034829
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	4	0.0017946	-17.52075	-17.68302	0.762	-23.52075	0.0746701	4.308280	0.041768
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	4	0.0046695	-11.99506	-12.15733	0.693	-17.99506	0.004713	5.079802	0.049178
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	3	0.0049996	-10.74017	-10.95743	0.715	-18.74017	0.002517	3.943078	0.038622
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	5	0.0079583	-10.24551	-10.33369	0.499	-14.24551	0.001965	7.932772	0.075871
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	1	0.002734	-10.16781	-11.20901	0.731	-20.16781	0.001890	5.175186	0.052051
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	4	0.0085045	-9.851154	-10.01342	0.614	-15.85115	0.001613	5.930694	0.057344
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	2	0.0038225	-9.79462	-10.58952	0.700	-17.79462	0.001399	5.895968	0.057934
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	5	0.0114757	-9.202728	-9.310007	0.450	-13.20273	0.001167	7.895384	0.074641
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	3	0.0072089	-9.051163	-9.675884	0.638	-15.05116	0.001081	6.787016	0.065122
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	3	0.0006226	-8.677407	-9.312131	0.607	-14.67741	0.000902	6.900010	0.068337
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	5	0.0118416	-8.683490	-8.891731	0.432	-10.68349	0.000900	8.487281	0.081789
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	4	0.0098021	-8.613059	-9.028410	0.552	-12.61306	0.000868	6.593701	0.064425
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	4	0.0112758	-7.984486	-8.402967	0.513	-11.98449	0.000634	7.873568	0.076769
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0)	6	0.0174442	-7.587208	-7.621297	0.000	-9.587208	0.000515	11.848466	0.112008
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	4	0.0112958	-7.342967	-7.733529	0.471	-9.342967	0.000460	10.391368	0.092723
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	3	0.0125639	-6.077511	-6.858055	0.569	-12.88811	0.000385	7.342841	0.071776
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	3	0.0129618	-5.942547	-6.723071	0.533	-9.942547	0.000229	8.740766	0.079468
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	2	0.0159758	-5.188545	-6.021508	0.591	-13.18855	0.000157	5.476918	0.053199
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	2	0.0107024	-4.593886	-5.765492	0.603	-10.59389	0.000116	8.561422	0.077548
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	2	0.0169867	-4.443536	-5.153222	0.592	-10.44434	0.000108	8.333829	0.074697
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	2	0.0188052	-4.083745	-5.254311	0.548	-10.08374	0.000090	8.664346	0.077011
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	0	-3.007947	-4.960758	-	0.715	-13.00795	0.000053	6.113295	0.059599
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	1	0.0217828	-2.612956	-4.173105	0.569	-10.61296	0.000043	8.217964	0.074266
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	1	0.0452555	-1.334963	-2.897212	0.470	-9.334963	0.000023	6.466281	0.053214



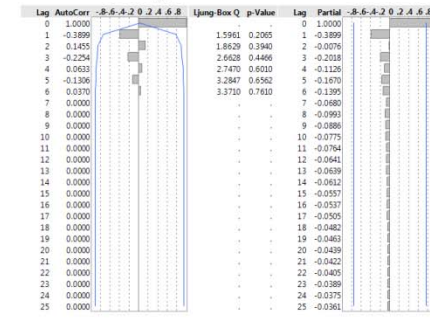
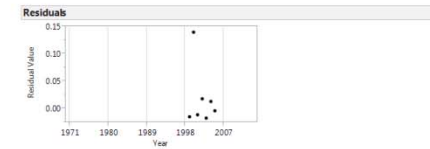
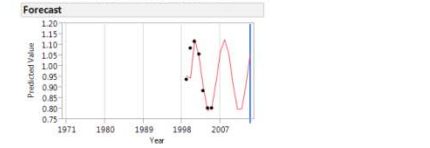
### Model: ARMA(2, 2)

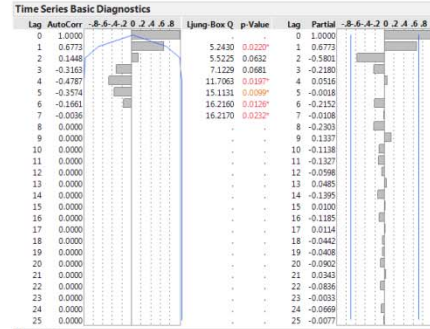
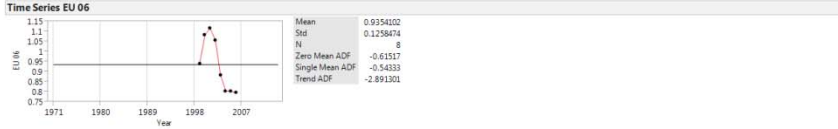
#### Model Summary

DF	2	Stable	Yes
Sum of Squared Errors	0.00065729	Invertible	Yes
Variance Estimate	0.00032885		
Standard Deviation	0.01813286		
Akaike's AIC	-21.807203		
Schwarz's Bayesian Criterion	-22.077652		
RSquare	0.8047831		
RSquare Adj	0.41434911		
MAPE	3.02519475		
MAE	0.03102709		
-2LogLikelihood	-31.807203		

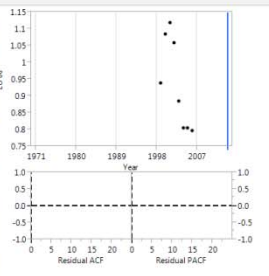
#### Parameter Estimates

Term	Lag	Estimate	Std Error	t-Ratio	Prob> t	Estimate
AR1	1	1.263955	0.0354913	35.60	<0.0001	0.70177324
AR2	2	-0.991915	0.0117395	-87.44	<0.0001	
MA1	1	1.663834	0.6400905	2.60	0.1216	
MA2	2	-0.999967	0.6173979	-1.62	0.2467	
Intercept	0	0.954148	0.003621	283.80	<0.0001	





Report	Graph	Model	DF	Variance	AIC	SBC	Rsquare	-2LogLH	Weights	2.A.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	4	0.001822	-18.25480	-17.93704	0.777	-26.2548	0.319396	4.371297	0.040941	
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	5	0.003233	-17.62355	-17.38502	0.735	-23.62355	0.232922	5.017502	0.040779	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	3	0.000929	-17.53134	-17.13494	0.795	-27.53134	0.222472	3.708821	0.032211	
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	5	0.004747	-14.09085	-13.85253	0.692	-20.99085	0.038823	5.823187	0.055120	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	5	0.004487	-13.29606	-13.05774	0.670	-19.29606	0.026764	5.416053	0.052025	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	4	0.004576	-12.20248	-12.04771	0.717	-21.20248	0.025411	4.823861	0.045564	
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	6	0.0071171	-12.96332	-12.80443	0.555	-16.96332	0.022662	7.881750	0.074083	
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	4	0.0061091	-12.25179	-12.41406	0.672	-18.25179	0.015878	6.390433	0.060058	
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	6	0.0097956	-11.98479	-11.82591	0.537	-15.98479	0.013894	7.418909	0.069519	
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	5	0.0078004	-11.88059	-11.94877	0.631	-15.88059	0.013188	5.829727	0.059671	
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	6	0.0099014	-11.51990	-11.57359	0.531	-13.51990	0.011010	7.517942	0.071974	
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	4	0.005272	-11.45534	-11.61761	0.651	-17.45534	0.010662	7.189713	0.068501	
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	5	0.0090104	-11.10715	-11.21540	0.597	-15.10715	0.009959	6.968429	0.067613	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	4	0.0088006	-10.33246	-10.49473	0.641	-16.33246	0.006082	6.488367	0.063047	
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	5	0.0091207	-10.24992	-10.45816	0.549	-12.24992	0.005836	9.081576	0.081011	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	2	0.003718	-9.986361	-10.25961	0.707	-19.98636	0.005115	5.461149	0.051973	
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	4	0.0094139	-9.18272	-9.634753	0.618	-13.18272	0.003484	7.344184	0.065282	
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	4	0.0098312	-9.011005	-9.427486	0.603	-13.01101	0.003141	7.801340	0.068788	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	7	0.0181001	-8.459990	-8.380508	0.000	-10.45999	0.002385	12.253873	0.113768	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	3	0.008837	-8.39332	-8.605602	0.645	-16.39332	0.002302	5.673296	0.052344	
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	3	0.0114831	-7.594799	-8.219520	0.644	-13.5948	0.001547	7.169945	0.064155	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	1	0.0061736	-7.491083	-8.532285	0.756	-17.49108	0.001499	5.347301	0.050346	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	2	0.0079731	-7.479003	-8.311965	0.727	-15.479	0.001460	6.013684	0.055585	
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	3	0.0134809	-7.249600	-7.874352	0.620	-13.24963	0.001302	7.271993	0.064310	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	3	0.016149	-6.947242	-7.163602	0.618	-14.94724	0.001119	7.763556	0.072595	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	3	0.0130287	-6.585638	-7.210390	0.572	-12.58564	0.000934	8.950652	0.080727	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	2	0.0147846	-5.876822	-6.709884	0.655	-13.87682	0.000655	7.618236	0.068862	



Model: ARMA(2, 1)

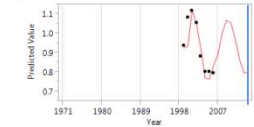
Model Summary

DF	4	Stable	Yes
Sum of Squared Errors	0.0075288	Invertible	Yes
Variance Estimate	0.001822		
Standard Deviation	0.04338433		
Akaike's Information Criterion	-18.254803		
Schwarz's Bayesian Criterion	-17.937026		
RSquare	0.77711843		
RSquare Adj	0.69995725		
MAPE	4.37129721		
MAE	0.04094205		
-2LogLikelihood	-26.254803		

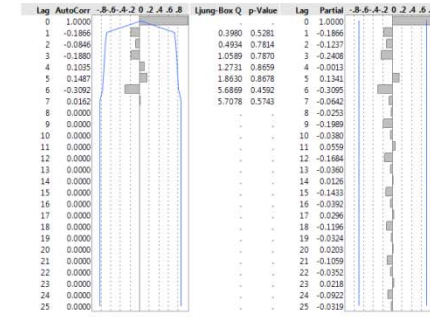
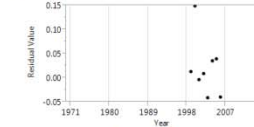
Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Estimate	Constant
AR1	1	1.430542	0.0844256	16.94	<0.0001*	0.49444391	
AR2	2	-0.964474	0.0394163	-24.47	<0.0001*		
MA1	1	0.999992	0.4433907	2.26	0.0871		
Intercept	0	0.927625	0.0117194	79.92	<0.0001*		

Forecast



Residuals

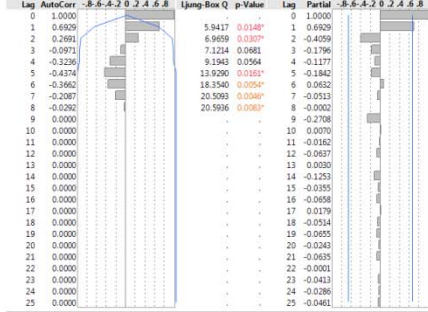


**Time Series EU 07**



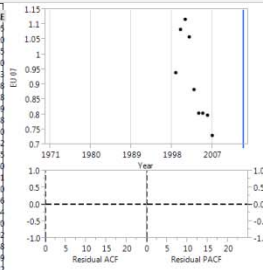
Mean	0.9125136
Std	0.1351734
N	9
Zero Mean ADF	-0.836752
Single Mean ADF	-0.341099
Trend ADF	-3.118042

**Time Series Basic Diagnostics**



**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	Z	A	B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	6	0.0046715	-17.57613	-16.99445	0.710	-23.57613	0.176403				6.479836	0.057695
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	6	0.0043371	-16.79963	-16.18826	0.716	-22.77993	0.118472				6.188534	0.057919
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	5	0.0038364	-16.30038	-15.57148	0.734	-24.36038	0.096053				5.498838	0.050285
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	5	0.0032549	-15.90022	-15.16132	0.711	-23.90022	0.078243				6.232464	0.056633
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	5	0.0046747	-15.75505	-15.51672	0.725	-21.75505	0.070968				6.120044	0.057333
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	4	0.0045337	-15.25092	-14.20480	0.744	-25.25092	0.055156				5.745807	0.051798
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	5	0.0042322	-15.14618	-14.21105	0.731	-21.14618	0.051243				6.010282	0.062218
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	6	0.0068292	-15.11746	-14.52579	0.685	-21.11746	0.051596				6.033481	0.055569
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	6	0.0071668	-14.64629	-14.48740	0.691	-18.64629	0.040766				5.882034	0.054888
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	4	0.0039032	-14.56642	-14.24806	0.716	-22.56642	0.039170				5.424825	0.051839
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	7	0.0087544	-14.27086	-14.19142	0.626	-16.27086	0.031378				7.344875	0.046792
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	7	0.0093183	-13.90303	-13.50858	0.590	-17.90303	0.028113				7.840465	0.071485
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	6	0.0081524	-13.76297	-13.60408	0.661	-17.76297	0.026211				6.959843	0.055109
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	7	0.0052341	-13.29154	-12.89710	0.527	-17.29154	0.027071				8.967774	0.026421
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	6	0.0077963	-13.21962	-13.27371	0.639	-15.21962	0.019976				8.409756	0.073618
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	4	0.0053064	-13.15038	-12.83262	0.721	-21.15038	0.019296				6.593403	0.062096
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	5	0.0078115	-13.13728	-12.89896	0.691	-19.13728	0.019170				6.856441	0.062294
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	5	0.0079669	-12.74688	-12.48306	0.695	-16.74688	0.013304				6.843938	0.059520
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	5	0.0081107	-12.06654	-12.17472	0.681	-16.06654	0.011223				7.183023	0.061992
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	3	0.0056998	-11.20694	-11.44330	0.777	-19.20694	0.007376				5.439897	0.049868
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	4	0.0056566	-10.99613	-11.15985	0.517	-16.99613	0.006973				6.173994	0.055169
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	4	0.0095679	-10.39747	-10.55973	0.696	-16.39747	0.004872				6.622173	0.057362
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	4	0.0068817	-9.90821	-10.07209	0.665	-15.90821	0.003816				7.769934	0.049935
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	3	0.0143831	-9.07216	-8.80008	0.736	-19.07216	0.002518				6.875452	0.061717
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	8	0.0209798	-8.48963	-8.213429	0.000	-10.48965	0.001868				13.416242	0.124489
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	3	0.0131543	-8.382978	-8.599337	0.694	-16.38298	0.001779				6.818687	0.059075
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	2	0.0232989	-5.219652	-5.490101	0.639	-15.21965	0.000366				8.409739	0.073618



**Model: AR(2)**

**Model Summary**

DF	6	Stable	Yes
Sum of Squared Errors	0.02802871	Invertible	Yes
Variance Estimate	0.00467145		
Standard Deviation	0.06834801		
Akaike's 'A' Information Criterion	-17.576129		
Schwarz's Bayesian Criterion	-16.984455		
RSquare	0.70958317		
RSquare Adj	0.61274423		
MAPE	6.47983629		
MAE	0.05769506		
-2LogLikelihood	-23.576129		

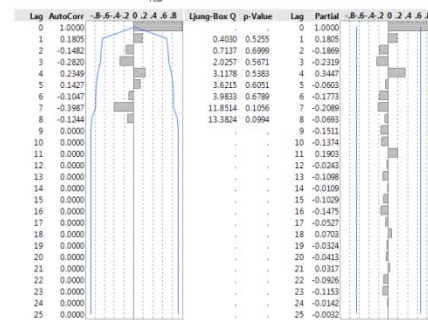
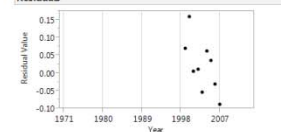
**Parameter Estimates**

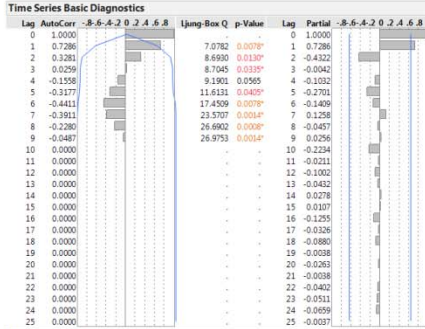
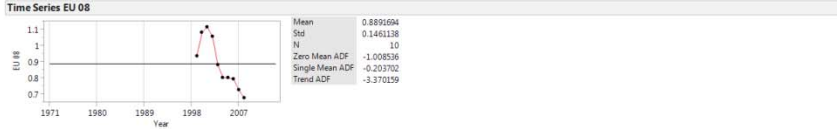
Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
AR1	1	1.391677	0.207876	6.70	0.0002*	0.3361266
AR2	2	-0.789601	0.193742	-4.03	0.0004*	
Intercept	0	0.868953	0.0551555	15.75	<.0001*	

**Forecast**

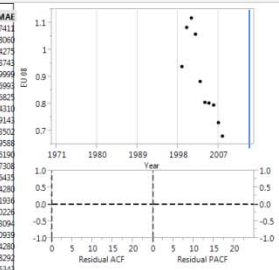


**Residuals**





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logH	Weights	J.A.B.#	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	7	0.0041425	-20.90957	-20.00182	0.750	-26.90957	0.173426		6.560421	0.057411
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2)	6	0.0031831	-20.43415	-19.22381	0.786	-28.43415	0.136734		5.282358	0.048690
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1)	6	0.0040289	-19.74169	-18.53126	0.780	-27.74169	0.096719		6.093910	0.054275
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	6	0.0043059	-19.49157	-18.89990	0.789	-29.49157	0.085349		5.874323	0.053742
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	7	0.0044189	-19.10502	-18.19726	0.749	-25.10502	0.070349		6.636241	0.059999
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1,2)	6	0.0035858	-18.91776	-18.32609	0.786	-24.91776	0.064061		6.146529	0.056963
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1,1)	5	0.0031157	-18.87955	-18.86615	0.781	-26.87955	0.063708		4.940268	0.046825
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1,1)	7	0.0058115	-18.44689	-17.53913	0.738	-24.44689	0.050623		6.009069	0.054110
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1,1)	7	0.0061325	-18.09493	-17.70048	0.760	-22.09493	0.042454		5.264854	0.049144
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	8	0.0077246	-17.28926	-17.60203	0.787	-19.28926	0.028377		6.867480	0.062052
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	7	0.0069788	-17.06961	-16.47416	0.734	-21.06961	0.025413		6.402010	0.059588
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,2)	5	0.0043526	-16.94410	-16.15520	0.788	-24.9441	0.023879		6.044330	0.056190
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2)	5	0.0079918	-16.84607	-15.33314	0.813	-26.84607	0.022737		5.333560	0.047308
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,1)	6	0.0050125	-16.64651	-16.07684	0.767	-22.64651	0.022008		6.059828	0.056415
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1,2)	4	0.0023431	-16.25528	-15.26915	0.745	-26.25528	0.016922		5.647511	0.054283
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	8	0.0086985	-16.16671	-15.56154	0.649	-20.16671	0.016189		8.088094	0.071936
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	7	0.0069276	-16.14320	-16.66376	0.708	-16.1432	0.018000		8.153851	0.070229
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	8	0.0084785	-15.15667	-14.55180	0.585	-19.15667	0.009771		9.268825	0.083304
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2,1)	6	0.0070226	-15.12312	-14.86424	0.741	-19.12312	0.009607		7.163346	0.060939
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,2)	6	0.0073287	-14.83375	-14.67487	0.731	-18.83375	0.008312		7.592126	0.064288
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,2)	5	0.0078606	-13.71270	-13.42423	0.755	-19.7127	0.004746		6.732009	0.052582
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,1)	4	0.0060218	-13.17135	-12.85359	0.781	-21.17135	0.003621		6.279219	0.055343
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2,2)	5	0.0083526	-13.15081	-12.91249	0.741	-19.15081	0.003584		7.178093	0.060704
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,1)	5	0.0084121	-13.12919	-12.89087	0.741	-19.12919	0.003545		7.154251	0.060619
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,2)	4	0.0083476	-12.90308	-11.74511	0.766	-20.90308	0.002060		7.039683	0.041296
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,2)	3	0.0042344	-11.66007	-11.26287	0.782	-21.66007	0.001701		6.697853	0.058556
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0,0,0)	9	0.0237214	-8.88817	-7.786032	-0.00	-10.88862	0.000285		14.603805	0.128007



Model: AR(2)

Model Summary

DF	7	Stable	Yes
Sum of Squared Errors	0.02899769	Invertible	Yes
Variance Estimate	0.00414253		
Standard Deviation	0.00436247		
Akaike's A Information Criterion	-20.909573		
Schwarz's Bayesian Criterion	-20.001818		
RSquare	0.74997794		
RSquare Adj	0.67854307		
MAPE	6.56042128		
MAE	0.05741091		
-2LogLikelihood	-26.909573		

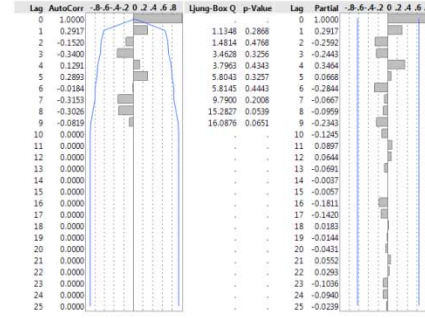
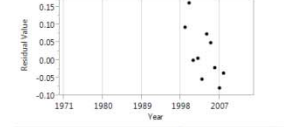
Parameter Estimates

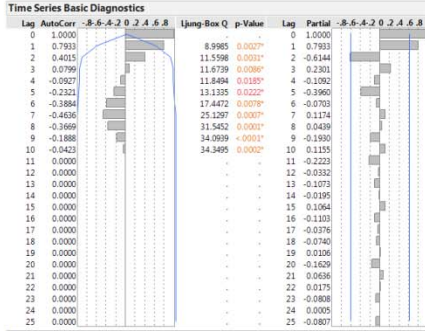
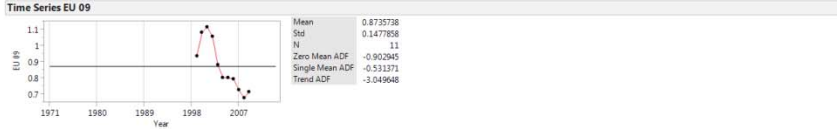
Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.461853	0.181070	8.07	<.0001*		0.2889862
AR2	2	-0.833207	0.175823	-4.71	<.0001*		
Intercept	0	0.846534	0.0560032	15.12	<.0001*		

Forecast



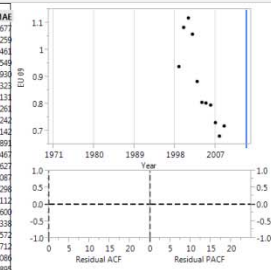
Residuals





### Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logH	Weights	Z.A.6.B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	8	0.036497	-24.83452	-23.64063	0.781	-30.83452	0.198685		6.196460	0.053677
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2)	7	0.0027507	-24.67754	-23.88596	0.814	-32.67754	0.183686		4.901817	0.044259
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	7	0.0037286	-23.78762	-22.95644	0.790	-31.78762	0.117080		5.715687	0.050461
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2)	6	0.0031395	-23.10063	-21.11115	0.802	-33.10063	0.083646		5.458208	0.045949
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	8	0.0038793	-22.85894	-21.66525	0.772	-28.85894	0.073900		6.196305	0.055930
<input type="checkbox"/>	<input type="checkbox"/>	IRMA(1,2)	7	0.0032142	-22.55330	-21.64554	0.809	-28.5533	0.063504		5.957624	0.054243
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,1)	7	0.0040554	-22.46771	-21.55995	0.804	-28.46771	0.060643		6.092389	0.054121
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	8	0.0050566	-22.13935	-20.84566	0.768	-28.13935	0.051612		5.587036	0.050261
<input type="checkbox"/>	<input type="checkbox"/>	IRMA(2,1,1)	6	0.0032425	-21.50985	-20.29551	0.800	-29.50985	0.037814		5.406911	0.048342
<input type="checkbox"/>	<input type="checkbox"/>	IRMA(1,1)	8	0.0039687	-21.05000	-20.44480	0.774	-25.05	0.029948		5.664314	0.051142
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	9	0.0073206	-19.84558	-19.54300	0.720	-21.84558	0.016399		7.150341	0.063891
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,1)	8	0.0067142	-19.58286	-18.97769	0.748	-23.58286	0.014381		6.740973	0.060467
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,1)	7	0.0059827	-19.54846	-18.64071	0.778	-25.54846	0.014136		6.146749	0.055627
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	9	0.0077385	-19.33479	-18.33900	0.689	-23.3479	0.012703		7.455266	0.066687
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1,2)	5	0.0027814	-18.59101	-17.07809	0.786	-28.59101	0.008758		5.853209	0.052298
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,2)	6	0.0059934	-18.20517	-16.99483	0.794	-26.20517	0.007221		5.119061	0.046112
<input type="checkbox"/>	<input type="checkbox"/>	E(2)	8	0.0074845	-17.57349	-17.37626	0.674	-19.57349	0.005269		8.8681274	0.073900
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	9	0.0068106	-17.47705	-16.68126	0.600	-21.47705	0.005018		6.145896	0.051518
<input type="checkbox"/>	<input type="checkbox"/>	IRMA(2,1)	7	0.0070055	-17.13067	-16.73622	0.723	-21.13067	0.004220		7.598842	0.063572
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,2)	7	0.0075675	-16.53784	-16.14339	0.705	-20.53784	0.003137		8.382760	0.069712
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,2)	6	0.0070799	-16.12841	-15.36731	0.704	-22.12841	0.002557		6.769551	0.058286
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,1)	5	0.0060062	-14.81284	-14.02395	0.750	-22.81284	0.001324		7.441581	0.063895
<input type="checkbox"/>	<input type="checkbox"/>	IRMA(2,2)	6	0.0069607	-14.73218	-14.14050	0.697	-20.73218	0.001272		7.527869	0.065316
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,1)	6	0.007895	-14.48509	-13.89442	0.702	-20.48509	0.001124		8.573443	0.071413
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,2)	5	0.0080414	-13.91206	-13.12317	0.748	-21.91206	0.000844		7.159403	0.061238
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,2)	4	0.0076433	-12.84666	-11.86054	0.753	-22.84666	0.000495		7.365964	0.063263
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0,0,0)	10	0.0240247	-8.847162	-8.449267	0.000	-10.84716	0.000007		14.900603	0.129483



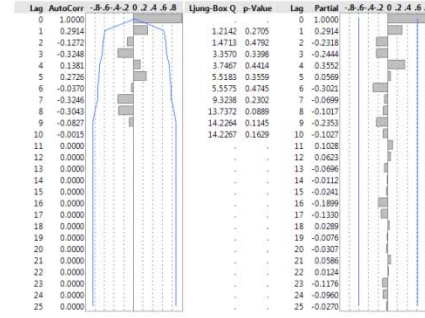
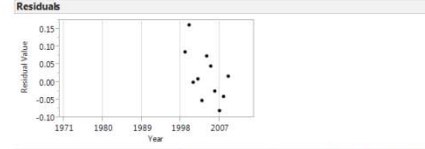
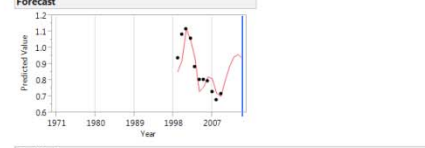
### Model: AR(2)

#### Model Summary

DF	8	Stable	Yes
Sum of Squared Errors	0.02919726	Invertible	Yes
Variance Estimate	0.0334996		
Standard Deviation	0.06041239		
Akaike's A' Information Criterion	-24.834518		
Schwarz's Bayesian Criterion	-23.640832		
RSquare	0.78075868		
RSquare Adj	0.72569835		
MAPE	6.19645991		
MAE	0.0536773		
-2LogLikelihood	-30.834518		

#### Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob >  H	Constant	Estimate
AR1	1	1.451413	0.1625288	8.93	<.0001*		0.30986374
AR2	2	-0.814118	0.1963899	-4.89	<.001*		
Intercept	0	0.854272	0.0455723	18.75	<.0001*		

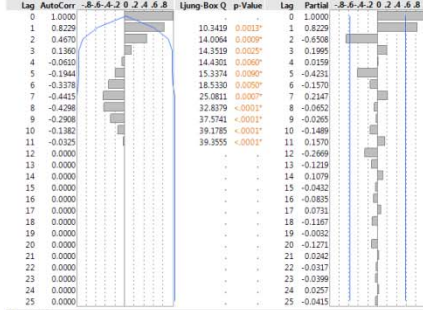


Time Series EU 10



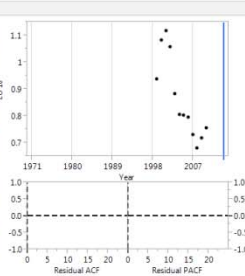
Mean 0.8636169  
 Std 0.1452967  
 N 12  
 Zero Mean ADF -0.794678  
 Single Mean ADF -0.74596  
 Trend ADF -2.298166

Time Series Basic Diagnostics



Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	Rsquare	2LogL	Weights	2.A.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	8	0.0024356	-28.84684	-26.90722	0.814	-36.84684	0.254129		4.824909	0.043329
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	9	0.0034628	-28.34876	-26.89404	0.780	-34.48076	1.198105		6.108551	0.042049
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	7	0.0029778	-28.61969	-24.21186	0.799	-36.61969	0.084322		5.482339	0.044803
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	8	0.0028304	-26.61337	-25.41969	0.815	-32.61337	0.083188		5.570960	0.055557
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	8	0.0039621	-26.51398	-25.32029	0.811	-32.51398	0.079155		5.615331	0.049828
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	9	0.0035829	-26.42637	-24.97355	0.775	-32.42637	0.073035		5.907148	0.053879
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	9	0.0044734	-25.93635	-24.48163	0.778	-31.93635	0.056299		5.193788	0.046679
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	7	0.0039294	-24.71485	-23.12327	0.809	-32.71485	0.032196		5.592252	0.049509
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	8	0.0059302	-24.62240	-23.82661	0.785	-28.62240	0.030742		5.312650	0.047921
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	6	0.0032596	-24.05716	-22.06789	0.812	-34.05716	0.023173		5.227969	0.046751
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	8	0.0052388	-23.22469	-22.03090	0.788	-29.22469	0.015283		5.652728	0.051035
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	9	0.0059726	-22.96906	-22.17327	0.758	-26.96906	0.013450		6.426930	0.057397
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	10	0.0069041	-22.57733	-21.60752	0.706	-26.57733	0.011057		6.960562	0.061472
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	10	0.0069004	-22.56962	-22.17172	0.721	-24.56962	0.011015		7.164218	0.062501
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	9	0.0066623	-20.78780	-20.48521	0.686	-22.78780	0.004519		7.906903	0.067016
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	7	0.0048929	-20.66657	-19.07499	0.783	-28.66657	0.004253		5.434488	0.048814
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	8	0.0065113	-20.43685	-19.83168	0.711	-24.43685	0.001792		7.159563	0.059441
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	10	0.0074709	-20.32934	-19.33952	0.609	-24.32934	0.003593		8.725045	0.077490
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	8	0.0067107	-19.78507	-19.17990	0.714	-23.78507	0.002737		7.817558	0.064754
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	7	0.0061419	-18.57671	-18.68696	0.758	-25.57671	0.003466		6.355305	0.054230
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	8	0.0089536	-19.19939	-17.45976	0.717	-27.19939	0.002257		6.703237	0.058705
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	6	0.0049274	-18.63089	-17.42055	0.758	-26.63089	0.001537		6.733948	0.057782
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	7	0.0071004	-18.43687	-17.52911	0.731	-24.43687	0.001395		7.160677	0.059469
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	7	0.0050044	-18.13189	-17.50773	0.712	-24.13189	0.001148		7.176956	0.059646
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	6	0.0066761	-17.46900	-16.25866	0.752	-25.46900	0.000860		6.457973	0.055230
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	5	0.0059888	-16.64862	-15.13569	0.761	-26.64862	0.000570		6.689002	0.057413
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	11	0.0230303	-10.24094	-9.756209	0.000	-12.24094	0.000023		14.618573	0.126994



Model: ARMA(1, 2)

Model Summary

DF 8 Stable Yes  
 Sum of Squared Errors 0.01948502 Invertible Yes  
 Variance Estimate 0.00243563  
 Standard Deviation 0.04935208  
 Akaike's Information Criterion -28.846843  
 Schwarz's Bayesian Criterion -26.907216  
 RSquare 0.8137123  
 RSquare Adj 0.74285441  
 MAPE 4.82490902  
 MAE 0.04332947  
 -2LogLikelihood -36.846843

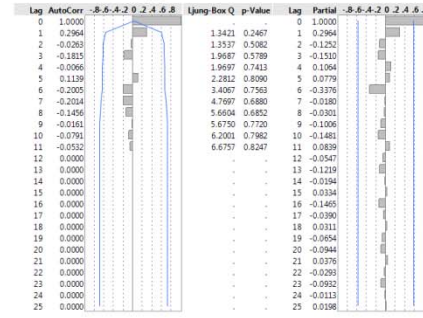
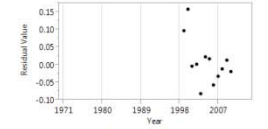
Parameter Estimates

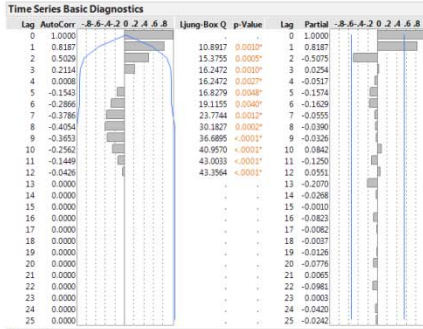
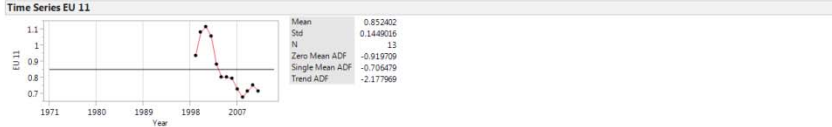
Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
AR1	1	0.583906	0.216704	2.69	0.0277	0.35007329
MA1	1	-1.262160	0.2987922	-4.22	0.00029	
MA2	2	-0.999999	0.3684255	-2.71	0.0285	
Intercept	0	0.841353	0.0778395	10.81	<0.0001	

Forecast



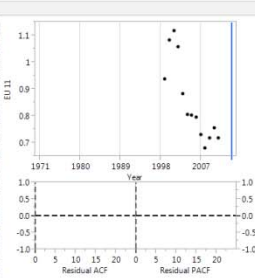
Residuals





### Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	Rsquare	2LogLH	Weights	2.A.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	9	0.0024656	-31.51311	-29.25331	0.795	-39.51311	0.203773		5.213513	0.046001
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	9	0.0031382	-30.63999	-29.18127	0.821	-36.63999	0.134260		5.247665	0.046479
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	8	0.0024665	-29.97981	-28.94029	0.820	-37.97981	0.094666		4.980966	0.043871
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	9	0.0027136	-29.97393	-28.51921	0.814	-35.97393	0.094388		5.101870	0.050713
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	10	0.0039733	-29.71796	-28.02271	0.796	-35.71796	0.083032		6.451836	0.054948
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	9	0.0048197	-29.41125	-27.51126	0.767	-37.41125	0.071225		5.890303	0.051282
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	10	0.0043205	-28.90473	-27.20988	0.771	-34.90473	0.055302		5.413390	0.047792
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	7	0.0027399	-28.52076	-26.09623	0.823	-38.52076	0.045642		4.823200	0.043145
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	10	0.0037652	-28.30408	-26.40974	0.755	-34.30408	0.049966		6.353215	0.056427
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	8	0.0038956	-28.33809	-26.40834	0.781	-38.33809	0.039527		5.625379	0.049487
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	10	0.0046418	-27.98294	-27.01313	0.793	-31.98294	0.034880		5.323245	0.046975
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	8	0.0030427	-27.97649	-26.03686	0.813	-35.97649	0.034768		5.728846	0.050861
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	9	0.0048738	-26.47322	-25.03550	0.762	-32.47322	0.016966		5.523759	0.049024
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	10	0.0056887	-25.88183	-24.91201	0.764	-29.88183	0.012199		6.294567	0.055083
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	11	0.0063048	-25.78899	-25.30208	0.738	-27.78899	0.011634		6.786377	0.059304
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	11	0.0065492	-25.42896	-24.29906	0.712	-29.42896	0.009727		7.044361	0.061488
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	9	0.0037901	-23.54296	-22.74716	0.739	-27.54296	0.001788		6.840783	0.056670
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	10	0.0063448	-23.49937	-23.09517	0.688	-25.49937	0.003695		8.085163	0.067066
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	8	0.0053651	-23.16318	-21.96949	0.771	-29.16318	0.003133		5.990443	0.050833
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	7	0.0044488	-22.53077	-20.99319	0.771	-30.53077	0.002307		6.190682	0.053082
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	9	0.0063578	-22.52324	-21.72655	0.714	-26.52324	0.002274		7.732008	0.062870
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	11	0.0079834	-22.08848	-20.95658	0.594	-26.08848	0.001829		8.726694	0.076942
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	8	0.0044899	-21.72857	-20.53288	0.729	-27.72857	0.001528		6.793890	0.055292
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	6	0.0048890	-20.95029	-18.97371	0.773	-30.95029	0.000983		6.153035	0.052702
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	7	0.0073029	-19.57082	-17.97924	0.739	-27.57082	0.000520		6.934649	0.056641
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	8	0.007031	-19.49307	-18.29938	0.688	-25.49307	0.000500		8.085163	0.067066
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	12	0.027462	-11.33181	-10.76686	0.000	-13.33181	0.000008		14.561234	0.125848



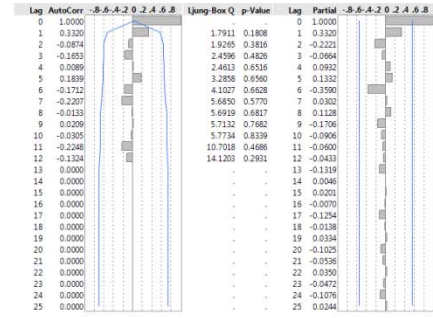
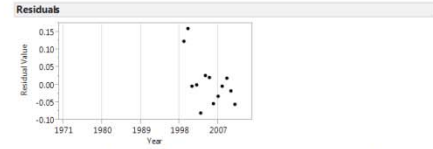
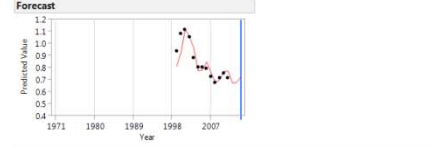
### Model: ARMA(1, 2)

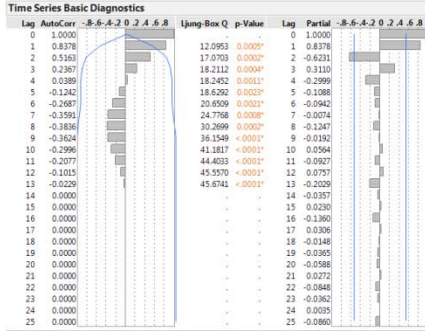
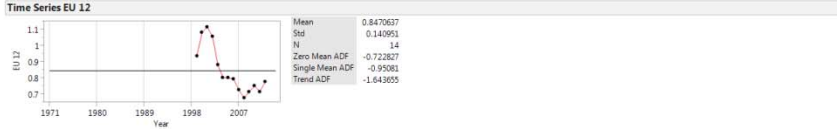
#### Model Summary

DF	9	Stable	Yes
Sum of Squared Errors	0.02218018	Invertible	Yes
Variance Estimate	0.00246558		
Standard Deviation	0.0495456		
Akaike's $\ln$ Information Criterion	-31.513107		
Schwarz's Bayesian Criterion	-29.25331		
RSquare	0.79507833		
RSquare Adj	0.72677111		
MAPE	5.21351255		
MAE	0.04600059		
-2LogLikelihood	-39.513107		

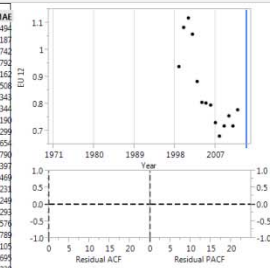
#### Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant
AR1	1	0.629527	0.2088167	3.01	0.0149	0.30196781
MA1	1	-1.220182	0.2853235	-4.28	0.0021	
MA2	2	-0.999996	0.3373040	-2.80	0.0208	
Intercept	0	0.815141	0.0980141	8.48	<0.0001	





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	Z.A.6.B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	11	0.0039251	-32.71417	-30.79699	0.763	-38.71417	0.224739		6.466111	0.054494
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	10	0.0030746	-32.04217	-29.48594	0.798	-40.04217	0.160044		5.499528	0.047187
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	9	0.00303883	-31.74206	-28.5678	0.796	-41.74206	0.132626		5.670282	0.048142
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	11	0.0044095	-31.50531	-29.58314	0.779	-37.50531	0.122929		5.635074	0.046792
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	11	0.0040797	-31.02384	-29.10667	0.737	-37.02384	0.096523		6.842497	0.061622
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	11	0.0050195	-29.59607	-28.46617	0.770	-33.59607	0.047271		5.705626	0.049608
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	10	0.0047244	-29.23027	-27.35959	0.786	-35.23028	0.033931		5.549389	0.048441
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	12	0.0061557	-28.53933	-27.26121	0.716	-32.53933	0.027869		6.853761	0.059344
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	10	0.0040273	-28.48395	-26.78710	0.773	-34.48395	0.027081		6.814007	0.057190
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	12	0.0062504	-28.12466	-27.55971	0.721	-30.12466	0.022051		7.002833	0.060299
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	11	0.0057359	-28.08716	-26.95726	0.748	-32.08716	0.022320		6.570300	0.056604
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	10	0.0053582	-27.85517	-26.16032	0.771	-33.85517	0.019795		5.947197	0.051790
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	9	0.0052489	-27.23214	-24.97234	0.786	-35.23214	0.014497		5.658707	0.048397
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	9	0.0042705	-26.79869	-24.47709	0.777	-34.79869	0.011317		6.393323	0.055469
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	12	0.0096919	-25.20178	-23.92366	0.602	-29.20178	0.005253		8.350620	0.073233
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	10	0.0078998	-25.11216	-22.55593	0.723	-33.11216	0.005023		6.578174	0.056249
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	11	0.0068235	-24.83825	-24.35325	0.634	-26.83825	0.004380		8.344914	0.069293
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	10	0.0066116	-24.84854	-22.87873	0.655	-27.84854	0.003416		8.129050	0.065078
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	10	0.0073084	-23.12779	-22.15798	0.642	-27.12779	0.001862		8.488039	0.069789
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	9	0.0066166	-23.10705	-21.65233	0.690	-29.10705	0.001843		6.840678	0.058105
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	9	0.007295	-22.19864	-20.74422	0.689	-28.19864	0.001176		7.710765	0.064895
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	9	0.0070931	-21.62563	-20.17091	0.651	-27.62563	0.000879		7.696996	0.065218
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	8	0.0072376	-21.26547	-19.32584	0.689	-29.26547	0.000734		6.580762	0.056181
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	8	0.0067013	-21.20123	-19.26160	0.689	-29.20123	0.000711		6.919625	0.058944
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	8	0.0093755	-20.12466	-17.39991	0.721	-30.12466	0.000416		7.020833	0.060299
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	7	0.0068319	-19.62900	-17.20447	0.688	-29.629	0.000324		7.030505	0.059934
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0, 0, 0)	13	0.0213954	-13.13132	-12.49226	0.000	-15.13132	0.000013		13.939671	0.120673



Model: AR(2)

Model Summary

DF	11	Stable	Yes
Sum of Squared Errors	0.04317638	Invertible	Yes
Variance Estimate	0.00302513		
Standard Deviation	0.06265082		
Akaike's A' Information Criterion	-32.714166		
Schwarz's Bayesian Criterion	-30.796994		
RSquare	0.7634635		
RSquare Adj	0.72045686		
MAPE	6.46611098		
MAE	0.05449057		
-2LogLikelihood	-38.714166		

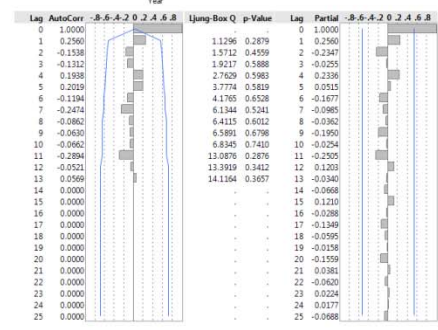
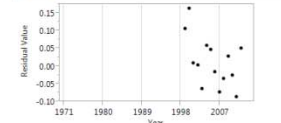
Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.401394	0.194952	7.18	<.0001*		0.25363562
AR2	2	-0.704859	0.210165	-3.35	<.0001*		
Intercept	0	0.832956	0.0492502	16.91	<.0001*		

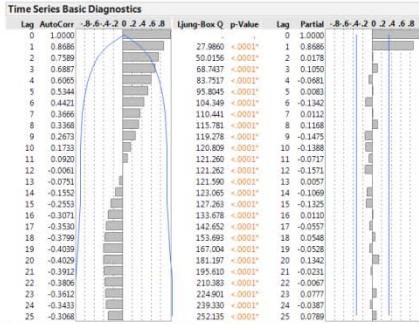
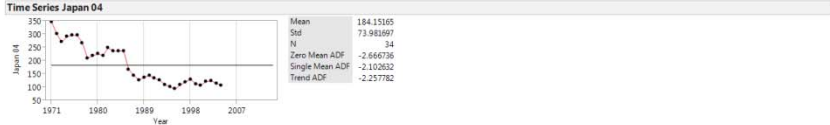
Forecast



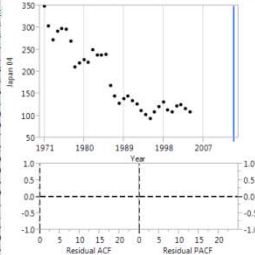
Residuals



## Japan



Report	Graph	Model	DF	Variance	AC	SBC	RSquare	-2LogLH	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(1, 2, 2)	28	391.98471	290.00703	295.79998	0.886	282.90704	0.319651	8.737043	15.402594
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	30	461.93412	292.57681	295.50828	0.886	288.57081	0.187074	9.466018	16.55001
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	27	405.39521	292.89478	300.22346	0.902	282.89478	0.118318	8.793188	15.49727
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	29	460.74912	293.03844	297.41864	0.892	287.03844	0.111187	8.551204	15.214645
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	29	467.96617	293.54518	297.84236	0.899	287.54518	0.084511	8.731951	15.462178
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	28	456.08656	294.10489	299.96784	0.894	286.10489	0.064606	8.602994	15.271777
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	30	382.95739	295.02796	299.51718	0.921	289.02796	0.040728	8.533331	14.827378
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	30	401.78103	295.29869	299.78309	0.920	289.29866	0.035603	9.083407	15.352594
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	32	456.24318	296.69433	299.19084	0.908	294.69433	0.017700	8.641131	15.364899
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	29	395.54554	297.01497	303.00061	0.921	289.01497	0.015081	8.609649	14.924639
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	31	447.97199	297.11971	300.11274	0.912	293.11971	0.014209	8.183737	14.600237
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	31	456.12209	297.67117	300.66418	0.911	293.67117	0.010861	8.245148	14.806362
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	29	402.51012	297.68722	303.67325	0.919	289.68722	0.010774	9.390180	15.697209
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	30	448.84876	298.15341	302.64293	0.914	292.15341	0.008534	8.171396	14.399483
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	28	408.65841	298.99697	306.47921	0.921	288.99697	0.005086	8.672761	14.993871
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	29	671.76516	302.21502	306.61223	0.862	296.21502	0.001120	10.114114	17.489919
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	30	696.98551	302.26252	305.25799	0.853	298.26252	0.001059	10.772615	18.567234
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	31	736.61641	302.62626	304.52800	0.840	301.62626	0.000733	11.063500	19.171744
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	30	427.58072	311.91549	318.02093	0.833	303.91549	0.000009	9.373596	18.179999
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	31	491.25497	313.32684	317.90592	0.823	307.32684	0.000004	9.532552	18.467429
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	29	442.30776	313.79929	321.41029	0.823	303.79929	0.000003	9.233138	18.300975
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	31	502.47802	314.04085	318.61993	0.823	308.04085	0.000003	9.674945	18.617459
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	32	522.73312	314.33568	317.38840	0.820	310.33568	0.000003	10.370550	19.359594
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	30	439.27949	316.00884	322.11428	0.808	308.00884	0.000001	11.287322	21.585635
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	31	1148.4807	341.94113	344.64041	0.702	335.94113	0.000000	17.174790	29.233712
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	32	1738.8051	355.45431	358.70703	0.605	351.45431	0.000000	22.625906	38.018902
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	33	5639.1489	391.14743	392.67379	0.000	389.14743	0.000000	41.390195	67.814644



Model: ARIMA(1, 2, 2)

Model Summary

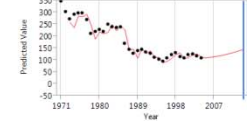
DF	28	Stable	Yes
Sum of Squared Errors	10975.5718	Invertible	Yes
Variance Estimate	391.984706		
Standard Deviation	19.798639		
Akaike's AIC Information Criterion	290.907038		
Schwarz's Bayesian Criterion	296.769692		
RSquare	0.9016529		
RSquare Adj	0.89111571		
MAPE	8.7374252		
MAE	15.4052844		
-2LogLikelihood	282.907038		

Failed: Cannot Decrease Objective Function Hessian is not positive definite.

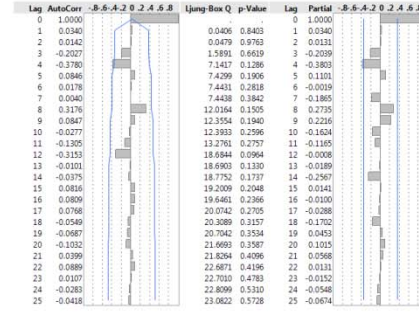
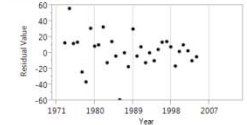
Parameter Estimates

Term	Lag	Estimate	Std Error	t-Ratio	Prob> t	Constant	Estimate
AR(1)	1	-0.5958262	0.1489911	-4.00	0.0004*	0.82112663	
MA(1)	1	5.28319e+1					
MA(2)	2	0.9999995	0.0070934	140.98	0.0001*		
Intercept	0	0.5146720					

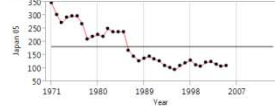
Forecast



Residuals

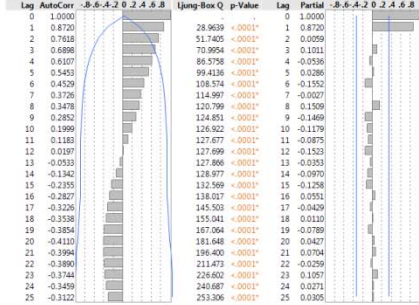


**Time Series Japan 05**



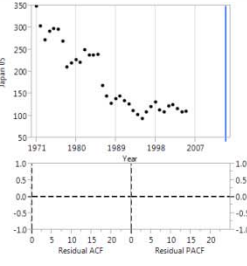
Mean 182.0369  
 Std 73.95336  
 N 35  
 Zero Mean ADF -2.682178  
 Single Mean ADF -2.182966  
 Trend ADF -2.210236

**Time Series Basic Diagnostics**



**Model Comparison**

Report	Graph	Model	DF	Variance	AC	SBC	RSquare	-2LogLH	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(1, 2, 2)	29	378.46012	298.62273	304.68876	0.900	290.62273	0.353353	8.470886	14.942318
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	31	447.04864	300.50118	303.49417	0.889	296.50116	0.150613	9.202890	16.089979
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	30	445.5164	300.92636	305.47589	0.895	294.92636	0.122277	8.358662	14.820531
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(1, 1, 1)	30	452.45076	301.45703	305.94605	0.889	295.45703	0.093399	8.542567	15.092481
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	29	440.29264	301.84703	307.85336	0.897	293.84703	0.073296	8.354956	14.823828
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(1, 1, 1)	31	372.1367	302.87911	307.45819	0.923	296.87911	0.045807	8.459691	14.583439
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	31	389.89963	303.15963	307.73891	0.922	297.15963	0.039660	9.004457	15.132948
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	33	444.95666	304.80098	306.52374	0.910	302.80098	0.017346	8.634677	15.160144
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	30	383.8385	304.86130	310.96674	0.923	296.8613	0.017024	8.542643	14.689400
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	29	358.51214	305.02772	312.45953	0.926	295.02772	0.015665	8.557063	14.422381
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	32	436.57447	305.18890	308.24365	0.914	301.18890	0.014452	8.144878	14.303996
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	32	444.02162	305.79512	308.83784	0.913	301.79512	0.010834	8.249768	14.633565
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	31	436.70004	306.17184	310.75092	0.916	300.17184	0.008841	8.118663	14.185724
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	30	389.11358	306.59898	314.70430	0.914	300.59898	0.002827	10.200424	16.527532
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	30	450.26051	310.48964	314.48816	0.895	304.48964	0.001016	9.965400	17.124375
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	31	676.92163	310.74930	313.74322	0.857	306.7493	0.008996	10.675015	18.264844
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	32	715.83404	311.05827	313.05478	0.844	309.05827	0.000598	10.972008	18.874803
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	28	817.45262	317.02489		0.844	309.52325	0.000011	10.944721	18.861861
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	31	413.48441	319.70137	325.82276	0.837	311.70137	0.000010	9.129573	17.690122
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	32	475.72362	321.25509	325.80209	0.828	315.25509	0.000005	9.270138	17.948594
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	32	446.65979	321.99020	326.65925	0.828	315.99021	0.000003	9.418028	18.097024
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	33	506.54834	322.35753	325.46822	0.825	318.35753	0.000003	10.081678	18.815625
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	30	469.85092	323.71835	331.49509	0.839	313.71835	0.000001	9.016344	17.676499
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	31	432.27378	324.34320	330.56444	0.819	316.34320	0.000001	11.302029	21.249108
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	32	1128.0736	350.78333	355.44808	0.798	344.78333	0.000000	17.039904	28.954022
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	33	1725.413	365.71255	368.82325	0.606	361.71255	0.000000	22.649692	37.890707
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	34	5629.938	402.56601	404.12136	0.000	400.56601	0.000000	41.480889	67.690427



**Model: ARIMA(1, 2, 2)**

**Model Summary**

DF	29	Stable	Yes
Sum of Squared Errors	10975.3434	Invertible	No
Variance Estimate	378.460118		
Standard Deviation	19.4549515		
Akaike's $\Delta$ Information Criterion	298.622731		
Schwarz's Bayesian Criterion	304.026761		
RSquare	0.90441831		
RSquare Adj	0.89452834		
MAPE	8.47038066		
MAE	14.943136		
-2LogLikelihood	290.622731		

Failed: Cannot Decrease Objective Function Hessian is not positive definite.

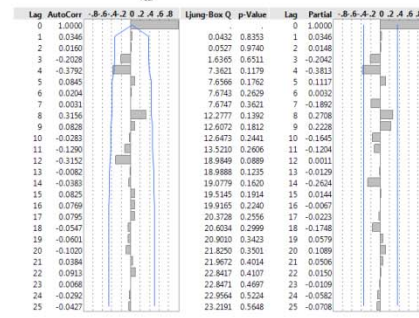
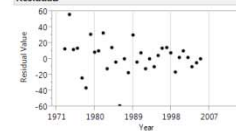
**Parameter Estimates**

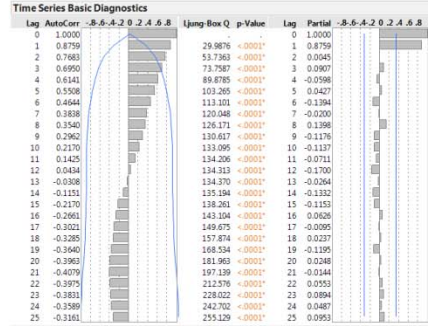
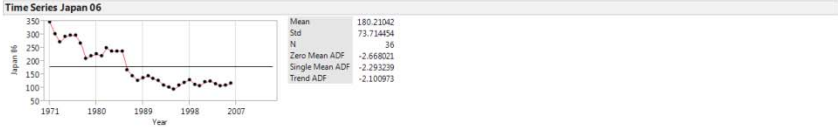
Term	Lag	Estimate	Std Error	t-Ratio	Prob> t	Constant	Estimate
AR(1)	1	-0.595378	0.1495827	-4.06	0.00027	0.82226983	
MA(1)	1	2.5971-13	0.0000000				
MA(2)	2	1.000000	0.0007169	148.88	<.00001*		
Intercept	0	0.515408					

**Forecast**



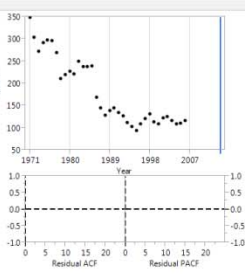
**Residuals**





### Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	2 4 6 8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	30	369.42443	306.36200	312.46745	0.906	298.362	0.357237		8.317308	14.610179
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	29	377.94784	308.34584	315.97764	0.909	298.36894	0.122487		8.395540	14.723453
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	32	433.62109	308.49374	311.48846	0.891	304.43574	0.126663		9.049383	15.732000
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	31	431.49542	308.79868	313.37776	0.897	302.79868	0.105643		8.208898	14.487981
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	31	438.29672	309.36249	313.24517	0.896	303.36249	0.079691		8.396418	14.759666
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	30	425.72344	309.77209	315.87753	0.899	301.77209	0.064933		8.170433	14.451596
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	32	364.48476	310.94638	315.61243	0.923	304.94638	0.036097		8.459275	14.443959
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	32	385.07907	311.42589	316.09191	0.923	305.42589	0.028402		9.030443	15.040521
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	31	375.78622	312.93842	319.15781	0.923	304.93842	0.013346		8.512016	14.522400
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	34	438.80596	313.09025	314.64860	0.911	311.09025	0.012339		8.704844	15.079474
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	33	426.73703	313.31593	316.42662	0.915	309.31593	0.011039		8.139734	14.227380
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	32	356.51867	313.46336	321.24202	0.928	303.46336	0.012255		8.492378	14.261473
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	33	435.15186	313.95115	317.06185	0.914	309.95115	0.008035		8.290538	14.524195
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	32	426.63868	314.28206	318.94811	0.917	308.28206	0.006810		8.137381	14.040095
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	31	398.78933	314.79889	321.02229	0.920	306.79889	0.005256		9.117593	15.128889
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	31	610.76588	318.78881	323.32689	0.868	312.78881	0.000716		9.817968	16.774025
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	32	656.65786	319.07226	322.12499	0.860	315.07226	0.000621		10.481553	17.871635
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	33	694.37874	319.85542	321.46178	0.847	317.85542	0.000463		10.721202	18.408127
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	32	401.01634	327.48825	333.82200	0.842	319.48825	0.000000		8.955086	17.293028
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	33	461.34869	329.16155	333.91211	0.833	323.16155	0.000004		9.057855	17.495022
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	32	444.95117	329.31481	335.64889	0.836	321.31481	0.000004		9.670778	18.344973
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	31	415.87188	329.36498	337.28258	0.842	319.36498	0.000004		8.810487	17.097471
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	33	472.131	329.93029	334.64064	0.834	323.93029	0.000003		9.211100	17.638976
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	34	492.16055	330.38184	333.54887	0.831	326.38184	0.000002		9.887176	18.365864
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	33	1108.1866	360.06205	364.81263	0.707	354.06205	0.000000		16.947881	28.627761
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	34	1793.7257	375.57738	378.78442	0.607	371.57738	0.000000		22.540134	37.634251
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	35	5589.0727	413.77789	415.38141	0.000	411.77789	0.000000		41.310913	67.331528



### Model: ARIMA(1, 2, 2)

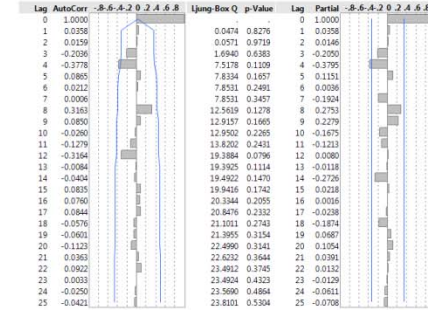
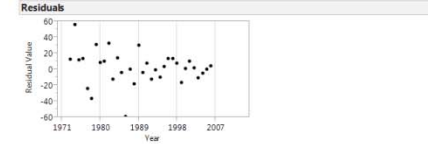
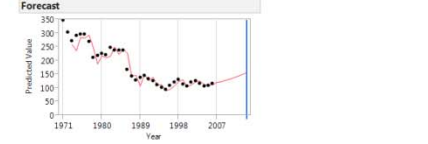
#### Model Summary

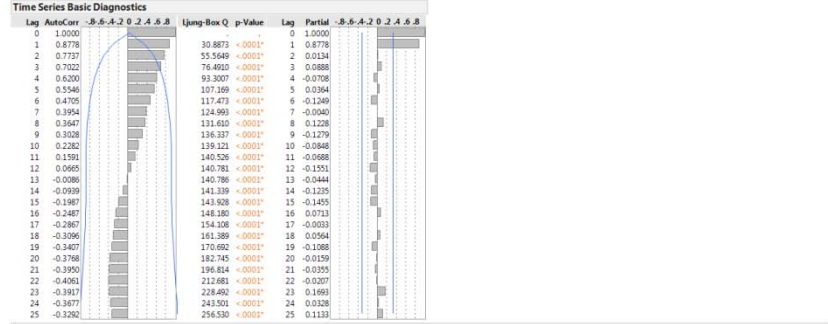
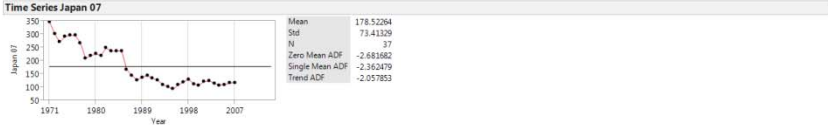
DF	30	Stable	Yes
Sum of Squared Errors	10992.7329	Invertible	Yes
Variance Estimate	366.424431		
Standard Deviation	19.14212159		
Akaike's AIC Information Criterion	306.362003		
Schwarz's Bayesian Criterion	312.467445		
RSquare	0.90631808		
RSquare Adj	0.89648889		
MAPE	8.31730808		
MAE	14.6101788		
-2LogLikelihood	298.362003		

Hessian is not positive definite.

#### Parameter Estimates

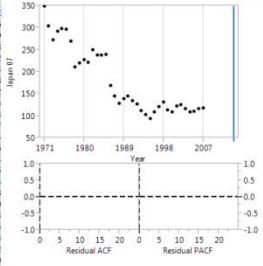
Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
AR(1)	1	-0.592247	0.142911	-4.16	0.0002	0.68321185
MA(1)	1	0.0000037				
MA(2)	2	0.9999963	4.771188	0.21	0.8354	
Intercept	0	0.5411224				





### Model Comparison

Report	Graph	Model	DF	Variance	AC	SBC	RSquare	-2LogLH	Weights	-2 A	-6	-4	2	0	2	A	6	8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	31	354.92829	314.04743	320.26989	0.908	306.02667	0.137021										8.150113	14.291208
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	30	365.55883	316.02667	323.80341	0.908	306.02667	0.137021										8.239385	14.406499
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	33	420.53179	316.30285	319.41355	0.893	312.30285	0.119348										8.819233	15.319488
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	32	416.18915	316.64269	321.30702	0.899	310.64269	0.100794										8.015688	14.142032
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	32	424.74997	317.81820	321.88424	0.899	311.81820	0.075518										8.215330	14.413964
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	31	412.00343	317.55995	323.78134	0.901	309.55995	0.063656										7.980250	14.094588
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	33	353.9515	318.60590	320.43465	0.925	312.60590	0.036617										8.320957	14.155442
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	33	374.47167	319.29641	324.00997	0.924	312.29641	0.022155										8.952127	14.848305
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	32	364.54728	320.65635	326.90043	0.925	312.65635	0.013335										8.390713	14.243501
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	32	364.66174	320.65989	326.90278	0.925	312.65988	0.013319										8.373409	14.222107
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	34	675.07167	319.29641	324.00997	0.902	319.12039	0.010732										8.643795	14.859704
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	34	414.92982	321.20452	324.37156	0.916	317.20452	0.010290										8.014950	13.944939
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	31	364.31068	321.66274	329.58034	0.927	311.66274	0.008183										8.600630	14.281504
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	34	423.26188	321.87280	325.03984	0.915	317.87280	0.007367										8.182696	14.259846
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	33	415.20172	322.00986	324.96153	0.909	316.20986	0.006292										8.047199	13.811154
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	32	611.16609	326.96747	331.63351	0.870	320.96747	0.005577										9.598862	16.372728
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	33	637.59999	327.36852	330.47922	0.862	323.36852	0.004872										10.321015	17.520189
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	34	675.07167	319.29641	324.00997	0.892	316.29641	0.002382										10.561874	18.045346
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	33	388.77249	335.24143	341.68510	0.844	327.24143	0.000009										8.779795	16.890205
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	34	447.65965	337.75651	341.88928	0.835	331.05652	0.000004										8.879065	17.113778
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	32	400.85226	337.12277	345.13736	0.844	327.12277	0.000004										8.647398	16.744492
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	34	458.10752	337.84715	342.67990	0.836	331.84715	0.000003										9.033609	17.264659
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	35	477.80673	338.34859	341.57043	0.834	334.34859	0.000002										9.633802	17.888392
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	33	417.54973	341.13804	347.58172	0.811	333.13804	0.000000										11.435218	21.157001
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	34	1087.5582	369.29033	374.69878	0.798	383.29033	0.000000										16.717833	28.302566
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	35	1685.51	385.48642	388.70826	0.607	381.48642	0.000000										22.425717	37.397222
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	36	5539.2198	424.91322	428.52414	0.000	422.91322	0.000000										41.080560	66.880233



### Model: ARIMA(1, 2, 2)

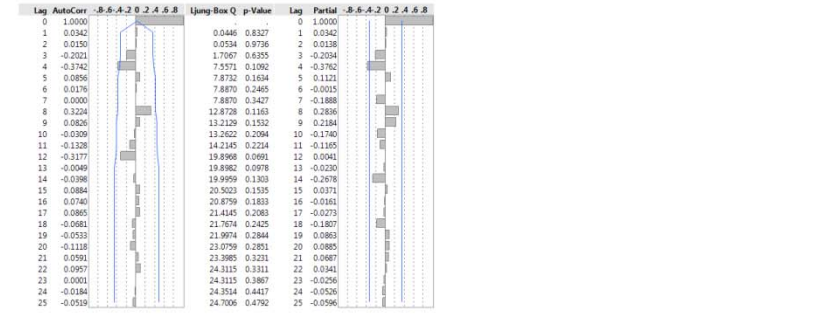
#### Model Summary

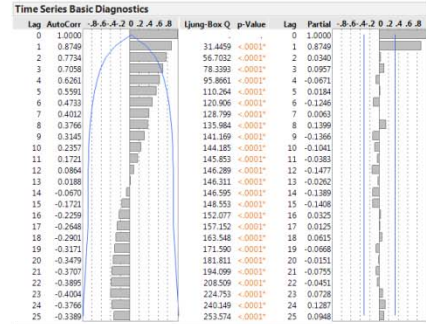
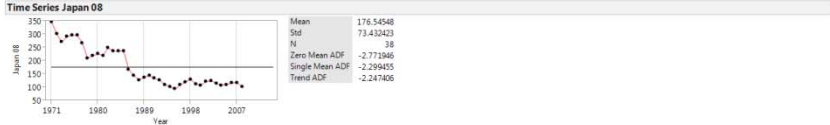
DF	31	Stable	Yes
Sum of Squared Errors	11002.777	Invertible	Yes
Variance Estimate	254.82628		
Standard Deviation	18.639506		
Akaike's $\ln$ Information Criterion	314.047506		
Schwarz's Bayesian Criterion	320.269899		
RSquare	0.90797324		
RSquare Adj	0.89906742		
MAPE	8.16011347		
MAE	14.2910766		
-2LogLikelihood	306.047506		

Failed: Cannot Decrease Objective Function Hessian is not positive definite.

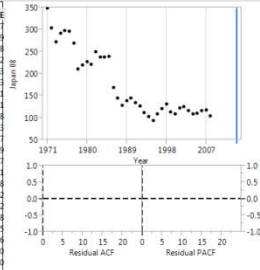
#### Parameter Estimates

Term	Lag	Estimate	Std Error	t-Ratio	Prob> t	Constant	Estimate
AR(1)	1	-0.5959631	0.142194	-4.19	0.00027		0.83387544
MA(1)	1	-0.4214467					
MA(2)	2	0.9999996					
Intercept	0	0.5224904	1.766024	0.30	0.7696		





Report	Graph	Model	DF	Variance	AC	SBC	RSquare	-2LogLH	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(1, 2, 2)	32	350.17028	322.34122	318.67533	0.909	314.34125	0.388324	8.427385	14.434077
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	31	360.0957	324.31278	332.23038	0.909	314.31278	0.137445	8.489908	14.524929
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	34	416.27204	324.84491	328.01195	0.895	320.84491	0.105317	8.962601	15.331208
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	33	413.59861	325.14391	329.86447	0.890	319.14391	0.090709	8.223209	14.223202
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	33	420.27234	325.70071	330.51318	0.888	319.70073	0.066637	8.379447	14.454161
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	32	405.98193	325.94796	332.28204	0.902	317.94796	0.060881	8.165329	14.157777
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	34	345.09564	326.40791	331.30307	0.927	320.40791	0.040790	8.328420	14.021122
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	34	362.34303	326.04200	331.76664	0.920	320.99409	0.036603	8.816599	14.557541
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	33	354.86083	328.44861	334.85229	0.927	320.44861	0.017880	8.419750	14.136944
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	33	355.05593	328.45399	334.89706	0.927	320.45399	0.017333	8.394201	14.105333
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	36	416.02103	329.12496	330.73548	0.914	327.12496	0.022996	8.422050	14.691311
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	35	405.46747	329.21721	332.43904	0.918	325.21721	0.011834	8.078117	13.877679
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	32	353.18166	329.30695	337.36154	0.929	319.30695	0.011315	8.495506	14.023322
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	35	413.63005	329.00413	333.12596	0.917	325.00413	0.008394	8.211950	14.142871
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	34	404.32003	330.09309	334.62980	0.921	324.09309	0.007638	8.059517	13.660948
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	33	602.20093	335.69393	340.44446	0.872	329.69393	0.004664	9.815542	16.472252
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	34	628.9836	336.17394	339.34007	0.884	332.17394	0.000365	10.540252	17.539825
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	35	662.94443	337.04875	338.68609	0.852	335.04875	0.000232	10.710074	17.981448
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	34	382.35809	343.55720	350.10754	0.841	335.5572	0.000009	8.927072	16.950985
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	34	422.52914	345.44661	351.99996	0.835	337.44661	0.000004	9.684363	18.066309
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	33	393.96281	345.49202	353.64722	0.840	335.49202	0.000004	8.801871	16.808878
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	35	441.63009	345.59330	350.50606	0.811	339.5933	0.000003	9.065275	17.205689
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	35	452.29632	346.43667	351.34943	0.832	340.43667	0.000002	9.242670	17.380223
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	36	470.72334	346.89082	350.15603	0.831	342.89082	0.000002	9.800489	17.951545
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	35	1091.6036	379.21713	384.13449	0.798	373.21713	0.000000	17.020488	28.380016
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	36	1692.0485	395.92872	399.20390	0.606	391.92872	0.000000	22.610309	37.408877
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	37	5538.0591	436.36311	438.00070	0.000	434.36311	0.000000	41.195216	66.681144



Model: ARIMA(1, 2, 2)

Model Summary

DF	32	Stable	Yes
Sum of Squared Errors	11205.737	Invertible	Yes
Variance Estimate	350.17028		
Standard Deviation	18.7130778		
Akaike's AIC Information Criterion	322.341252		
Schwarz's Bayesian Criterion	328.875228		
RSquare	0.9090918		
RSquare Adj	0.9005887		
MAPE	8.4273852		
MAE	14.4340774		
-2LogLikelihood	314.341252		

Failed: Cannot Decrease Objective Function Hessian is not positive definite.

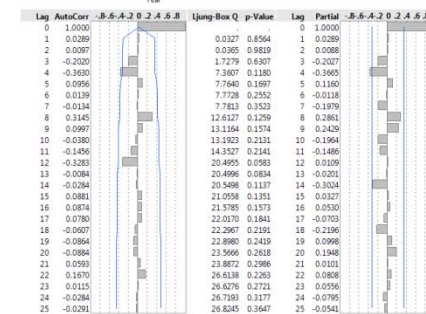
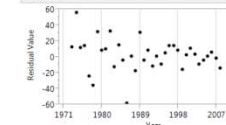
Parameter Estimates

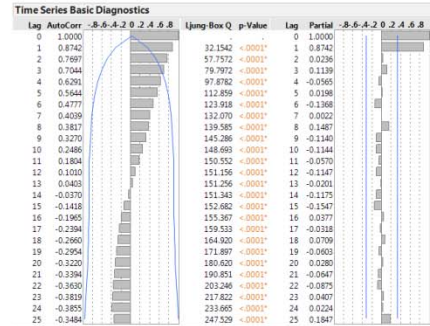
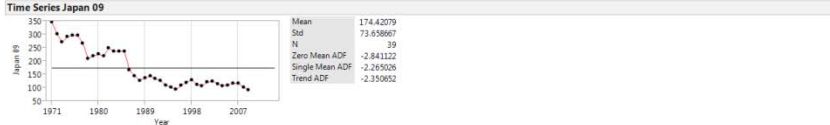
Term	Lag	Estimate	Std Error	t-Ratio	Proba> t	Constant Estimate
AR(1)	1	-0.5902874	0.0000000		0.000000	0.70520798
MA(1)	1	1.1041167	0.0301757	0.00	1.0000	
MA(2)	2	0.9999995	0.0000000		0.000000	
Intercept	0	0.4434469	0.0000000			

Forecast

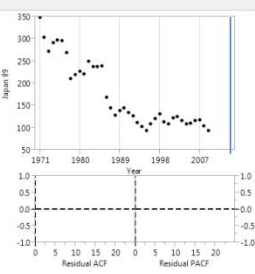


Residuals





Report	Graph	Model	DF	Variance	AIC	SBC	Rsquare	-2LogLH	Weights	2	4	6	8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	33	340.86391	330.10368	336.54735	0.912	322.02687	0.14877					8.440159	14.289774
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	32	350.49526	332.08457	340.12016	0.912	322.08487	0.14877					8.486708	14.353711
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1, 2)	35	407.75718	332.97917	336.20101	0.897	328.97917	0.089878					9.011671	15.215090
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	34	402.86902	333.05479	337.88754	0.903	327.05479	0.086543					8.209945	14.015890
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	34	413.05717	335.74523	341.00000	0.901	327.74177	0.061384					8.309768	14.211122
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	33	395.46365	333.84811	340.29178	0.905	325.84811	0.052620					8.145584	13.970559
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	35	335.21868	334.07999	338.98875	0.929	328.07999	0.051038					8.118144	13.661333
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2, 1)	35	352.85434	334.59130	339.50406	0.928	328.59130	0.040341					8.609973	14.201871
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	34	344.39971	336.05517	342.60552	0.929	328.05517	0.019007					8.214251	13.781748
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	33	344.58907	336.06097	342.61132	0.929	328.06097	0.019251					8.187440	13.748927
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	33	342.63778	336.89008	345.07801	0.911	326.89008	0.012718					8.319495	13.700095
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	37	407.02685	336.97618	348.61373	0.917	334.97618	0.012182					8.481220	14.309668
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1, 1)	36	394.20256	336.99130	340.26647	0.921	332.99130	0.012090					7.873762	13.515532
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	36	402.1793	337.70308	340.97825	0.920	333.70308	0.008470					8.031835	13.804742
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	35	392.76897	337.83041	342.74617	0.922	331.83041	0.007927					7.822947	13.308821
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	34	384.85844	343.85379	348.68055	0.876	337.85379	0.000391					9.641679	16.115777
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	35	611.03552	344.38586	347.60770	0.888	340.38586	0.000300					10.278392	17.086399
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	36	645.89642	345.40134	347.02126	0.857	343.40134	0.000180					10.530809	17.601594
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	35	372.12538	351.20360	358.04786	0.842	342.20360	0.000000					8.894018	16.755160
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	34	383.02756	353.27936	361.59176	0.842	343.27936	0.000004					8.750411	16.596821
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	35	411.27796	353.33923	359.99348	0.837	345.33923	0.000003					9.622613	17.830404
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	36	420.94495	353.54773	358.53841	0.833	347.54773	0.000000					9.037075	17.028564
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	36	440.85871	354.40031	359.45980	0.833	346.40031	0.000000					9.214733	17.181333
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	37	460.67975	355.13026	358.45728	0.831	351.13026	0.000001					9.873803	17.866341
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	36	1073.7713	388.46294	393.45323	0.710	382.46294	0.000000					17.055344	28.168015
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	37	1690.915	406.18179	409.91885	0.668	402.18179	0.000000					22.32915	37.339341
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	38	5568.3782	448.03967	449.69723	0.000	446.03967	0.000000					41.818925	66.605741



**Model: ARIMA(1, 2, 2)**

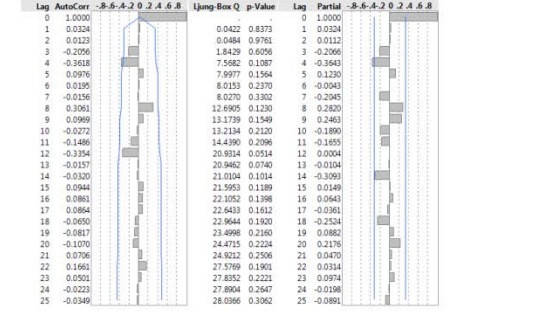
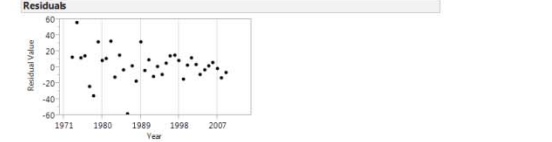
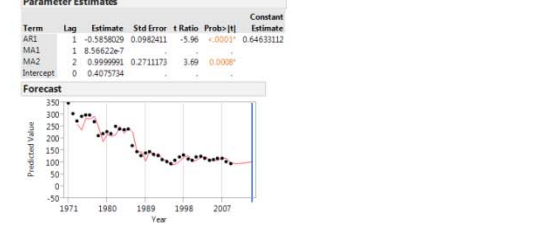
**Model Summary**

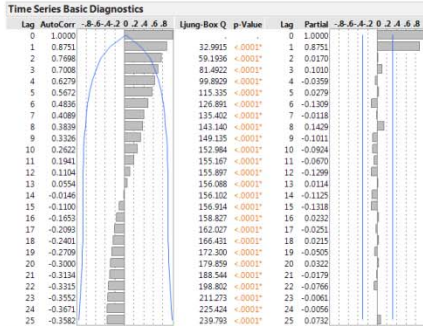
DF	33	Stable	Yes
Sum of Squared Errors	11248.4432	Invertible	Yes
Variance Estimate	340.863915		
Standard Deviation	18.4624481		
Akaike's AIC Information Criterion	330.103678		
Schwarz's Bayesian Criterion	336.547349		
RSquare	0.91181121		
RSquare Adj	0.90379405		
MAPE	8.44015859		
MAE	14.2897738		
-2LogLikelihood	322.103678		

Hessian is not positive definite.

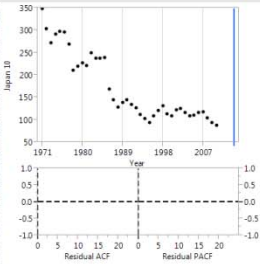
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant
AR(1)	1	-0.5818020	0.0982411	-5.96	<0.0001	0.64833112
MA1	1	8.56622e-2				
MA2	2	0.9999991	0.2711173	3.69	0.0008*	
Intercept	0	0.4075734				





Report	Graph	Model	DF	Variance	AC	SBC	RSquare	-2LogL	Weights	2.A.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	34	332.09023	337.83981	344.39016	0.915	329.83981	0.382291		8.426388	14.110140
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	33	341.42055	339.82767	348.01360	0.915	329.82767	0.144844		8.407542	14.116421
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	35	392.09787	344.89028	345.80204	0.904	334.89028	0.083217		8.148420	13.819319
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	36	397.64858	340.89958	344.17475	0.901	336.89958	0.082790		8.843978	14.976104
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	35	399.096	341.58075	346.49951	0.905	335.58075	0.059716		8.190479	13.924109
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	36	325.90234	341.65828	346.54697	0.911	335.65828	0.056653		7.913403	13.311185
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	34	385.8951	341.74158	348.29192	0.908	333.74158	0.054342		8.167603	13.853255
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	36	342.95712	342.20672	347.13741	0.931	336.20672	0.043066		8.436780	13.881791
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	35	334.56167	343.83953	350.29078	0.931	335.83953	0.021089		8.014425	13.454532
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	35	338.74417	343.64252	350.29078	0.931	335.64252	0.021007		8.003696	13.402966
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	34	332.54239	344.43465	352.75246	0.933	334.43465	0.014377		8.115722	13.358351
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	37	383.57383	344.74197	348.09920	0.924	340.74197	0.012123		7.699033	13.190610
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	38	394.36289	344.77983	346.64239	0.920	342.77983	0.011896		8.265384	14.040259
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	37	391.37456	345.47710	348.80422	0.922	341.47711	0.008394		7.872361	13.490748
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	36	381.86564	345.55200	350.54268	0.926	339.55200	0.008086		7.648096	12.982058
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	35	568.1604	351.96518	356.87794	0.881	345.96518	0.003227		8.194474	15.698751
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	36	594.5016	352.59772	355.87260	0.873	348.59772	0.000239		10.134880	16.741283
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	37	628.65535	353.68210	355.31968	0.862	351.68210	0.000139		10.337175	17.213667
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	36	362.8736	359.25128	366.00679	0.844	351.25128	0.000009		8.895436	16.583830
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	37	418.82237	361.47884	364.54557	0.833	355.47884	0.000003		8.990413	16.795973
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	37	429.15776	362.38317	367.44981	0.836	356.38317	0.000002		9.133123	16.591286
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	38	449.41334	363.18020	366.55796	0.833	359.18020	0.000001		9.852048	17.664274
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	36	385.54791	364.80594	371.62135	0.820	356.80594	0.000001		11.103090	20.188771
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	35	396.26041	366.85463	375.59843	0.819	356.85463	0.000000		11.087734	20.129693
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	37	1081.2753	398.50982	403.57646	0.711	392.50982	0.000000		17.859595	28.207668
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	38	1705.2723	416.83008	420.21384	0.608	412.83008	0.000000		23.238708	37.457016
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	39	5613.2375	459.81783	481.50071	0.000	457.81783	0.000000		42.200793	66.505081



Model: ARIMA(1, 2, 2)

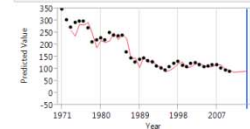
Model Summary

DF	34	Stable	Yes
Sum of Squared Errors	11291.0070	Invertible	No
Variance Estimate	332.090232		
Standard Deviation	18.2233431		
Akaike's $\ln$ Information Criterion	337.839815		
Schwarz's Bayesian Criterion	344.390159		
RSquare	0.91466459		
RSquare Adj	0.90713499		
MAPE	8.42638763		
MAE	14.1101402		
-2LogLikelihood	329.839815		

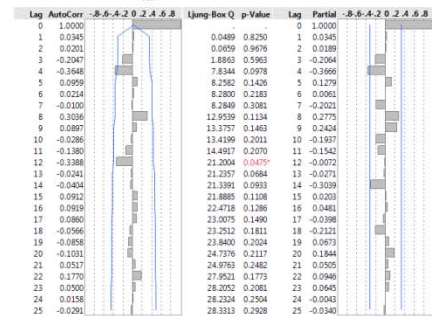
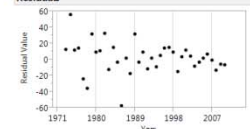
Parameter Estimates

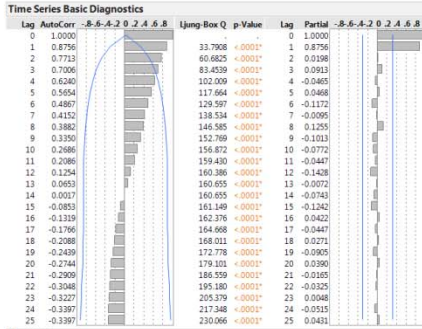
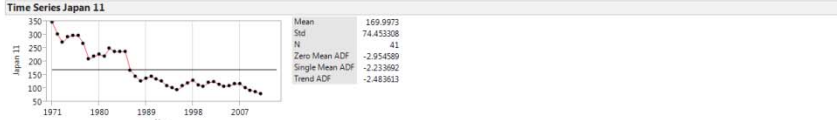
Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant
AR1	1	-0.585294	0.1373997	-4.36	0.0000	0.5944029
MA1	1	0.000000	0.1296558	0.00	1.0000	
MA2	2	1.000000	0.1296547	7.71	<0.0001*	
Intercept	0	0.374948	0.3095118	1.22	0.2296	

Forecast

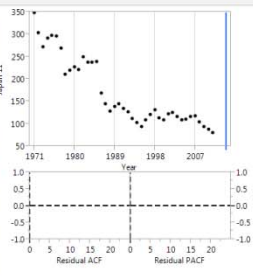


Residuals





Report	Graph	Model	DF	Variance	AIC	SBC	Rsquare	-2LogL	Weights	2.A.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	35	323.571	345.52694	352.18118	0.918	337.52694	0.391147		8.404398	13.918241
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	34	332.39549	347.51463	355.81244	0.918	337.51463	0.144783		8.445529	13.971799
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	36	382.46754	344.7922	353.78969	0.913	342.7922	0.078922		8.173466	13.694978
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	37	388.79025	348.87103	352.18615	0.904	344.87103	0.073482		8.931998	14.776697
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	37	317.08423	349.21318	354.27982	0.934	343.21318	0.061927		7.742073	13.004533
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	36	389.54083	349.49633	354.87002	0.908	343.49633	0.051752		8.174823	13.730314
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	35	377.4444	349.68313	356.33737	0.911	341.68313	0.048999		8.239860	13.734648
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	37	333.62914	349.79270	354.85934	0.933	343.7927	0.046349		8.259118	13.562749
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	36	325.24164	351.18958	357.94310	0.934	343.18958	0.023052		7.839912	13.112726
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	36	325.42331	351.19698	357.95160	0.934	343.19698	0.022977		7.811548	13.093705
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	35	323.04487	351.95437	360.39876	0.936	341.95437	0.015727		7.932417	13.040855
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	38	384.32177	352.56158	354.25046	0.923	350.56158	0.011609		7.559620	12.906154
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	38	381.1239	353.23445	356.60221	0.925	349.23445	0.008334		8.123156	13.724681
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	37	371.70826	353.25930	358.32593	0.929	347.2593	0.008190		7.534692	12.720610
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	36	552.37437	360.05072	365.04180	0.885	354.05072	0.000274		9.17507	15.313892
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	37	578.57002	360.76581	364.06293	0.878	356.76581	0.000162		9.940296	16.311282
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	38	612.37601	361.94061	363.40417	0.867	359.94061	0.000107		10.175018	16.852357
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	37	353.77273	367.04762	373.90221	0.846	359.04762	0.000008		8.890657	16.401932
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	37	391.74791	369.23918	376.09447	0.840	361.23918	0.000003		9.688335	17.543244
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	38	409.17253	369.47491	374.61563	0.837	363.47491	0.000002		9.032343	16.658036
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	38	419.12171	370.39764	375.53836	0.838	364.39764	0.000002		9.161728	16.754729
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	39	439.57126	371.29975	374.72690	0.835	367.29975	0.000001		9.919441	17.544096
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	36	404.02738	371.88532	380.45308	0.850	361.88532	0.000001		8.744964	16.217443
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	38	1072.2719	408.10543	413.24654	0.715	402.10543	0.000000		17.737682	28.24874
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	39	1716.645	427.41340	430.84054	0.610	423.4134	0.000000		23.709963	37.499675
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	40	5681.8774	471.78789	473.50065	0.000	469.78789	0.000000		43.075919	66.593362



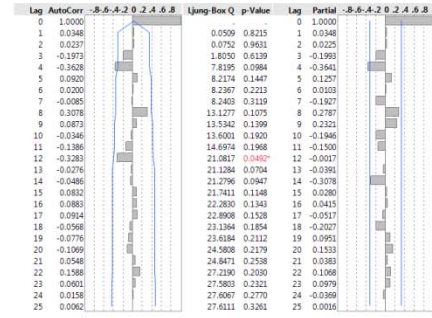
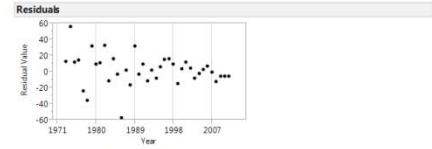
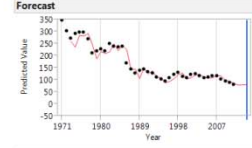
Model: ARIMA(1, 2, 2)

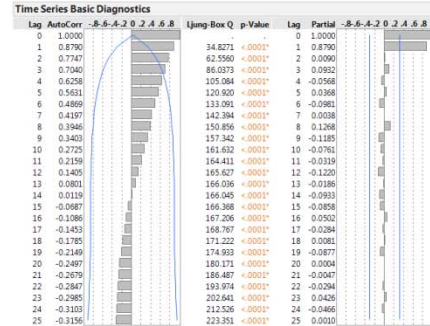
**Model Summary**

DF	35	Stable	Yes
Sum of Squared Errors	1123.989	Invertible	No
Variance Estimate	323.571		
Standard Deviation	17.9880794		
Akaike's Information Criterion	345.52696		
Schwarz's Bayesian Criterion	353.181182		
RSquare	0.91782344		
RSquare Adj	0.91077974		
MAPE	8.40439839		
MAE	13.9182434		
-2LogLikelihood	337.526936		

**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Estimate
AR1	1	-0.583000	0.1356173	-4.30	0.0001	0.54821257
MA1	1	0.000000	0.1200184	0.00	1.0000	
MA2	2	1.000000	0.1200178	8.33	<0.0001*	
Intercept	0	0.344519	0.2929514	1.19	0.2437	





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogL	Weights	2.A.6.B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	36	314.59164	353.07240	359.82792	0.921	345.0724	0.406348		8.216399	13.587300
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	35	322.85534	355.05798	363.50197	0.921	345.05798	0.150999		8.255964	13.644044
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	37	372.40787	356.50206	361.96970	0.913	350.9296	0.071041		8.019676	13.396627
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	38	378.5542	356.63128	360.00904	0.908	352.63128	0.068564		8.710350	14.460889
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	38	309.73997	356.87963	362.01635	0.936	350.87963	0.060797		7.738955	12.824698
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	37	373.03344	357.23517	362.30181	0.912	351.23517	0.050955		8.021259	13.424048
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	36	369.90033	357.35915	364.11467	0.914	349.35915	0.047648		8.051732	13.405980
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	38	325.75166	357.46341	362.60413	0.936	351.46341	0.045227		8.238068	13.376901
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	37	317.18872	358.84604	365.70033	0.936	350.84604	0.022055		7.818288	12.955138
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	37	317.59028	358.85455	365.70964	0.936	350.85455	0.022961		7.808352	12.918808
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	36	315.18096	359.59129	368.15915	0.938	349.59129	0.015608		7.973666	12.825424
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	40	371.84805	360.47379	362.55086	0.926	356.47379	0.010224		8.120946	13.545959
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	38	363.23826	361.07343	366.21434	0.931	355.07343	0.007439		7.561021	12.573166
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	39	372.67639	361.08736	364.51450	0.928	357.08736	0.007387		7.754796	13.042615
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	37	536.91815	368.21882	373.28545	0.889	362.21882	0.000029		9.175961	15.100246
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	38	564.41087	368.47496	372.35771	0.882	364.47496	0.000143		9.894372	16.173284
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	39	597.99885	370.24559	371.93447	0.872	368.24559	0.000076		10.143491	16.613918
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	38	344.25727	374.66540	381.61608	0.851	366.6654	0.000008		8.702373	16.014933
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	38	381.16088	376.20875	383.89443	0.845	368.20875	0.000003		9.502893	17.174774
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	39	398.53107	377.23866	382.45167	0.843	371.23866	0.000002		8.815254	16.259414
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	39	408.20447	378.18544	383.39845	0.844	372.18544	0.000001		8.940951	16.350224
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	40	428.2392	379.18855	382.64389	0.840	375.18855	0.000001		9.732588	17.171128
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	37	392.7902	379.59969	388.98784	0.855	369.59969	0.000001		8.950918	15.827454
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	39	1066.7832	417.65602	422.86903	0.718	411.65602	0.000000		17.997992	28.196348
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	40	1724.6256	437.91897	441.39431	0.612	433.91897	0.000000		24.147484	27.544319
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	41	5736.9234	483.67522	485.41289	-0.00	481.67522	0.000000		43.828406	66.505269

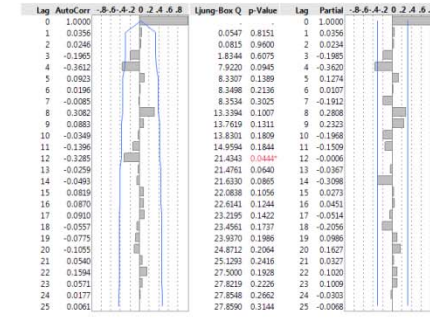
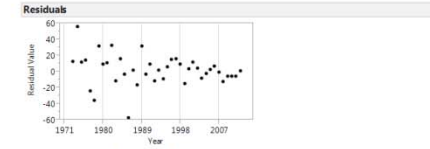
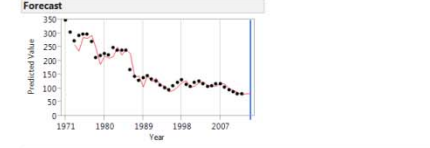
Model: ARIMA(1, 2, 2)

**Model Summary**

DF	36	Stable	Yes
Sum of Squared Errors	11232.299	Invertible	Yes
Variance Estimate	314.591639		
Standard Deviation	17.738734		
Akaike's $\ln$ Information Criterion	353.07299		
Schwarz's Bayesian Criterion	359.827917		
RSquare	0.92079682		
RSquare Adj	0.91439056		
MAPE	8.2163989		
MAE	13.5872998		
-2LogLikelihood	345.072399		

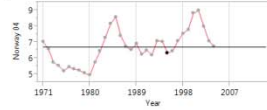
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant
AR1	1	-0.582872	0.1338232	-4.36	0.0001	0.55270814
MA1	1	2.60632e-8	0.0000013	0.02	0.9844	
MA2	2	1.0000000	0.1091131	9.16	<0.0001*	
Intercept	0	0.3491904	0.2781960	1.26	0.2175	



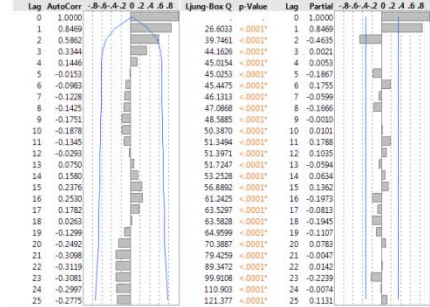
## Norway

**Time Series Norway O4**



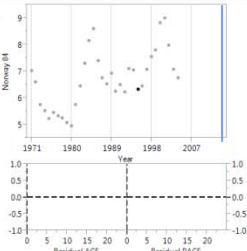
Mean	6.7046529
Std	1.0583015
N	34
Zero Mean ADF	-0.329991
Single Mean ADF	-1.610611
Trend ADF	-2.26682

**Time Series Basic Diagnostics**



**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	2.4.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	28	0.2102376	54.977788	62.460326	0.805	44.977788	0.196382		6.684600	0.400775
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	31	0.2328759	55.543972	62.140256	0.782	49.943972	0.146402		6.598887	0.426878
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	29	0.258996	55.750849	61.736880	0.785	47.750849	0.133424		6.348656	0.420221
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	31	0.2651665	55.921874	62.500996	0.781	49.921874	0.122488		6.351696	0.422211
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	29	0.2324294	55.391995	62.027758	0.806	46.391995	0.098022		5.857633	0.382233
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	30	0.261519	56.773169	62.876111	0.789	48.773169	0.080027		6.149259	0.405420
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	31	0.3215096	58.283458	61.276473	0.737	54.283458	0.037008		6.438743	0.438441
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	31	0.3219601	58.310408	61.303423	0.737	54.310408	0.037105		6.669135	0.453842
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	31	0.2864608	54.300513	62.920795	0.764	52.300513	0.036361		6.720523	0.453361
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	29	0.2979002	59.307028	65.293059	0.760	51.307028	0.022543		6.874069	0.460766
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	30	0.3228875	59.388778	63.878300	0.744	53.388778	0.021640		6.315282	0.428854
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	30	0.2424771	59.194844	64.028027	0.743	53.534804	0.020771		6.581116	0.446764
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	30	0.3286028	59.935654	64.425177	0.740	53.935654	0.016403		6.497400	0.441847
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	32	0.3611045	61.022076	62.515783	0.696	59.022076	0.009568		7.231895	0.495749
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	29	0.3438862	62.171147	66.568354	0.720	56.171147	0.005384		6.661459	0.451368
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	32	0.3486838	62.363533	65.418045	0.717	58.363533	0.004886		7.338604	0.469798
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	29	0.3439324	62.548580	66.945788	0.717	56.54858	0.004458		6.958625	0.471852
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	28	0.3479862	63.714789	69.577372	0.724	55.714789	0.002488		6.739952	0.456326
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	28	0.3252105	60.938897	69.785441	0.722	52.928897	0.002236		6.662328	0.451396
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	30	0.4225488	65.499190	68.430662	0.665	61.49919	0.001020		7.179367	0.490967
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	27	0.3677844	66.000442	73.320099	0.721	56.000419	0.000794		6.599958	0.447612
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	30	0.3454241	65.564828	72.662070	0.718	58.564828	0.000601		7.370578	0.516877
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	31	0.4612847	67.173490	68.639232	0.622	65.173490	0.000441		8.001214	0.541838
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	30	0.4515634	67.362240	70.297122	0.643	63.36224	0.000402		7.480895	0.509569
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	29	0.4479629	68.099892	72.497120	0.657	62.099892	0.000278		7.366087	0.500679
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	32	0.112282	76.490963	79.545264	0.569	72.490963	0.000004		8.928850	0.523621
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	33	1.1539415	102.34106	103.88742	-0.00	100.34106	0.000000		12.992381	0.844962



**Model: ARIMA(2, 1, 2)**

**Model Summary**

DF	28	Stable	Yes
Sum of Squared Errors	5.60917169	Invertible	No
Variance Estimate	0.20032756		
Standard Deviation	0.4477967		
Akaike's AIC	54.9777881		
Schwarz's Bayesian Criterion	62.4603259		
RSquare	0.80530814		
RSquare Adj	0.77763030		
MAPE	6.08459997		
MAE	0.40077476		
-2LogLikelihood	44.9777881		

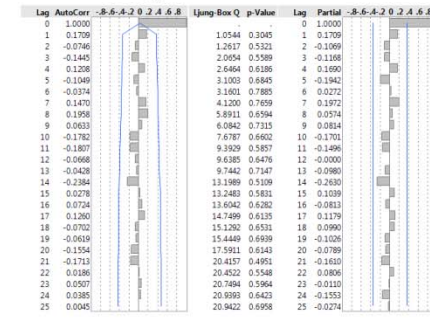
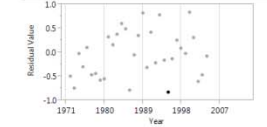
**Parameter Estimates**

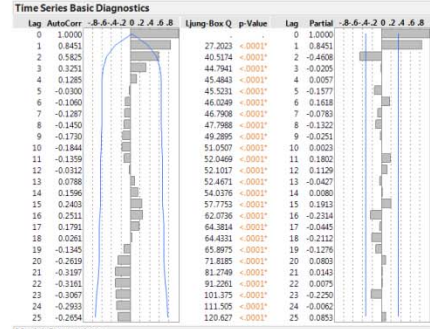
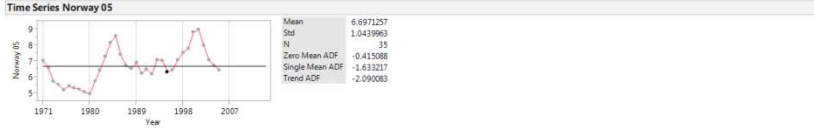
Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.667773	0.0867346	19.23	<0.0001*		0.0122305
AR2	2	-0.814664	0.1678399	-1.40	<0.0001*		
MA1	1	1.999977	0.2019592	9.90	<0.0001*		
MA2	2	-0.999977	0.1981069	-5.05	<0.0001*		
Intercept	0	0.059116	0.0086623	6.82	<0.0001*		

**Forecast**

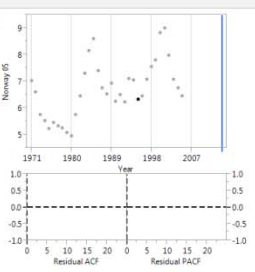


**Residuals**





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	2.A	4.B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	29	0.194934	55.484984	63.116787	0.805	45.484984	0.216720			5.947729	0.392189
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	32	0.257358	56.402677	61.067121	0.782	50.402677	0.136011			6.235955	0.414006
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	32	0.226797	56.746792	61.414836	0.778	50.746792	0.115204			6.558505	0.425364
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	30	0.256184	56.818090	62.923492	0.782	48.818090	0.111283			6.334600	0.420270
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	30	0.246326	55.570565	62.279695	0.801	47.570565	0.078121			5.855539	0.384816
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	31	0.256504	57.580461	63.801853	0.787	49.580461	0.076010			6.132361	0.404555
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	31	0.264787	58.291315	64.512707	0.782	50.291315	0.053274			6.221847	0.413428
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	32	0.312019	58.993932	62.046653	0.737	54.993932	0.037462			6.318423	0.431035
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	32	0.276628	59.012120	61.748164	0.788	53.012120	0.039575			6.037234	0.405010
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	32	0.313654	59.128784	62.181505	0.736	55.128784	0.035048			6.572972	0.447139
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	31	0.313787	60.168815	64.747896	0.743	54.168815	0.020836			6.234222	0.423384
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	30	0.333281	62.930149	67.428072	0.720	59.930149	0.005115			6.792912	0.454252
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	31	0.316475	60.409931	64.989012	0.741	54.409931	0.018470			6.465144	0.438624
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	31	0.3192014	60.690607	65.269688	0.739	54.690607	0.016051			6.376414	0.433488
<input type="checkbox"/>	<input type="checkbox"/>	FI(1)	33	0.3526379	62.034162	63.586522	0.694	60.034162	0.008199			7.126714	0.488969
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	30	0.333281	62.930149	67.428072	0.720	59.930149	0.005115			6.551276	0.443631
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	33	0.3271891	63.318489	66.429185	0.715	59.318489	0.004314			7.256827	0.491481
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	30	0.3345549	63.440700	67.930222	0.716	57.440700	0.004058			6.863304	0.465096
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	29	0.3269281	64.587868	70.526894	0.723	58.587868	0.002275			6.594462	0.446671
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	29	0.3416198	64.737373	70.723403	0.721	56.737373	0.002122			6.551509	0.443517
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	31	0.4093124	66.456344	69.449359	0.665	62.456344	0.000898			7.000950	0.478724
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	28	0.3555561	66.749578	74.232116	0.721	56.749578	0.000776			6.480537	0.436021
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	32	0.4488332	68.198049	69.696537	0.622	66.198049	0.000376			7.775161	0.524989
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	31	0.4379379	68.393024	71.386039	0.643	64.393024	0.000341			7.328971	0.498639
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	30	0.4349963	69.141034	73.630556	0.656	63.141034	0.000235			7.229362	0.490961
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1)	33	0.4887236	77.249310	80.639612	0.564	73.249310	0.000001			8.754355	0.573592
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	34	1.1121951	104.33962	105.89496	0.000	102.33962	0.000000			12.720522	0.828152



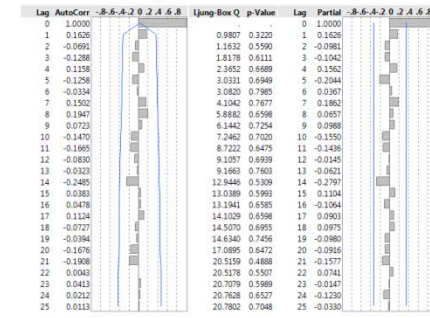
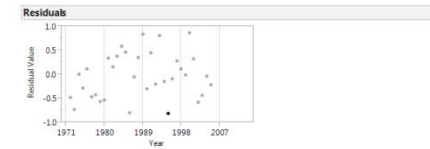
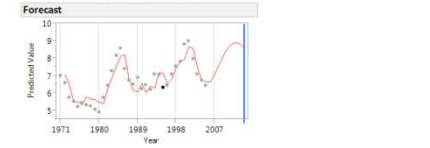
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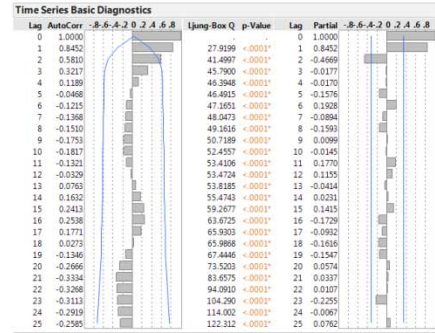
**Model Summary**

DF	29	Stable	Yes
Sum of Squared Errors	5.64320962	Invertible	No
Variance Estimate	0.19459344		
Standard Deviation	0.44112746		
Akaike's A' Information Criterion	55.4849841		
Schwarz's Bayesian Criterion	63.1167867		
RSquare	0.80479003		
RSquare Adj	0.77763762		
MAPE	5.94772928		
MAE	0.39218899		
-2LogLikelihood	45.4849841		

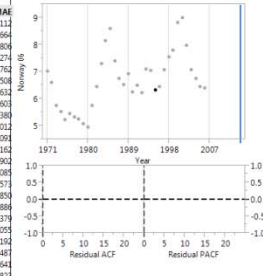
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.678427	0.082512	20.33	<0.0001	0.01179612	
AR2	2	-0.884490	0.072620	-12.18	<0.0001		
MA1	1	1.999991	0.207840	9.62	<0.0001		
MA2	2	-0.999991	0.204764	-4.88	<0.0001		
Intercept	0	0.057245	0.0081645	7.01	<0.0001		





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logLH	Weights	Z	A	B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	33	0.249624	56.788362	61.538919	0.782	50.788362	0.181428				6.080078	0.404112
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	33	0.220674	57.169037	61.919594	0.777	51.169037	0.149983				6.446135	0.417864
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	31	0.249624	57.169037	63.589130	0.781	49.307737	0.135796				6.245475	0.414886
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	31	0.233944	57.909087	63.826662	0.800	47.920867	0.103566				5.774715	0.378271
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	32	0.2494163	57.988422	64.320498	0.787	49.986422	0.099666				5.996193	0.395762
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	32	0.2566179	58.682987	65.017063	0.782	50.682987	0.070354				6.075109	0.402958
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	33	0.271126	59.541817	64.282427	0.783	53.541817	0.045793				6.455573	0.423823
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	33	0.3030314	59.624260	62.734957	0.737	55.62426	0.049444				6.182143	0.420633
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	32	0.3042048	59.748132	62.858828	0.736	55.748132	0.041305				6.417396	0.436380
<input type="checkbox"/>	<input type="checkbox"/>	MA(1, 2)	32	0.3042098	60.712055	65.437079	0.716	54.712055	0.024767				6.099946	0.414022
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	31	0.3840901	60.902008	67.136600	0.737	52.902008	0.023160				6.623919	0.445091
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	32	0.3066981	61.003212	65.669256	0.742	55.003212	0.022053				6.309432	0.428162
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	32	0.3099504	61.309994	65.973028	0.739	55.309994	0.018945				6.238610	0.423902
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	34	0.3422723	62.789913	64.342181	0.695	60.789913	0.009046				6.928235	0.475585
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	30	0.2794803	63.299145	71.075886	0.756	53.299145	0.006997				6.320400	0.423573
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	31	0.3227507	63.626297	68.205279	0.720	57.626297	0.005941				6.394134	0.432833
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	34	0.3178911	63.985410	67.125448	0.716	59.98541	0.004905				7.084330	0.479889
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	31	0.3338902	64.136412	68.695494	0.717	58.136412	0.004650				6.992994	0.453378
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	30	0.3278933	65.255468	71.360910	0.723	57.255468	0.002631				6.444214	0.436055
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	30	0.3304318	65.412010	71.517452	0.722	57.41201	0.002433				6.401020	0.433192
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	29	0.3434874	67.431562	75.063396	0.722	57.431562	0.000886				6.322908	0.428467
<input type="checkbox"/>	<input type="checkbox"/>	MA(2, 1)	32	0.4372647	69.347458	70.873819	0.621	67.347458	0.000340				6.902857	0.473444
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	33	0.4372647	69.347458	70.873819	0.621	67.347458	0.000340				7.651907	0.517823
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	32	0.4264465	69.502953	72.555674	0.642	65.502953	0.000125				7.219802	0.490904
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	31	0.4252889	70.394907	74.971958	0.633	64.394907	0.000203				7.144482	0.484699
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	34	0.4842093	78.813618	81.980656	0.565	74.813618	0.000003				8.555125	0.56014
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0, 0, 0)	35	1.0922264	106.32528	107.90880	-0.00	104.32528	0.000000				12.470297	0.812694



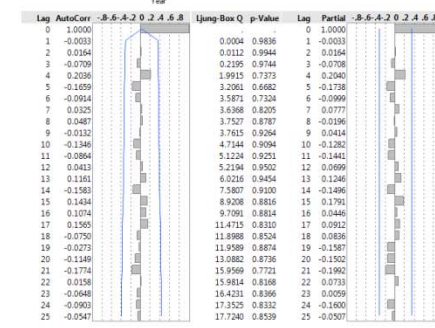
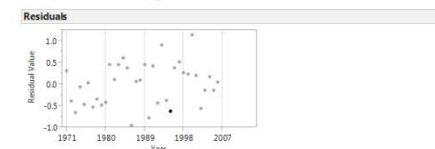
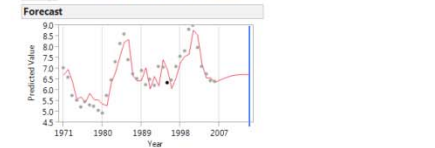
**Model: AR(2)**

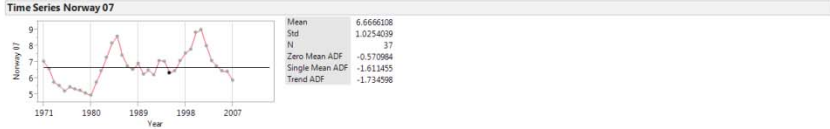
**Model Summary**

DF	33	Stable	Yes
Sum of Squared Errors	8.23759112	Invertible	Yes
Variance Estimate	0.24962397		
Standard Deviation	0.49962383		
Alkaike's 'A' Information Criterion	56.7883624		
Schwarz's Bayesian Criterion	61.5389192		
RSquare	0.78172809		
RSquare Adj	0.76849949		
MAPE	6.0800778		
MAE	0.40411246		
-2LogLikelihood	50.7883624		

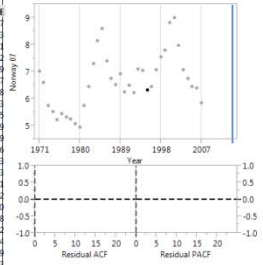
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.232811	0.1426366	8.64	<.0001*	1.56392711	
AR2	2	-0.491925	0.1412828	-3.30	<.0001*		
Intercept	0	6.711806	0.3305944	20.30	<.0001*		





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logLH	Weights	Z.A.B.#	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	34	0.2528273	58.726508	63.59061	0.775	52.726508	0.180932		6.214119	0.412137
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	34	0.2252426	59.894412	64.122166	0.771	53.289412	0.136547		6.467917	0.418813
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2)	32	0.2528273	59.824541	67.979130	0.794	49.824541	0.099393		5.858568	0.382214
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2)	33	0.2444692	60.020408	66.490479	0.780	52.020408	0.093333		6.083211	0.402872
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1,1)	32	0.2632633	60.456466	66.780521	0.768	52.456466	0.076184		6.370568	0.423279
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1)	33	0.2588781	60.515499	66.999171	0.777	52.515499	0.073963		6.195366	0.410457
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1,2)	31	0.2474004	60.847971	68.656566	0.820	50.847971	0.059583		5.841998	0.391176
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,1)	34	0.3020501	61.154075	64.321113	0.735	57.154075	0.053750		6.248648	0.423413
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	34	0.3042813	61.192735	64.597772	0.733	57.192735	0.047704		6.478349	0.438665
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	34	0.2743321	61.252500	66.358264	0.730	55.2525	0.044460		6.557900	0.438589
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2)	33	0.3033604	62.321487	67.071804	0.741	56.321487	0.029871		6.165251	0.416839
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,1)	33	0.306069	62.680138	67.430695	0.738	56.680138	0.025061		6.354207	0.429436
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,1)	33	0.3089637	62.902428	67.652964	0.736	56.902428	0.022425		6.287156	0.425403
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,2)	32	0.2920289	63.177151	69.112277	0.823	55.177151	0.019547		6.612766	0.446862
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	35	0.3404823	64.363308	65.948627	0.693	62.363308	0.010802		6.936114	0.474344
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,1)	32	0.3209136	65.165527	69.831571	0.718	59.165527	0.007233		6.519049	0.439002
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2)	32	0.3227731	65.740261	70.406325	0.714	59.740261	0.005426		6.763421	0.455829
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	35	0.3185896	65.801800	69.037376	0.710	61.801800	0.005262		7.142490	0.482718
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,1)	31	0.3266867	66.877299	73.098691	0.720	58.877299	0.003073		6.506858	0.438042
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,2)	31	0.3287726	66.994163	73.215555	0.719	58.994163	0.002899		6.514365	0.438604
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1)	33	0.3096774	68.780330	71.892025	0.666	64.780330	0.001187		6.862267	0.467159
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,2)	33	0.4201382	70.972877	74.083373	0.642	66.972877	0.000397		7.263203	0.491413
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	34	0.4325499	70.979116	72.534464	0.621	68.979116	0.000395		7.715505	0.519592
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,2)	32	0.4185291	71.809611	78.472055	0.654	65.809611	0.000261		7.202551	0.486749
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,2)	30	0.4886935	78.922464	86.690294	0.632	68.922464	0.000003		7.709349	0.519361
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	35	0.4867191	81.111072	84.332008	0.558	77.111072	0.000002		8.604948	0.563228
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0,0,0)	36	1.0806601	108.85786	110.46878	0.000	106.85786	0.000000		12.448478	0.813428



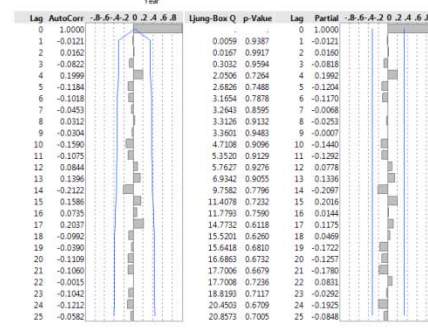
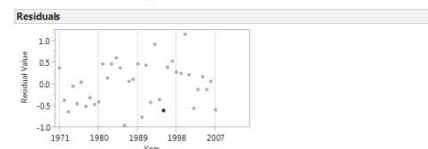
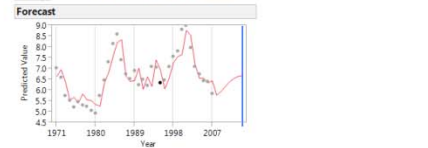
**Model: AR(2)**

**Model Summary**

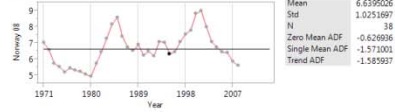
DF	34	Stable	Yes
Sum of Squared Errors	8.59612908	Invertible	Yes
Variance Estimate	0.25282733		
Standard Deviation	0.50281938		
Akaike's AIC Information Criterion	58.7265076		
Schwarz's Bayesian Criterion	63.5592614		
RSquare	0.77542935		
RSquare Adj	0.76221931		
MAPE	6.21411866		
MAE	0.41233673		
-2LogLikelihood	52.7265076		

**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.235669	0.1436113	8.60	<.0001*		1.52122294
AR2	2	-0.445491	0.1428269	-3.27	<.0001*		
Intercept	0	6.645155	0.3344961	19.87	<.0001*		

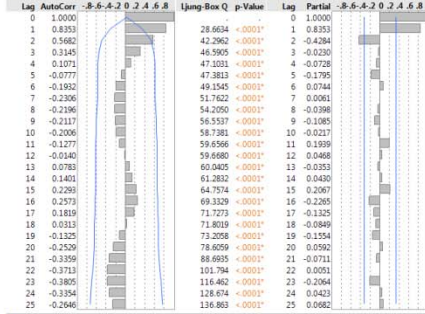


Time Series Norway 08



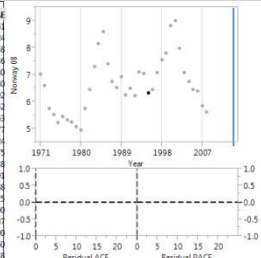
Mean 6.639526  
 Std 1.0251697  
 N 38  
 Zero Mean ADF -0.626936  
 Single Mean ADF -1.571001  
 Trend ADF -1.585937

Time Series Basic Diagnostics



Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logH	Weights	Z	A	B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	35	0.2459819	59.175692	64.088451	0.781	53.175692	0.191833				6.113429	0.405061
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	35	0.2218213	60.116079	65.028837	0.774	54.116079	0.119873				6.444305	0.416724
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2)	34	0.247487	60.495049	67.046885	0.785	52.49504	0.099107				5.899981	0.399598
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2)	33	0.2269828	60.563048	68.70979	0.797	50.563048	0.095869				5.81152	0.376239
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1)	34	0.2518707	60.994081	67.544426	0.782	52.994081	0.077280				6.103205	0.403940
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	33	0.2574751	61.108437	67.552108	0.773	53.108437	0.072895				6.278749	0.416740
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1,2)	32	0.2399204	61.242171	69.378860	0.785	51.242171	0.065539				5.743260	0.383962
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,1)	35	0.2934284	61.724608	64.846444	0.741	57.724608	0.053633				6.086354	0.412352
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1,1)	35	0.2955869	61.969898	65.191734	0.739	57.969898	0.047443				6.304249	0.426863
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	35	0.2870992	62.085037	68.997795	0.782	56.085037	0.044788				6.453540	0.431077
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1,2)	34	0.2945199	62.877099	67.705523	0.747	58.877099	0.032027				6.010310	0.400704
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,1)	34	0.2979194	63.239636	68.072390	0.745	57.239636	0.025145				6.199077	0.418775
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,1)	34	0.299899	63.467948	68.302002	0.743	57.467948	0.022433				6.131880	0.414738
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,2)	33	0.2822264	63.768815	67.212486	0.752	55.768815	0.019299				6.466238	0.433861
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	36	0.3119675	65.187120	66.798038	0.700	63.18712	0.009496				6.822028	0.465888
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,1)	33	0.3112264	65.801043	70.551800	0.725	59.801043	0.006986				6.361879	0.428125
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2,2)	33	0.3130427	66.377489	71.138046	0.721	60.377489	0.005237				6.595292	0.444349
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	36	0.3126785	66.820077	70.096150	0.715	62.820077	0.004195				7.099479	0.478837
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,1)	32	0.3166084	67.508822	73.842998	0.727	59.508822	0.002974				6.369197	0.428396
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,2)	32	0.3186017	67.628944	73.963019	0.726	59.628944	0.002801				6.362953	0.428069
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,2)	31	0.294645	69.512137	77.486923	0.715	59.512137	0.001071				6.270723	0.422336
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2,1)	34	0.379596	69.658126	72.825163	0.674	65.658126	0.001016				6.712786	0.456317
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,2)	34	0.4089639	71.978502	75.145540	0.650	67.978502	0.000318				7.146388	0.482513
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	35	0.4233648	72.206695	73.760184	0.628	70.206695	0.000284				7.850151	0.512504
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,2)	33	0.4071391	72.813070	77.561527	0.662	66.81307	0.000210				7.094809	0.474894
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	36	0.4787223	82.619613	85.894786	0.564	78.619613	0.000002				8.554464	0.559374
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0,0,0)	37	1.0793775	111.72855	113.36613	0.000	109.72855	0.000000				12.507781	0.814329



Model: AR(2)

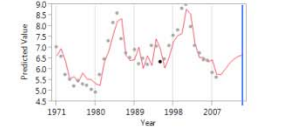
Model Summary

DF	35	Stable	Yes
Sum of Squared Errors	8.60936499	Invertible	Yes
Variance Estimate	0.2459819		
Standard Deviation	0.4959658		
Alaika's 'A' Information Criterion	59.1756921		
Schwarz's Bayesian Criterion	64.0884506		
RSquare	0.7805647		
RSquare Adj	0.76812068		
MAPE	6.11342876		
MAE	0.40506087		
-2LogLikelihood	53.1756921		

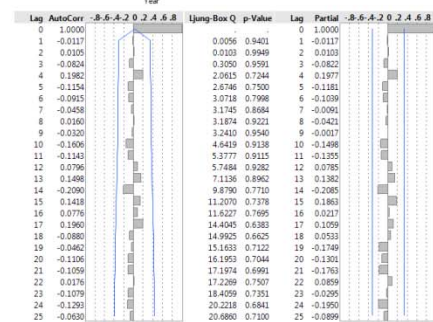
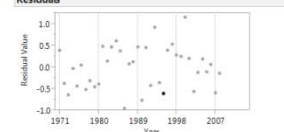
Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.241302	0.1397710	8.90	<0.0001		1.50315166
AR2	2	-0.470218	0.1396497	-3.37	<0.001		
Intercept	0	6.630105	0.3296087	20.12	<0.0001		

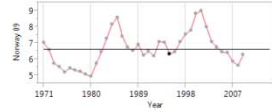
Forecast



Residuals

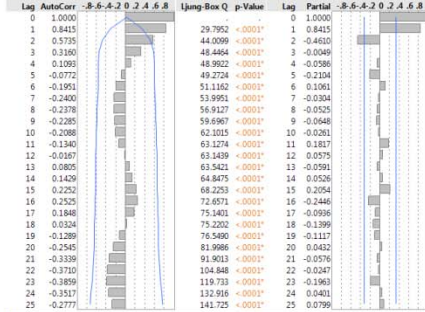


Time Series Norway 09



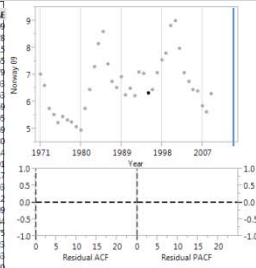
Mean 6.6305615  
 Std 1.013441  
 N 39  
 Zero Mean ADF -0.463062  
 Single Mean ADF -1.747765  
 Trend ADF -1.90222

Time Series Basic Diagnostics



Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logLH	Weights	Z.A.B.	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	36	0.249623	60.718063	65.708748	0.775	54.718063	0.214061		6.175234	0.407199
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	34	0.253403	62.120388	68.722882	0.770	54.172038	0.103479		6.350950	0.419428
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	35	0.249744	62.259895	68.702042	0.778	54.215995	0.101229		6.073731	0.399415
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	33	0.250713	62.215351	70.439462	0.786	52.215351	0.099446		5.969399	0.394265
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	36	0.2437276	62.261243	67.251028	0.765	56.261243	0.098955		6.526958	0.420479
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	35	0.252947	62.614067	69.268314	0.776	54.614067	0.082959		6.176538	0.406063
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	34	0.247452	63.107704	71.425513	0.785	53.107704	0.064833		6.027407	0.394765
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	36	0.2662341	63.430562	68.421247	0.758	57.430562	0.051533		6.496631	0.432059
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	36	0.3020645	64.193516	67.468688	0.728	60.193516	0.037861		6.454858	0.434005
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	36	0.3011185	64.310699	67.585871	0.728	60.310699	0.035583		6.257232	0.421069
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	34	0.2801519	65.108218	71.695852	0.750	57.108218	0.023888		6.613977	0.442038
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	35	0.3025255	65.491792	70.404550	0.734	59.491792	0.019678		6.198389	0.416614
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	35	0.3028007	65.504777	70.417936	0.733	59.504777	0.019550		6.388943	0.429959
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	35	0.3061087	65.882439	70.795197	0.731	59.882439	0.016188		6.327204	0.425927
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	37	0.3355881	67.334843	68.972429	0.689	65.334843	0.007830		6.991339	0.474403
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	37	0.3112569	68.261008	71.588131	0.710	64.261008	0.004928		7.147731	0.479912
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	34	0.3186239	68.388411	73.210265	0.711	62.388411	0.004628		6.432025	0.431969
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	34	0.3177731	68.453774	73.440538	0.710	62.453774	0.004920		6.707974	0.450444
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	33	0.3215883	69.886121	76.329793	0.715	61.886121	0.002187		6.538648	0.436375
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	33	0.3246013	70.084642	76.528313	0.714	62.084642	0.001980		6.481733	0.434723
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	35	0.3247581	72.292429	75.460696	0.684	68.292429	0.000574		7.376111	0.496166
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	32	0.3380096	72.297009	80.351598	0.712	62.297009	0.000555		6.392193	0.429088
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	36	0.4319447	74.927752	76.538870	0.610	72.927752	0.000176		7.773532	0.520743
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	35	0.4232461	75.087750	78.305956	0.629	71.087750	0.000162		7.313801	0.492418
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	34	0.4169832	75.596981	80.399445	0.645	69.596981	0.000128		7.219990	0.483601
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	37	0.4657737	83.653834	86.980957	0.566	79.653834	0.000002		8.337475	0.545200
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0, 0, 0)	38	1.0540907	113.71862	115.38218	0.000	111.71862	0.000000		12.295330	0.801234



Model: AR(2)

Model Summary

DF	36	Stable	Yes
Sum of Squared Errors	8.89136117	Invertible	Yes
Variance Estimate	0.2496225		
Standard Deviation	0.4997709		
Akaike's A' Information Criterion	60.7180634		
Schwarz's Bayesian Criterion	65.7087483		
RSquare	0.7750476		
RSquare Adj	0.7625402		
MAPE	6.1752305		
MAE	0.40719948		
-2LogLikelihood	54.7180634		

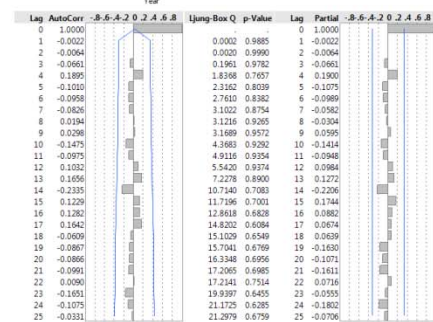
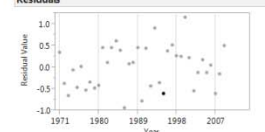
Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.229113	0.139628	8.80	<.0001*	1.59819699	
AR2	2	-0.463243	0.139628	-3.35	<.0001*		
Intercept	0	6.683542	0.3107417	21.51	<.0001*		

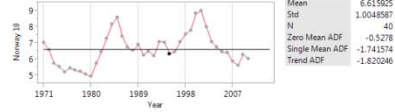
Forecast



Residuals

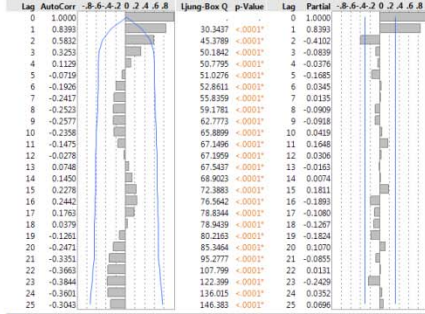


**Time Series Norway 10**



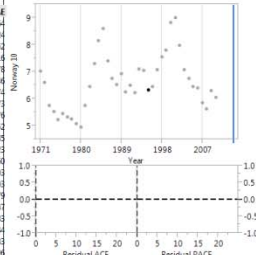
Mean 6.615925  
 Std 1.004587  
 N 40  
 Zero Mean ADF -0.5278  
 Single Mean ADF -1.741574  
 Trend ADF -1.820246

**Time Series Basic Diagnostics**



**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogH	Weights	Z	A	B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	37	0.2512443	62.77521	67.842459	0.766	56.77521	0.241569				6.291720	0.415304
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	36	0.2501149	64.468351	71.223869	0.768	56.468351	0.103637				6.337398	0.417524
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	36	0.2508292	64.794783	71.552021	0.766	56.794783	0.082030				6.237826	0.411292
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	35	0.2493914	64.897371	71.531617	0.757	56.897371	0.083628				6.387324	0.422938
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	37	0.2626264	64.845220	70.011858	0.752	58.84522	0.081651				6.545038	0.430578
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	37	0.2977645	65.490808	68.817991	0.726	61.490808	0.062155				6.454944	0.434204
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	37	0.2987047	65.471708	68.844162	0.725	61.673038	0.058353				6.281202	0.422274
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	34	0.243997	65.999676	74.317484	0.767	55.999676	0.048194				6.275397	0.415773
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	35	0.2603377	66.185752	74.630149	0.769	56.185752	0.043912				6.199310	0.408478
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	35	0.2813553	66.717372	73.425018	0.758	58.717372	0.032766				6.393484	0.439952
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	36	0.3020987	67.024811	72.021216	0.729	61.024811	0.028913				6.418856	0.431898
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	36	0.3024481	67.074244	72.064928	0.729	61.074244	0.028161				6.271006	0.423233
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	37	0.2749763	67.274767	72.341406	0.738	61.274767	0.025475				6.729863	0.435209
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	36	0.3042638	67.387800	72.274465	0.729	61.28778	0.025960				6.358799	0.427362
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	38	0.3280717	68.197161	69.861322	0.690	66.197161	0.016058				6.885716	0.467033
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	38	0.3035364	69.181023	72.538782	0.710	65.181023	0.009821				7.078003	0.475079
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	35	0.3159022	69.860860	74.773619	0.707	63.86086	0.009991				6.527688	0.436841
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	35	0.3146022	69.894976	74.909234	0.707	63.894976	0.009442				6.728424	0.450883
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	34	0.3201438	71.479649	78.029994	0.710	63.479649	0.003112				6.623504	0.443034
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	34	0.322353	71.621826	78.172170	0.709	63.621826	0.002896				6.574306	0.439883
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	36	0.3462372	73.148229	76.149501	0.666	69.148229	0.001354				7.265668	0.488808
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	33	0.3338047	73.848008	82.035939	0.707	63.848008	0.000952				6.511874	0.431608
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	36	0.4242656	77.275300	80.550272	0.620	73.2751	0.000172				7.433369	0.498327
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	35	0.4140515	77.378842	82.291400	0.639	71.378842	0.000163				7.341211	0.491919
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	37	0.4430033	77.887105	79.524751	0.592	75.887105	0.000126				8.000991	0.533225
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	38	0.4821934	85.423795	88.801554	0.561	81.423795	0.000003				8.315332	0.544136
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0, 0, 0)	39	1.0356318	115.90284	117.59172	0.000	113.90284	0.000000				12.169961	0.793604



**Model: AR(2)**

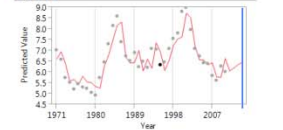
**Model Summary**

DF	37	Stable	Yes
Sum of Squared Errors	9.29603857	Invertible	Yes
Variance Estimate	0.25124429		
Standard Deviation	0.50124274		
Akaike's A <sub>c</sub> Information Criterion	62.7752008		
Schwarz's Bayesian Criterion	67.8445951		
RSquare	0.76614614		
RSquare Adj	0.75350539		
MAPE	6.29171958		
MAE	0.41530418		
-2LogLikelihood	56.7752008		

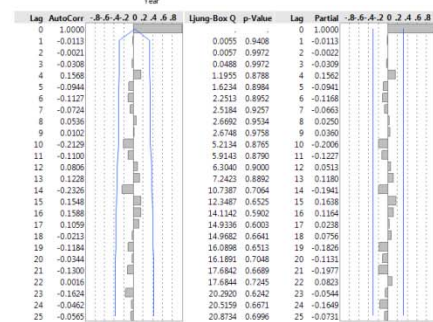
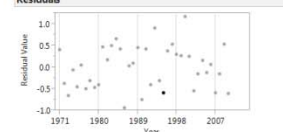
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.201331	0.139684	8.60	<.0001*	15126.2005	
AR2	2	-0.428674	0.138626	-3.10	<.0001*		
Intercept	0	6.618474	0.321747	20.57	<.0001*		

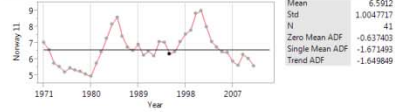
**Forecast**



**Residuals**

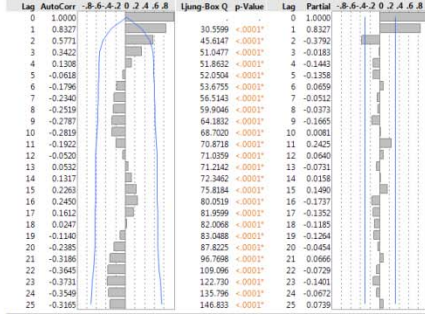


**Time Series Norway 11**



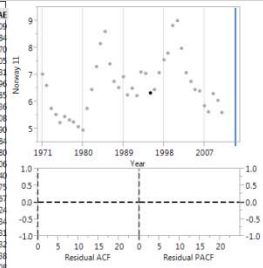
Mean 6.592  
Std 1.0047717  
N 41  
Zero Mean ADF -0.637403  
Single Mean ADF -1.671499  
Trend ADF -1.649849

**Time Series Basic Diagnostics**



**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logH	Weights	Z	A	B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	38	0.2499894	64.067814	69.208531	0.766	58.067834	0.226000	6.336808	0.417209		6.336808	0.417209
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	37	0.2547118	65.827821	72.682130	0.767	57.827821	0.093741	6.248951	0.413086		6.248951	0.413086
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	38	0.2627273	65.959892	71.180206	0.754	59.959892	0.087768	6.527332	0.432779		6.527332	0.432779
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	37	0.2566007	66.054122	72.908410	0.766	58.054122	0.083732	6.348713	0.417905		6.348713	0.417905
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	37	0.2916732	66.299822	69.677581	0.730	62.299822	0.074034	6.404339	0.429633		6.404339	0.429633
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	36	0.2638645	66.334214	73.089732	0.757	58.334214	0.072772	6.406026	0.423796		6.406026	0.423796
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	38	0.2937733	66.584079	69.962338	0.739	62.584079	0.064263	6.251719	0.418485		6.251719	0.418485
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	36	0.2548933	66.903518	75.471378	0.773	56.903518	0.054745	6.164614	0.405136		6.164614	0.405136
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	36	0.2774436	67.783641	74.519159	0.747	59.783641	0.035610	6.520963	0.434408		6.520963	0.434408
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	37	0.2935518	67.738877	72.840525	0.734	61.738877	0.035420	6.374786	0.426999		6.374786	0.426999
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	38	0.2584765	67.807990	73.984076	0.743	61.807990	0.033130	6.655463	0.436888		6.655463	0.436888
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	37	0.2963565	67.915131	72.981770	0.733	61.915131	0.033012	6.251926	0.418588		6.251926	0.418588
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	37	0.2982033	68.113263	73.179902	0.732	62.113263	0.029899	6.331648	0.424306		6.331648	0.424306
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	35	0.271502	68.323237	76.767374	0.753	58.323237	0.021679	6.398800	0.423444		6.398800	0.423444
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	39	0.3240245	69.424823	71.113803	0.693	67.424823	0.015518	6.859029	0.463875		6.859029	0.463875
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	39	0.3044624	70.749413	74.176557	0.709	66.749413	0.008002	7.116501	0.476167		7.116501	0.476167
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	36	0.3074653	70.790229	75.780924	0.712	64.790229	0.007841	6.866310	0.445424		6.866310	0.445424
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	36	0.3100007	70.819095	75.809760	0.712	64.819095	0.007728	6.530768	0.435334		6.530768	0.435334
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	35	0.3120595	72.247680	78.901887	0.716	64.247680	0.003783	6.572923	0.438333		6.572923	0.438333
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	35	0.3148886	72.452163	79.106410	0.714	64.452163	0.003416	6.536416	0.436032		6.536416	0.436032
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	37	0.3408761	74.397135	77.666585	0.671	70.397135	0.001329	7.250879	0.485808		7.250879	0.485808
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	34	0.3281186	74.786414	83.104222	0.712	64.786414	0.001063	6.515316	0.434508		6.515316	0.434508
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	36	0.4046778	78.450543	83.441228	0.646	72.450543	0.000170	7.295311	0.487074		7.295311	0.487074
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	37	0.4119712	78.661004	81.988127	0.624	74.661004	0.000153	7.481486	0.498889		7.481486	0.498889
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	36	0.4323913	78.895796	80.620358	0.601	78.895796	0.000132	7.900344	0.523105		7.900344	0.523105
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	39	0.4585331	87.179308	90.606452	0.564	83.179308	0.000002	8.322625	0.543806		8.322625	0.543806
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0, 0, 0)	40	1.0348054	118.74331	120.45688	-0.00	116.74331	0.000000	12.204650	0.794800		12.204650	0.794800



**Model: AR(2)**

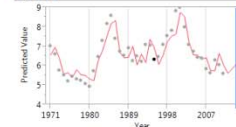
**Model Summary**

DF	38	Stable	Yes
Sum of Squared Errors	9.49959668	Invertible	Yes
Variance Estimate	0.24998936		
Standard Deviation	0.49998936		
Akaike's AIC Information Criterion	64.0678143		
Schwarz's Bayesian Criterion	69.2085305		
RSquare	0.76612071		
RSquare Adj	0.75381127		
MAPE	6.33680767		
MAE	0.4172091		
-2LogLikelihood	58.067843		

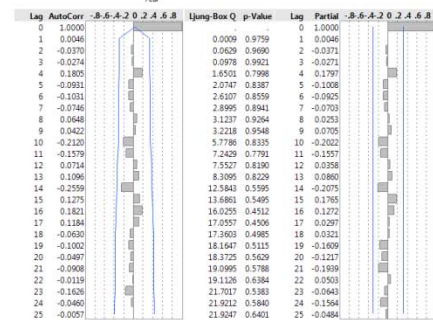
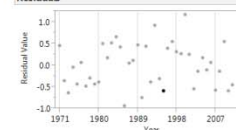
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob >  t	Constant	Estimate
AR1	1	1.211491	0.1389281	8.73	<.0001*	1.46689771	
AR2	2	-0.453712	0.1381879	-3.15	<.0001*		
Intercept	0	6.571484	0.3251840	20.21	<.0001*		

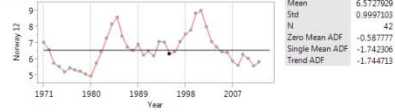
**Forecast**



**Residuals**

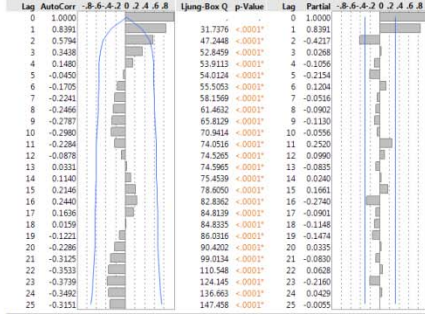


Time Series Norway 12



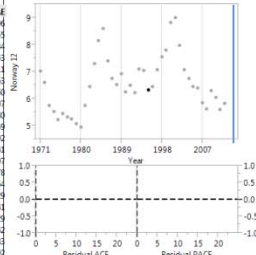
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Std 0.9997103  
N 42  
Zero Mean ADF -0.587777  
Single Mean ADF -1.742306  
Trend ADF -1.744713

Time Series Basic Diagnostics



Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	Z.A.B.	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	39	0.2446306	64.587149	69.800158	0.769	58.587149	0.244284		6.265640	0.411594
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	39	0.2564606	66.437241	71.652050	0.757	60.437241	0.096823		6.426767	0.425455
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2)	38	0.2502522	66.502223	73.452802	0.769	58.502223	0.093770		6.212870	0.407754
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1)	38	0.2502544	66.566058	73.540737	0.769	58.566058	0.092620		6.272469	0.411285
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1,1)	37	0.2573668	66.881396	73.737484	0.780	58.881396	0.077502		6.338465	0.418111
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	39	0.2871058	67.259318	70.686463	0.731	63.259318	0.064216		6.402528	0.427966
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2)	37	0.2496776	67.475564	76.163912	0.735	57.475564	0.057633		6.112379	0.400766
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,1)	39	0.2901564	67.883403	71.110547	0.729	63.883403	0.051946		6.267961	0.420107
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,2)	37	0.2703963	68.33472	75.187761	0.750	60.33472	0.037531		6.458352	0.429180
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2)	39	0.2842957	68.556212	73.789221	0.734	62.556212	0.033576		6.824214	0.427599
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,1)	38	0.2912472	68.818568	73.965674	0.734	62.818568	0.029488		6.302248	0.426692
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1,2)	36	0.2645327	68.883153	77.451014	0.780	58.883153	0.028512		6.337606	0.418263
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2)	38	0.2929746	69.050013	74.180729	0.733	63.050013	0.026230		6.315827	0.421397
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,1)	38	0.2937832	69.449501	74.280217	0.733	61.449501	0.024969		6.354872	0.424378
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	40	0.3174654	70.29717	72.011289	0.696	68.29717	0.014056		6.816845	0.459554
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	40	0.296985	71.349842	74.825182	0.713	67.349842	0.008306		6.974579	0.466229
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2)	37	0.302961	71.839555	76.906194	0.713	65.839555	0.006502		6.858079	0.443441
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,1)	37	0.3060675	70.243490	77.091028	0.712	66.24349	0.005928		6.518932	0.433328
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,1)	36	0.3077692	73.426514	80.182032	0.716	65.426514	0.002941		6.598901	0.438842
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,2)	36	0.3102673	73.606896	80.362413	0.715	65.606896	0.002687		6.565363	0.436683
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1)	38	0.3339857	75.120614	78.688039	0.673	71.120614	0.001146		7.197762	0.480892
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,2)	35	0.323506	76.013178	84.453756	0.712	66.013178	0.000807		6.507856	0.432573
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,2)	37	0.3399586	79.642900	84.708228	0.647	73.6429	0.000131		7.248716	0.482856
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,2)	38	0.4164034	80.481477	83.876236	0.621	76.481477	0.000098		7.522998	0.499778
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	39	0.4322037	80.344338	82.613215	0.596	78.944338	0.000068		7.960188	0.526862
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	40	0.4498543	88.440054	91.915393	0.567	84.440054	0.000002		8.239105	0.536239
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0,0,0)	41	1.0237968	121.16650	122.90417	-0.00	119.1665	0.000000		12.153722	0.791478



Model: AR(2)

Model Summary

DF	39	Stable	Yes
Sum of Squared Errors	9.540993	Invertible	Yes
Variance Estimate	0.2446306		
Standard Deviation	0.49460146		
Akaike's AIC Information Criterion	64.5871495		
Schwarz's Bayesian Criterion	69.8001583		
RSquare	0.76872661		
RSquare Adj	0.75686223		
MAPE	6.26563954		
MAE	0.41159618		
-2LogLikelihood	58.5871495		

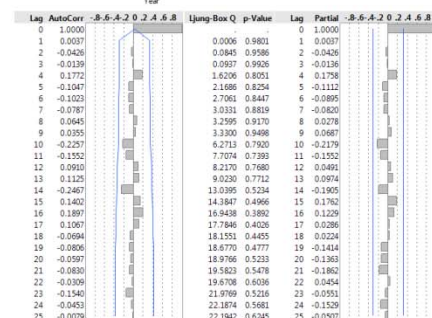
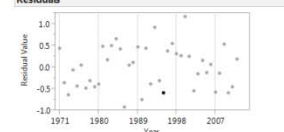
Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.205122	0.1361848	8.85	<.0001*		1.4942505
AR2	2	-0.451963	0.1365683	-3.16	<.0001*		
Intercept	0	6.590111	0.3135661	21.02	<.0001*		

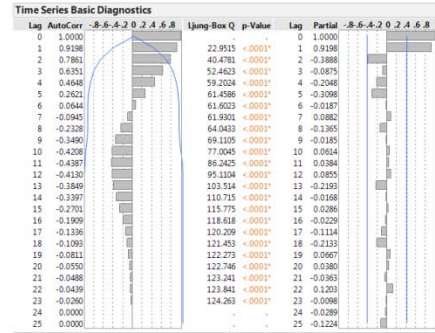
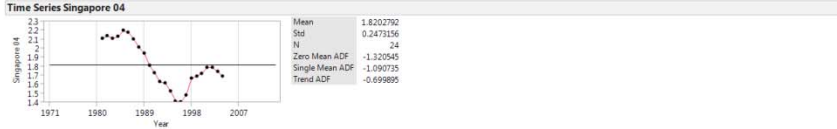
Forecast



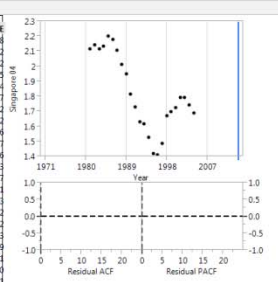
Residuals



## Singapore



Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogH	Weights	Z.A.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	21	0.003824	-59.28416	-55.74999	0.890	-65.28416	0.189519		3.248821	0.058728
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	21	0.0040314	-59.27386	-57.00287	0.938	-63.27386	0.188546		2.999669	0.052232
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	21	0.0040293	-57.89864	-55.62796	0.854	-61.89864	0.094797		2.999620	0.052292
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	20	0.0041673	-57.53183	-54.12555	0.939	-63.53183	0.078011		2.997187	0.052335
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	20	0.0042032	-57.41906	-54.01258	0.939	-63.41906	0.074585		3.003754	0.052324
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	20	0.0042042	-57.41460	-54.00802	0.939	-63.41460	0.074415		3.003406	0.052317
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	20	0.0042034	-57.39962	-52.97440	0.889	-65.39962	0.070633		3.253908	0.058832
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	20	0.0040744	-56.88255	-52.17034	0.895	-64.88255	0.057036		3.210892	0.058132
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	21	0.0044331	-56.16005	-52.62589	0.893	-62.16005	0.039743		3.350632	0.060348
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	19	0.0043677	-55.57809	-51.03611	0.939	-63.57809	0.029709		2.855576	0.052127
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	19	0.0044244	-55.41833	-50.87736	0.939	-63.41833	0.027442		3.003948	0.052326
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	19	0.0042722	-54.90441	-49.01414	0.895	-64.90441	0.021213		3.196855	0.057903
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	18	0.0037409	-54.71212	-49.03465	0.943	-64.71212	0.018298		2.921361	0.051027
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	21	0.0050615	-52.88422	-51.79118	0.940	-64.88422	0.007725		3.362760	0.058321
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	22	0.0056675	-52.73034	-51.59485	0.910	-54.73034	0.007153		3.378384	0.058843
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	20	0.0051055	-51.70275	-49.52066	0.919	-55.70275	0.004279		3.370528	0.058392
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	20	0.0051982	-51.35053	-49.18844	0.918	-55.35053	0.002588		3.377081	0.058552
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	19	0.0051439	-50.56787	-47.28414	0.922	-56.56787	0.002426		3.289596	0.056853
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	19	0.0052078	-50.35088	-47.07775	0.921	-56.35088	0.002177		3.246265	0.056249
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	18	0.0048797	-50.07967	-45.71150	0.928	-58.07967	0.001897		3.225767	0.055983
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	22	0.0060865	-50.06786	-47.71215	0.872	-54.06786	0.001890		3.874264	0.066786
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	17	0.0045578	-48.93959	-43.48438	0.931	-58.93959	0.001075		3.153149	0.054861
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	19	0.0055919	-48.88920	-45.61607	0.916	-54.88920	0.001048		3.362552	0.058138
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	18	0.0054889	-48.66459	-44.30042	0.923	-56.66459	0.000937		3.259054	0.056464
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	21	0.0082094	-38.45034	-34.83418	0.814	-44.45034	0.000006		4.802514	0.087100
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	22	0.0187992	-22.13493	-19.77882	0.653	-26.13493	0.000000		6.738022	0.121448
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	23	0.0638244	3.048727	4.226781	0.000	1.048727	0.000000		11.972483	0.213982



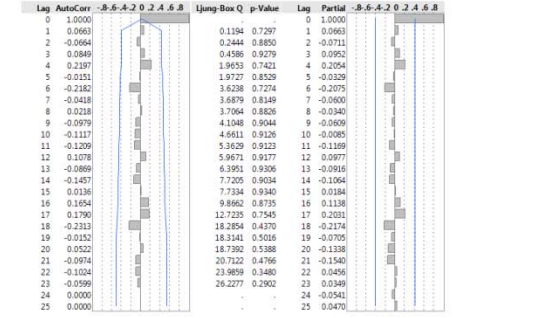
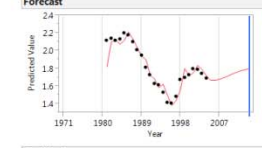
**Model: AR(2)**

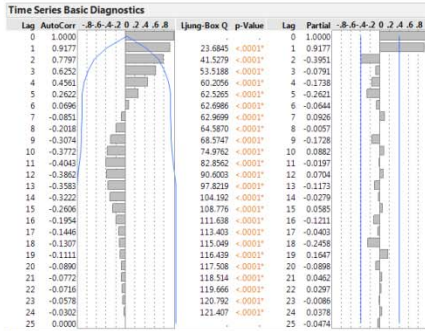
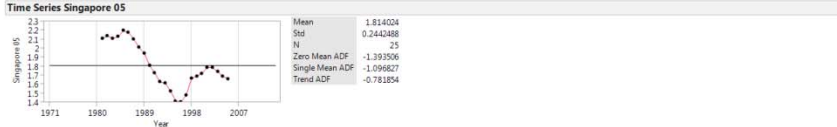
**Model Summary**

DF	21	Stable	Yes
Sum of Squared Errors	0.08069013	Invertible	Yes
Variance Estimate	0.0038239		
Standard Deviation	0.06198999		
Alaika's 'A' Information Criterion	-59.284156		
Schwarz's Bayesian Criterion	-55.749994		
RSquare	0.89902114		
RSquare Adj	0.87908066		
MAPE	3.24882144		
MAE	0.05872824		
-2LogLikelihood	-65.284156		

**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.534803	0.1505824	10.19	<.0001*		0.14448354
AR2	2	-0.614155	0.1548379	-3.97	<.0001*		
Intercept	0	1.820783	0.1307077	13.93	<.0001*		





### Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logLH	Weights	Z	A	B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	22	0.003652	-63.15727	-59.50064	0.891	-69.15727	0.200573				3.132184	0.056616
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	22	0.0038536	-63.03061	-60.67450	0.939	-67.03061	0.188264				2.904340	0.050553
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	22	0.0040981	-61.62202	-59.20591	0.935	-65.62202	0.093069				2.881818	0.050204
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	21	0.0039681	-61.33514	-57.80098	0.940	-67.33514	0.080050				2.874366	0.050222
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	21	0.0040077	-61.18859	-57.65442	0.939	-67.18859	0.074951				2.902912	0.050523
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	21	0.0038537	-61.18485	-56.30935	0.890	-69.18485	0.074811				3.135386	0.056668
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	21	0.0040088	-61.18254	-57.64838	0.939	-67.18254	0.074723				2.903152	0.050555
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	21	0.0039159	-60.56919	-55.69369	0.893	-68.56919	0.054899				3.160397	0.057503
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	22	0.0042389	-59.81069	-56.15407	0.892	-65.81069	0.037833				3.265342	0.058811
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	20	0.0042516	-59.38130	-54.69039	0.840	-67.38130	0.030262				2.870353	0.050253
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	20	0.0040088	-59.18885	-54.47963	0.939	-67.18885	0.027371				2.903015	0.050504
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	20	0.0041136	-58.57850	-52.48212	0.893	-68.57850	0.020303				3.176306	0.054210
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	19	0.003709	-57.72160	-51.81314	0.942	-67.72160	0.012341				2.913885	0.050775
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	22	0.0040766	-56.21565	-55.00216	0.916	-58.21565	0.006236				3.297198	0.057147
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	23	0.0054237	-56.11989	-54.84184	0.911	-58.11989	0.005945				3.255973	0.056692
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	21	0.0048894	-55.12474	-52.85375	0.920	-59.12474	0.003614				3.296028	0.057067
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	21	0.0049902	-54.70642	-52.43544	0.918	-58.70642	0.002922				3.316203	0.057844
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	20	0.0048892	-54.13950	-50.73502	0.933	-60.13950	0.002298				3.146907	0.054883
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	20	0.0049648	-53.85880	-50.44432	0.922	-59.85880	0.001912				3.155494	0.054652
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	19	0.0044034	-53.76438	-49.22241	0.929	-61.76438	0.001831				3.112859	0.054021
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	23	0.005871	-53.21106	-50.73370	0.870	-57.21106	0.001388				3.812862	0.067709
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	18	0.0043024	-52.68174	-47.00427	0.931	-62.68174	0.001065				3.038516	0.052859
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	19	0.0051285	-52.23802	-47.69604	0.923	-60.23802	0.000853				3.152802	0.054626
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	20	0.0053576	-52.21965	-48.60917	0.916	-58.21965	0.000844				3.297198	0.057147
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	22	0.0089862	-39.69972	-16.64309	0.893	-45.69972	0.000022				4.871037	0.084861
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	23	0.0182535	-23.96453	-21.52678	0.652	-27.96453	0.000000				6.603965	0.119161
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0, 0, 0)	24	0.0621432	2.468522	3.687398	0.000	0.4685219	0.000000				11.732511	0.209927

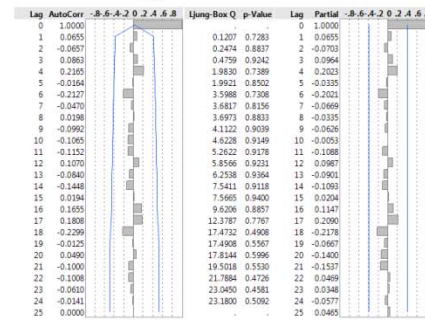
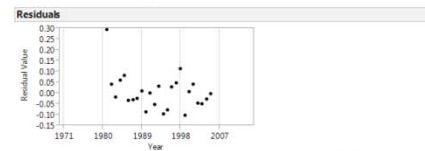
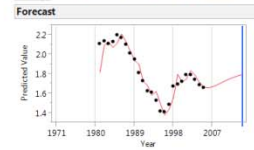
### Model: AR(2)

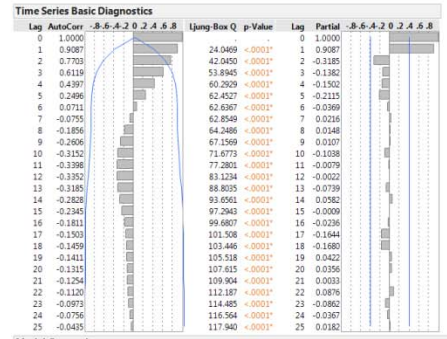
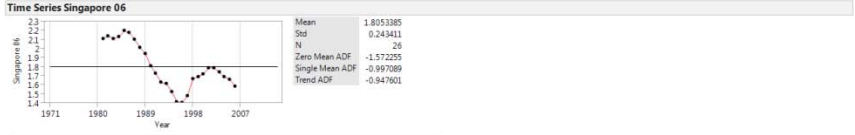
#### Model Summary

DF	22	Stable	Yes
Sum of Squared Errors	0.0806333	Invertible	Yes
Variance Estimate	0.0036524		
Standard Deviation	0.06054124		
Akaike's AIC Information Criterion	-63.157269		
Schwarz's Bayesian Criterion	-59.500642		
RSquare	0.8906098		
RSquare Adj	0.88069796		
MAPE	3.1321857		
MAE	0.05661613		
-2LogLikelihood	-69.157269		

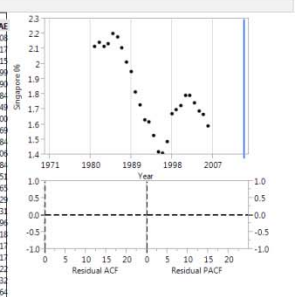
#### Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Pr> t	Constant	Estimate
AR(1)	1	1.538571	0.1459397	10.54	<.0001*		0.14328018
AR(2)	2	-0.617342	0.1594929	-4.10	<.0001*		
Intercept	0	1.818951	0.1267447	14.35	<.0001*		





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLik	Weights	2.4.5.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	23	0.013058	-65.05611	-63.61835	0.939	-70.05611	0.214937		2.907905	0.050468
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	23	0.0037041	-65.53690	-61.76261	0.880	-71.5369	0.165793		3.232788	0.058217
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	23	0.0040677	-64.46647	-62.03072	0.935	-68.46647	0.097176		2.894522	0.050521
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	22	0.0039661	-64.21961	-60.56298	0.939	-70.21961	0.055807		2.899993	0.050599
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	22	0.0039613	-64.15370	-60.49707	0.939	-70.1537	0.083025		2.917806	0.050599
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	22	0.0039627	-64.14628	-60.48965	0.939	-70.14628	0.082718		2.917600	0.050598
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	22	0.0039523	-63.66730	-58.63482	0.879	-71.6673	0.065101		3.238884	0.058349
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	22	0.0039672	-62.76971	-57.37332	0.881	-70.76971	0.041960		3.260819	0.058904
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	21	0.0040803	-62.37294	-57.49743	0.940	-70.37294	0.034082		2.871119	0.049969
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	21	0.0041498	-62.15461	-57.27911	0.939	-70.15461	0.030557		2.917304	0.050598
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	21	0.0040115	-61.88207	-58.10778	0.881	-67.88207	0.030994		3.370005	0.060959
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	20	0.0039941	-61.12023	-55.02785	0.942	-71.12023	0.018286		2.890040	0.050384
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	21	0.0041353	-60.82473	-54.53425	0.881	-70.82473	0.015716		3.271526	0.058951
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	23	0.0047512	-59.29686	-58.11880	0.917	-61.29686	0.007321		3.275016	0.056566
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	24	0.0051275	-58.94949	-57.20881	0.911	-60.94949	0.006162		3.254223	0.056428
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	21	0.0047321	-58.71023	-55.17607	0.928	-64.71023	0.005460		3.110989	0.053731
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	22	0.0047391	-58.34826	-55.99216	0.921	-62.34826	0.004556		3.249709	0.056098
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	22	0.004843	-57.88016	-55.52495	0.919	-61.88016	0.003809		3.279142	0.059613
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	21	0.0047778	-57.20061	-53.66685	0.923	-63.20061	0.002567		3.159492	0.054811
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	19	0.0038188	-57.18559	-51.29532	0.936	-67.18559	0.002547		2.750955	0.047517
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	21	0.0048098	-57.06622	-53.52006	0.923	-63.06622	0.002400		3.122630	0.053922
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	20	0.0048098	-56.72602	-52.01180	0.909	-64.72602	0.002022		3.116666	0.053832
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	20	0.0048835	-55.15596	-50.64374	0.924	-63.15596	0.001020		3.120313	0.053884
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	24	0.0058986	-55.28664	-52.77045	0.862	-59.28664	0.000986		3.892263	0.068959
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	23	0.0081834	-42.41310	-38.63881	0.805	-48.4131	0.000002		4.801943	0.087148
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	24	0.0186028	-24.87729	-22.36110	0.645	-28.87729	0.000000		6.616498	0.118383
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	25	0.0618189	2.30894	3.566691	-0.00	0.308941	0.000000		11.658380	0.208448



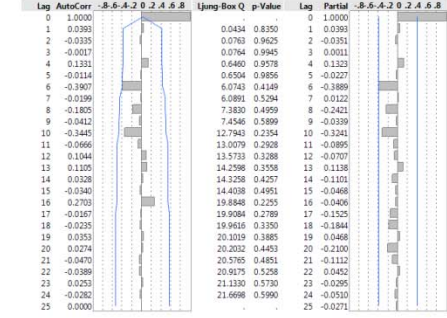
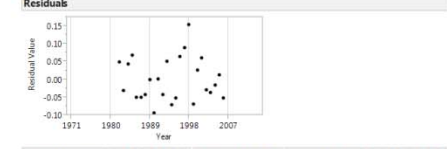
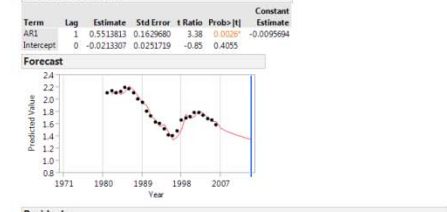
**Model: AR(1, 1)**

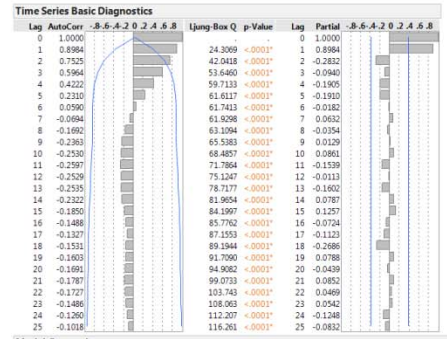
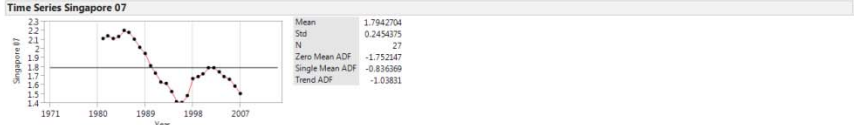
**Model Summary**

DF	23	Stable	Yes
Sum of Squared Errors	0.08753269	Invertible	Yes
Variance Estimate	0.00380577		
Standard Deviation	0.06169092		
Akaike's A Information Criterion	-65.056106		
Schwarz's Bayesian Criterion	-63.618354		
RSquare	0.9387888		
RSquare Adj	0.93812745		
MAPE	2.90790123		
MAE	0.0504079		
-2LogLikelihood	-70.056106		

**Parameter Estimates**

Term	Lag	Estimate	Std Error	t-Ratio	Pr> t	Constant Estimate
AR1	1	0.5513813	0.1629680	3.38	9.002E-05	-0.0095694
Intercept	0	-0.0213307	0.0251719	-0.85	0.4055	





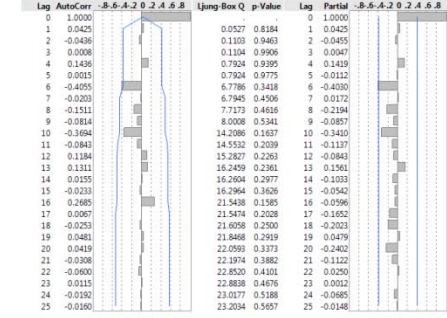
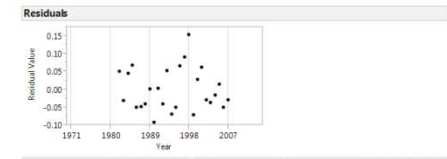
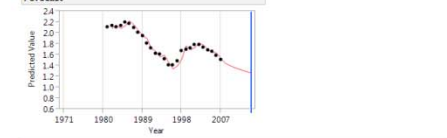
Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLik	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	24	0.003806	-69.63541	-67.11922	0.941	-73.63541	0.229817	3.272622	0.049611
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	24	0.0038208	-68.74405	-64.85654	0.877	-74.74405	0.144610	3.278630	0.058822
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	24	0.0039358	-67.97126	-65.45506	0.937	-71.97126	0.098263	2.845843	0.049319
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	23	0.0037865	-67.87654	-64.11025	0.942	-73.87654	0.093718	2.847325	0.049355
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	23	0.0038188	-67.77054	-63.99025	0.942	-73.77054	0.088880	2.876318	0.049713
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	23	0.003821	-67.75681	-63.98252	0.942	-73.75681	0.088272	2.877039	0.049722
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	23	0.0037686	-66.80286	-61.61951	0.876	-74.80286	0.054787	3.274724	0.058776
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	22	0.0038613	-66.12803	-60.95588	0.879	-74.12803	0.039203	3.259533	0.058778
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	22	0.0039165	-66.03873	-61.00435	0.942	-74.03873	0.037352	2.834890	0.049198
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	22	0.0039921	-65.77249	-60.74010	0.942	-73.77249	0.032729	2.875740	0.049705
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	21	0.0034421	-65.06271	-58.79223	0.945	-75.06271	0.023382	2.789073	0.048999
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	24	0.0042289	-64.84884	-60.97313	0.877	-70.84884	0.020581	3.403714	0.060686
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	22	0.0038845	-64.19122	-57.71204	0.879	-74.19122	0.014844	3.261465	0.058825
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	24	0.0045534	-62.87079	-61.65191	0.921	-64.87079	0.007671	3.148140	0.054386
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	22	0.0040768	-62.34852	-58.68990	0.932	-68.34852	0.005902	3.028358	0.052354
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	23	0.0045408	-61.93038	-59.49263	0.925	-65.93038	0.004793	3.151303	0.054313
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	25	0.005256	-61.69319	-60.43509	0.914	-63.69319	0.004257	3.265958	0.056292
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	23	0.0040362	-61.46075	-59.02300	0.923	-65.46075	0.003790	3.166848	0.054625
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	22	0.0046662	-60.83313	-57.17710	0.907	-66.83313	0.003770	3.095700	0.052711
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	22	0.0045917	-60.71538	-57.05875	0.927	-66.71538	0.002611	3.008555	0.051921
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	21	0.0041842	-60.36746	-55.49396	0.932	-68.36746	0.002194	3.043731	0.052485
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	20	0.0037778	-60.36322	-54.20774	0.938	-70.36322	0.002186	2.783633	0.047854
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	21	0.0047476	-59.01474	-54.13923	0.928	-67.01474	0.001116	3.008397	0.051899
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	25	0.0059605	-57.14528	-54.55360	0.854	-61.14528	0.000438	3.997216	0.070487
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	24	0.0084097	-43.68111	-39.79360	0.803	-49.68111	0.000001	4.864988	0.088003
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	25	0.0189895	-25.72322	-23.13065	0.645	-29.72322	0.000000	6.653192	0.119538
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	26	0.0625565	2.768181	4.064018	0.000	0.7681811	0.000000	11.729000	0.208965

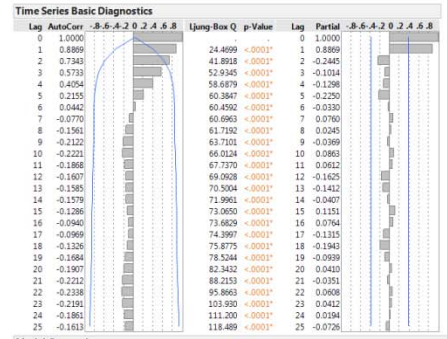
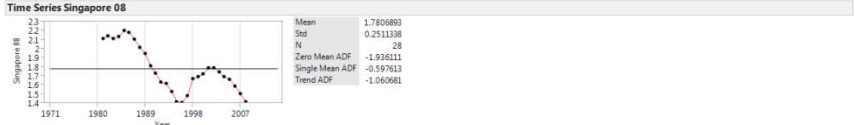
**Model: AR(1, 1)**

DF	Sum of Squared Errors	Variance Estimate	Standard Deviation	Akaike's $\ln$ Information Criterion	Schwarz's Bayesian Criterion	RSquare	RSquare Adj	MAPE	MAE	-2LogLikelihood
24	0.08833403	0.00368058	0.06067672	-69.635413	-67.11922	0.9413685	0.9380252	2.8726232	0.04963091	-73.635413

**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Pr >  t	Constant Estimate
AR1	1	0.5638811	0.1586816	3.55	0.00087	-0.0103482
Intercept	0	-0.0237279	0.0249991	-0.95	0.3520	





### Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLik	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	25	0.003579	-73.12068	-70.53741	0.945	-77.12068	0.252589	2.861342	0.049191
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	25	0.003706	-71.69954	-67.70292	0.874	-77.69954	0.123593	3.354389	0.058633
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	24	0.0038743	-71.38498	-67.49747	0.946	-77.38498	0.105066	2.829322	0.048778
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	24	0.003723	-71.23283	-67.34632	0.945	-77.23283	0.097919	2.869993	0.049236
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	24	0.003734	-71.22677	-67.33926	0.945	-77.22677	0.097574	2.867405	0.049209
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	25	0.0038914	-70.97454	-68.38287	0.941	-74.97454	0.086013	2.854874	0.048919
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	24	0.0037067	-69.77981	-64.45099	0.873	-77.77981	0.047329	3.341488	0.059613
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	23	0.0038042	-69.50880	-64.52165	0.946	-77.50880	0.041269	2.818918	0.048628
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	23	0.0038737	-69.23439	-64.05105	0.945	-77.23439	0.036032	2.866659	0.049082
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	24	0.0038018	-68.93781	-63.60899	0.875	-76.93781	0.031066	3.348900	0.059794
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	22	0.0039598	-67.54896	-61.09688	0.946	-77.54896	0.015891	2.838558	0.048999
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	23	0.0038666	-66.93796	-62.27684	0.875	-76.93796	0.011430	3.348469	0.059804
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	25	0.0042835	-66.90190	-62.90529	0.869	-72.9019	0.011225	3.538457	0.062755
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	25	0.004728	-66.47381	-65.21772	0.927	-68.47381	0.009071	3.042344	0.052483
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	23	0.0038628	-65.97714	-62.20245	0.937	-71.97714	0.007072	2.974189	0.051068
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	24	0.004451	-65.56516	-63.04897	0.931	-69.56516	0.005753	3.054033	0.052556
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	24	0.004445	-65.08829	-62.57210	0.929	-69.08829	0.004533	3.060489	0.052732
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	23	0.0044823	-64.45538	-60.88109	0.933	-70.45538	0.003309	2.981008	0.051229
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	23	0.0044766	-64.33483	-60.54954	0.933	-70.33483	0.003110	2.939173	0.050521
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	26	0.0052309	-64.23215	-62.93632	0.918	-66.23215	0.002954	3.309342	0.056486
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	21	0.0039981	-64.23136	-57.94088	0.942	-74.23136	0.002953	2.708366	0.046481
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	22	0.0043021	-63.98786	-58.95547	0.937	-71.98786	0.002615	2.979383	0.051157
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	22	0.0045483	-62.64893	-57.61654	0.933	-70.64893	0.001339	2.935008	0.050489
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	26	0.0060885	-58.63200	-55.97109	0.847	-62.63200	0.001800	4.144123	0.072482
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	25	0.009929	-43.25373	-39.23711	0.797	-49.25373	0.000000	5.184377	0.092599
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	26	0.018055	-24.98750	-22.32809	0.638	-28.9875	0.000000	6.847237	0.121796
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	27	0.065404	4.081473	5.413677	-0.000	2.0814728	0.000000	12.059812	0.212802

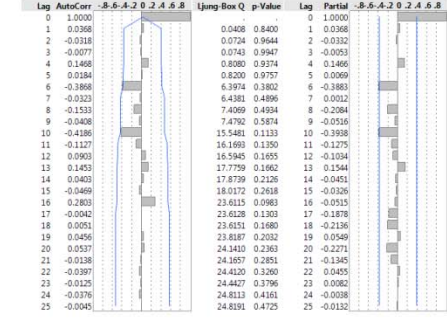
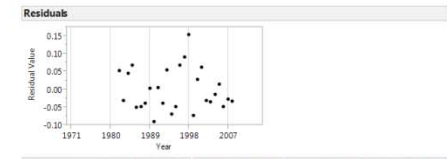
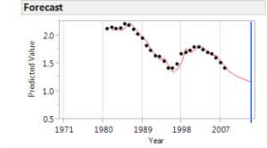
### Model: AR(1, 1)

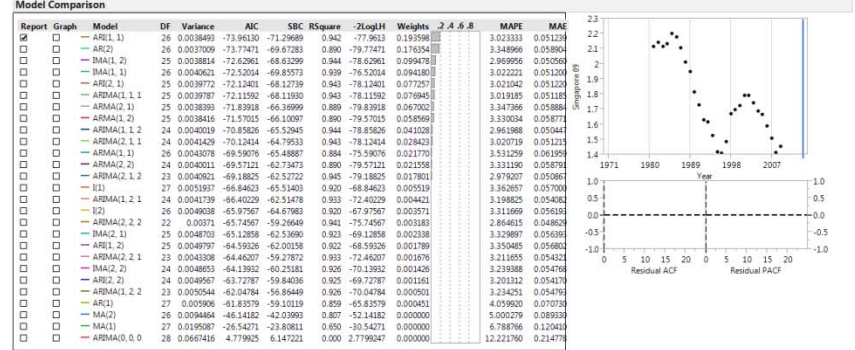
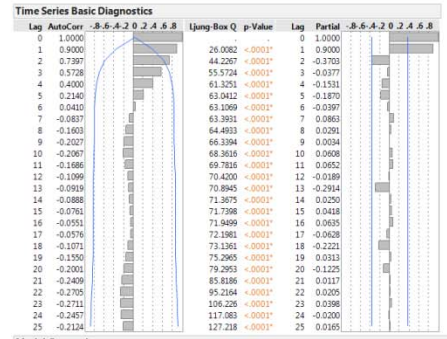
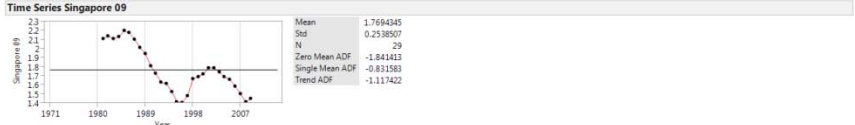
#### Model Summary

DF	25	Stable	Yes
Sum of Squared Errors	0.08947459	Invertible	Yes
Variance Estimate	0.00357898		
Standard Deviation	0.05982461		
Akaike's AIC Information Criterion	-73.120682		
Schwarz's Bayesian Criterion	-70.537408		
RSquare	0.94522213		
RSquare Adj	0.94030102		
MAPE	2.86194217		
MAE	0.04919335		
-2LogLikelihood	-77.120682		

#### Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Pr >  t	Constant Estimate
AR1	1	0.5790683	0.1546156	3.75	0.0007	-0.0111797
Intercept	0	-0.0265595	0.0250729	-1.06	0.2996	





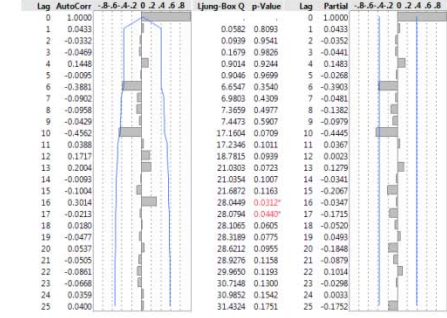
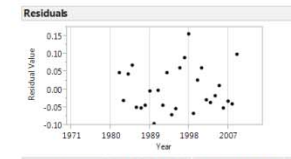
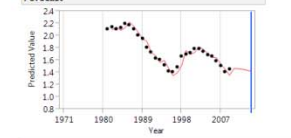
### Model: AR(1, 1)

#### Model Summary

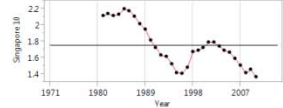
DF	26	Stable	Yes
Sum of Squared Errors	0.10008205	Invertible	Yes
Variance Estimate	0.00384934		
Standard Deviation	0.06204308		
Akaike's AIC Information Criterion	-73.961309		
Schwarz's Bayesian Criterion	-71.29689		
RSquare	0.94233549		
RSquare Adj	0.94011763		
MAPE	3.02333334		
MAE	0.05123924		
-2LogLikelihood	-77.961299		

#### Parameter Estimates

Term	Lag	Estimate	Std Error	t-Ratio	Pr> t	Constant Estimate
AR1	1	0.5295116	0.1586042	3.34	0.0025*	-0.0090626
Intercept	0	-0.0193946	0.0232389	-0.83	0.4137	



**Time Series Singapore 10**



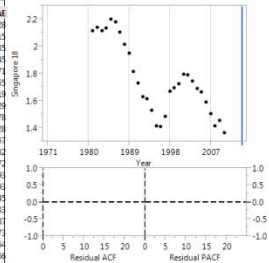
Mean	1.7558833
Std	0.2600038
N	30
Zero Mean ADF	-2.014308
Single Mean ADF	-0.590056
Trend ADF	-1.195993

**Time Series Basic Diagnostics**



**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	-2.4.5.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	27	0.004899	-74.99432	-72.25971	0.941	-78.99432	0.216286		3.136118	0.052328
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	27	0.004897	-73.32009	-70.58849	0.938	-77.32009	0.115465		3.144249	0.052431
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	26	0.004242	-73.02234	-68.92345	0.941	-79.02234	0.099391		3.129333	0.052223
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	26	0.004242	-73.02234	-68.92345	0.941	-79.02234	0.099391		3.132044	0.052244
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	26	0.0042363	-72.99765	-68.89576	0.941	-78.99765	0.098125		3.134407	0.052371
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	26	0.004238	-72.48394	-68.28035	0.871	-78.48394	0.075898		3.050084	0.062325
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	25	0.0042079	-71.67332	-66.08853	0.874	-79.67332	0.050607		3.576054	0.062113
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	25	0.0042079	-71.67332	-66.08853	0.868	-77.83585	0.020293		3.099225	0.051928
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	25	0.0044059	-71.05775	-65.58856	0.942	-79.05775	0.037199		3.133089	0.052278
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	24	0.0042528	-70.56992	-63.73344	0.945	-80.56992	0.029488		3.066248	0.051528
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	25	0.0044064	-69.83585	-64.23396	0.908	-77.83585	0.020293		3.667027	0.063751
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	28	0.005167	-69.41783	-68.00053	0.924	-71.41783	0.016384		3.401098	0.057132
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	27	0.0048179	-68.68346	-64.47987	0.864	-74.68346	0.011349		3.856330	0.066772
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	25	0.0044078	-68.30505	-61.29906	0.870	-78.30505	0.009391		3.666321	0.063991
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	25	0.0044078	-67.42026	-63.42985	0.932	-73.42026	0.006035		3.284066	0.054666
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	26	0.0049401	-67.12644	-64.46204	0.926	-71.12644	0.005210		3.364114	0.056246
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	26	0.0053463	-66.03552	-64.70331	0.917	-68.03552	0.003020		3.498715	0.058233
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	26	0.0051701	-65.95412	-63.28971	0.922	-69.95412	0.002899		3.500139	0.059481
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	23	0.0049861	-65.89014	-59.23812	0.939	-75.89014	0.002821		3.031748	0.050471
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	25	0.0050309	-65.65754	-61.66093	0.927	-71.65754	0.002500		3.309078	0.055154
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	25	0.0051361	-65.14849	-61.15387	0.926	-71.14849	0.001938		3.325074	0.055466
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	24	0.0052363	-63.70258	-58.37376	0.927	-71.70258	0.000941		3.272477	0.054551
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	24	0.0052438	-63.55704	-58.22822	0.927	-71.55704	0.000875		3.311560	0.055344
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	28	0.0060158	-63.37853	-60.57634	0.853	-67.37853	0.000800		4.207532	0.072059
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	27	0.01173	-42.44307	-38.23948	0.785	-48.44307	0.000000		5.646151	0.096888
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	28	0.0224026	-43.94289	-21.14049	0.626	-27.94289	0.000000		7.186997	0.123848
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	29	0.0699492	6.319690	7.720887	-0.00	4.319698	0.000000		12.557392	0.218460



**Model: AR(1, 1)**

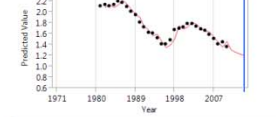
**Model Summary**

DF	27	Stable	Yes
Sum of Squared Errors	0.11040048	Invertible	Yes
Variance Estimate	0.00408891		
Standard Deviation	0.06394506		
Akaike's AIC Information Criterion	-74.994323		
Schwarz's Bayesian Criterion	-72.259732		
RSquare	0.94142662		
RSquare Adj	0.93925744		
MAPE	3.13611853		
MAE	0.05232837		
-2LogLikelihood	-78.994323		

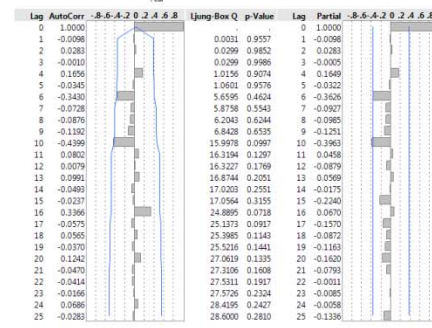
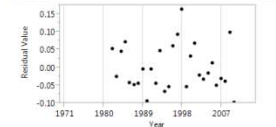
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob >  t	Constant Estimate
AR1	1	0.4820138	0.1617726	2.98	0.0097	-0.0136124
Intercept	0	-0.0262795	0.0214417	-1.23	0.2309	

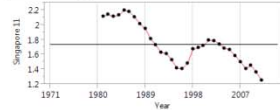
**Forecast**



**Residuals**

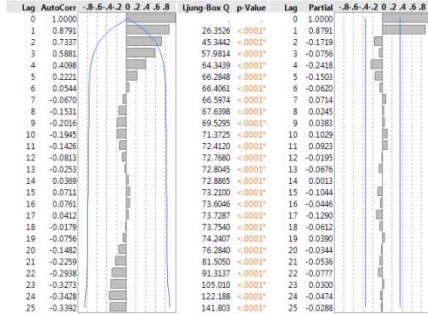


**Time Series Singapore 11**



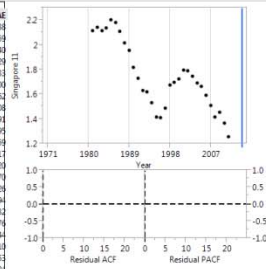
Mean	1.739742
Std	0.2705947
N	31
Zero Mean ADF	-2.187243
Single Mean ADF	-0.259271
Trend ADF	-1.079972

**Time Series Basic Diagnostics**



**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLik	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	28	0.004019	-78.14325	-75.34286	0.947	-82.14325	0.283910	3.138720	0.051838
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	28	0.004298	-76.88089	-73.88570	0.944	-80.68809	0.137010	3.115877	0.051559
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	27	0.004572	-76.15079	-71.94719	0.947	-82.15079	0.104731	3.126095	0.051748
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	27	0.004369	-76.15545	-71.94657	0.947	-82.15545	0.104696	3.135622	0.051828
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	27	0.004671	-76.14870	-71.94511	0.947	-82.14870	0.104622	3.136038	0.051833
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	28	0.004205	-74.98488	-70.67852	0.869	-80.98048	0.058338	3.770630	0.064800
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	26	0.004268	-74.39955	-68.79116	0.947	-82.39955	0.043553	3.095352	0.051202
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	26	0.004263	-74.15545	-68.55066	0.947	-82.15545	0.038919	3.134408	0.051808
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	27	0.004299	-73.39954	-67.66359	0.869	-81.39954	0.024644	3.749027	0.064391
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	25	0.004213	-73.21095	-66.20497	0.949	-83.21095	0.024082	3.098384	0.051695
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	27	0.004402	-72.22200	-66.48605	0.965	-80.22200	0.014688	3.782359	0.065319
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	29	0.0052048	-71.62972	-70.23452	0.939	-73.62972	0.010901	3.468490	0.057817
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	28	0.004731	-71.50480	-67.20283	0.866	-77.50480	0.010262	3.905022	0.067129
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	26	0.004796	-70.80278	-66.70089	0.939	-76.80278	0.007224	3.243559	0.053670
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	27	0.0048257	-70.28746	-67.55286	0.933	-74.28746	0.005583	3.353655	0.055628
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	26	0.004594	-70.28236	-63.11243	0.865	-80.28236	0.005569	3.795467	0.065394
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	28	0.0051594	-69.46048	-68.09318	0.926	-71.46048	0.003662	3.403505	0.056532
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	24	0.0039618	-69.37291	-62.53643	0.945	-79.37291	0.003534	3.027188	0.050070
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	26	0.004849	-69.12854	-65.02665	0.935	-75.12854	0.001128	3.232402	0.053724
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	27	0.0050525	-69.06743	-66.33284	0.930	-73.06743	0.003034	3.465097	0.057410
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	25	0.0044589	-68.83241	-63.35233	0.939	-76.83241	0.002697	3.237432	0.053553
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	26	0.004804	-68.44003	-64.53815	0.934	-74.44003	0.002450	3.233402	0.053724
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	25	0.0050399	-67.22711	-61.75793	0.935	-75.22711	0.001209	3.192450	0.053064
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	29	0.0062184	-64.39875	-61.53077	0.848	-68.39875	0.000294	4.413713	0.075189
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	28	0.0116746	-43.81900	-39.51704	0.798	-49.81900	0.000000	5.752026	0.099644
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	29	0.0228495	-45.04784	-41.71967	0.845	-48.04784	0.000000	7.988463	0.127678
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	30	0.0756622	8.91393	10.365920	0.000	6.913932	0.000000	13.115534	0.224086



**Model: AR(1, 1)**

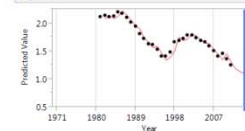
**Model Summary**

DF	28	Stable	Yes
Sum of Squared Errors	0.11253305	Invertible	Yes
Variance Estimate	0.00401904		
Standard Deviation	0.06339598		
Akaike's AIC Information Criterion	-78.143254		
Schwarz's Bayesian Criterion	-75.340859		
RSquare	0.94676957		
RSquare Adj	0.94477216		
MAPE	3.13672971		
MAE	0.0518378		
-2LogLikelihood	-82.143254		

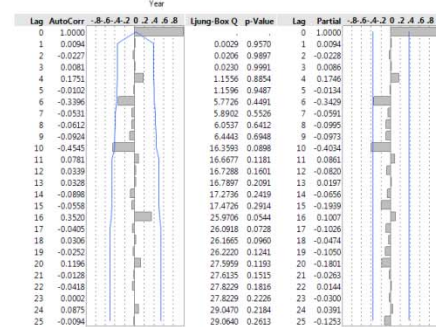
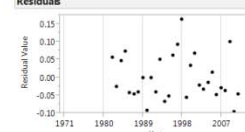
**Parameter Estimates**

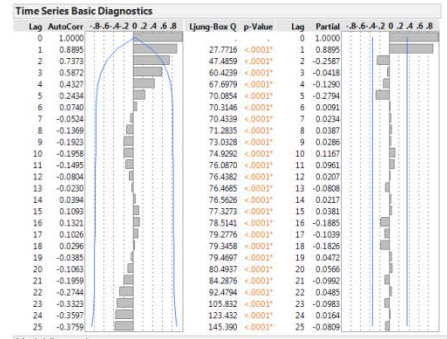
Term	Lag	Estimate	Std Error	t-Ratio	Pr> t	Constant Estimate
AR1	1	0.5029278	0.1580729	3.18	0.0036	-0.0145572
Intercept	0	-0.0292859	0.0217753	-1.34	0.1894	

**Forecast**



**Residuals**





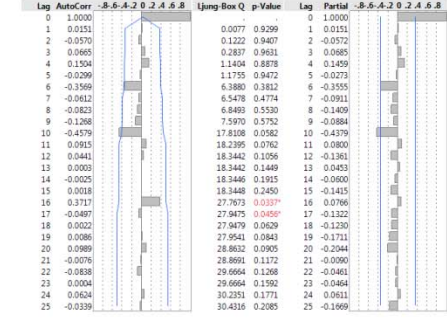
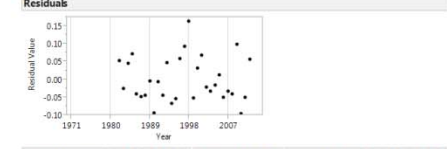
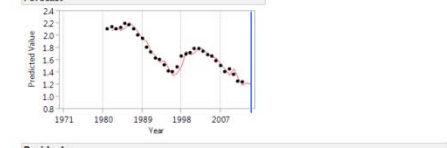
Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLik	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	29	0.004041	-80.97318	-78.10521	0.950	-84.97318	0.255114	3.209416	0.052416
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	29	0.0041244	-80.08747	-77.21950	0.949	-84.08747	0.165889	3.118499	0.051248
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	28	0.0041414	-79.01079	-74.70883	0.950	-85.01079	0.096832	3.200935	0.052323
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	28	0.0041439	-78.99644	-74.69258	0.950	-84.99644	0.096048	3.200374	0.052398
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	28	0.0041659	-78.82258	-74.52062	0.950	-84.82258	0.086135	3.198742	0.052322
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	29	0.0041241	-78.38126	-73.98406	0.887	-84.38126	0.070684	3.709421	0.063177
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	27	0.0041581	-77.74479	-72.00884	0.952	-85.74479	0.051417	3.077781	0.050971
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	28	0.0041759	-77.13984	-71.40589	0.951	-85.13984	0.037993	3.189000	0.052062
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	28	0.0041912	-76.90774	-71.04479	0.886	-84.90774	0.033834	3.680759	0.062744
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	26	0.0042899	-75.88860	-68.71667	0.952	-85.88860	0.020205	3.052892	0.050200
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	27	0.0042482	-75.58858	-68.22990	0.887	-85.58858	0.017494	3.622033	0.061875
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	28	0.0042123	-75.26991	-69.40296	0.886	-83.26991	0.014888	3.779342	0.064347
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	29	0.0045663	-75.13734	-70.74013	0.879	-81.13734	0.013961	3.787727	0.065079
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	30	0.0050459	-75.00655	-73.57256	0.935	-77.00655	0.013077	3.431802	0.056633
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	27	0.0042951	-73.19543	-68.99384	0.942	-79.19543	0.005287	3.371420	0.054958
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	28	0.0048979	-72.29563	-69.49323	0.936	-76.29563	0.003372	3.478513	0.056748
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	25	0.003932	-72.01190	-65.00591	0.948	-82.01190	0.002926	3.055977	0.050088
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	27	0.004871	-71.39639	-67.19580	0.939	-77.39639	0.002124	3.381785	0.055208
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	27	0.0048002	-71.32056	-67.12507	0.938	-77.32056	0.002090	3.280228	0.053911
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	29	0.0053399	-70.85734	-69.45614	0.928	-72.85734	0.001643	3.594780	0.058565
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	28	0.0052218	-70.52227	-67.71987	0.932	-74.52227	0.001389	3.649072	0.059362
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	26	0.0049396	-69.90520	-64.30050	0.940	-77.90520	0.001020	3.251432	0.053528
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	26	0.0050202	-69.70491	-64.10032	0.939	-77.70491	0.000923	3.228303	0.052978
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	30	0.0060077	-67.87813	-64.74666	0.880	-71.67813	0.000335	4.322826	0.073529
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	29	0.0119577	-44.72968	-40.33248	0.806	-50.72968	0.000000	5.657087	0.097323
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	30	0.0248872	-20.0177	-19.37230	0.639	-26.20377	0.000000	7.781627	0.131988
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	31	0.0807422	11.24807	12.73402	0.000	9.248065	0.000000	13.660862	0.229813

**Model: AR(1, 1)**

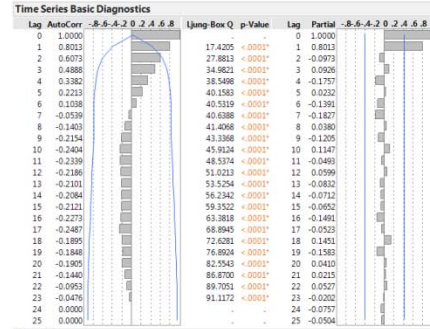
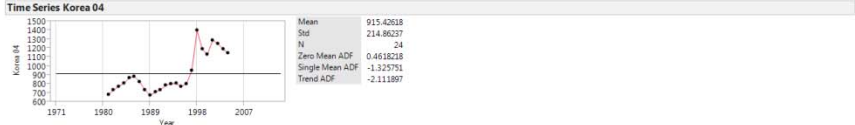
DF	Sum of Squared Errors	Variance Estimate	Standard Deviation	Akaike's $\chi^2$ Information Criterion	Schwarz's Bayesian Criterion	RSquare	RSquare Adj	MAPE	MAE	-2LogLikelihood
29	0.11611922	0.00400411	0.0627805	-80.973185	-78.10521	0.95024997	0.94833446	3.20941605	0.05241556	-84.973185

**Parameter Estimates**

Term	Lag	Estimate	Std Error	t-Ratio	Prob >  t	Constant Estimate
AR1	1	0.4732047	0.1552711	3.05	0.00497	-0.0136063
Intercept	0	-0.0258284	0.0203220	-1.27	0.2138	



## South Korea



Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogL	Weights	2.A.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	20	16284.999	280.82794	283.01002	0.656	276.82794	0.386051	7.977133	82.888617	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	19	17133.49	282.82762	286.10075	0.656	276.82792	0.142043	7.983624	82.920492	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	18	17138.46	282.82779	286.10091	0.656	276.82779	0.142011	7.980207	82.97165	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	18	16371.748	283.25444	287.61861	0.686	275.25444	0.114746	7.242826	74.489811	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	18	17596.983	284.14128	288.30545	0.666	276.14128	0.073648	7.396702	76.708807	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	17	17355.226	285.14063	290.99584	0.667	275.14063	0.044681	7.171454	73.211169	
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	19	22121.118	285.97350	289.24463	0.586	279.9735	0.029465	7.969561	80.29322	
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	22	14804.332	287.11062	288.24812	0.691	285.11062	0.016687	7.201942	75.414669	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	20	13407.249	288.22403	291.73298	0.732	282.224	0.009096	7.429946	72.470394	
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	20	14440.326	288.68011	292.84960	0.726	282.68011	0.007767	6.994320	70.916011	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	20	14714.011	288.95426	292.36074	0.720	282.95426	0.006638	6.857902	69.181999	
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	21	15426.55	288.99827	291.26926	0.692	284.99827	0.006494	7.266907	75.019197	
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	21	15476.126	289.00627	291.24206	0.691	285.00627	0.003286	7.262873	75.35921	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	19	13446.474	289.60672	294.14869	0.743	281.60672	0.004790	7.533755	73.05404	
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	20	28815.274	290.39233	292.57442	0.432	286.39233	0.003234	9.206631	98.033131	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	19	15470.958	290.92978	295.47175	0.721	282.92978	0.003472	6.755651	68.139599	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	18	14001.968	291.16312	296.84959	0.747	281.16312	0.002000	7.266813	70.521668	
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	21	32184.761	291.75332	292.84436	0.333	289.75332	0.001638	9.217796	99.250066	
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	22	14696.99	301.59616	303.92227	0.674	297.59616	0.000012	7.043494	68.288993	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	21	15245.794	303.24984	306.80000	0.678	297.24984	0.000005	7.034322	68.937319	
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	21	15318.878	303.44648	306.98064	0.676	297.44648	0.000005	6.921293	67.231118	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	20	15420.051	304.57840	309.28862	0.686	296.5784	0.000003	7.174943	69.573109	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	20	15492.868	304.65868	309.39609	0.686	296.65868	0.000003	7.104429	69.146468	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	19	14693.812	306.38954	312.77961	0.688	296.38954	0.000001	7.133463	68.950209	
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	21	19410.207	308.92973	312.46389	0.607	302.92973	0.000000	10.404071	99.539515	
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	22	22911.517	311.62442	314.18023	0.526	307.62442	0.000000	12.367126	115.99638	
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	23	48173.049	327.80894	329.04999	-0.00	325.80894	0.000000	19.929227	185.8804	

**Model: IMA(2, 1)**

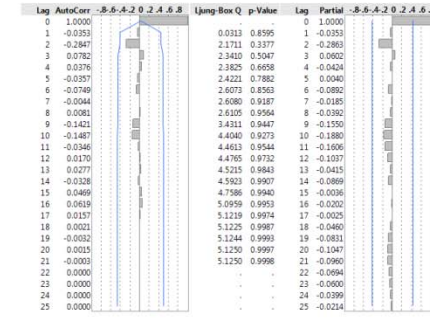
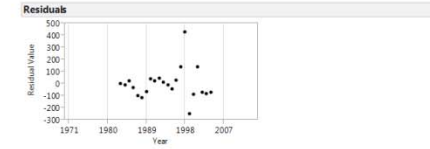
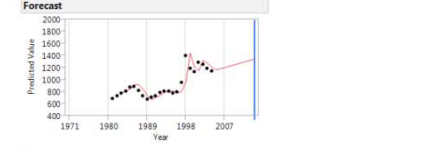
**Model Summary**

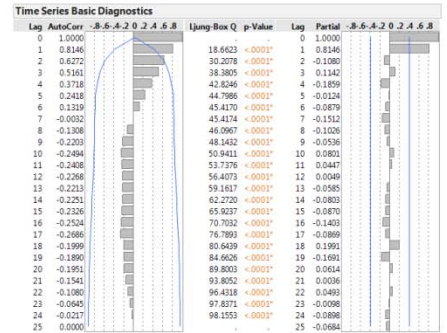
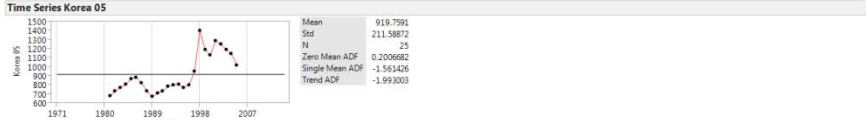
DF	20	Stable	Yes
Sum of Squared Errors	325698989	Invertible	Yes
Variance Estimate	16284.9993		
Standard Deviation	127.612692		
Kalman's N: Information Criterion	280.827938		
Schwarz's Bayesian Criterion	283.010023		
RSquare	0.65620952		
RSquare Adj	0.61992		
MAPE	7.977133		
MAE	82.8886169		
-2LogLikelihood	276.827938		

Failed: Cannot Decrease Objective Function Hessian is not positive definite.

**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
MA1	1	0.99999997	0.1330827	7.51	<0.0001		0.00542403
Intercept	0	0.00542403					





### Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogL	Weights	-2.4.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	21	16313.758	293.45345	295.72244	0.942	294.45345	0.33981		8.042224	83.28578
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	20	17174.44	295.42226	298.82874	0.841	289.42226	0.148871		7.964440	82.736512
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	20	17156.371	295.43507	298.84155	0.641	289.43507	0.147920		8.000931	83.009744
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	19	14991.301	296.4172	300.95670	0.602	288.4172	0.090630		7.658218	78.624631
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	19	16258.856	297.01565	301.55762	0.657	289.01565	0.057114		7.673817	79.226764
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	20	23128.924	297.88042	301.28690	0.585	291.88042	0.043554		7.851993	79.203992
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	18	17587.706	297.96546	303.64293	0.688	287.96546	0.041741		7.487634	76.270493
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	21	14994.538	299.89221	301.09206	0.675	297.89221	0.116201		7.563993	78.166161
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	21	13759.731	301.28416	304.81832	0.714	295.28416	0.007942		7.190220	73.321120
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	22	15666.454	301.84858	304.20069	0.676	297.84858	0.006001		7.583784	78.227302
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	22	15671.508	301.85345	304.20756	0.675	297.85345	0.005980		7.579689	78.218039
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	21	15040.384	301.86253	305.49669	0.703	295.86253	0.005657		7.116021	72.438878
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	21	15311.059	302.30420	305.83836	0.697	296.30420	0.004769		7.117601	72.621032
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	20	13678.588	302.41229	307.12450	0.728	294.41229	0.004518		7.349077	72.515099
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	21	27628.598	302.53857	304.80956	0.432	298.53857	0.004242		9.071605	96.480635
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	20	15865.042	304.02170	308.73991	0.701	296.02170	0.002021		6.839584	69.625292
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	19	14267.326	304.04322	309.93349	0.731	294.04322	0.001999		7.149777	70.777008
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	22	30937.471	304.06342	305.19791	0.334	302.06342	0.001980		9.097604	97.883798
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	23	14495.822	311.42202	315.89978	0.675	309.42202	0.000018		6.963948	67.929948
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	22	14820.22	315.06993	318.72255	0.680	309.06993	0.000008		7.058978	69.574512
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	22	14922.791	315.21146	318.86909	0.678	309.21146	0.000006		6.950743	68.248324
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	21	15058.59	316.42004	321.29555	0.688	308.42004	0.000004		7.105564	69.799308
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	21	15077.574	316.42039	321.29589	0.687	308.42039	0.000004		7.139000	69.923162
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	20	15713.371	318.24270	324.33708	0.690	308.24270	0.000002		7.100623	69.375211
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	22	18524.894	320.48758	324.14420	0.611	314.48758	0.000001		9.988235	95.597396
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	23	21911.016	323.59970	326.03365	0.531	319.59970	0.000000		11.908534	111.67604
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	24	46635.194	340.67915	341.89602	0.000	338.67915	0.000000		19.780388	183.99132

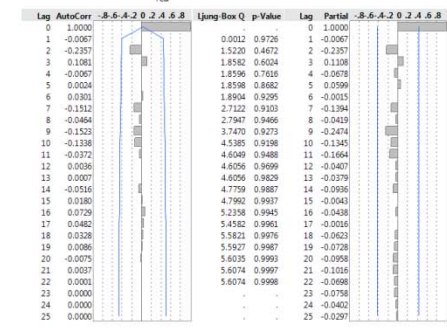
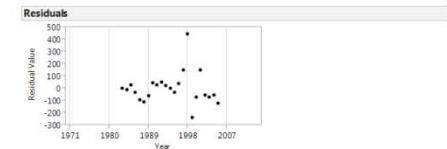
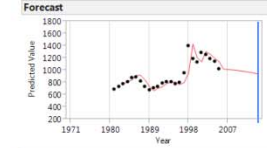
### Model: IMA(2, 1)

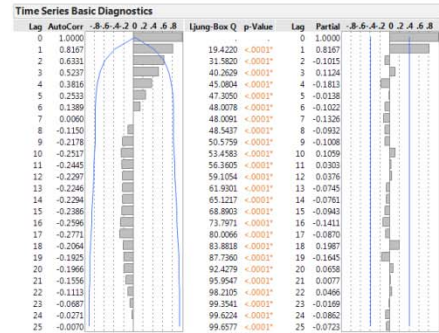
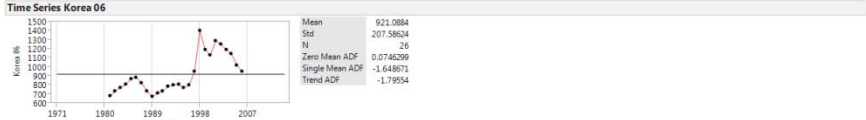
#### Model Summary

DF	21	Stable	Yes
Sum of Squared Errors	342588.908	Invertible	Yes
Variance Estimate	16313.7575		
Standard Deviation	127.72521		
Akaike's AIC Information Criterion	293.453449		
Schwarz's Bayesian Criterion	295.722437		
RSquare	0.64159546		
RSquare Adj	0.62452858		
MAPE	8.04221422		
MAE	83.285703		
-2LogLikelihood	289.451449		

#### Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Pr> t	Constant Estimate
MA1	1	1.000000	0.139782	7.15	<.0001*	-1.4097348
Intercept	0	-1.409735	3.594006	-0.39	0.6988	





### Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	-2.4.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	22	15739.743	305.17431	307.53042	0.638	301.17431	0.330432		7.925572	81.694407
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	21	16525.114	307.08227	310.61743	0.638	301.08327	0.151981		7.757848	80.420237
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	21	16515.018	307.11889	310.65405	0.638	301.11889	0.149223		7.834607	81.04332
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	20	16394.058	308.21033	312.92255	0.656	300.21033	0.086507		7.634612	78.250798
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	20	16786.874	308.31535	313.02756	0.649	300.31535	0.082062		7.385034	76.149511
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	21	20237.561	309.56880	313.09496	0.584	303.56880	0.044035		7.680828	77.393103
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	19	16932.133	309.67877	315.56704	0.663	299.67877	0.041594		7.451588	75.780000
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	22	14648.642	311.72899	312.94783	0.669	309.72899	0.144863		7.625542	78.359468
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	23	15278.387	313.71804	316.15579	0.669	309.71804	0.005599		7.574990	77.988604
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	23	15281.774	313.72302	316.18077	0.669	309.72302	0.005495		7.599279	78.171375
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	22	14871.002	314.48868	317.74470	0.692	308.88868	0.004576		7.094199	72.687056
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	22	15068.24	314.36773	318.02436	0.688	308.36773	0.003981		7.146673	73.520020
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	21	13528.742	314.47764	319.35315	0.718	306.47764	0.003768		7.075206	70.973505
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	22	26418.202	314.53443	318.89953	0.431	310.53443	0.003663		8.853628	93.986969
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	22	15457.714	314.95961	318.61024	0.680	308.95961	0.002961		7.070605	72.638338
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	21	15510.234	315.97065	320.84616	0.693	307.97065	0.001786		7.013814	71.21084
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	20	14086.523	316.10487	322.19934	0.721	306.10487	0.001670		6.890521	69.216573
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	23	29739.059	316.26282	317.47087	0.331	314.26282	0.001520		8.981139	96.239490
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	24	13910.33	324.81223	327.42862	0.676	320.81223	0.000020		6.857048	67.037868
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	23	14204.302	326.41587	330.19015	0.680	320.41587	0.000010		6.900018	68.157673
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	23	14325.856	326.60258	330.37787	0.679	320.60258	0.000009		6.818276	67.130939
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	22	14418.053	327.75473	332.78712	0.688	319.75473	0.000005		6.937118	68.28374
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	22	14461.743	327.80157	332.83396	0.688	319.80157	0.000005		6.983937	68.605793
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	21	15037.784	329.61873	335.90921	0.690	319.61873	0.000002		6.961952	68.257951
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	23	17738.826	332.03792	335.81221	0.610	326.03792	0.000001		9.746234	93.105415
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	24	21052.328	335.38213	337.89833	0.530	331.38213	0.000000		11.666784	109.1720
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	25	44815.729	353.23324	354.49134	0.000	351.23324	0.000000		19.219940	178.5508

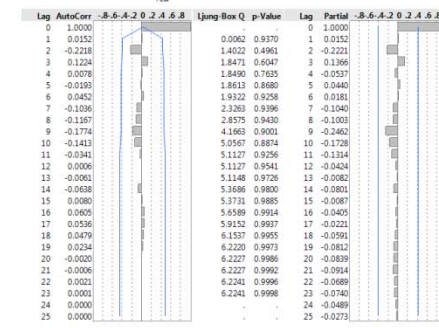
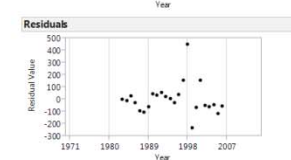
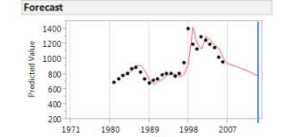
### Model: IMA(2, 1)

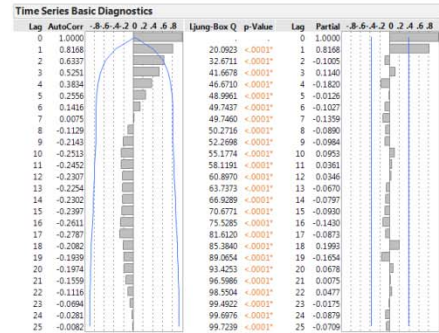
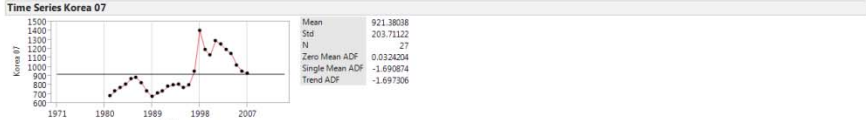
#### Model Summary

DF	22	Stable	Yes
Sum of Squared Errors	346274345	Invertible	Yes
Variance Estimate	15739.743		
Standard Deviation	125.458132		
Akaike's A Information Criterion	305.17431		
Schwarz's Bayesian Criterion	307.530418		
RSquare	0.63762023		
RSquare Adj	0.62146026		
MAPE	7.92557157		
MAE	81.6944075		
-2LogLikelihood	301.17431		

#### Parameter Estimates

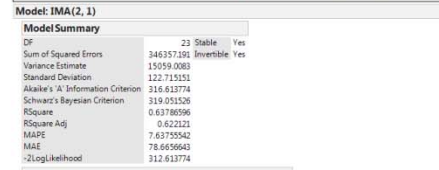
Term	Lag	Estimate	Std Error	t-Ratio	Pr> t	Constant
MA1	1	1.000000	0.141587	7.06	<.0001*	-2.0178241
Intercept	0	-2.017824	3.331122	-0.61	0.5509	





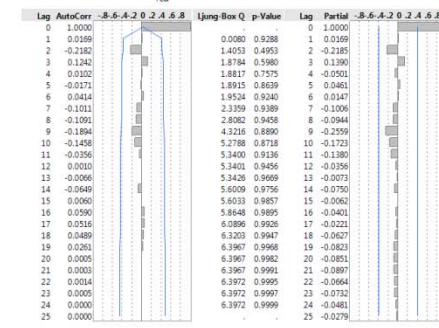
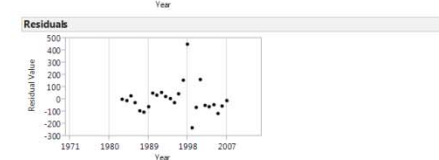
### Model Comparison

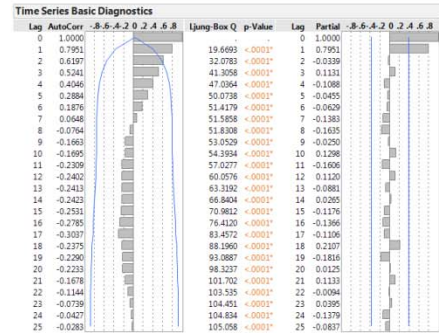
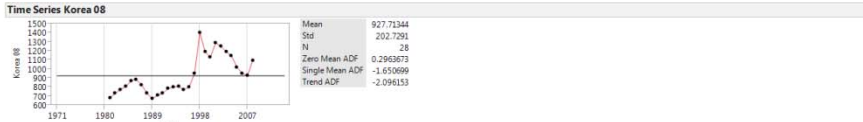
Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLik	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	23	15195108	316.61377	319.05153	0.638	312.61377	0.339006	7.637555	78.665664
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	22	15773.837	318.52044	322.17707	0.638	312.52044	0.153799	7.466178	77.356569
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	22	15765.538	318.55751	322.23414	0.638	312.55751	0.153074	7.541782	77.972136
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	21	15681.021	319.66589	324.54139	0.655	311.66589	0.085740	7.434246	76.055737
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	21	15994.949	319.72838	324.60388	0.649	311.72838	0.084072	7.135654	73.510467
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	20	16136.592	321.09656	327.19094	0.662	311.09656	0.042419	7.252257	73.640022
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	22	19411.478	321.29047	324.94710	0.582	315.29047	0.038499	7.609991	76.520720
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	23	14122.763	321.19077	324.48887	0.668	321.19077	0.148887	7.448579	76.733304
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	24	14666.101	325.16638	327.68257	0.668	321.16638	0.005544	7.404538	76.090572
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	24	14692.606	325.17680	327.69300	0.668	321.17680	0.005515	7.442858	76.392117
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	23	14484.263	325.78659	329.51088	0.687	319.78659	0.004189	7.074891	72.333848
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	23	14559.202	325.99313	329.76542	0.684	319.99313	0.003670	7.162586	73.050388
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	23	14844.464	326.39679	330.17107	0.679	320.39679	0.002997	6.952742	71.241352
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	23	25483.933	326.65328	329.09103	0.426	322.65328	0.002636	8.774356	92.818865
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	22	14961.54	327.52889	332.56127	0.690	319.52889	0.01701	7.007398	70.926252
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	22	15049.066	327.65414	332.68653	0.688	319.65414	0.001598	7.030750	71.557206
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	24	28595.534	328.45350	329.67038	0.328	326.45350	0.001073	8.826641	94.285229
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	21	15630.245	329.46073	335.75622	0.691	319.46073	0.000646	6.908924	69.772103
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	25	13161.179	336.20002	338.80069	0.676	332.20002	0.000022	6.951166	65.051941
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	24	13612.022	337.67684	341.56435	0.681	331.67684	0.000011	6.666770	65.863939
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	24	13728.634	337.87341	341.70902	0.679	331.87341	0.000010	6.589983	64.896222
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	23	13818.949	339.00005	344.16640	0.689	331.00005	0.000006	6.722901	66.220128
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	23	13854.509	339.07129	344.25664	0.688	331.07129	0.000005	6.788096	66.759479
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	22	14374.942	340.88039	347.35957	0.691	330.88039	0.000002	6.765086	66.408722
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	24	17000.601	343.52122	347.40873	0.611	337.52122	0.000001	9.397182	89.816038
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	25	20218.551	347.08001	349.67669	0.530	341.08001	0.000000	11.260795	105.43664
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	26	43094.349	365.72467	367.02090	0.000	363.72467	0.000000	18.551267	172.24388



#### Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Pr> t	Constant Estimate
MA1	1	1.000000	0.134963	7.41	<.0001*	-2.1019907
Intercept	0	-2.101991	3.078788	-0.68	0.5016	





### Model Comparison

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogL	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	24	15708.114	330.20978	332.7297	0.616	326.20978	0.334999	8.220993	85.236948
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	23	16428.096	332.12891	335.90120	0.616	326.12891	0.151459	8.074863	84.132344
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	23	16415.356	332.16402	335.93811	0.616	326.16402	0.148675	8.148842	84.729457
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	22	16129.369	333.02332	338.05570	0.637	325.02332	0.097146	7.872884	83.038121
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	22	16713.355	331.43008	338.46247	0.626	325.43008	0.078943	7.688516	79.818901
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	21	16768.508	334.71807	341.00856	0.640	324.71807	0.041460	7.726603	79.120779
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	23	21297.786	336.33258	340.10687	0.532	330.33258	0.018495	8.251216	83.842930
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	26	14522.785	336.35745	337.05329	0.654	334.35745	0.018264	7.729495	79.848308
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	24	13312.111	337.53169	341.41920	0.693	331.53169	0.010155	7.207086	72.249519
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	23	13034.971	338.26565	343.44899	0.710	330.26565	0.007035	7.203895	72.265832
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	25	15101.722	338.35421	340.94588	0.654	334.35421	0.006731	7.707309	79.692995
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	25	15102.707	338.35579	340.94746	0.654	334.35579	0.006725	7.718426	79.770366
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	24	14585.987	338.48718	342.37469	0.679	332.48718	0.004298	7.378206	75.388791
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	24	14799.543	338.81960	342.70741	0.674	332.81960	0.005333	7.406155	75.839333
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	22	13261.074	340.01393	346.49111	0.712	330.01393	0.002998	7.097712	71.160284
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	24	26294.682	340.44552	342.95874	0.397	336.44552	0.002369	9.120752	96.890989
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	23	15316.648	340.62434	345.80788	0.677	332.62434	0.002163	7.237040	73.854789
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	25	26958.511	341.87917	343.13727	0.308	339.87917	0.001155	9.196648	96.188331
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	26	14010.955	349.87944	352.94085	0.651	345.87944	0.000021	7.124423	69.722924
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	25	14311.337	351.43429	355.43091	0.655	345.43429	0.000010	7.200949	70.868324
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	25	14425.026	351.62207	355.61988	0.653	345.62207	0.000009	7.072803	69.489795
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	24	14484.239	351.70831	358.07713	0.664	344.70831	0.000005	7.285860	71.402010
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	24	14565.021	352.84217	358.17099	0.662	344.84217	0.000005	7.223351	70.967222
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	23	15068.424	354.62255	361.28658	0.665	344.62255	0.000002	7.265763	71.177740
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	25	17635.151	357.10271	361.09933	0.589	351.10271	0.000001	10.028894	95.461248
<input type="checkbox"/>	<input type="checkbox"/>	MA(3)	26	20820.313	350.61641	363.28082	0.509	356.61641	0.000000	11.853463	110.71948
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	27	42621.277	378.92531	380.25752	0.000	378.92531	0.000000	18.690344	173.34687

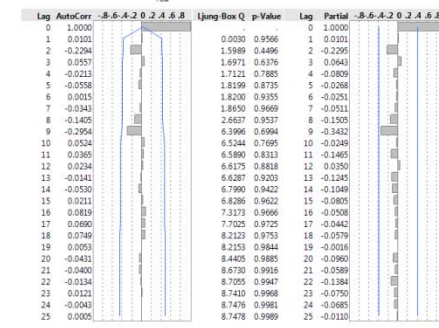
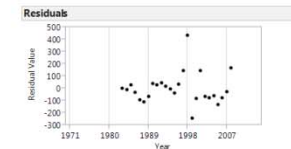
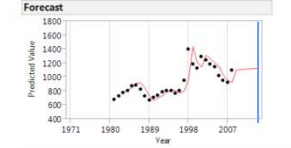
### Model: IMA(2, 1)

#### Model Summary

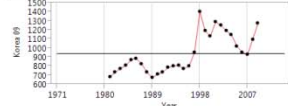
DF	24	Stable	Yes
Sum of Squared Errors	376994.727	Invertible	Yes
Variance Estimate	15708.1136		
Standard Deviation	125.32204		
Akaike's A Information Criterion	330.209775		
Schwarz's Bayesian Criterion	332.72968		
RSquare	0.61600221		
RSquare Adj	0.6000023		
MAPE	8.22099308		
MAE	85.236949		
-2LogLikelihood	326.209775		

#### Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob >  t	Constant Estimate
MA1	1	0.9999999	0.112280	8.91	<.0001*	-0.6038237
Intercept	0	-0.6038237	2.968677	-0.20	0.8405	



**Time Series Korea 09**



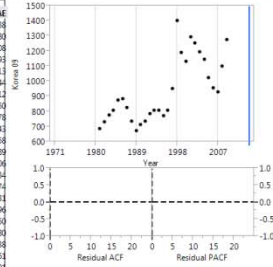
Mean	939.67591
Std	209.03842
N	29
Zero Mean ADF	0.597249
Single Mean ADF	-1.368796
Trend ADF	-2.192131

**Time Series Basic Diagnostics**

Lag	AutoCorr	Partial	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	1.0000	0	1.0000	0	1.0000
1	0.7666	0.7666	18.8700	<.0001*	1	0.7666
2	0.5505	0.5505	29.3308	<.0001*	2	-0.0650
3	0.4790	0.4790	37.2640	<.0001*	3	0.1741
4	0.3886	0.3886	42.6932	<.0001*	4	-0.0633
5	0.3165	0.3165	46.4457	<.0001*	5	0.0449
6	0.2393	0.2393	48.6807	<.0001*	6	-0.0719
7	0.1451	0.1451	49.5454	<.0001*	7	-0.0708
8	0.0294	0.0294	49.5826	<.0001*	8	-0.1468
9	-0.0954	-0.0954	49.9914	<.0001*	9	-0.1434
10	-0.0824	-0.0824	50.3227	<.0001*	10	0.1298
11	-0.0800	-0.0800	50.6322	<.0001*	11	-0.0738
12	-0.2079	-0.2079	52.9180	<.0001*	12	-0.2424
13	-0.2505	-0.2505	56.4441	<.0001*	13	0.0736
14	-0.2426	-0.2426	60.3770	<.0001*	14	-0.0694
15	-0.2662	-0.2662	65.1261	<.0001*	15	0.0409
16	-0.2520	-0.2520	71.0206	<.0001*	16	-0.1659
17	-0.3216	-0.3216	78.7712	<.0001*	17	-0.0560
18	-0.2716	-0.2716	84.8009	<.0001*	18	0.1185
19	-0.2704	-0.2704	91.3756	<.0001*	19	-0.0902
20	-0.2755	-0.2755	98.9585	<.0001*	20	-0.0005
21	-0.2076	-0.2076	103.804	<.0001*	21	-0.0464
22	-0.1330	-0.1330	106.074	<.0001*	22	0.1545
23	-0.0787	-0.0787	107.003	<.0001*	23	0.0590
24	-0.0522	-0.0522	107.492	<.0001*	24	-0.1360
25	-0.0565	-0.0565	108.210	<.0001*	25	-0.1005

**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	-2,4,6,8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	25	16068.527	343.36195	345.95327	0.329	339.3616	0.351076		8.571047	89.820838
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	24	16818.222	344.80997	348.66948	0.633	338.80997	0.170078		8.045481	85.061780
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	24	16672.525	345.03763	348.82934	0.631	339.03763	0.151476		8.310784	87.666208
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	23	16359.158	345.88158	351.26682	0.651	337.88158	0.099033		8.021042	84.011695
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	23	16681.406	345.95921	351.14256	0.646	337.95921	0.095549		7.798243	81.784712
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	22	16936.667	347.49610	353.97529	0.655	337.4961	0.044309		7.853437	81.784244
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	24	21079.86	348.79980	352.68731	0.561	342.7998	0.023889		8.263557	84.972612
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	25	14906.498	340.50966	350.84886	0.605	347.50966	0.011681		7.888488	82.72829
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	24	12757.548	350.12534	355.45416	0.731	342.12534	0.011900		7.404161	74.355578
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	25	14643.514	351.00008	355.08669	0.695	345.00008	0.007346		7.571464	77.89964
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	26	15222.222	351.24204	353.90645	0.688	347.24204	0.008809		7.634752	80.453058
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	26	13400.57	351.37110	354.03551	0.686	347.3711	0.006383		7.807070	83.840609
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	25	15012.737	351.68429	355.68800	0.687	345.68429	0.005458		7.592102	78.911109
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	25	15369.697	352.29005	356.28666	0.680	346.29005	0.004032		7.346476	76.810134
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	25	25442.216	352.15725	355.14892	0.448	348.55725	0.003558		8.922211	95.208874
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	24	15501.118	353.46372	358.70253	0.690	345.46372	0.002242		7.411026	76.765232
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	26	27844.797	353.92353	355.22837	0.371	351.92353	0.001774		8.860189	94.602396
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	23	17498.886	357.50966	364.17068	0.665	347.50966	0.002097		7.888410	82.729250
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	27	14940.723	364.25947	366.99496	0.941	360.25947	0.000010		7.721378	78.652788
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	26	14752.518	364.90646	369.00834	0.657	358.90646	0.000007		7.807989	77.579638
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	26	15071.174	365.46389	369.56578	0.650	359.46389	0.000006		7.565881	75.34899
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	25	14944.245	366.21168	371.60286	0.665	358.21168	0.000004		7.695361	76.171291
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	25	15020.841	366.34066	371.80984	0.663	358.34066	0.000004		7.624249	75.464479
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	26	17917.391	370.33291	374.43480	0.603	364.33291	0.000000		10.278079	98.397874
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	27	21497.386	374.42286	377.15745	0.520	370.42286	0.000000		12.368185	116.315156
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0)	28	45249.032	384.15893	395.52623	-0.100	392.15893	0.000000		19.444193	181.32868
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	24	52761.62	402.16688	409.03336	-0.000	392.16688	0.000000		19.454423	181.35024



**Model: IMA(2, 1)**

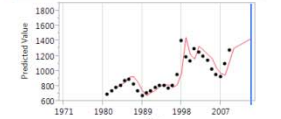
**Model Summary**

DF	25	Stable	Yes
Sum of Squared Errors	401713164	Invertible	Yes
Variance Estimate	16068.5265		
Standard Deviation	126.761692		
Akaike's A Information Criterion	343.361596		
Schwarz's Bayesian Criterion	345.95327		
RSquare	0.6281783		
RSquare Adj	0.61376254		
MAPE	8.5704665		
MAE	89.8928378		
-2LogLikelihood	339.361596		

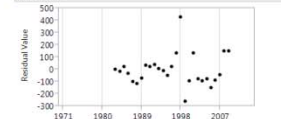
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
MA1	1	0.99999904	0.106739	9.37	<.0001*	0.6456093
Intercept	0	0.64560930	2.854430	0.23	0.8229	

**Forecast**

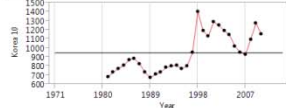


**Residuals**



Lag	AutoCorr	Partial	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	1.0000	0	1.0000	0	1.0000
1	0.0739	0.0739	0.1646	0.6849	1	0.0739
2	-0.2344	-0.2344	1.7411	0.4187	2	-0.2311
3	0.0240	0.0240	1.7599	0.6237	3	0.0653
4	-0.0742	-0.0742	1.8472	0.4055	4	-0.1437
5	-0.0820	-0.0820	2.1863	0.8228	5	-0.0416
6	-0.0337	-0.0337	2.2339	0.8970	6	-0.0833
7	-0.0665	-0.0665	2.4071	0.9339	7	-0.0649
8	-0.0848	-0.0848	2.7031	0.9516	8	-0.1349
9	-0.3158	-0.3158	7.0414	0.6328	9	-0.3913
10	-0.0581	-0.0581	7.1967	0.7068	10	-0.1027
11	0.1824	0.1824	9.0077	0.6212	11	-0.0377
12	0.0785	0.0785	9.3296	0.6746	12	-0.0133
13	0.0029	0.0029	9.3300	0.7476	13	-0.0909
14	-0.0802	-0.0802	9.5484	0.7944	14	-0.2088
15	0.0218	0.0218	9.5794	0.8453	15	-0.0783
16	0.0851	0.0851	10.0946	0.8616	16	-0.0922
17	0.0868	0.0868	10.6849	0.8725	17	-0.0060
18	0.0866	0.0866	11.3374	0.8795	18	-0.0828
19	0.0274	0.0274	11.4110	0.9092	19	-0.0278
20	-0.0585	-0.0585	11.7944	0.9230	20	-0.0077
21	-0.0794	-0.0794	12.5555	0.9234	21	-0.0653
22	-0.0479	-0.0479	12.9149	0.9355	22	-0.0908
23	-0.0008	-0.0008	12.9150	0.9538	23	-0.1298
24	0.0068	0.0068	12.9271	0.9673	24	-0.0311
25	-0.0021	-0.0021	12.9289	0.9774	25	0.0186

**Time Series Korea 10**



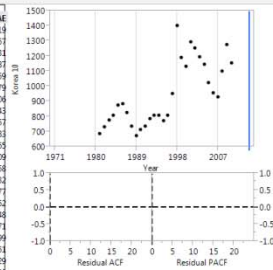
Mean 946.87801  
 Std 209.13309  
 N 30  
 Zero Mean ADF 0.3404918  
 Single Mean ADF -1.66785  
 Trend ADF -2.319106

**Time Series Basic Diagnostics**

Lag	AutoCorr	Partial	Ljung-Box Q	p-Value
1	0.10000	0.10000	20.8689	<.0001*
2	0.7940	0.7940	31.8777	<.0001*
3	0.4599	-0.1725	39.3988	<.0001*
4	0.3759	0.40619	44.6173	<.0001*
5	0.3175	0.0825	48.4877	<.0001*
6	0.2621	0.0448	51.2560	<.0001*
7	0.1803	-0.0714	52.6133	<.0001*
8	0.0784	-0.1045	52.8815	<.0001*
9	-0.0350	-0.1347	52.9377	<.0001*
10	-0.0884	0.1742	53.0502	<.0001*
11	-0.0365	-0.0683	53.1174	<.0001*
12	-0.1248	-0.2050	53.9487	<.0001*
13	-0.2379	-0.1155	57.1440	<.0001*
14	-0.2746	0.0036	61.6697	<.0001*
15	-0.2851	-0.0409	66.8717	<.0001*
16	-0.3061	-0.0926	73.2951	<.0001*
17	-0.3356	-0.1366	81.6132	<.0001*
18	-0.2890	0.1837	88.2964	<.0001*
19	-0.2993	-0.1927	95.9065	<.0001*
20	-0.3046	0.1070	104.814	<.0001*
21	-0.2444	-0.0344	111.188	<.0001*
22	-0.1622	0.0789	114.344	<.0001*
23	-0.0945	0.0862	115.508	<.0001*
24	-0.0588	-0.0477	116.126	<.0001*
25	-0.0648	-0.1203	116.928	<.0001*

**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLik	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	26	16195.169	354.14192	358.80213	0.624	351.14192	0.316685	8.551055	90.248618
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	25	16865.479	357.98505	361.98166	0.624	351.98505	0.141925	8.302608	88.145557
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	25	16859.572	358.06743	362.06405	0.624	352.06743	0.1319196	8.444969	89.452433
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	24	16079.368	358.18995	361.51576	0.653	350.18995	0.123209	8.103040	84.968887
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	24	16832.073	358.85381	364.18263	0.639	350.85381	0.091920	7.867516	83.055099
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	23	16651.735	359.83323	366.49425	0.657	349.83323	0.056229	7.924610	82.571879
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	26	15049.24	362.23380	363.60110	0.661	360.2338	0.016961	8.011677	84.534506
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	25	21801.847	362.67670	366.67132	0.542	350.6747	0.013605	8.557378	88.814448
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	25	12872.356	362.79904	368.26823	0.727	354.79904	0.012785	7.444878	75.719971
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	26	14406.743	363.11808	367.21997	0.698	357.11808	0.010900	7.614313	78.420388
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	26	14822.118	363.81833	367.92021	0.690	357.81833	0.007680	7.678020	78.809965
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1, 1)	27	15598.361	364.21995	366.95454	0.661	360.21995	0.006283	7.987317	84.203399
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	27	15603.033	364.22773	366.96232	0.661	360.22773	0.006259	8.013774	84.406658
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	24	13334.092	364.48860	371.32108	0.729	354.4846	0.005504	7.328595	74.517132
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	26	15551.235	365.12160	369.22349	0.674	359.1216	0.004002	7.492542	78.721077
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	25	15296.648	365.62278	371.00197	0.692	357.62278	0.003116	7.440461	77.243352
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	26	27782.604	368.00578	370.67019	0.393	364.00578	0.000946	9.545912	102.63148
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1, 1)	27	30019.999	369.11132	370.44552	0.319	367.11132	0.000545	9.468771	102.21871
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	28	14612.798	375.95778	378.78015	0.684	371.95778	0.000018	5.14746	75.307598
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	27	14524.23	376.79098	380.98287	0.667	370.79098	0.000012	7.747735	77.541051
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	27	14843.173	377.35494	381.55853	0.661	371.35494	0.000009	7.494628	75.027129
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	26	14554.434	377.81828	383.42307	0.677	369.81828	0.000007	7.584073	75.591808
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	26	14691.554	378.05670	383.66149	0.674	370.0567	0.000006	7.571867	75.574952
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	25	15166.844	380.36415	387.37013	0.672	370.36415	0.000002	8.074334	79.483858
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	27	17264.619	381.85613	386.05972	0.616	375.85613	0.000001	9.956004	95.504708
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	28	20974.288	382.35596	389.15896	0.533	382.35596	0.000000	12.249575	115.20868
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	29	45244.808	407.71456	409.11376	0.000	405.71456	0.000000	19.668024	183.44672



**Model: IMA(2, 1)**

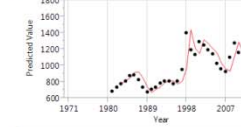
**Model Summary**

DF	26	25	Stable	Yes
Sum of Squared Errors	421074.934	Invertible	Yes	
Variance Estimate	16195.169			
Standard Deviation	127.260241			
Akaike's AIC Information Criterion	354.141919			
Schwarz's Bayesian Criterion	358.806328			
RSquare	0.62377362			
RSquare Adj	0.60910317			
MAPE	8.5505559			
MAE	90.2486188			
-2LogLikelihood	352.141919			

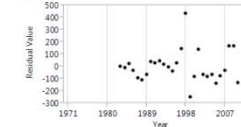
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Pr> t	Constant Estimate
MA1	1	0.9999992	0.100514	9.95	<.0001*	-0.3838206
Intercept	0	-0.3838206	2.703730	-0.14	0.8882	

**Forecast**

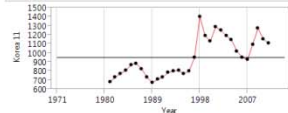


**Residuals**



Lag	AutoCorr	Partial	Ljung-Box Q	p-Value
0	1.0000	1.0000	0.0173	0.8954
1	0.0236	0.0236	2.2952	0.3174
2	-0.2655	-0.2655	2.3254	0.5077
3	0.0390	0.0390	2.4057	0.6616
4	-0.0479	-0.0479	2.4508	0.7839
5	-0.0352	-0.0352	2.4558	0.8734
6	-0.0111	-0.0111	2.5204	0.9269
7	-0.0342	-0.0342	2.4209	0.9598
8	-0.0536	-0.0536	7.7187	0.5627
9	-0.3395	-0.3395	7.7481	0.6534
10	-0.0251	-0.0251	11.3360	0.4156
11	0.2695	0.2695	11.4772	0.4885
12	-0.0519	-0.0519	11.5798	0.5624
13	-0.0428	-0.0428	11.8778	0.6161
14	-0.0705	-0.0705	11.9348	0.6840
15	0.0297	0.0297	12.4055	0.7156
16	0.0820	0.0820	12.8474	0.7463
17	0.0761	0.0761	13.2034	0.7794
18	0.0651	0.0651	13.2223	0.8270
19	0.0142	0.0142	13.7919	0.8409
20	-0.0737	-0.0737	14.2027	0.8607
21	-0.0585	-0.0585	14.2135	0.8930
22	-0.0148	-0.0148	14.3544	0.9163
23	0.0268	0.0268	14.4050	0.9370
24	0.0155	0.0155	14.4411	0.9535
25	-0.0114	-0.0114		

**Time Series Korea 11**



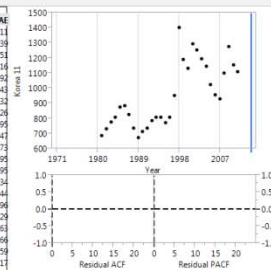
Mean	952.0413
Std	207.6698
N	31
Zero Mean ADF	0.2497861
Single Mean ADF	-1.768886
Trend ADF	-2.309067

**Time Series Basic Diagnostics**

Lag	AutoCorr	Partial	Ljung-Box Q	p-Value	Ljung-Box Q	p-Value
0	1.0000	1.0000	0	1.0000	0	1.0000
1	0.8032	0.8032	22.0011	<.0001*	1	0.8032
2	0.5943	-0.1434	34.4068	<.0001*	2	-0.1434
3	0.4491	0.1106	42.5000	<.0001*	3	0.1106
4	0.3664	-0.0441	47.5860	<.0001*	4	-0.0441
5	0.3116	0.0996	51.4075	<.0001*	5	0.0996
6	0.2666	-0.0251	54.3135	<.0001*	6	-0.0251
7	0.1995	-0.0334	56.0063	<.0001*	7	-0.0334
8	0.1050	-0.1167	56.4965	<.0001*	8	-0.1167
9	0.0005	-0.0963	56.4965	<.0001*	9	-0.0963
10	-0.0074	0.1142	56.4962	<.0001*	10	0.1142
11	-0.0145	-0.0623	56.5099	<.0001*	11	-0.0623
12	-0.0941	-0.1780	56.9865	<.0001*	12	-0.1780
13	-0.1794	-0.0948	58.8184	<.0001*	13	-0.0948
14	-0.2079	-0.1106	61.1345	<.0001*	14	-0.1106
15	-0.2965	0.0862	68.7573	<.0001*	15	0.0862
16	-0.3221	-0.1586	75.8333	<.0001*	16	-0.1586
17	-0.3477	-0.0815	84.6666	<.0001*	17	-0.0815
18	-0.3009	0.1260	91.7922	<.0001*	18	0.1260
19	-0.3092	-0.1281	99.9430	<.0001*	19	-0.1281
20	-0.3240	0.0296	109.707	<.0001*	20	0.0296
21	-0.2676	-0.0111	117.033	<.0001*	21	-0.0111
22	-0.1910	0.0806	121.180	<.0001*	22	0.0806
23	-0.1174	0.0401	122.943	<.0001*	23	0.0401
24	-0.0715	-0.0221	123.690	<.0001*	24	-0.0221
25	-0.0707	-0.1028	124.542	<.0001*	25	-0.1028

**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	27	15708.809	367.8265	370.5504	0.627	363.8245	0.318995	8.359263	88.349011
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	28	16289.101	369.5441	373.64029	0.629	363.5441	0.142581	8.004473	85.158939
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	25	15433.08	369.57942	375.04461	0.609	361.57942	0.140386	7.844732	82.209223
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	26	16312.194	369.69902	373.70381	0.628	363.69902	0.112442	8.215553	87.1516016
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	25	16191.852	370.33488	375.80406	0.645	362.33488	0.096031	7.649942	80.857592
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	24	15969.781	371.24068	378.07716	0.662	361.24068	0.061055	7.705716	80.347043
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	29	14670.916	373.92793	375.32913	0.663	371.92793	0.015929	7.952215	83.738712
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	26	12398.684	374.03112	379.63951	0.731	366.03112	0.011128	7.227493	73.828328
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	27	13880.032	374.42625	378.62984	0.703	368.42625	0.012416	7.397718	76.289995
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	26	21183.647	374.63963	378.74152	0.545	368.63963	0.011360	8.329182	86.678547
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	26	14275.257	375.14570	379.34929	0.699	369.1457	0.008665	7.457426	77.553773
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	25	12842.307	375.74275	382.76874	0.733	365.74275	0.006384	7.118004	72.896295
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	28	15148.874	375.84552	378.64592	0.664	371.84552	0.006113	7.803257	82.465299
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	28	15176.369	375.89253	378.69492	0.664	371.89253	0.005965	7.898489	83.306234
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	27	15026.425	376.59205	380.79564	0.679	370.59205	0.004204	7.549211	77.309344
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	26	14730.153	376.98203	382.58682	0.697	368.98203	0.003459	7.276332	75.619206
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	27	26778.6	380.00518	382.73977	0.402	376.00518	0.000763	9.263407	99.596229
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	29	29144.991	381.40349	382.77079	0.325	379.40349	0.000379	9.356647	101.04203
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	29	14117.651	381.31319	390.18116	0.661	381.31319	0.000020	7.319329	73.161986
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	28	14050.044	388.17959	392.48155	0.671	382.17959	0.000013	7.571959	75.808399
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	28	14312.506	388.68367	392.88564	0.666	382.68367	0.000010	7.273242	72.800417
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	27	14039.307	388.15990	394.89185	0.681	381.1599	0.000006	7.443375	74.172388
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	27	14161.514	389.37512	395.11307	0.679	381.37512	0.000007	7.390147	73.741589
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	26	14565.927	391.12362	398.29355	0.681	381.12362	0.000003	7.405742	73.736919
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	28	17194.402	394.29472	398.59668	0.610	388.29472	0.000001	10.244627	96.018223
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	29	20579.956	398.71644	401.58482	0.531	394.71644	0.000000	12.353468	116.10568
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	30	44563.094	420.80221	422.23619	0.000	418.80221	0.000000	19.659122	183.19205



**Model: IMA(2, 1)**

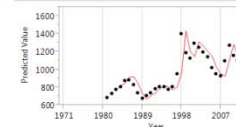
**Model Summary**

DF	27	Stable	Yes
Sum of Squared Errors	424137.84	Invertible	Yes
Variance Estimate	15708.809		
Standard Deviation	125.34787		
Akaike's A Information Criterion	367.82653		
Schwarz's Bayesian Criterion	370.55044		
RSquare	0.62731819		
RSquare Adj	0.61315116		
MAPE	8.3592629		
MAE	88.3490112		
-2LogLikelihood	363.824653		

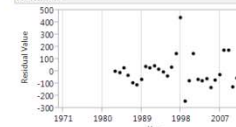
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Pr> t	Constant Estimate
MA1	1	1.000000	0.097358	10.27	<.0001*	-0.7659945
Intercept	0	-0.765995	2.546355	-0.30	0.7659	

**Forecast**

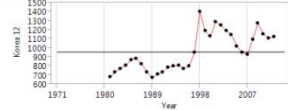


**Residuals**



Lag	AutoCorr	Partial	Ljung-Box Q	p-Value	Ljung-Box Q	p-Value
0	1.0000	1.0000	0	1.0000	0	1.0000
1	0.0407	0.0407	0.0531	0.8177	1	0.0407
2	-0.2827	-0.2849	2.7148	0.2573	2	-0.2849
3	0.0090	0.0386	2.7176	0.4372	3	0.0386
4	-0.0454	-0.1405	2.718	0.5932	4	-0.1405
5	-0.0268	-0.0518	2.8187	0.7279	5	-0.0518
6	0.0049	-0.0538	2.8196	0.8311	6	-0.0538
7	-0.0259	-0.0221	2.8479	0.8988	7	-0.0221
8	-0.0425	-0.0651	2.9242	0.9390	8	-0.0651
9	-0.3271	-0.3847	7.7345	0.5611	9	-0.3847
10	-0.0426	-0.0527	7.8124	0.6472	10	-0.0527
11	0.2787	0.0615	11.6008	0.3873	11	0.0615
12	-0.0186	-0.0850	11.7092	0.4693	12	-0.0850
13	-0.0930	-0.0750	12.1950	0.5117	13	-0.0750
14	-0.0884	-0.2194	12.6035	0.5532	14	-0.2194
15	0.0241	-0.0964	12.7088	0.6264	15	-0.0964
16	0.0853	-0.0728	13.2038	0.6578	16	-0.0728
17	0.0751	0.0256	13.6200	0.6934	17	0.0256
18	0.0615	-0.0629	13.9348	0.7333	18	-0.0629
19	0.0072	-0.3003	13.9395	0.7872	19	-0.3003
20	-0.0781	0.0265	14.5494	0.8016	20	0.0265
21	-0.0654	-0.1440	15.0297	0.8215	21	-0.1440
22	-0.0064	-0.3200	15.0409	0.8505	22	-0.3200
23	0.0383	-0.1204	15.2612	0.8850	23	-0.1204
24	0.0259	-0.0020	15.3823	0.9091	24	-0.0020
25	-0.0079	0.0274	15.3962	0.9316	25	0.0274

**Time Series Korea 12**



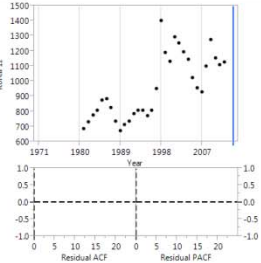
Mean	957.48258
Std	206.62946
N	32
Zero Mean ADF	0.2814018
Single Mean ADF	-1.774811
Trend ADF	-2.347671

**Time Series Basic Diagnostics**

Lag	AutoCorr	Partial	Ljung-Box Q	p-Value	Ljung-Box Q	p-Value
1	0.8046	0.8046	22.7228	<.0001*	22.7228	<.0001*
2	0.6961	-0.1171	36.0471	<.0001*	36.0471	<.0001*
3	0.4988	0.1388	45.3850	<.0001*	45.3850	<.0001*
4	0.3766	-0.1318	50.8941	<.0001*	50.8941	<.0001*
5	0.3027	0.1000	54.5633	<.0001*	54.5633	<.0001*
6	0.2402	-0.0644	57.3964	<.0001*	57.3964	<.0001*
7	0.2031	-0.0270	59.1891	<.0001*	59.1891	<.0001*
8	0.1255	-0.0971	59.9032	<.0001*	59.9032	<.0001*
9	0.0289	-0.1148	59.9426	<.0001*	59.9426	<.0001*
10	0.0285	0.2116	59.9628	<.0001*	59.9628	<.0001*
11	0.0272	-0.0916	60.0213	<.0001*	60.0213	<.0001*
12	-0.0705	-0.2129	60.2918	<.0001*	60.2918	<.0001*
13	-0.1494	-0.0594	61.5194	<.0001*	61.5194	<.0001*
14	-0.2076	-0.0076	64.0787	<.0001*	64.0787	<.0001*
15	-0.2898	-0.0863	69.4527	<.0001*	69.4527	<.0001*
16	-0.3343	-0.0951	77.0507	<.0001*	77.0507	<.0001*
17	-0.3640	-0.1167	86.8622	<.0001*	86.8622	<.0001*
18	-0.3128	0.2168	94.2679	<.0001*	94.2679	<.0001*
19	-0.3208	-0.2231	102.879	<.0001*	102.879	<.0001*
20	-0.3378	0.0871	113.227	<.0001*	113.227	<.0001*
21	-0.2881	-0.0612	121.438	<.0001*	121.438	<.0001*
22	-0.2161	0.1983	126.516	<.0001*	126.516	<.0001*
23	-0.1488	0.0532	129.194	<.0001*	129.194	<.0001*
24	-0.0965	-0.1123	130.461	<.0001*	130.461	<.0001*
25	-0.0847	-0.0279	131.575	<.0001*	131.575	<.0001*

**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLik	Weights	-2 A B S	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	28	15154.91	379.2865	382.0825	0.654	375.2685	0.313472		8.147401	86.136315
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	28	14859.325	380.9589	386.5568	0.665	372.9589	0.144682		7.620418	79.915697
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	27	15699.901	381.01741	385.22100	0.635	375.01741	0.139949		7.831819	83.340408
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	27	15718.626	381.16277	366.686	0.625	373.16277	0.131016		8.032025	85.210405
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	26	15570.171	381.73445	387.33504	0.651	373.73445	0.097784		7.415659	78.188044
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	25	15373.885	382.64094	389.64693	0.668	372.64094	0.062148		7.506704	78.376832
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	27	11994.534	385.27943	391.01138	0.736	377.27943	0.018648		7.021160	71.956753
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	30	14182.795	385.31095	386.74684	0.670	385.31095	0.016551		7.710668	81.210418
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	28	13417.552	385.74808	390.05104	0.709	379.74808	0.011317		7.216183	74.530033
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	27	20459.44	386.37312	390.57871	0.552	380.37312	0.009606		6.118777	84.569995
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	28	13805.93	386.50578	390.80974	0.700	380.50578	0.009996		7.279057	75.887108
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	26	12403.077	387.00883	394.17878	0.737	380.00883	0.009698		6.944824	72.241525
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	29	14629.546	387.22778	390.09576	0.671	383.22778	0.006272		7.581752	80.145661
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	29	14654.872	387.27622	390.14419	0.671	383.27622	0.006122		7.666216	80.874066
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	28	14490.073	387.92848	392.22844	0.685	381.92848	0.004423		7.120828	74.912145
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	27	14255.184	388.30220	394.12815	0.702	380.3022	0.003504		7.148667	74.471159
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	28	26144.575	392.31625	395.11885	0.407	388.31625	0.004883		9.183972	98.944810
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	29	28310.923	393.64836	395.02955	0.334	391.64836	0.002025		9.230728	99.792389
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	30	13704.588	398.78818	401.71985	0.664	394.78818	0.000019		7.282166	72.857728
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	29	13642.084	399.66149	404.05870	0.674	393.66149	0.000013		7.535077	75.452027
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	29	13916.552	400.23663	404.62184	0.669	394.23663	0.000009		7.199994	72.037452
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	28	13545.384	400.43368	406.29662	0.686	392.43368	0.000009		7.289782	72.644822
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	28	13891.177	400.72738	406.59033	0.683	392.72738	0.000007		7.276649	72.597105
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	27	14033.91	402.39973	409.72841	0.687	392.39973	0.000003		7.252477	72.209570
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	29	16689.313	405.97774	410.37485	0.615	399.97774	0.000001		10.125885	96.877728
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	30	20151.481	410.82028	413.76255	0.535	406.82028	0.000000		10.332764	115.88062
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	31	44073.014	433.99140	435.45714	0.000	431.9914	0.000000		19.724124	183.73453



**Model: IMA(2, 1)**

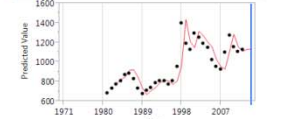
**Model Summary**

DF	28	Stable	Yes
Sum of Squared Errors	424393469	Invertible	Yes
Variance Estimate	15156.906		
Standard Deviation	123.113401		
Akaike's A Information Criterion	379.286853		
Schwarz's Bayesian Criterion	382.080248		
RSquare	0.6343252		
RSquare Adj	0.62127296		
MAPE	8.14740101		
MAE	86.1363508		
-2LogLikelihood	375.286853		

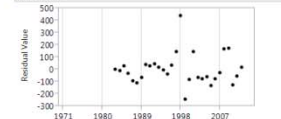
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Pr> t	Constant Estimate
MA1	1	0.999995	0.093295	10.72	<.0001*	-0.662772
Intercept	0	-0.6627720	2.386570	-0.28	0.7833	

**Forecast**

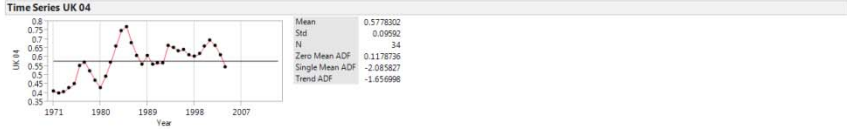


**Residuals**

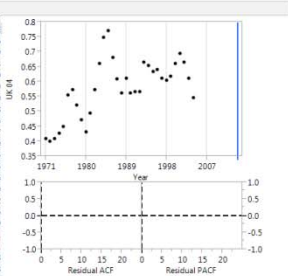


Lag	AutoCorr	Partial	Ljung-Box Q	p-Value	Ljung-Box Q	p-Value
0	1.0000	1.0000				
1	0.0384	0.0384	0.0487	0.8253	0.0384	0.8253
2	-0.2881	-0.2900	2.8948	0.2352	-0.2900	0.2352
3	0.0154	0.0446	2.9032	0.4068	0.0446	0.4068
4	-0.0386	-0.1274	2.9581	0.5489	-0.1274	0.5489
5	-0.0274	0.0010	2.9869	0.7020	0.0010	0.7020
6	0.0023	-0.0548	2.9871	0.8105	-0.0548	0.8105
7	-0.0180	-0.0263	3.0272	0.8262	-0.0263	0.8262
8	-0.0451	-0.0676	3.1159	0.9069	-0.0676	0.9069
9	-0.3304	-0.3624	8.1058	0.5235	-0.3624	0.5235
10	-0.0437	-0.0598	8.1979	0.6096	-0.0598	0.6096
11	0.0287	0.0589	12.2548	0.3441	0.0589	0.3441
12	-0.0222	-0.0899	12.2911	0.4226	-0.0899	0.4226
13	-0.1035	-0.0827	12.8963	0.4559	-0.0827	0.4559
14	-0.0718	-0.2089	13.2053	0.5104	-0.2089	0.5104
15	0.0301	-0.0176	13.2632	0.5820	-0.0176	0.5820
16	0.0868	-0.0705	13.7800	0.6151	-0.0705	0.6151
17	0.0739	0.0160	14.1833	0.6541	0.0160	0.6541
18	0.0616	-0.0785	14.4873	0.6968	-0.0785	0.6968
19	0.0082	-0.0349	14.4931	0.7542	-0.0349	0.7542
20	-0.0758	0.0301	15.0448	0.7738	0.0301	0.7738
21	-0.0637	-0.1452	15.4773	0.7983	-0.1452	0.7983
22	-0.0070	-0.1378	15.4832	0.8407	-0.1378	0.8407
23	0.0366	-0.1123	15.6666	0.8692	-0.1123	0.8692
24	0.0221	-0.0038	15.7446	0.8971	-0.0038	0.8971
25	-0.0113	0.0241	15.7699	0.9215	0.0241	0.9215

## United Kingdom



Report	Graph	Model	DF	Variance	AIC	SBC	Rsquare	-2LogH	Weights	2.A.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	30	0.0018533	-110.9386	-104.8332	0.755	-118.9386	0.361144		6.693961	0.037006
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	31	0.0019915	-110.1255	-105.5464	0.737	-116.1255	0.244934		7.063542	0.038749
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	29	0.0019031	-109.0214	-101.4266	0.755	-116.0214	0.140988		6.781332	0.037381
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	30	0.0020578	-108.1267	-102.0213	0.737	-116.1267	0.088530		7.067188	0.038769
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	29	0.0019194	-106.7975	-100.7715	0.794	-114.7975	0.044643		5.510006	0.032903
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	31	0.0022352	-101.1111	-101.0280	0.724	-112.0280	0.041017		7.183597	0.040259
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	31	0.0023141	-104.7849	-100.2058	0.704	-110.7849	0.016650		7.834975	0.041898
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	30	0.0022144	-104.5090	-100.0195	0.764	-110.5090	0.014505		6.127581	0.036155
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	31	0.0023774	-103.6350	-100.6220	0.740	-107.6220	0.006276		6.601567	0.038721
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	28	0.0018906	-103.9873	-99.10475	0.784	-113.9873	0.009146		5.820564	0.033769
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	31	0.0023959	-103.3985	-100.4054	0.738	-107.3985	0.008324		6.630972	0.038715
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	30	0.0023381	-103.1566	-98.66709	0.752	-109.1566	0.007376		6.422783	0.037585
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	28	0.0022364	-101.0466	-97.90253	0.768	-111.0466	0.000691		6.192706	0.036466
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	30	0.002417	-102.1318	-97.44234	0.744	-108.1318	0.004419		6.555348	0.038409
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	32	0.0026055	-101.8337	-98.78209	0.681	-105.8337	0.003811		7.526164	0.042492
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	32	0.0027467	-99.87798	-98.48147	0.690	-101.8798	0.001505		7.219523	0.042216
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	29	0.0024825	-95.64015	-91.24884	0.687	-101.6401	0.001173		6.967480	0.040989
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	29	0.0024808	-95.27485	-90.87754	0.685	-101.2748	0.000143		7.117674	0.041651
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	28	0.0024331	-94.95536	-89.09241	0.701	-102.9534	0.000122		6.917562	0.040611
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	28	0.0025266	-94.09909	-88.28244	0.682	-102.9991	0.000200		6.919958	0.040678
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	27	0.0026471	-91.89121	-84.56253	0.690	-101.8912	0.000026		7.023389	0.041348
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	31	0.002921	-91.12349	-89.65775	0.590	-93.12349	0.000018		7.154151	0.042411
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	30	0.0033067	-89.99074	-87.25927	0.601	-93.99074	0.000010		7.284996	0.043062
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	30	0.0033258	-89.82642	-88.89394	0.599	-93.82642	0.000009		7.223891	0.042731
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	29	0.003435	-87.87312	-83.47592	0.600	-93.87312	0.000004		7.189074	0.042532
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	32	0.0042424	-86.47491	-83.42219	0.525	-90.47491	0.000002		10.065200	0.054035
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	33	0.0094795	-60.92952	-59.39416	-0.00	-62.92952	0.000000		14.460372	0.077390



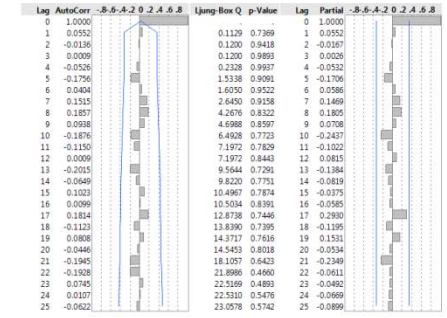
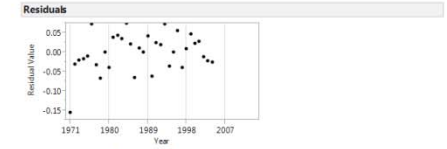
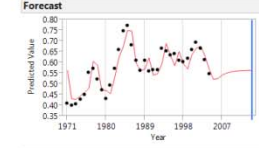
**Model: ARMA(1, 2)**

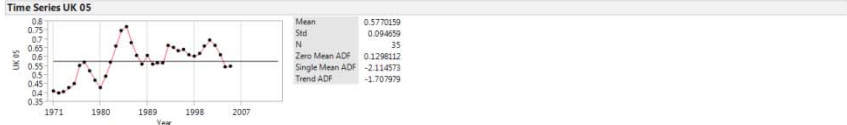
**Model Summary**

DF	30	Stable	Yes
Sum of Squared Errors	0.0555994	Invertible	Yes
Variance Estimate	0.00186532		
Standard Deviation	0.0431893		
Akaike's Information Criterion	-110.93862		
Schwarz's Bayesian Criterion	-104.83338		
RSquare	0.75544132		
RSquare Adj	0.73088545		
MAPE	6.69396121		
MAE	0.03700611		
-2LogLikelihood	-118.93862		

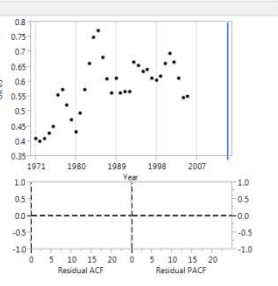
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob >  t	Constant
AR1	1	0.5977712	0.1617732	3.70	0.0007	0.22710781
MA1	1	-0.7306087	0.1483586	-4.92	<.0001*	
MA2	2	-0.5797417	0.2191587	-2.65	0.0129*	
Intercept	0	0.5646294	0.0378361	14.91	<.0001*	





Report	Graph	Model	DF	Variance	AC	SBC	Rsquare	-2LogH	Weights	2.A.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	31	0.0018133	-115.0999	-108.8785	0.751	-123.0999	0.376832		6.707186	0.036961
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	32	0.0019671	-114.0068	-109.2407	0.731	-120.0098	0.218163		7.075837	0.038725
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	30	0.0018956	-113.1856	-105.4988	0.750	-123.1856	0.144695		6.743596	0.037004
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	31	0.002003	-112.0157	-105.7943	0.731	-120.0157	0.080617		7.077068	0.038754
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	30	0.0019208	-111.2722	-105.1667	0.795	-119.2722	0.055981		5.988112	0.031795
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	32	0.0021169	-111.1169	-104.4558	0.721	-116.8119	0.041581		7.112009	0.039759
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	32	0.0022413	-109.1223	-104.4562	0.705	-115.1223	0.018972		7.616593	0.040733
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	31	0.002189	-108.3504	-103.7714	0.761	-114.3504	0.012898		6.111612	0.036006
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	32	0.0023284	-107.5448	-104.4621	0.738	-111.5448	0.008621		6.568109	0.038458
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	32	0.0020313	-107.5018	-104.4491	0.738	-111.5018	0.008438		6.545319	0.038164
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	31	0.0022763	-107.2870	-102.7079	0.752	-113.2870	0.007579		6.341210	0.037045
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	30	0.0022154	-107.5585	-100.9531	0.766	-115.5585	0.006761		6.165395	0.036257
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	29	0.0021256	-107.0211	-99.39234	0.779	-117.0211	0.005645		5.891481	0.034253
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	31	0.0023628	-106.1035	-101.5344	0.743	-112.1035	0.004194		6.517328	0.038108
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	33	0.0025761	-105.9998	-102.8891	0.681	-109.9998	0.003982		7.329811	0.041373
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1)	33	0.0026635	-104.0832	-102.5568	0.691	-106.0832	0.001527		7.009546	0.040498
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	30	0.002431	-99.13869	-94.44894	0.683	-105.0385	0.001323		7.078733	0.041127
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	29	0.0023822	-98.71739	-92.73136	0.699	-106.7174	0.001014		6.913625	0.040457
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	29	0.0024864	-97.68187	-91.69584	0.688	-105.6819	0.000062		6.969754	0.040820
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	28	0.0025008	-95.51888	-88.33644	0.686	-105.5189	0.000021		7.016426	0.041169
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2)	32	0.0033451	-93.47432	-91.97781	0.572	-95.47432	0.000008		7.232534	0.042839
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	31	0.0033413	-92.49894	-89.55993	0.586	-96.49894	0.000005		7.430152	0.043805
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	31	0.0033724	-92.23054	-89.23752	0.582	-96.23054	0.000004		7.306540	0.043148
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	30	0.0034957	-90.52962	-88.04040	0.586	-96.52962	0.000002		7.417380	0.044042
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	30	0.0034741	-90.32556	-85.83604	0.584	-96.32556	0.000002		7.297916	0.043105
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	33	0.0041141	-90.17289	-87.06199	0.526	-94.17289	0.000001		9.792021	0.052566
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	34	0.0092239	-63.69752	-62.14217	0.000	-65.69752	0.000000		14.174422	0.075882



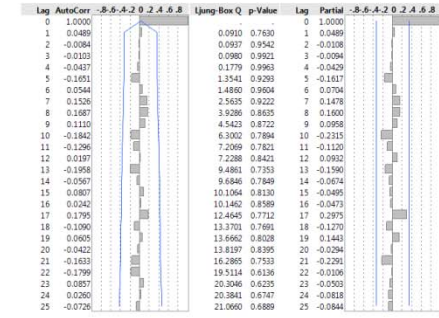
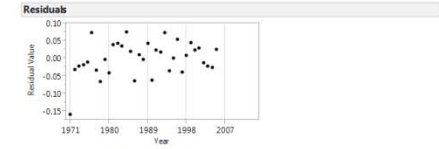
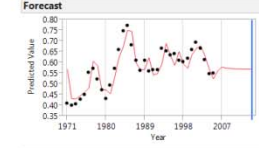
**Model: ARMA(1, 2)**

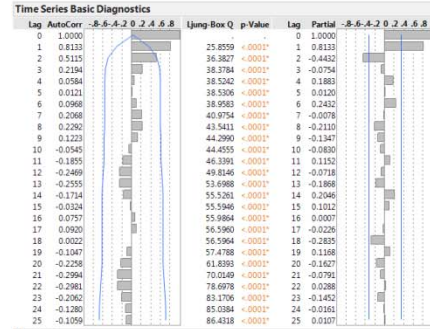
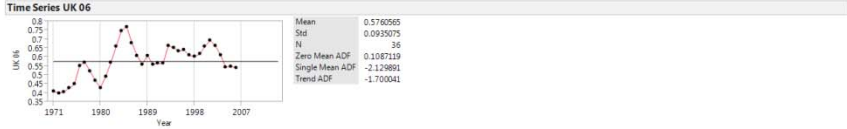
**Model Summary**

DF	31	Stable	Yes
Sum of Squared Errors	0.0567718	Invertible	Yes
Variance Estimate	0.00181335		
Standard Deviation	0.04279426		
Akaike's Information Criterion	-115.09991		
Schwarz's Bayesian Criterion	-108.87851		
RSquare	0.75062207		
RSquare Adj	0.72648873		
MAPE	6.70718584		
MAE	0.03696061		
-2LogLikelihood	-123.09991		

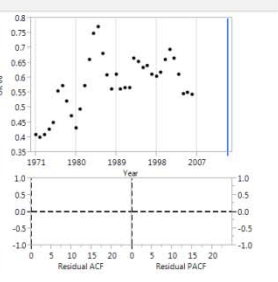
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant
AR1	1	0.5917009	0.1601940	3.69	0.0007	0.23217741
MA1	1	-0.7306283	0.1545210	-4.73	<0.0001*	
MA2	2	-0.5629387	0.1941013	-2.90	0.0068*	
Intercept	0	0.5689454	0.0363778	15.37	<0.0001*	



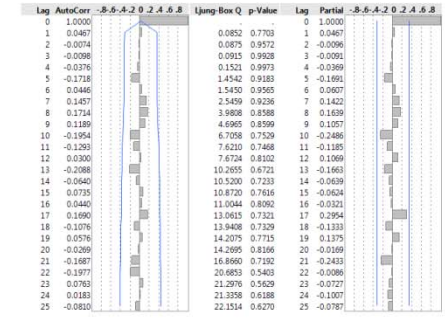
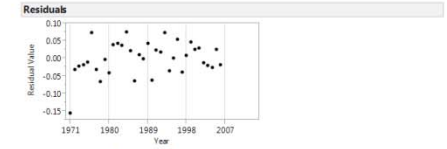
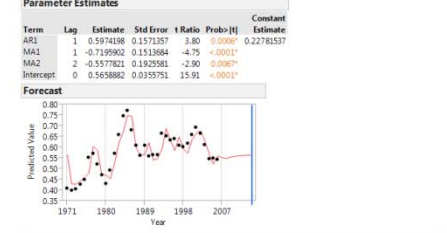


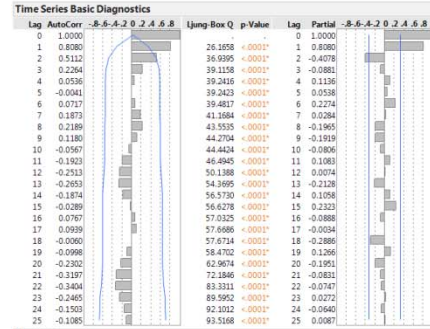
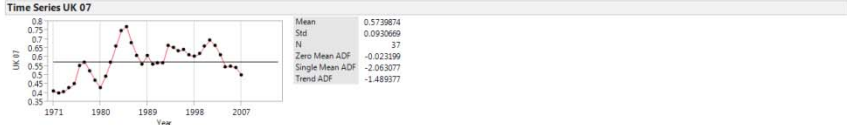
Report	Graph	Model	DF	Variance	AC	SBC	RSquare	-2LogH	Weights	2.A	6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	32	0.0017853	-119.4877	-113.1536	0.753	-127.4877	0.389724			6.576910	0.036310
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	33	0.001913	-118.3981	-113.6476	0.733	-124.3981	0.226025			6.925037	0.037951
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	31	0.0018715	-117.5989	-109.6404	0.752	-127.5989	0.148503			6.617883	0.036472
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	32	0.0019727	-116.4000	-110.0659	0.733	-124.4	0.083228			6.926283	0.037969
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	33	0.0021101	-115.0795	-110.3249	0.723	-121.0795	0.042919			6.962303	0.038967
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	31	0.0020976	-115.2927	-108.3756	0.786	-122.2927	0.033787			5.505599	0.024242
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	33	0.0021771	-113.3523	-108.6017	0.706	-118.3523	0.018133			7.480752	0.040046
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 2)	33	0.0021297	-112.6096	-107.9395	0.761	-118.6096	0.012483			6.025135	0.035467
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	33	0.0022612	-111.7925	-108.8818	0.739	-115.7925	0.008313			6.433798	0.037852
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1, 1)	33	0.0022717	-111.6588	-108.5481	0.738	-115.6588	0.007776			6.444795	0.037554
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	31	0.0021517	-111.3540	-105.1326	0.766	-119.354	0.006676			6.073114	0.035683
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	32	0.0022272	-111.3148	-106.6488	0.751	-117.3148	0.006547			6.300255	0.036700
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	29	0.0020776	-111.2927	-103.5169	0.779	-121.2927	0.006478			5.825320	0.033923
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	32	0.0022964	-110.3091	-105.6431	0.743	-116.3091	0.003960			6.408739	0.037444
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	34	0.0025012	-110.1761	-107.0090	0.683	-114.1761	0.003705			7.157926	0.040416
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	34	0.0025886	-108.1712	-106.6159	0.692	-110.1712	0.001380			6.861648	0.040118
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	31	0.0023681	-103.4371	-98.8384	0.665	-109.4371	0.000127			6.788956	0.038875
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 2)	31	0.0023552	-103.2897	-98.71061	0.685	-109.2897	0.000118			6.896226	0.040252
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	30	0.0020231	-102.9467	-96.84121	0.700	-110.9467	0.000100			6.785049	0.039662
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	29	0.0024645	-99.7379	-92.4798	0.688	-109.7379	0.000020			6.828782	0.040048
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	33	0.0032473	-97.34494	-95.81858	0.575	-99.34494	0.000006			7.092461	0.041961
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2, 1)	32	0.003238	-96.43176	-93.37904	0.589	-100.4318	0.000004			7.219924	0.042616
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	32	0.003267	-96.16232	-93.10960	0.589	-100.1623	0.000003			7.091730	0.041882
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	30	0.0028121	-95.9203	-89.81759	0.631	-103.923	0.000003			7.332937	0.042011
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	31	0.0033621	-94.26040	-89.88132	0.587	-100.2604	0.000001			7.083568	0.041839
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	34	0.0040284	-93.59329	-90.42626	0.525	-97.59329	0.000001			9.684857	0.052111
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	35	0.0089935	-66.45584	-64.87232	0.000	-66.45584	0.000000			13.922195	0.074681



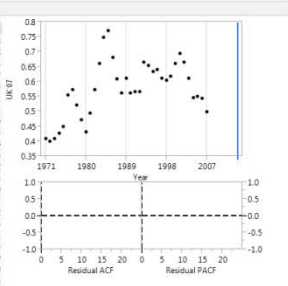
Model: ARMA(1, 2)

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant
ARI	1	0.5974188	0.1571357	3.80	0.0000	0.22781537
MA1	1	-0.7195902	0.1513884	-4.75	<0.0001*	
MA2	2	-0.5577821	0.1925581	-2.90	0.0067*	
Intercept	0	0.5658862	0.0395751	13.91	<0.0001*	





Report	Graph	Model	DF	Variance	AC	SBC	Rsquare	-2LogLH	Weights	2.A.6.8	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2)	33	0.0018159	-122.3843	-115.9406	0.754	-130.3843	0.354942		6.666341	0.036838
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	34	0.0019533	-121.7556	-116.6228	0.736	-127.7556	0.250001		6.899226	0.037858
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1)	32	0.0018709	-120.4902	-112.3346	0.754	-130.4902	0.112016		6.685773	0.036811
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1)	33	0.0019727	-119.7666	-113.3230	0.736	-127.7666	0.095885		6.901304	0.037897
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	34	0.0020915	-118.6903	-113.8376	0.728	-124.6903	0.059979		6.917809	0.038735
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	33	0.0020226	-119.1127	-115.2536	0.777	-124.6877	0.022567		5.757197	0.033382
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	34	0.0021966	-116.3484	-111.5156	0.706	-122.3484	0.017957		7.507227	0.042021
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1,2)	33	0.0021385	-115.8017	-111.0512	0.759	-121.8017	0.011206		6.143238	0.035936
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	34	0.002246	-115.2813	-112.1162	0.739	-119.2813	0.010191		6.473097	0.037661
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1,1)	34	0.0022229	-115.2251	-112.0260	0.738	-118.2251	0.009896		6.476145	0.037566
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,1)	33	0.0022104	-114.8400	-110.0955	0.751	-120.8400	0.008189		6.350338	0.036884
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,2)	32	0.0021599	-114.5322	-108.1981	0.763	-122.5322	0.007000		6.203149	0.036212
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,1)	31	0.0022222	-113.8537	-109.1031	0.743	-119.8537	0.004966		6.411822	0.037864
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	35	0.002482	-113.5893	-110.3675	0.687	-117.5893	0.004369		7.168097	0.040443
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,2)	31	0.0019567	-113.4275	-105.5099	0.768	-123.4275	0.004020		6.078146	0.034987
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	35	0.0025754	-111.4731	-109.8895	0.692	-113.4731	0.001516		6.926518	0.040302
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,1)	32	0.0023228	-107.2856	-102.6395	0.690	-113.2856	0.000187		6.793218	0.039695
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2,2)	32	0.0023026	-107.2641	-102.5981	0.691	-113.2641	0.000185		6.840994	0.039631
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,1)	31	0.002257	-106.9323	-100.7109	0.706	-114.9323	0.000157		6.742957	0.039325
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,2)	31	0.0022352	-105.8579	-99.39469	0.696	-113.8579	0.000202		6.741092	0.039359
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,2)	30	0.0024636	-103.4908	-95.71401	0.692	-113.4908	0.000028		6.861909	0.040000
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	34	0.0031892	-100.8680	-99.31284	0.582	-102.8680	0.000008		7.133627	0.041944
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2,1)	33	0.0031145	-100.0085	-96.89776	0.596	-104.0085	0.000005		7.283242	0.042779
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,2)	33	0.0032010	-99.66236	-96.53366	0.592	-103.6624	0.000006		7.144021	0.041954
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,2)	32	0.0032901	-97.86646	-93.20041	0.594	-103.8665	0.000002		7.097336	0.041719
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	35	0.0039706	-96.72660	-93.50477	0.527	-100.7266	0.000001		9.679357	0.052164
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0,0,0)	36	0.008902	-68.70686	-67.09594	0.000	-70.70686	0.000000		13.808884	0.074566



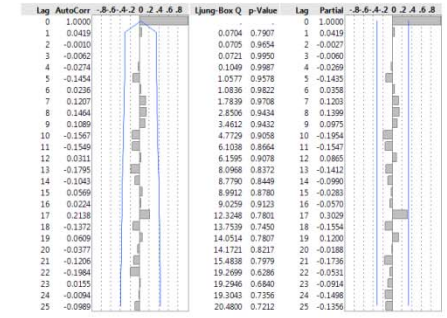
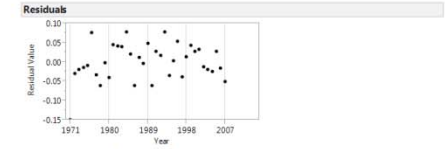
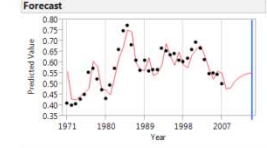
**Model: ARMA(1,2)**

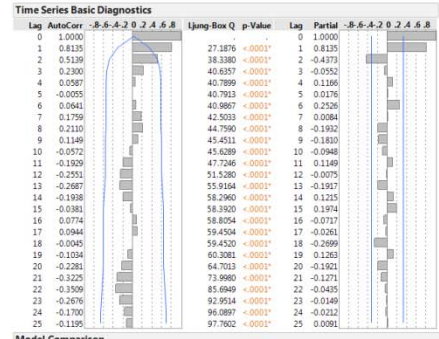
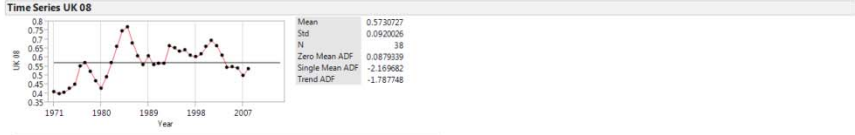
**Model Summary**

DF	33	Stable	Yes
Sum of Squared Errors	0.0590303	Invertible	Yes
Variance Estimate	0.00181594		
Standard Deviation	0.04261384		
Akaike's Information Criterion	-122.38425		
Schwarz's Bayesian Criterion	-115.94026		
RSquare	0.75425816		
RSquare Adj	0.73192799		
MAPE	6.6663427		
MAE	0.03683806		
-2LogLikelihood	-130.38425		

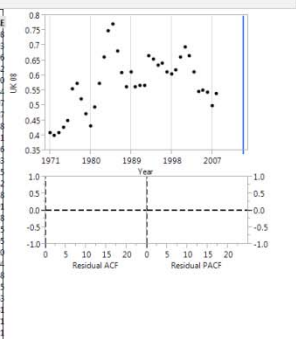
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	0.6055542	0.1615787	3.75	0.0007	0.21977534	
MA1	1	-0.7332235	0.1675702	-4.38	0.0001		
MA2	2	-0.5272949	0.1815790	-2.90	0.0045		
Intercept	0	0.5585912	0.0368355	15.37	<0.0001		





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2logH	Weights	Z	A	B	MAPE	MAE
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AR(2)	35	0.0019257	-125.0460	-120.1332	0.726	-131.046	0.334488				7.031643	0.038396
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	34	0.001879	-124.7902	-118.2398	0.738	-132.7902	0.276724				6.870141	0.037693
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	34	0.0019623	-123.0462	-116.4959	0.726	-131.0462	0.115707				7.032285	0.038409
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	33	0.0019335	-123.8204	-114.0314	0.738	-132.8204	0.032978				6.882969	0.037742
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	35	0.0020899	-122.1171	-117.2043	0.718	-128.1171	0.072711				7.041840	0.039109
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	35	0.0019945	-120.5253	-114.0816	0.775	-128.5253	0.032805				5.752600	0.033484
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	33	0.0021836	-119.8809	-114.9662	0.730	-123.8809	0.023770				7.544687	0.040097
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	35	0.0022612	-118.3269	-115.1051	0.731	-122.3269	0.010929				6.586792	0.037867
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	35	0.0022665	-118.2299	-115.0880	0.730	-122.2299	0.010411				6.586695	0.038188
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	34	0.0022183	-117.9355	-113.0827	0.749	-123.9355	0.008897				6.405909	0.037241
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	34	0.0022375	-117.6935	-112.8068	0.741	-123.6935	0.007962				6.437976	0.037586
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	36	0.0024473	-117.3263	-114.0512	0.681	-121.3263	0.006627				7.164765	0.040283
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	34	0.0022989	-116.7487	-111.9159	0.734	-122.7487	0.004964				6.563077	0.038015
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	33	0.0022422	-115.5682	-115.1256	0.748	-124.5682	0.004838				6.428011	0.037342
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	32	0.0021532	-115.4343	-108.3797	0.760	-126.4343	0.004442				6.085832	0.035518
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	36	0.0025413	-115.0897	-113.4788	0.689	-117.0897	0.002166				6.924126	0.040191
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	33	0.0023555	-109.6458	-104.8952	0.678	-115.6458	0.000142				7.021023	0.040678
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	33	0.0022771	-109.6096	-104.8561	0.676	-115.6096	0.000140				6.969349	0.040515
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	32	0.002333	-108.9656	-102.6315	0.690	-116.9656	0.000101				6.935636	0.040205
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	32	0.0024125	-108.0873	-101.7532	0.681	-116.0873	0.000095				6.966586	0.040420
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	31	0.0025208	-105.6156	-97.20950	0.676	-113.6156	0.000039				6.966813	0.040504
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	35	0.0032925	-102.6304	-101.0469	0.559	-104.6304	0.000004				7.282212	0.042748
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	34	0.0032356	-102.1980	-99.03096	0.579	-106.1980	0.000003				7.459626	0.043715
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	34	0.0032885	-101.6871	-98.52011	0.572	-105.6871	0.000003				7.302991	0.042763
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	36	0.0038664	-100.4617	-97.20950	0.539	-104.4617	0.000001				8.443342	0.050891
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	33	0.0033624	-99.04773	-95.19717	0.576	-105.0477	0.000001				7.279988	0.042672
<input type="checkbox"/>	<input type="checkbox"/>	ARIMA(0, 0, 0)	37	0.0086932	-71.49202	-69.85443	0.000	-73.49202	0.000000				13.648884	0.073421



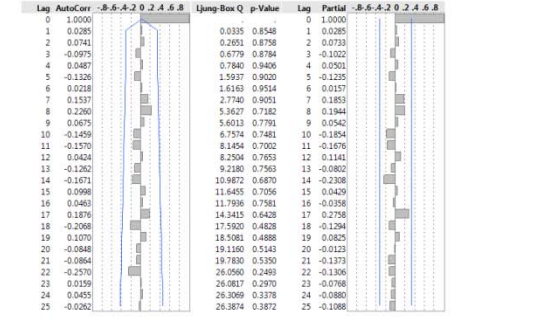
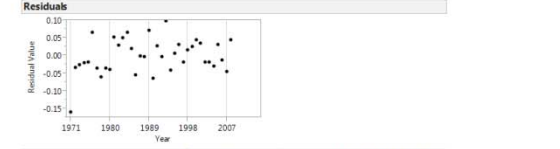
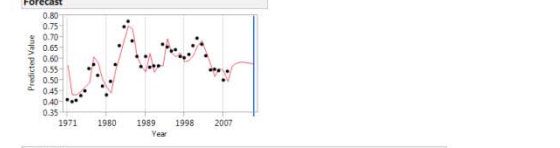
**Model: AR(2)**

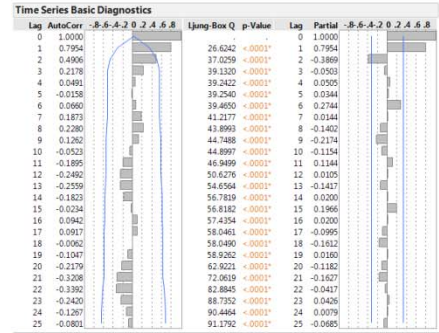
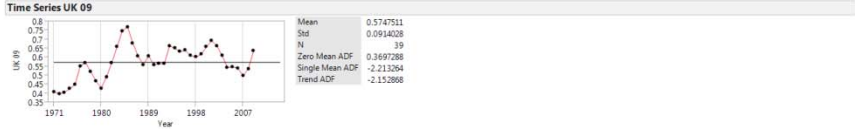
**Model Summary**

DF	35	Stable	Yes
Sum of Squared Errors	0.06739917	Invertible	Yes
Variance Estimate	0.00192569		
Standard Deviation	0.04388269		
Akaike's A Information Criterion	-125.046		
Schwarz's Bayesian Criterion	-120.13325		
RSquare	0.7263435		
RSquare Adj	0.71072803		
MAPE	7.03164348		
MAE	0.03839627		
-2LogLikelihood	-131.046		

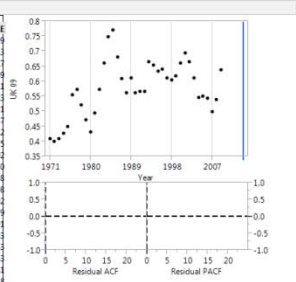
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.268120	0.1386172	9.15	<.0001*		0.12909783
AR2	2	-0.484716	0.1460346	-3.38	<.0001*		
Intercept	0	0.569726	0.0297413	19.16	<.0001*		





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogH	Weights	Z	A	B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	36	0.0020064	-126.7781	-121.7874	0.707	-132.7781	0.295250	7.261789	0.039999		7.154570	0.039213
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	35	0.0019511	-126.6383	-119.9840	0.720	-134.6383	0.275306	7.274834	0.039713		7.169632	0.039309
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	35	0.0020016	-124.8202	-118.1059	0.708	-132.8202	0.110264	5.779928	0.038111		6.724524	0.039047
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	34	0.0020007	-124.6596	-116.3418	0.720	-134.6596	0.102366	6.724524	0.039047		6.724524	0.039047
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	34	0.0018796	-123.8392	-117.2888	0.771	-131.8392	0.067921	6.724524	0.039047		6.724524	0.039047
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	36	0.0021934	-123.5568	-118.5661	0.696	-129.5568	0.058979	6.563230	0.038112		6.563230	0.038112
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	36	0.0022127	-122.6178	-117.0272	0.690	-123.6178	0.036883	6.509237	0.037975		6.509237	0.037975
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	35	0.0023019	-119.6964	-114.7836	0.729	-125.6964	0.008939	6.764469	0.038002		6.764469	0.038002
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	34	0.0023841	-119.5311	-116.2560	0.712	-123.5311	0.007880	6.563677	0.038256		6.563677	0.038256
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	34	0.0023221	-118.4282	-111.8779	0.734	-126.4282	0.004540	6.712310	0.039028		6.712310	0.039028
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	35	0.0023931	-118.4255	-113.5128	0.718	-124.4255	0.004334	6.322762	0.036698		6.322762	0.036698
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	33	0.0022977	-117.7714	-109.5985	0.684	-127.7714	0.003278	7.451810	0.041902		7.451810	0.041902
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	37	0.0026397	-117.6169	-114.2898	0.647	-121.6169	0.003026	7.150384	0.041679		7.150384	0.041679
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	37	0.0027141	-115.7275	-114.0899	0.663	-117.7275	0.001176	7.203622	0.041891		7.203622	0.041891
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	34	0.0024905	-110.7920	-105.9592	0.655	-116.7920	0.000100	7.134907	0.041683		7.134907	0.041683
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	34	0.0025298	-109.8259	-105.8259	0.652	-116.8259	0.000064	7.054209	0.041043		7.054209	0.041043
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	33	0.0024834	-110.6011	-104.1574	0.672	-118.6011	0.000091	7.107795	0.041443		7.107795	0.041443
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	33	0.0025378	-109.4512	-103.0075	0.660	-117.4512	0.000051	7.122469	0.041381		7.122469	0.041381
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	32	0.0026354	-108.2884	-101.7139	0.654	-116.2884	0.000034	7.294023	0.043018		7.294023	0.043018
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	36	0.0032926	-105.5073	-103.8964	0.552	-107.5073	0.000007	7.339224	0.043231		7.339224	0.043231
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	35	0.0033125	-104.2894	-101.0676	0.562	-108.2894	0.000004	7.301091	0.043008		7.301091	0.043008
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	35	0.0033345	-104.0669	-100.8451	0.559	-108.0669	0.000003	8.467493	0.052399		8.467493	0.052399
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	37	0.0038721	-103.8413	-99.8143	0.521	-107.8413	0.000002	7.298782	0.042997		7.298782	0.042997
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	34	0.0033399	-102.4096	-97.57685	0.563	-108.4096	0.000002	13.621820	0.073345		13.621820	0.073345
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	38	0.0085743	-73.93614	-72.27258	-0.00	-75.93614	0.000000					



Model: AR(2)

Model Summary

DF	36	Stable	Yes
Sum of Squared Errors	0.0723231	Invertible	Yes
Variance Estimate	0.00200645		
Standard Deviation	0.04479339		
Akaike's AIC Information Criterion	-126.77812		
Schwarz's Bayesian Criterion	-121.78743		
RSquare	0.70780504		
RSquare Adj	0.69124002		
MAPE	7.26178882		
MAE	0.03999918		
-2LogLikelihood	-132.77812		

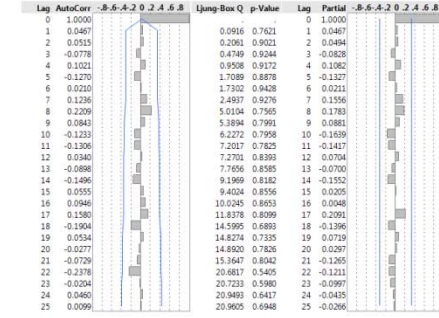
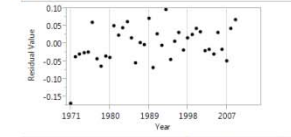
Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
AR1	1	1.291068	0.1398760	9.24	<0.0001	0.14150253
AR2	2	-0.537112	0.1459915	-3.68	<0.0001	
Intercept	0	0.578403	0.0277217	20.86	<0.0001	

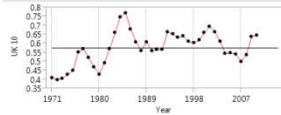
Forecast



Residuals

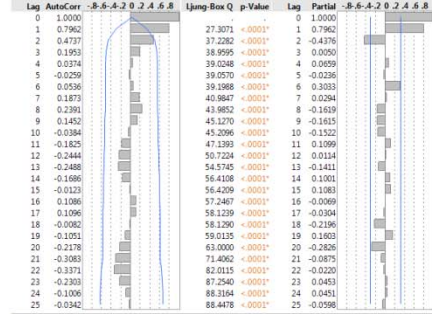


**Time Series UK 10**



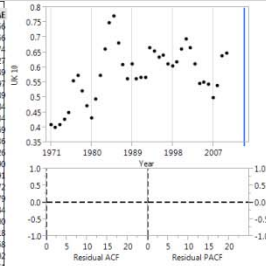
Mean	0.5765614
Std	0.0909584
N	40
Zero Mean ADF	0.398182
Single Mean ADF	-2.220619
Trend ADF	-2.183186

**Time Series Basic Diagnostics**



**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	Z	A	B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	37	0.0019785	-130.8048	-125.7381	0.713	-136.8048	0.326116				7.144203	0.039156
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	36	0.0019502	-130.2418	-123.4863	0.724	-138.2418	0.246109				7.104662	0.039156
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	36	0.0020308	-128.8542	-122.0987	0.714	-136.8542	0.122971				7.156190	0.039274
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	35	0.0020007	-128.2446	-119.8004	0.724	-138.2446	0.090971				7.096873	0.039217
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	37	0.002136	-127.9080	-122.8413	0.701	-133.9080	0.076620				7.156730	0.039849
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	35	0.0020092	-126.9309	-120.2797	0.766	-134.9309	0.047009				5.797549	0.039997
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	37	0.0021233	-126.7017	-121.6551	0.694	-132.7017	0.041939				7.599108	0.040289
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	37	0.002312	-123.9449	-120.6178	0.717	-127.9449	0.010561				6.649019	0.038684
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	36	0.002266	-123.6772	-118.6866	0.730	-129.6772	0.009239				6.520438	0.037804
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	37	0.002498	-123.3220	-119.9949	0.712	-127.3220	0.007736				6.711306	0.039309
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	36	0.002166	-122.8284	-117.8377	0.734	-128.8284	0.009644				6.609517	0.038638
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	35	0.0023579	-122.2222	-117.2316	0.719	-128.2222	0.004464				6.662556	0.038626
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	35	0.0023209	-121.6303	-114.9760	0.730	-129.6303	0.003320				6.641226	0.038799
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	38	0.0025784	-121.6287	-118.2509	0.690	-125.6287	0.003321				7.351585	0.041294
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	34	0.0023199	-120.7921	-112.4743	0.738	-130.7921	0.002184				6.415348	0.037472
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	38	0.0026428	-119.8300	-118.1725	0.688	-121.8300	0.001354				6.977902	0.040079
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	35	0.002432	-114.8197	-109.9070	0.658	-120.8197	0.000110				7.097401	0.041244
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	34	0.0023786	-114.5176	-107.9672	0.674	-122.5176	0.000906				7.003628	0.040880
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	35	0.0024794	-114.3983	-109.4855	0.653	-120.3983	0.000689				7.096134	0.041518
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	34	0.0024882	-113.2331	-106.6827	0.661	-121.2331	0.000050				7.064101	0.041258
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	33	0.0025687	-112.6575	-102.4696	0.655	-120.6575	0.000044				7.064384	0.041302
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	37	0.0034342	-106.7850	-105.1474	0.527	-108.7850	0.000002				7.540066	0.044561
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	38	0.0037859	-106.7466	-103.3689	0.526	-110.7466	0.000002				9.334008	0.050371
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	36	0.0033535	-106.5824	-103.3062	0.550	-110.5824	0.000002				7.735780	0.045617
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	36	0.0034372	-105.7608	-102.4907	0.539	-109.7608	0.000001				7.538996	0.044901
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	35	0.0034448	-104.6697	-99.75600	0.550	-110.6697	0.000001				7.485385	0.044189
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	39	0.0084856	-76.27314	-74.58426	-0.00	-78.27314	0.000000				13.619475	0.073411



**Model: AR(2)**

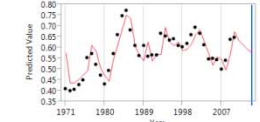
**Model Summary**

DF	37	Stable	Yes
Sum of Squared Errors	0.07320429	Invertible	Yes
Variance Estimate	0.00197849		
Standard Deviation	0.04448027		
Akaike's A Information Criterion	-130.80479		
Schwarz's Bayesian Criterion	-125.73815		
RSquare	0.7127848		
RSquare Adj	0.6972965		
MAPE	7.14420254		
MAE	0.03915571		
-2LogLikelihood	-136.80479		

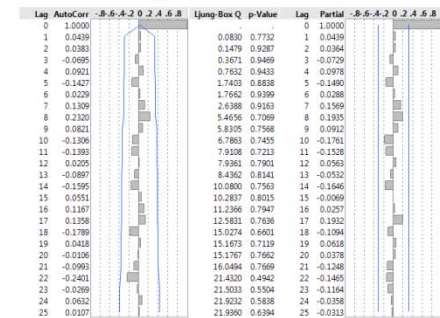
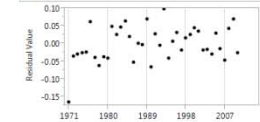
**Parameter Estimates**

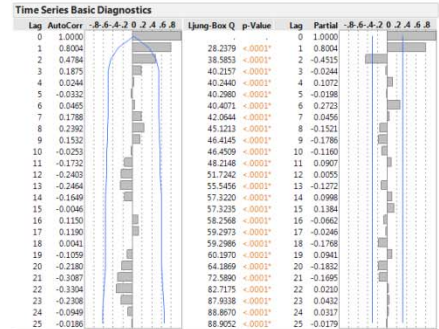
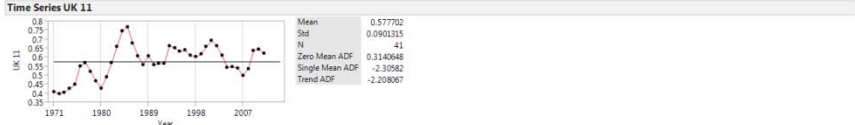
Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.265739	0.132995	9.52	<0.0001*		0.14039153
AR2	2	-0.508653	0.1393959	-3.66	<0.0001*		
Intercept	0	0.575149	0.0271329	21.20	<0.0001*		

**Forecast**

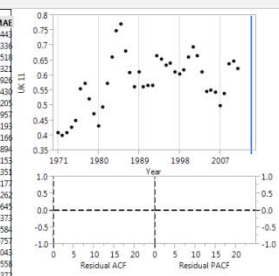


**Residuals**





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogLH	Weights	Z	A	B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	38	0.0019295	-135.2213	-130.0806	0.715	-141.2213	0.320326	7.006131	0.038445		6.951871	0.038338
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	37	0.0019003	-134.7185	-127.8643	0.725	-142.7185	0.249129				7.010875	0.038518
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	37	0.0019777	-133.2991	-126.4444	0.716	-141.2991	0.122515				6.948876	0.038211
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	36	0.0019529	-132.7198	-124.1520	0.725	-142.7198	0.081708				6.989035	0.038026
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	38	0.0020799	-132.3065	-127.1658	0.703	-138.3065	0.074587				5.696328	0.033633
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	36	0.0019601	-131.3045	-124.5490	0.766	-139.3045	0.045193				7.461763	0.040205
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	36	0.0021493	-130.5348	-125.2942	0.692	-136.5348	0.033799				5.622932	0.032957
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	35	0.0019758	-130.0360	-121.5716	0.771	-140.0360	0.023730				6.558126	0.038193
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	38	0.0022613	-128.0563	-124.8786	0.717	-132.0563	0.008807				6.385357	0.037768
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	37	0.0022055	-127.9993	-122.9327	0.731	-133.9993	0.008807				6.654712	0.038809
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	36	0.0023192	-127.4812	-121.8034	0.711	-131.4812	0.009750				6.519947	0.038153
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	37	0.0022063	-126.3302	-121.2436	0.719	-132.3302	0.003720				6.574878	0.038353
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	36	0.0022704	-125.8798	-119.1243	0.731	-133.8798	0.003000				6.531425	0.038177
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	34	0.0016304	-125.7602	-117.4424	0.739	-135.7602	0.002826				5.896997	0.042452
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	39	0.0025168	-125.7545	-122.3273	0.633	-129.7545	0.002818				7.213825	0.040645
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	39	0.0025975	-123.6261	-121.9372	0.667	-125.6261	0.000972				6.914203	0.040373
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	36	0.0023695	-118.9697	-113.9960	0.659	-124.9697	0.000966				6.960397	0.040594
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	35	0.0023105	-118.8199	-112.1656	0.675	-126.8199	0.000688				6.822784	0.039757
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	36	0.0024281	-118.3388	-113.3481	0.653	-124.3388	0.000099				7.006779	0.041043
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	35	0.0024238	-117.3135	-110.7192	0.627	-123.3135	0.000443				6.939204	0.040596
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	38	0.0033718	-110.3373	-106.6737	0.525	-112.3373	0.000001				7.507621	0.044772
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	39	0.0037108	-110.3095	-106.8823	0.526	-114.3095	0.000001				9.217473	0.049746
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	37	0.0033465	-109.5769	-106.2497	0.541	-113.5769	0.000001				7.711942	0.045578
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	37	0.0034023	-109.0081	-105.6610	0.533	-113.0081	0.000001				7.544832	0.044953
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	36	0.0033934	-108.1178	-103.1271	0.547	-114.1178	0.000000				7.433494	0.043904
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0, 0, 0)	40	0.0083268	-78.97890	-77.26533	0.000	-80.9789	0.000000				13.501747	0.072799



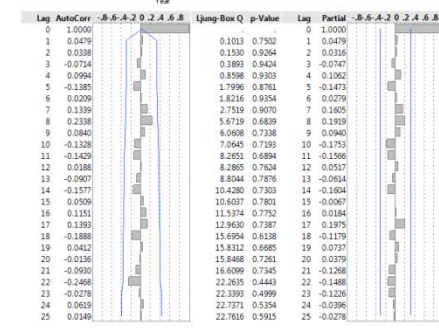
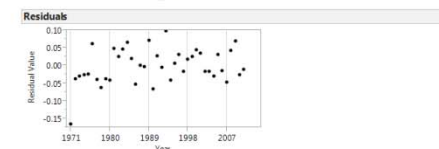
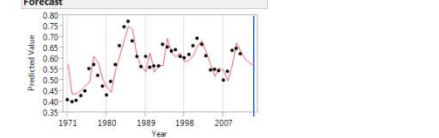
**Model: AR(2)**

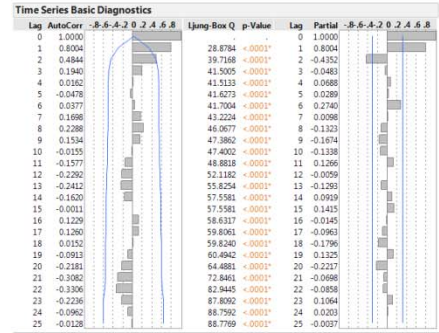
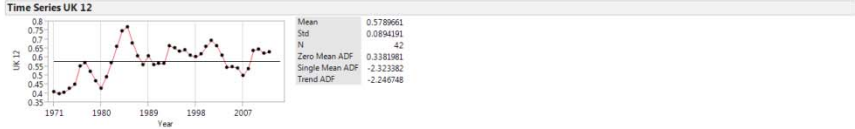
**Model Summary**

DF	38	Stable	Yes
Sum of Squared Errors	0.0733288	Invertible	Yes
Variance Estimate	0.0019295		
Standard Deviation	0.0439264		
Akaike's A Information Criterion	-135.22127		
Schwarz's Bayesian Criterion	-130.08056		
RSquare	0.7151119		
RSquare Adj	0.70011779		
MAPE	7.0061307		
MAE	0.038443		
-2LogLikelihood	-141.22127		

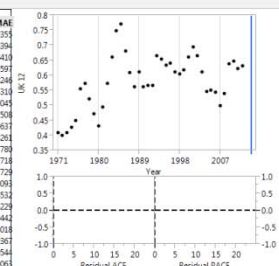
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.284500	0.131318	9.83	<.0001*		0.14143223
AR2	2	-0.511613	0.1378028	-3.70	<.0001*		
Intercept	0	0.574197	0.0263367	21.80	<.0001*		





Report	Graph	Model	DF	Variance	AIC	SBC	RSquare	-2LogH	Weights	Z.A.B.B	MAPE	MAE
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	39	0.0019053	-139.1699	-133.9569	0.712	-145.1699	0.336956		6.977688	0.038255
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2)	38	0.0018913	-138.3644	-131.4138	0.719	-146.3644	0.225257		6.959809	0.038394
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1)	38	0.0018913	-137.2523	-130.3016	0.713	-145.2523	0.129179		6.978939	0.038416
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	39	0.0020372	-136.4958	-131.2628	0.702	-142.4958	0.084962		6.925821	0.038597
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2)	37	0.0019385	-136.4334	-127.7451	0.719	-146.4334	0.085776		6.930796	0.038246
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1,1)	38	0.0019233	-135.4590	-128.6047	0.766	-143.4590	0.052694		5.670205	0.033319
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	39	0.0021194	-134.3928	-129.1778	0.689	-140.3928	0.030890		7.435406	0.040045
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1,1)	39	0.0022057	-132.3294	-128.9023	0.719	-136.3294	0.011020		6.437814	0.037508
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,1)	38	0.0021547	-132.2373	-127.9966	0.733	-138.2373	0.010524		6.299886	0.036837
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,1)	39	0.0022573	-131.4010	-127.9738	0.712	-135.4010	0.009627		6.343489	0.036203
<input type="checkbox"/>	<input type="checkbox"/>	IMA(1,2)	38	0.0022175	-131.0792	-128.9485	0.725	-137.0792	0.003986		6.455227	0.037780
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,1)	38	0.0022497	-130.5625	-125.4218	0.721	-136.5625	0.004555		6.463636	0.037718
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1,2)	37	0.0022195	-130.0663	-123.2120	0.731	-138.0663	0.003354		6.452535	0.037729
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	40	0.0024592	-129.8566	-126.3823	0.653	-133.8566	0.003201		7.112120	0.040093
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1,2)	36	0.0022027	-129.2734	-120.7056	0.740	-139.2734	0.002391		6.273950	0.036532
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,2)	35	0.0016372	-127.9080	-119.4636	0.726	-137.9080	0.001208		6.055592	0.035228
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	40	0.0025237	-127.7773	-126.0638	0.689	-129.7773	0.001132		6.754174	0.039442
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2,2)	37	0.0023194	-123.1461	-118.0795	0.690	-129.1461	0.000132		6.860733	0.040018
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2,1)	36	0.0022616	-122.8796	-116.1240	0.675	-130.8796	0.000098		6.751216	0.039367
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,1)	37	0.0022715	-122.4291	-117.3624	0.654	-128.4291	0.000078		6.918001	0.040564
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,2,2)	36	0.0022654	-121.4028	-114.7373	0.626	-129.4028	0.000049		6.851442	0.040063
<input type="checkbox"/>	<input type="checkbox"/>	IMA(2,1)	38	0.0026378	-118.3354	-114.9577	0.599	-122.3354	0.000010		7.149844	0.041532
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	39	0.0033103	-113.9262	-112.2373	0.525	-115.9262	0.000001		7.419204	0.043938
<input type="checkbox"/>	<input type="checkbox"/>	MA(1)	40	0.0039432	-113.8295	-110.3541	0.526	-117.8295	0.000001		9.112013	0.049404
<input type="checkbox"/>	<input type="checkbox"/>	AR(1,2)	38	0.0033118	-112.4678	-109.3100	0.534	-116.4678	0.000001		7.445032	0.044044
<input type="checkbox"/>	<input type="checkbox"/>	AR(2,2)	37	0.0033004	-112.0246	-106.9580	0.550	-118.0246	0.000000		7.292198	0.043079
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(0,0,0)	41	0.0081908	-81.62052	-79.88285	0.000	-83.62052	0.000000		13.409958	0.072321



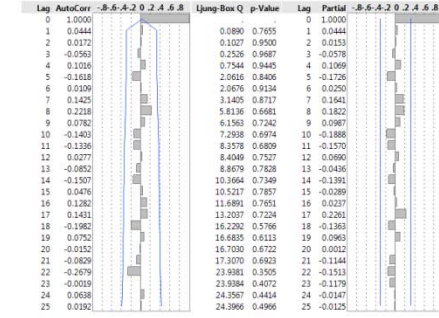
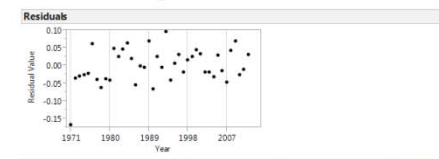
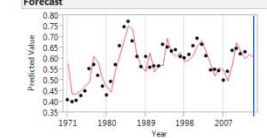
### Model: AR(2)

#### Model Summary

DF	39	Stable	Yes
Sum of Squared Errors	0.07430812	Invertible	Yes
Variance Estimate	0.00190534		
Standard Deviation	0.04369516		
Akaike's 'A' Information Criterion	-139.16987		
Schwarz's Bayesian Criterion	-133.95686		
RSquare	0.71239443		
RSquare Adj	0.69764017		
MAPE	6.9776835		
MAE	0.03825458		
-2LogLikelihood	-145.16987		

#### Parameter Estimates

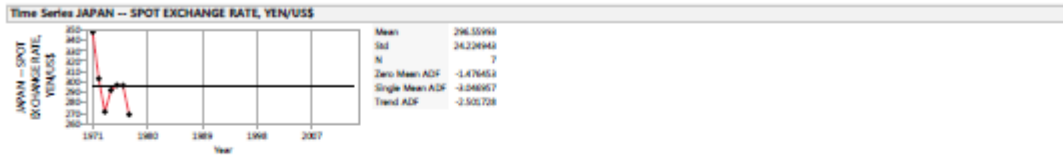
Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant	Estimate
AR1	1	1.261120	0.1306732	9.65	<.0001*		138.40661
AR2	2	-0.501038	0.1369746	-3.66	<.0001*		
Intercept	0	0.576892	0.0265160	21.76	<.0001*		



**FY79-FY12**

**Japan**

# Japan - Time Series of JAPAN -- SPOT EXCHANGE RATE, YEN/US\$

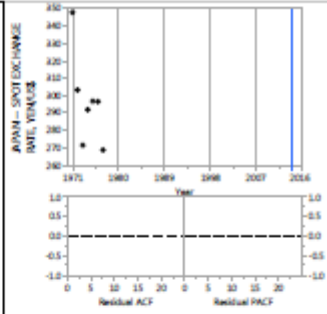


**Time Series Basic Diagnostics**

Lag	AutoCor	-0.5	-0.2	0	0.2	0.5	Ljung-Box Q	p-Value	Lag	Partial	-0.5	-0.2	0	0.2	0.5
0	1.0000								0	1.0000					
1	0.0709						0.0529	0.8182	1	0.0709					
2	-0.2352						1.8858	0.3025	2	-0.1320					
3	-0.0257						1.8962	0.3066	3	0.0423					
4	0.1744						2.0350	0.1599	4	0.0745					
5	-0.0462						2.3215	0.0349	5	-0.0787					
6	-0.3484						9.7494	0.1356	6	-0.2943					
7	0.0000								7	0.0278					
8	0.0000								8	-0.2469					
9	0.0000								9	0.0348					
10	0.0000								10	-0.0311					
11	0.0000								11	-0.0484					
12	0.0000								12	-0.1143					
13	0.0000								13	-0.0006					
14	0.0000								14	-0.1580					
15	0.0000								15	0.0275					
16	0.0000								16	-0.0708					
17	0.0000								17	-0.0581					
18	0.0000								18	-0.0448					
19	0.0000								19	-0.0553					
20	0.0000								20	-0.0960					
21	0.0000								21	0.0549					
22	0.0000								22	-0.0794					
23	0.0000								23	-0.0045					
24	0.0000								24	-0.0554					
25	0.0000								25	-0.0097					

**Model Comparison**

Report	Graph	Model	DF	Variance	AIC	SBC	Kjogur	-2LogL	Weights	-2.A.S.F	MAP	MAE
<input type="checkbox"/>	<input type="checkbox"/>	I(2)	4	949.425	49.45667	49.06625	-4.02	47.45667	0.98462		8.215022	24.87808
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	4	1292.2916	51.454221	50.675207	-4.02	47.456221	0.94661		8.233004	24.87808
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	4	1292.2916	51.454221	50.675207	-4.02	47.456221	0.94661		8.233024	24.872947
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	2	1404.6049	52.858065	51.886379	-3.61	46.858065	0.97274		6.798551	18.100719
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 0)	2	1444.0408	52.884932	51.712615	-3.50	46.884402	0.97176		6.891961	18.921210
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	2	1448.2916	51.453788	52.296321	-4.02	47.455788	0.95199		8.189965	24.244887
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	1	2088.5982	54.625348	52.949116	-3.46	46.425364	0.93223		7.382722	21.051894
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	1	2089.6872	54.751258	53.188809	-3.46	46.751258	0.92826		6.796858	18.244359
<input type="checkbox"/>	<input type="checkbox"/>	I(1)	5	636.73217	54.671447	54.662197	-2.04	54.671447	0.95087		7.480714	21.577360
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	0	56.804783	54.851972		-3.27	46.804783	0.95111		6.944451	18.727702
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	4	688.72512	57.979422	57.542961	-1.75	53.979422	0.95520		6.298558	18.279187
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	2	349.32365	58.124254	57.271292	-0.97	50.124254	0.95277		5.255867	15.405650
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	4	742.81862	58.346468	57.929887	-1.90	54.346468	0.94372		6.579207	18.073812
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	4	625.24229	58.493974	57.871252	-1.25	52.493974	0.96446		6.194968	18.006530
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	1	332.76582	58.383802	57.551878	-0.79	48.583802	0.94426		4.832380	14.821265
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	3	771.69883	59.855542	59.240840	-1.77	53.855542	0.95239		6.085368	20.180142
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	2	1494.1569	61.884461	61.051498	-1.67	53.884461	0.90079		5.906664	17.177110
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	4	1028.2761	66.296424	65.679033	-1.20	60.296424	0.90008		10.045307	26.764784
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 0, 0)	6	684.65287	66.488499	66.444679	0.000	66.488499	0.90000		5.478004	16.575947
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	5	502.83462	67.141284	67.022904	-0.00	63.141284	0.90058		5.858486	17.748922
<input type="checkbox"/>	<input type="checkbox"/>	MA(2)	4	472.89325	68.054824	67.894354	0.159	62.054824	0.90058		4.866702	14.708280
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	4	608.36314	68.194279	68.040909	0.064	62.194279	0.90058		5.305560	16.297436
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	5	801.28148	68.389542	68.248962	-0.01	64.389542	0.90058		5.428473	16.371579
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	4	729.30363	69.059677	69.488117	-0.01	63.059677	0.90051		5.342147	16.579495
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	3	626.6462	70.025887	69.796528	0.169	62.025887	0.90051		4.172489	14.116612
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1)	3	793.8295	70.120520	69.894361	0.068	62.120520	0.90051		5.261152	16.184200
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	2	683.48592	71.551811	71.281461	0.060	61.551811	0.90000		5.480795	16.554516



**Model Summary**

DF: 4 Stable: Yes

Sum of Squared Errors: 877.29996 Invertible: Yes

Variance Estimate: 949.424997

Standard Deviation: 31.139846

Nakagami K Information Criterion: 49.456673

Schwarz's Bayesian Criterion: 49.066252

Kjogur: -4.0272162

Kjogur-AIC: -4.0272162

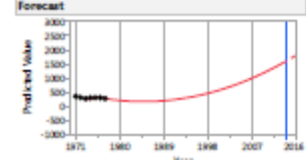
MAP: 8.21502257

MAE: 24.87808

-2Loglikelihood: 47.4566673

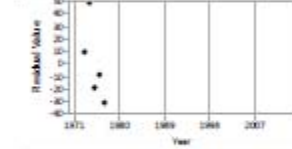
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	3.8651400	12.45062	0.27	0.8059	3.86514



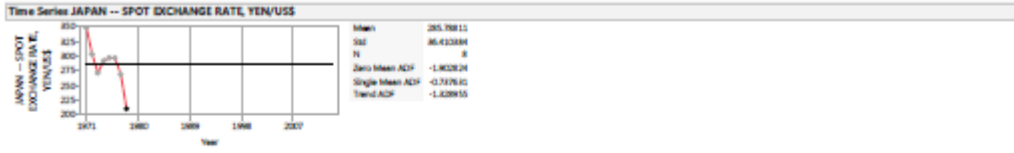
Time Series JAPAN – SPOT EXCHANGE RATE, YEN/US\$

Model: I(2)



Lag	AutoCor	-3	-2	-1	0	1	2	3	Ljung-Box Q	p-Value	Lag	Partial	-3	-2	-1	0	1	2	3	
0	1.0000										0	1.0000								
1	-0.0089								0.0007	0.9790	1	-0.0089								
2	-0.0065								0.0009	0.9995	2	-0.0065								
3	-0.0112								2.0915	0.3679	3	-0.0112								
4	-0.0754								1.1588	0.5326	4	-0.0754								
5	0.0000										5	-0.0127								
6	0.0000										6	-0.2083								
7	0.0000										7	-0.1048								
8	0.0000										8	-0.0121								
9	0.0000										9	-0.1190								
10	0.0000										10	-0.0994								
11	0.0000										11	-0.0841								
12	0.0000										12	-0.2782								
13	0.0000										13	-0.2724								
14	0.0000										14	-0.0462								
15	0.0000										15	-0.1588								
16	0.0000										16	-0.2588								
17	0.0000										17	-0.0448								
18	0.0000										18	-0.0477								
19	0.0000										19	-0.0487								
20	0.0000										20	-0.0434								
21	0.0000										21	-0.0412								
22	0.0000										22	-0.0414								
23	0.0000										23	-0.0479								
24	0.0000										24	-0.0468								
25	0.0000										25	-0.0465								

# Japan - Time Series of JAPAN -- SPOT EXCHANGE RATE, YEN/US\$ 2

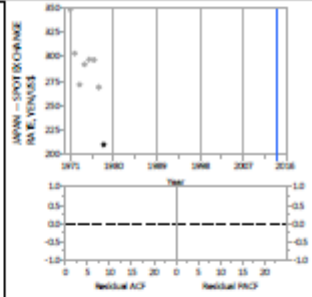


Time Series Basic Diagnostics

Lag	AutCorr	-B-B-A-2-D-2-A-B-B	Ljung-Box Q	p-Value	Lag	Partial	-B-B-A-2-D-2-A-B-B
0	1.0000				0	1.0000	
1	0.1915		0.4288	0.5179	1	0.1915	
2	-0.1779		0.8885	0.6376	2	-0.2222	
3	-0.0462		0.8752	0.8006	3	0.0881	
4	0.0621		0.9549	0.8186	4	0.0282	
5	0.1479		1.0567	0.8180	5	0.1219	
6	-0.2238		3.4589	0.1987	6	-0.2919	
7	-0.6828		18.9999	0.0000*	7	-0.8245	
8	0.0000				8	0.2840	
9	0.0000				9	-0.1978	
10	0.0000				10	0.0256	
11	0.0000				11	0.0886	
12	0.0000				12	0.0254	
13	0.0000				13	-0.2447	
14	0.0000				14	-0.2885	
15	0.0000				15	-0.2039	
16	0.0000				16	-0.1538	
17	0.0000				17	0.0638	
18	0.0000				18	0.0317	
19	0.0000				19	-0.0340	
20	0.0000				20	-0.1742	
21	0.0000				21	0.0284	
22	0.0000				22	-0.0944	
23	0.0000				23	-0.0688	
24	0.0000				24	0.0812	
25	0.0000				25	0.0134	

Model Comparison

Report	Seqs	Model	DF	Variance	AIC	SBC	Rsquare	-2LogLH	Weights	-2-A-B-B	MAPE	MM
<input type="checkbox"/>	<input type="checkbox"/>	ICD	5	961.46206	58.188979	58.962708	0.128	57.188979	0.02775		8.76082	28.241411
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 2)	4	1132.2516	80.862844	82.518213	0.147	56.862844	0.13474		8.17885	28.081328
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	4	1158.9202	82.960988	82.548887	0.141	56.960988	0.136288		8.632787	28.258146
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2)	8	793.47811	61.705644	62.082622	0.248	55.705644	0.137175		7.87856	21.997868
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 2)	8	1521.2232	82.605811	82.284689	0.148	56.605811	0.058117		8.761584	28.371852
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 1)	8	1545.4477	82.948214	82.308081	0.147	56.808214	0.058454		8.586608	28.153238
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2, 2)	2	1174.7986	63.679751	62.848768	0.251	55.679751	0.062127		7.727488	21.742701
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 1)	2	899.6081	67.252570	66.882288	-0.25	58.252570	0.000830		8.262717	28.821888
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 2, 2)	1	5212.4488	87.629518	86.588835	0.087	57.629518	0.000568		9.000541	28.834982
<input type="checkbox"/>	<input type="checkbox"/>	ICD	6	825.69277	67.756882	67.732588	0.228	65.756882	0.005201		8.958782	28.309827
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	5	882.37821	67.805818	67.895428	0.148	63.805818	0.005225		6.824819	18.178827
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	4	495.78216	68.428544	68.184263	0.151	62.428544	0.006208		6.885825	18.177888
<input type="checkbox"/>	<input type="checkbox"/>	AR(1, 1)	5	825.2428	68.708189	68.800009	0.128	64.708189	0.003167		7.838421	18.542885
<input type="checkbox"/>	<input type="checkbox"/>	AR(2, 1)	4	899.27231	68.763880	68.578081	0.130	62.763880	0.003186		6.682084	18.288854
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	4	714.88801	68.625530	68.458251	0.417	68.625530	0.000258		7.088988	18.482779
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 2)	8	708.49889	71.478982	71.283380	0.421	68.478982	0.000814		5.988401	15.118124
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 2)	7	741.87787	71.538111	71.288882	0.157	61.538111	0.000782		6.128889	18.898284
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2, 1, 1)	8	808.68288	71.558473	71.348114	0.424	64.558473	0.000782		7.882272	20.882818
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2)	6	888.14782	82.808288	81.078188	0.261	74.808288	0.000007		8.288441	22.857811
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2)	5	111.75886	80.968882	81.252717	0.488	74.968882	0.000007		8.178485	24.747888
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	5	792.45888	81.781888	81.971779	0.221	75.781888	0.000005		8.087177	25.848879
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1, 1)	7	1015.1041	82.228881	82.803122	0.080	82.228881	0.000004		10.085788	28.761888
<input type="checkbox"/>	<input type="checkbox"/>	AR(2)	5	1123.47188	82.885775	83.184128	0.174	76.885775	0.000004		8.262757	25.838887
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	6	1386.0288	82.912888	83.071782	0.105	78.912888	0.000003		10.117629	28.578812
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	4	678.96288	82.948288	83.280408	0.168	74.948288	0.000003		8.008288	26.424817
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 1)	4	848.11828	83.153211	83.488587	0.488	75.153211	0.000002		8.825188	25.252708
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1, 2)	8	1028.6517	84.962515	85.489722	0.274	74.962515	0.000002		8.687887	25.217328



Model: 1(2)

Model Summary

DF: 5 Stable: Yes

Sum of Squared Errors: 6827.81628 Invertible: Yes

Variance Inflation: 961.46206

Standard Deviation: 31.012882

Adjusted R Squared: 0.128

Schwarz's Bayesian Criterion: 58.1889788

Rsquare: 0.128

Rsquare Adj: 0.128

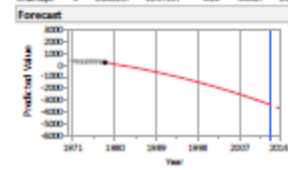
MAPE: 8.761584

MM: 28.241411

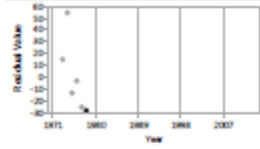
-2LogLikelihood: 57.1889788

Parameter Estimates

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant
Intercept	0	-2.262217	11.57117	-0.20	0.8527	-2.262217

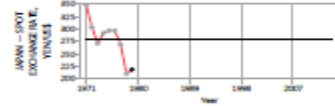


Residuals



Lag	Autocorr	-3	-2	-1	0	1	2	3	Ljung-Box Q	p-Value	Lag	Partial	-3	-2	-1	0	1	2	3	
0	1.0000										0	1.0000								
1	0.3952								0.8028	0.5366	1	0.3952								
2	0.2125								0.8024	0.6684	2	-0.2282								
3	-0.2174								1.5279	0.7752	3	-0.2229								
4	-0.8674								4.8970	0.2882	4	-0.8427								
5	-0.0882								5.2840	0.6239	5	0.0868								
6	0.0000										6	-0.0281								
7	0.0000										7	-0.0886								
8	0.0000										8	-0.2618								
9	0.0000										9	-0.0011								
10	0.0000										10	-0.0842								
11	0.0000										11	-0.1181								
12	0.0000										12	-0.0606								
13	0.0000										13	-0.0335								
14	0.0000										14	-0.0621								
15	0.0000										15	-0.0846								
16	0.0000										16	-0.0588								
17	0.0000										17	-0.0241								
18	0.0000										18	-0.0626								
19	0.0000										19	-0.0626								
20	0.0000										20	-0.0427								
21	0.0000										21	-0.0274								
22	0.0000										22	-0.0862								
23	0.0000										23	-0.0668								
24	0.0000										24	-0.0845								
25	0.0000										25	-0.0281								

Time Series JAPAN -- SPOT EXCHANGE RATE, YEN/US\$



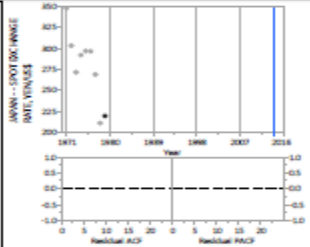
Mean	276.88828
Std	63.288703
N	4
Zero Mean ADF	-1.808657
Single Mean ADF	-1.264968
Trend ADF	-1.814205

Time Series Basic Diagnostics

Lag	Autocorr	-B-B-A-2-D-2-A-A-B	Ljung-Box Q	p-Value	Lag	Partial	-B-B-A-2-D-2-A-A-B
0	1.0000				0	1.0000	
1	-0.0497		2.5229	0.1187	1	0.9497	
2	-0.0260		3.5541	0.1760	2	-0.0260	
3	-0.0318		3.9688	0.4864	3	0.1429	
4	-0.0247		3.9880	0.6148	4	-0.0732	
5	0.0677		3.7268	0.7628	5	0.0769	
6	-0.1842		3.4068	0.7981	6	-0.2652	
7	-0.4298		32.2915	0.0000*	7	-0.2817	
8	-0.2629		20.1590	0.0000*	8	0.0839	
9	0.0000				9	-0.0284	
10	0.0000				10	-0.1211	
11	0.0000				11	0.0908	
12	0.0000				12	-0.0961	
13	0.0000				13	0.0445	
14	0.0000				14	-0.0268	
15	0.0000				15	0.0845	
16	0.0000				16	-0.0258	
17	0.0000				17	-0.0903	
18	0.0000				18	0.0284	
19	0.0000				19	0.0292	
20	0.0000				20	-0.0727	
21	0.0000				21	-0.0667	
22	0.0000				22	-0.0529	
23	0.0000				23	0.0308	
24	0.0000				24	-0.0968	
25	0.0000				25	-0.0854	

Model Comparison

Support	Weights	Model	DF	Writens	Adj	SBC	Rsquare	-2LogL	Weights	-A-A-B	MAPS	MAE		
✓	0.0000	ARMA(1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 2)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 2)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 1)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 2)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 1, 1)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 1, 2)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 1, 1, 1)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 1, 1, 2)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 1, 1, 1, 1)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1, 1, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 1, 1, 1, 2)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1, 1, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 1, 1, 1, 1, 1)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1, 1, 1, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 1, 1, 1, 1, 2)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1, 1, 1, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(1, 1, 1, 1, 1, 1, 1, 1)	4	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653
✓	0.0000	ARMA(2, 1, 1, 1, 1, 1, 1, 1)	5	1234.5177	72.922279	72.943068	0.986	68.702279	0.17588	1	1	1	3281798	42.207653



Model: 1(2)

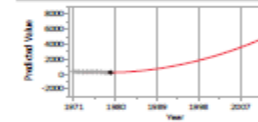
Model Summary

DF	6	55664	Yes
Sum of Squared Errors	8923.2081	Invertible	Yes
Variances Estimate	1497.2148		
Standard Deviation	38.688688		
Akaike's AIC Information Criterion	71.818705		
Schwarz's Bayesian Criterion	72.868012		
Rsquare	-0.1487605		
Rsquare Adj	-0.1487605		
MAPS	12.512287		
MAE	61.207653		
-2LogLikelihood	89.818705		

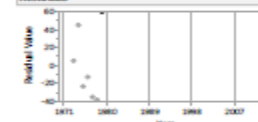
Parameter Estimates

Term	Lag	Estimate	Std Error	t-Ratio	Prob> t	Constraint
Intercept	0	74.623374	14.96578	0.56	0.5805	74.623374

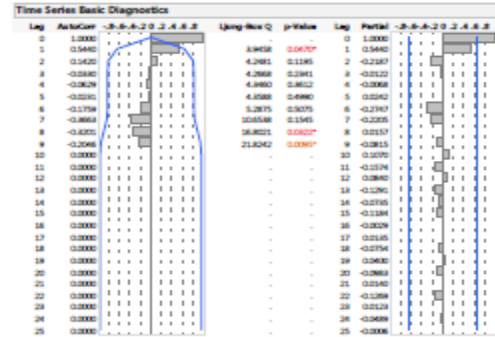
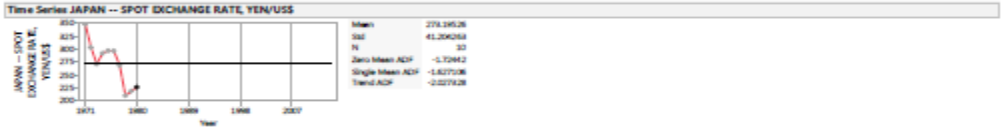
Forecast



Residuals

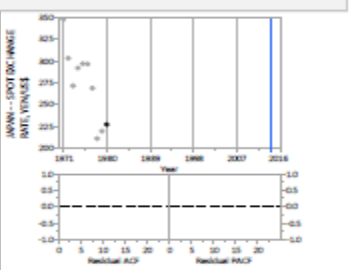


Lag	Autocorr	-B-B-A-2-D-2-A-A-B	Ljung-Box Q	p-Value	Lag	Partial	-B-B-A-2-D-2-A-A-B
0	1.0000				0	1.0000	
1	-0.0497		2.5229	0.1187	1	0.9497	
2	-0.0260		3.5541	0.1760	2	-0.0260	
3	-0.0318		3.9688	0.4864	3	0.1429	
4	-0.0247		3.9880	0.6148	4	-0.0732	
5	0.0677		3.7268	0.7628	5	0.0769	
6	-0.1842		3.4068	0.7981	6	-0.2652	
7	-0.4298		32.2915	0.0000*	7	-0.2817	
8	-0.2629		20.1590	0.0000*	8	0.0839	
9	0.0000				9	0.0284	
10	0.0000				10	-0.0276	
11	0.0000				11	-0.1468	
12	0.0000				12	-0.1429	
13	0.0000				13	-0.0328	
14	0.0000				14	-0.1917	
15	0.0000				15	-0.0262	
16	0.0000				16	-0.0966	
17	0.0000				17	-0.0925	
18	0.0000				18	-0.1160	
19	0.0000				19	-0.0876	
20	0.0000				20	-0.0906	
21	0.0000				21	-0.0539	
22	0.0000				22	-0.1184	
23	0.0000				23	-0.0265	
24	0.0000				24	-0.0991	
25	0.0000				25	-0.0984	



### Model Comparison

Support	Length	Model	DF	Variances	AIC	SBC	Kjellera	-2logL	Weights	-2.5	-2.0	-1.5	-1.0	-0.5	0	0.5	1.0	MAPE	MSB
<input type="checkbox"/>	<input type="checkbox"/>	AR(1)	6	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(1,1)	7	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,1)	8	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(2,2)	9	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(3,1)	10	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(3,2)	11	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(4,1)	12	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(4,2)	13	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(5,1)	14	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(5,2)	15	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(6,1)	16	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(6,2)	17	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(7,1)	18	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(7,2)	19	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(8,1)	20	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(8,2)	21	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(9,1)	22	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(9,2)	23	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(10,1)	24	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167
<input type="checkbox"/>	<input type="checkbox"/>	ARMA(10,2)	25	465.6148	81.58082	81.78765	0.177	77.58382	0.17184									11.821412	28.115167

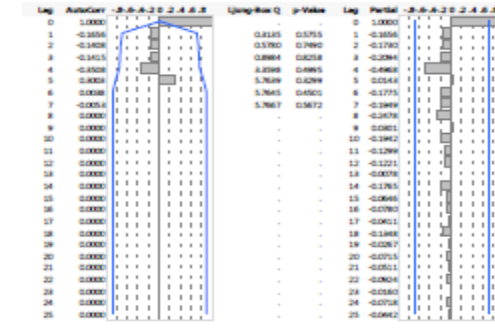
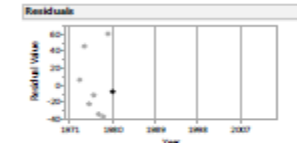
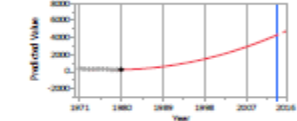


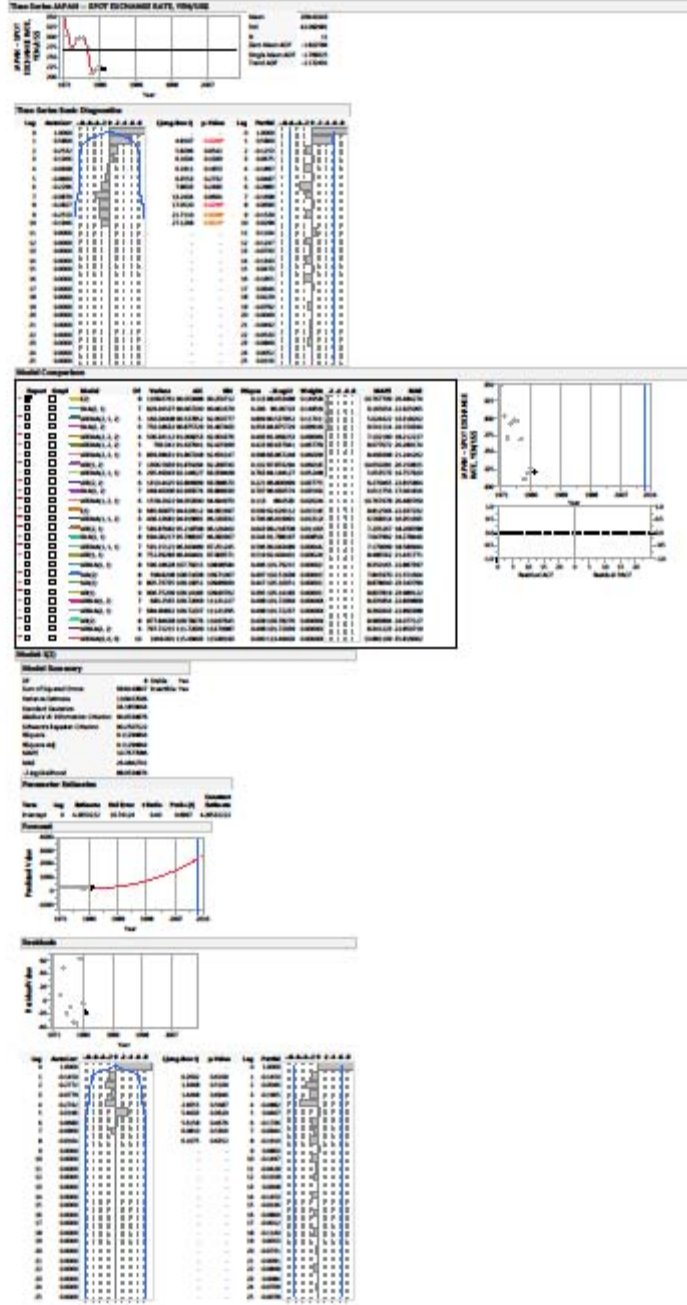
### Model Summary

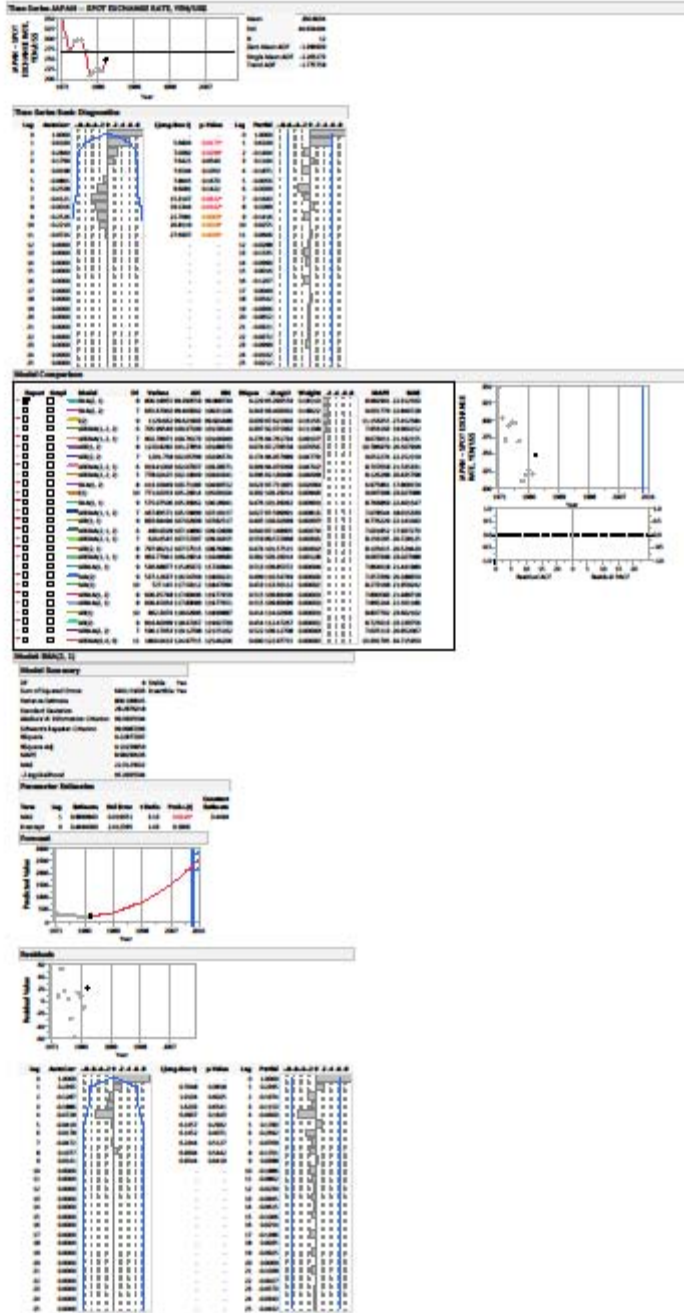
DF	7	Statistic	Yes
Sign of Squared Errors	8888.658	Significant	Yes
Variance Heterosk	1284.06497		
Standard Deviation	35.838523		
Acoules' K Information Criterion	82.897541		
Schwarz's Bayesian Criterion	82.976968		
Kjellera	0.017681		
Kjellera AIC	0.017681		
MAPE	11.821412		
MSB	28.115167		
-2logLikelihood	78.897541		

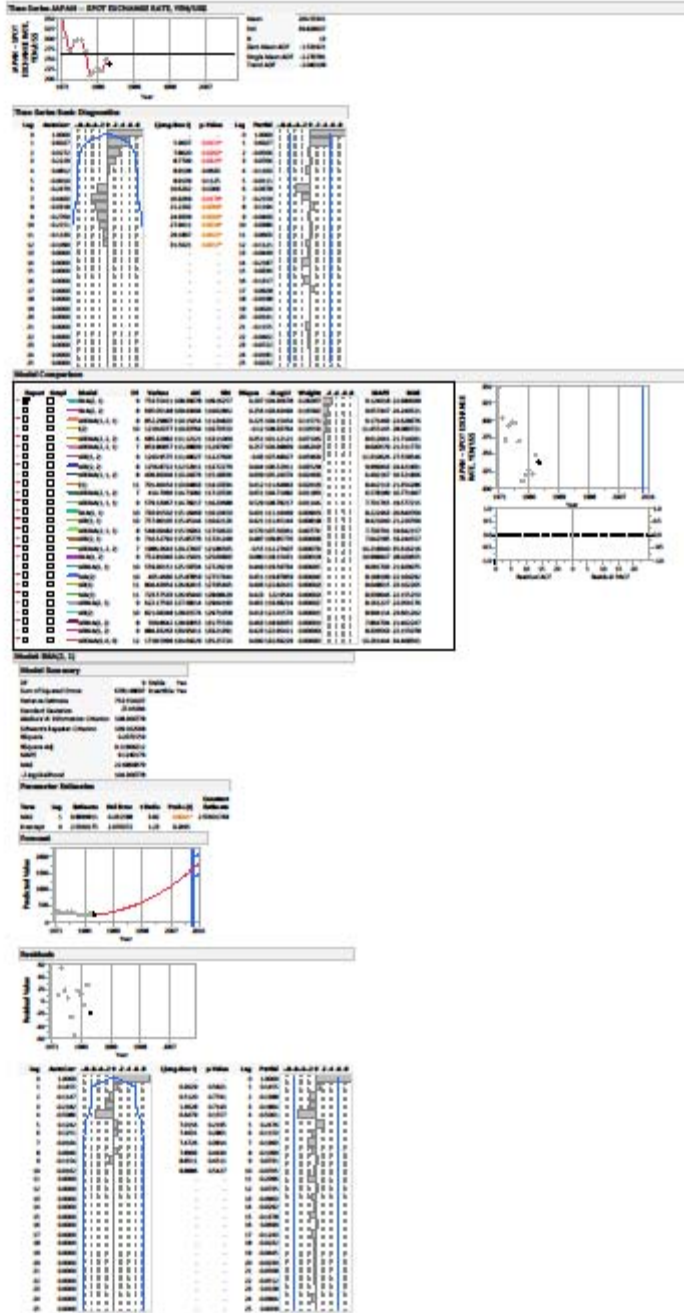
### Parameter Estimates

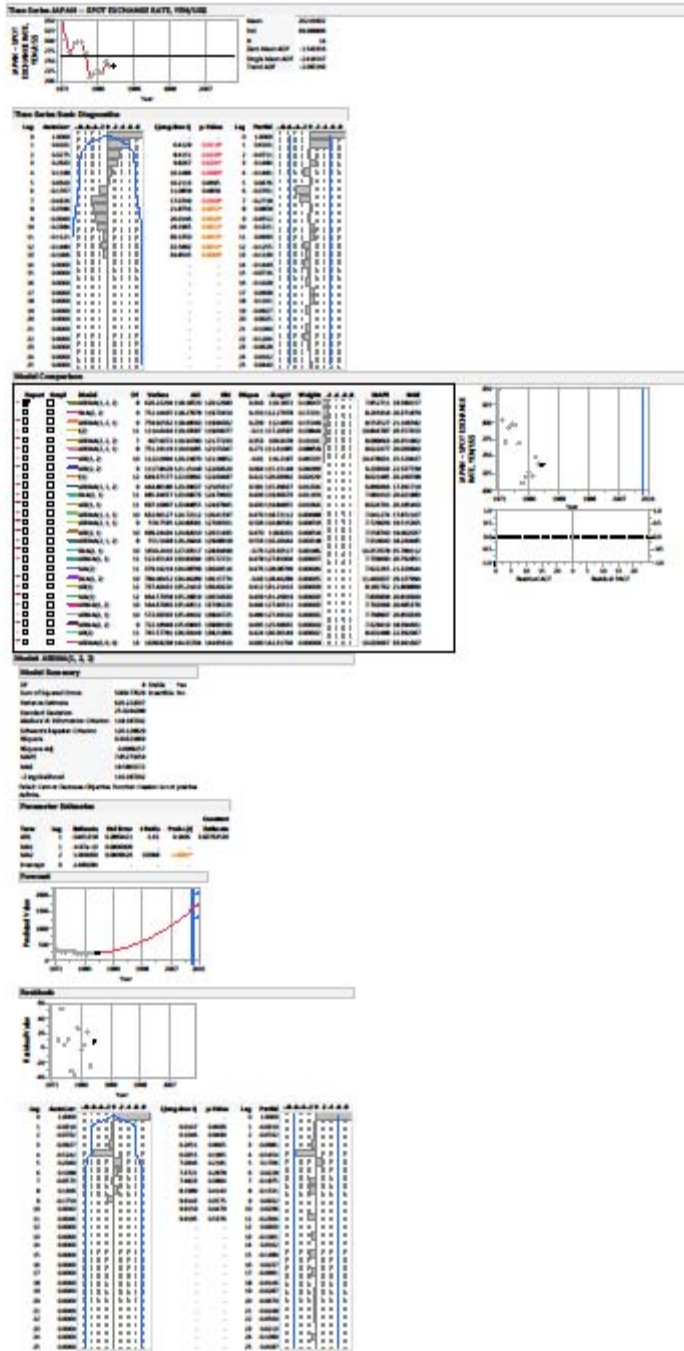
Term	Lag	Estimate	Std Error	t Ratio	P-Value	Estimate
Intercept	0	6.544532	11.83182	0.55	0.5905	6.544532

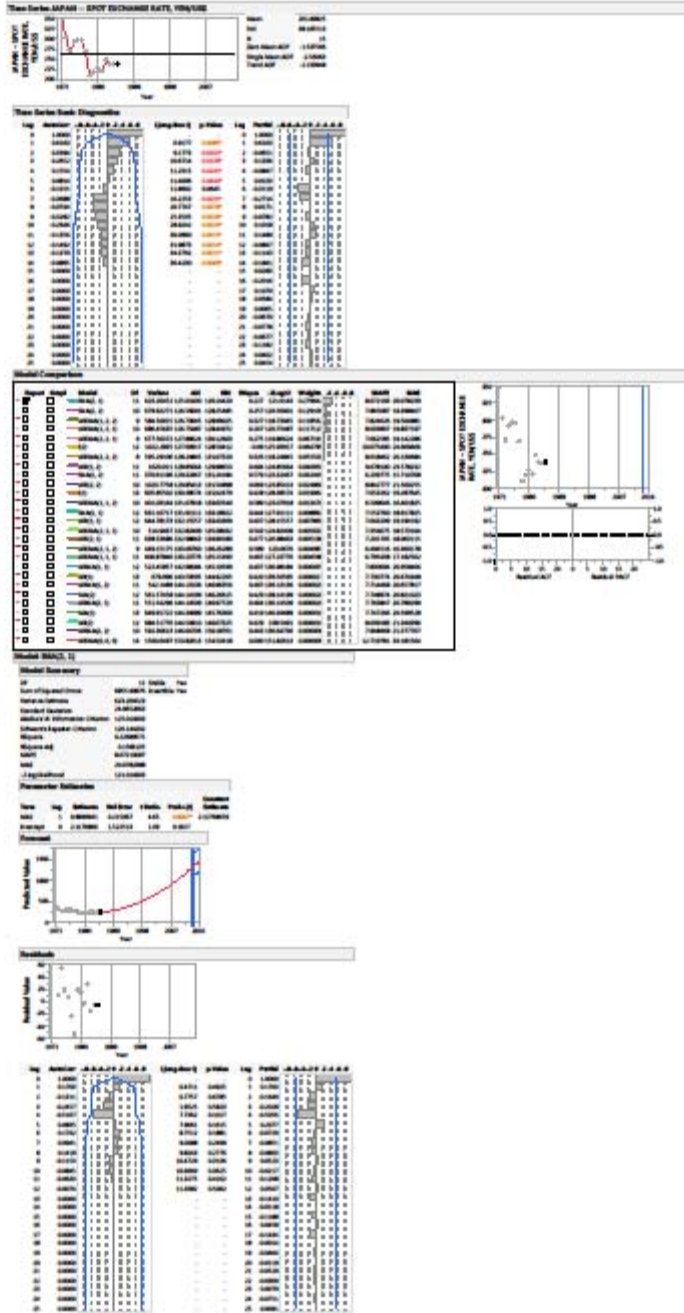


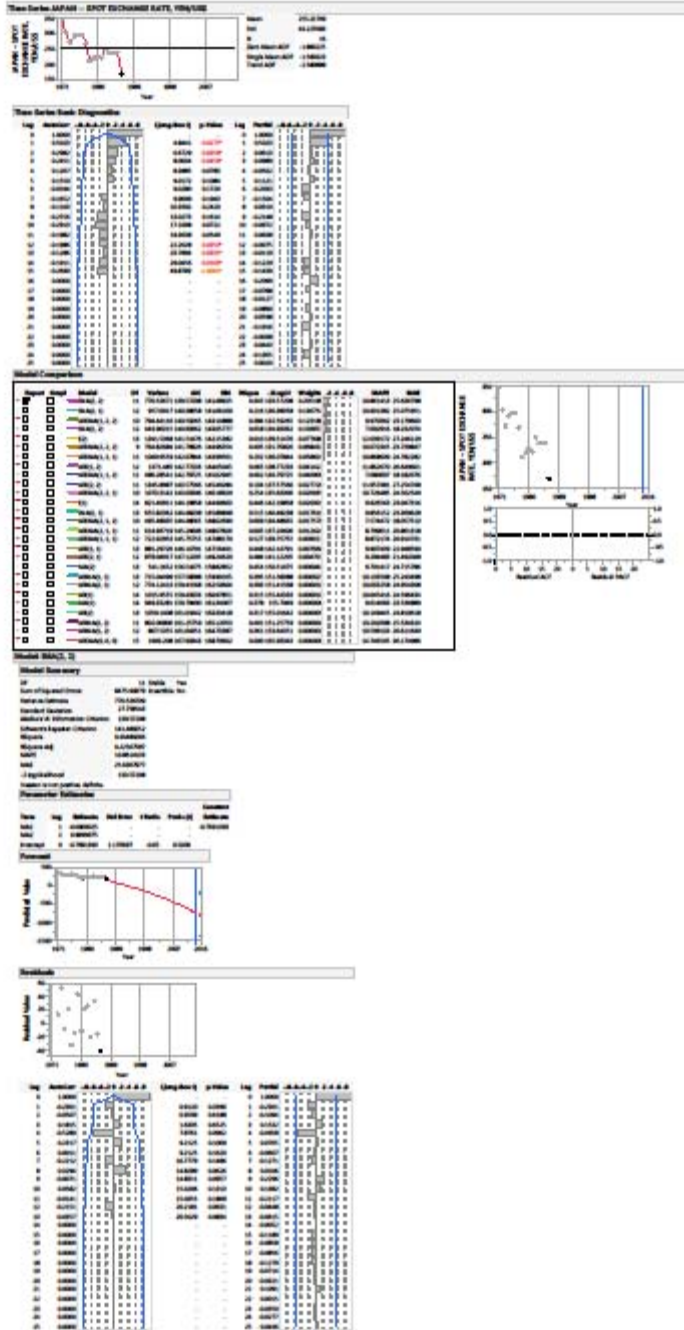




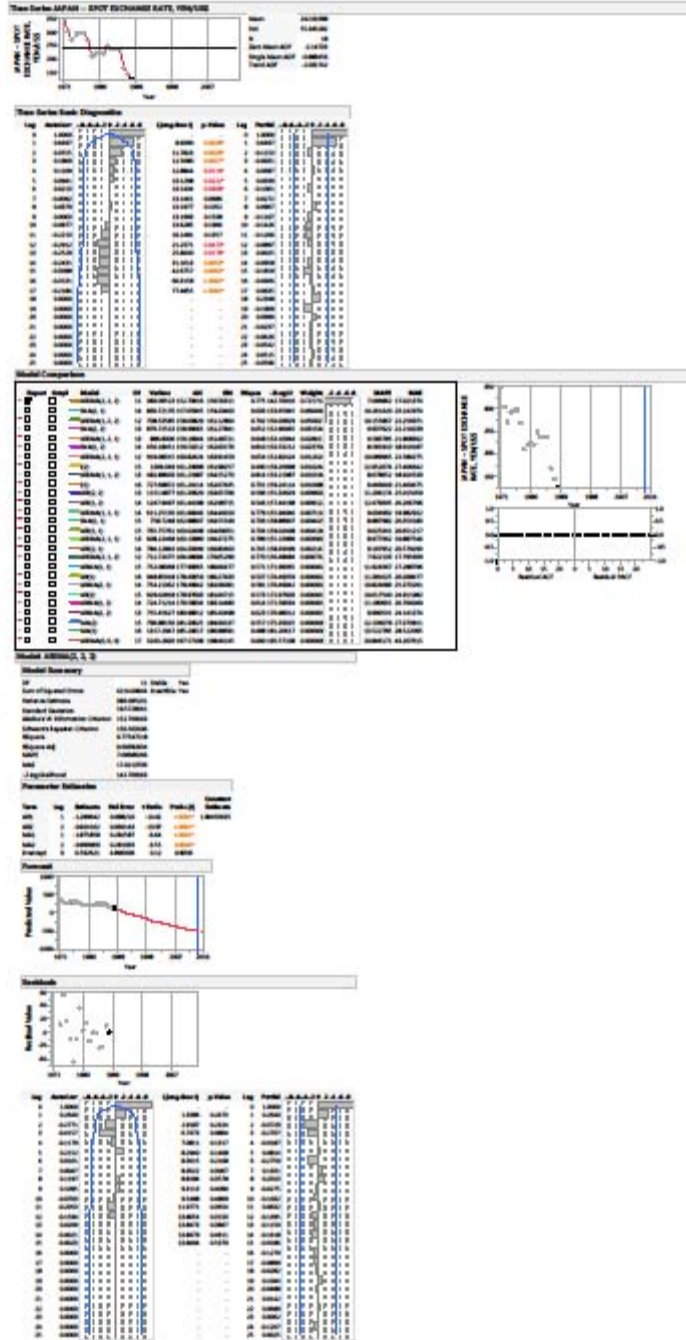


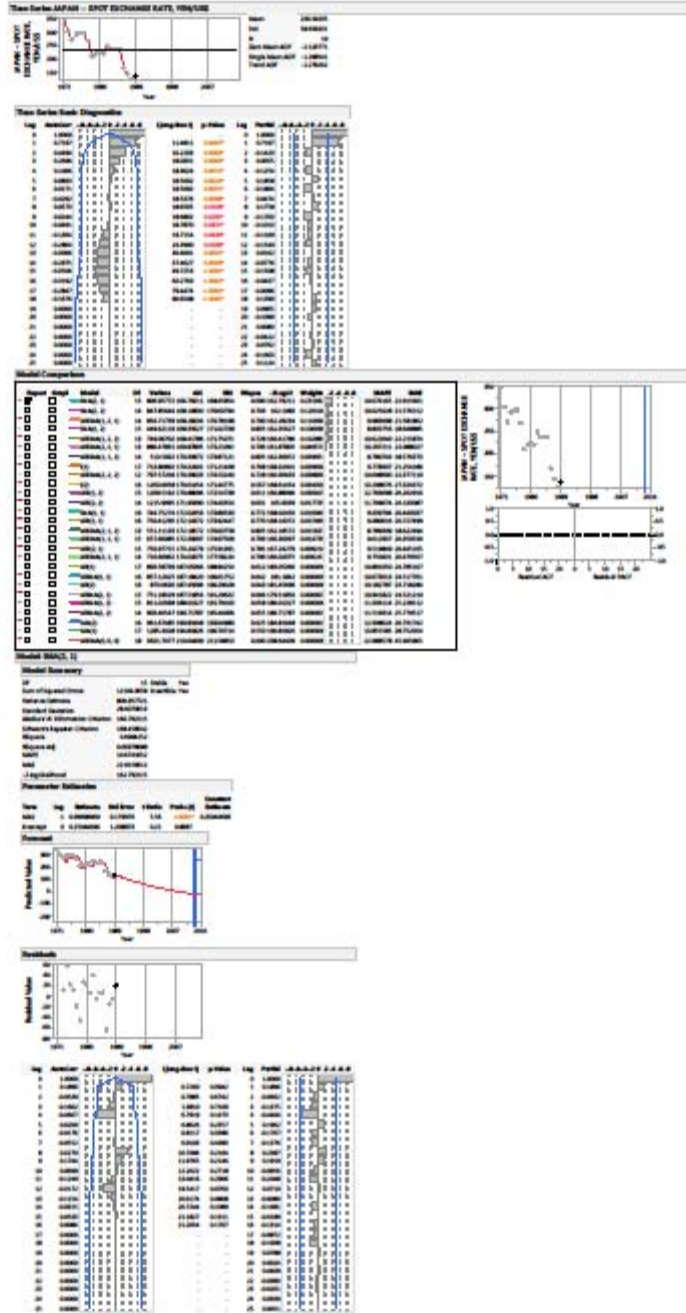


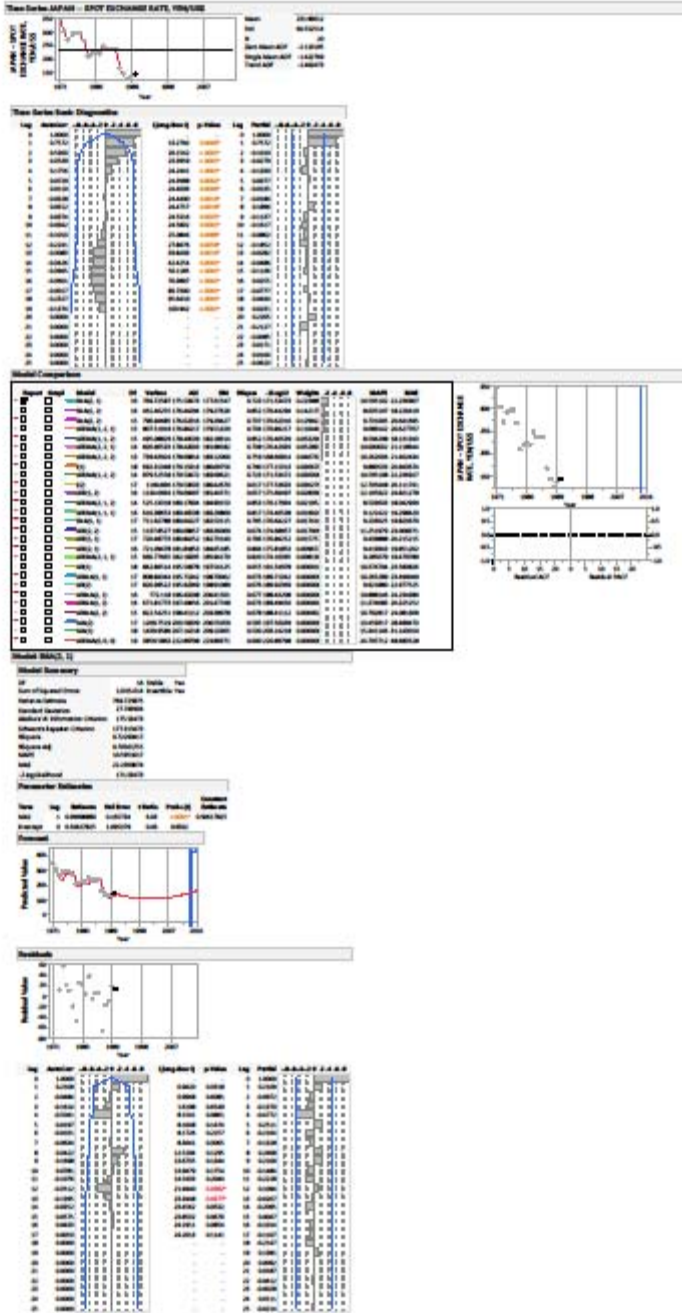




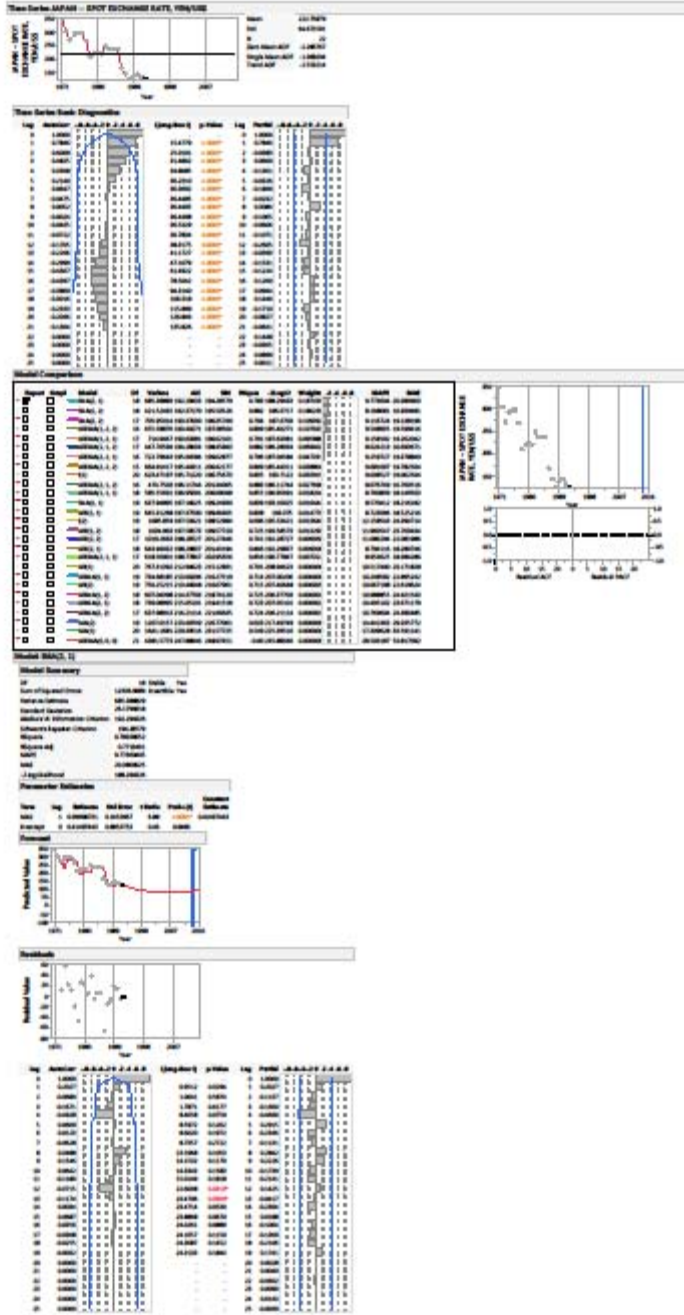


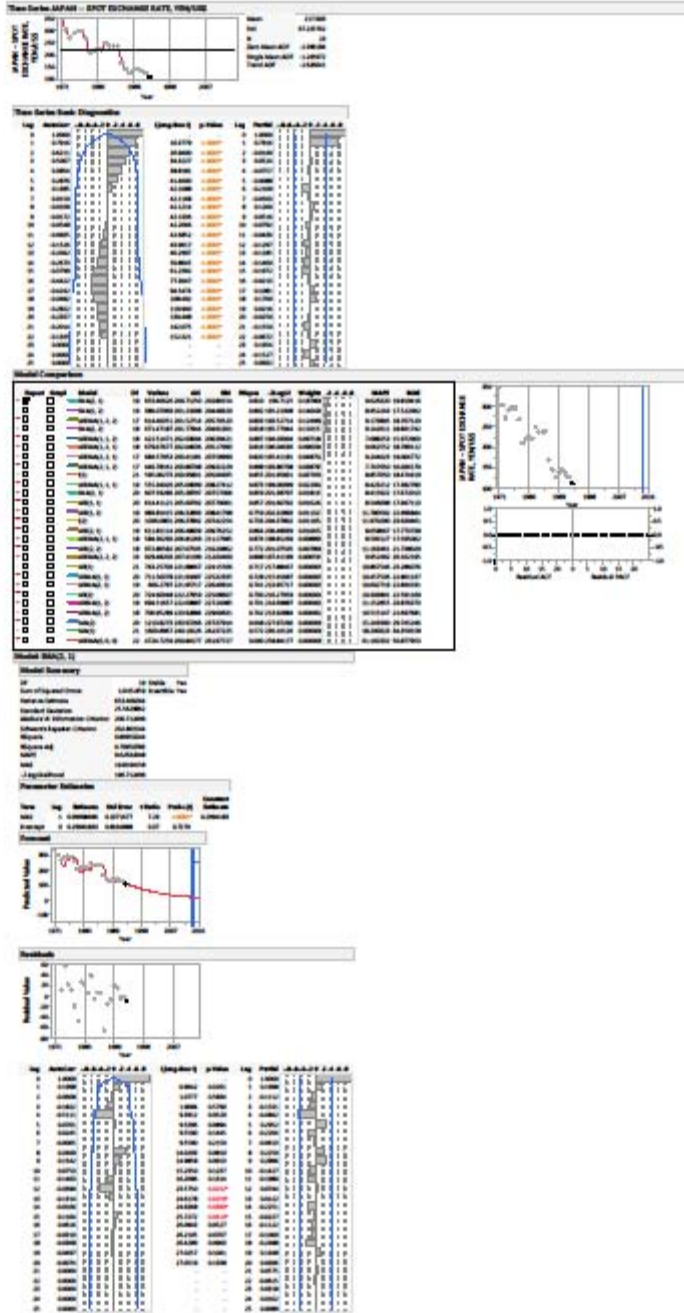


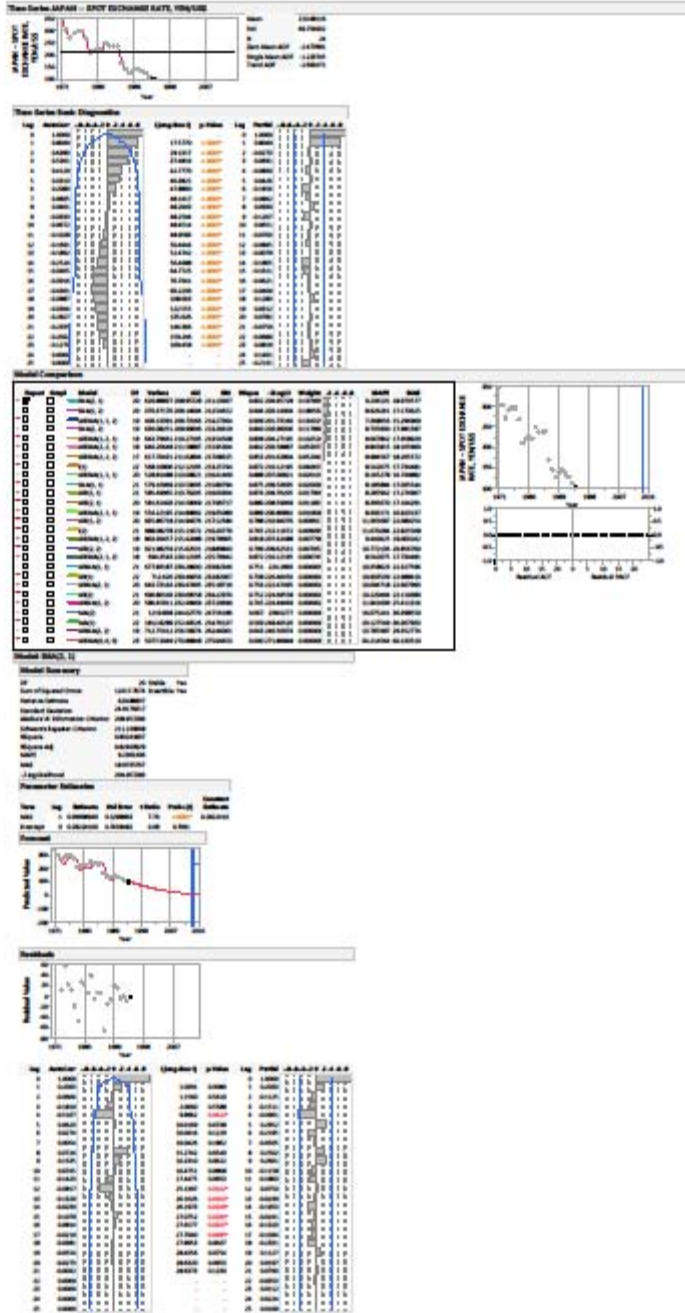


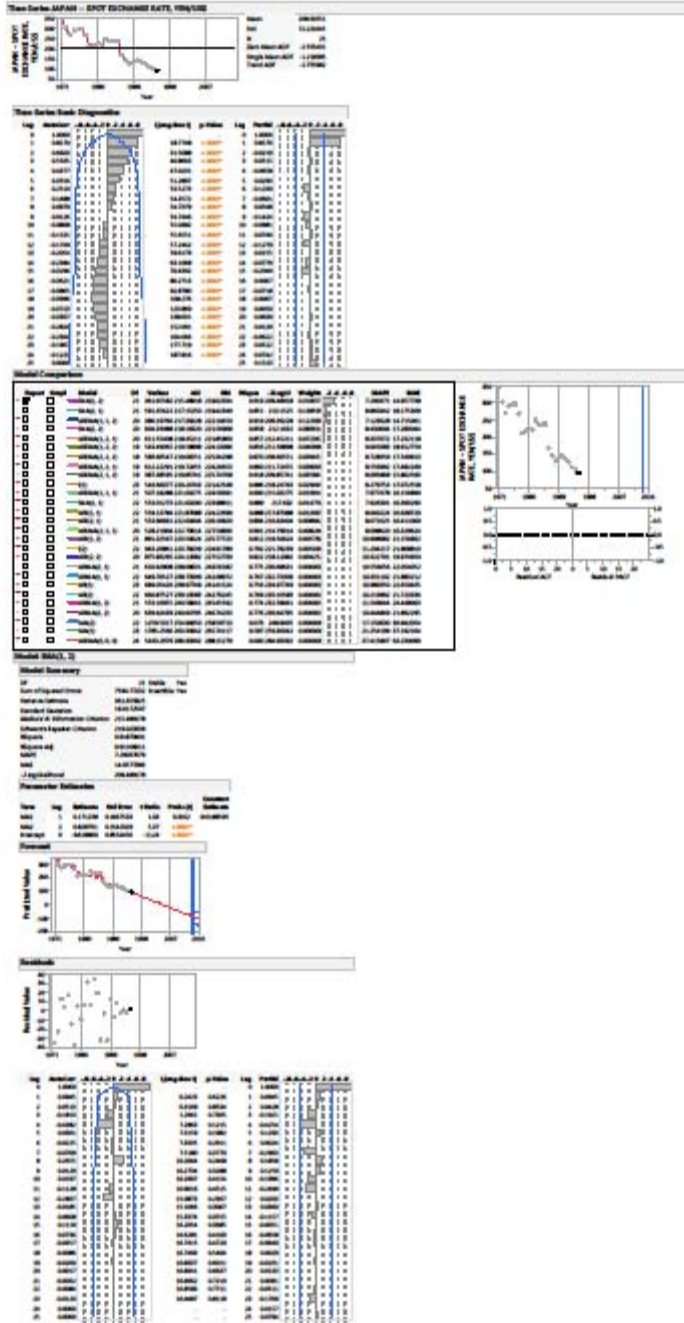


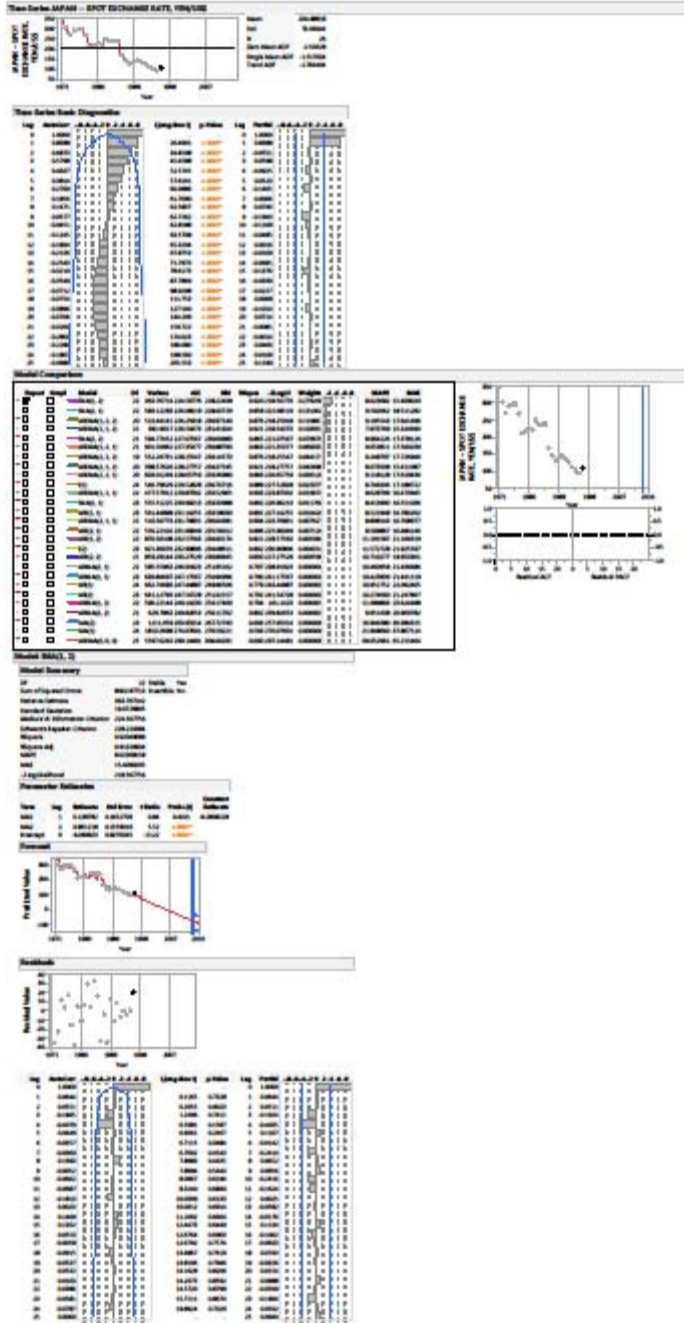


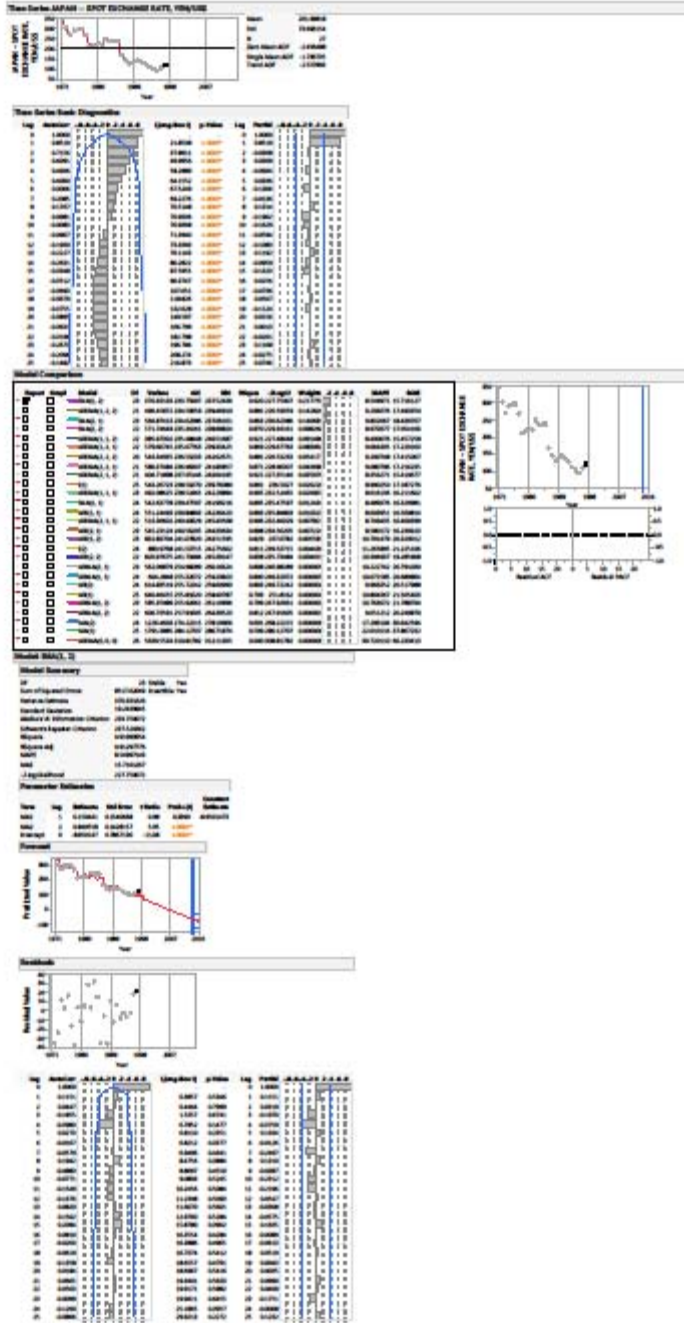


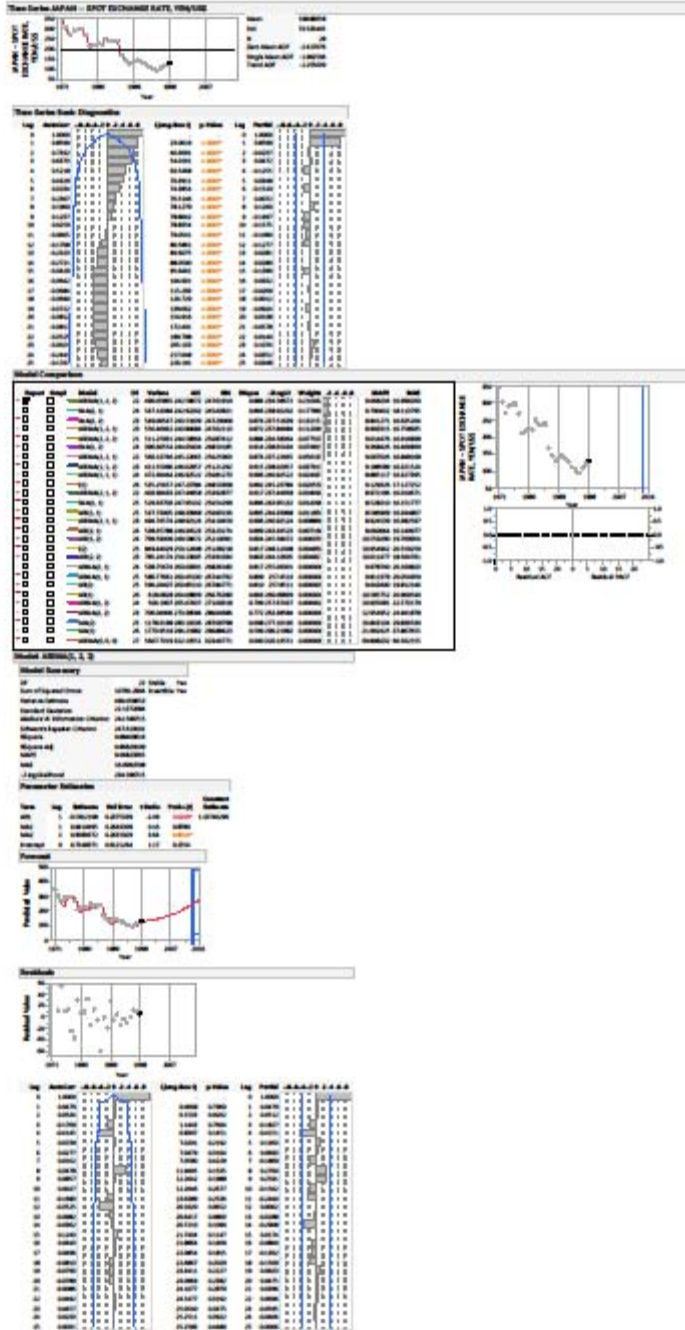


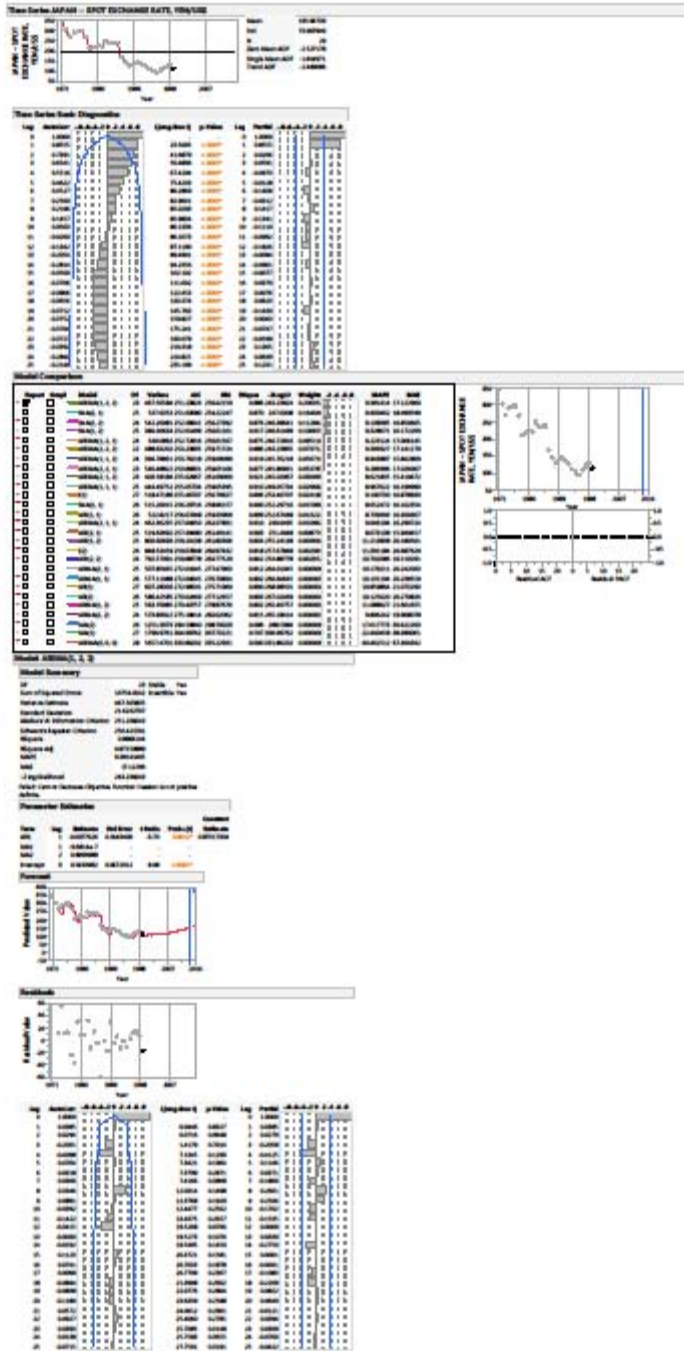


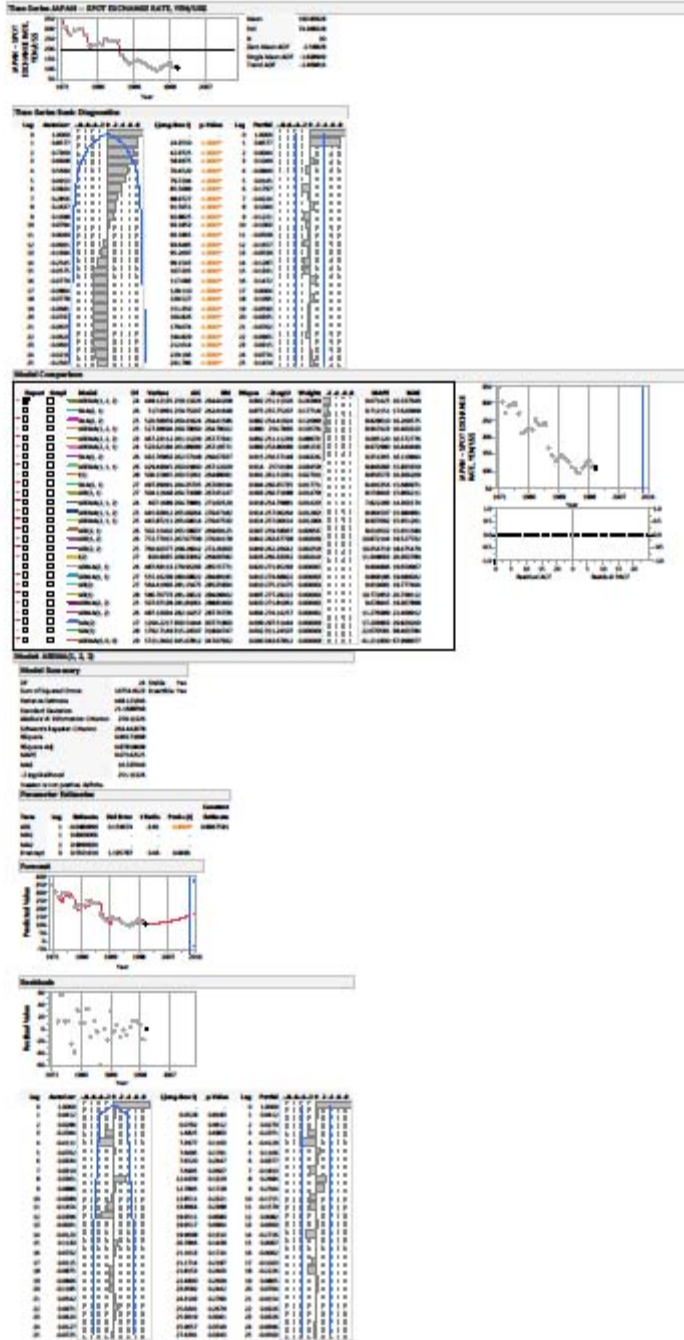


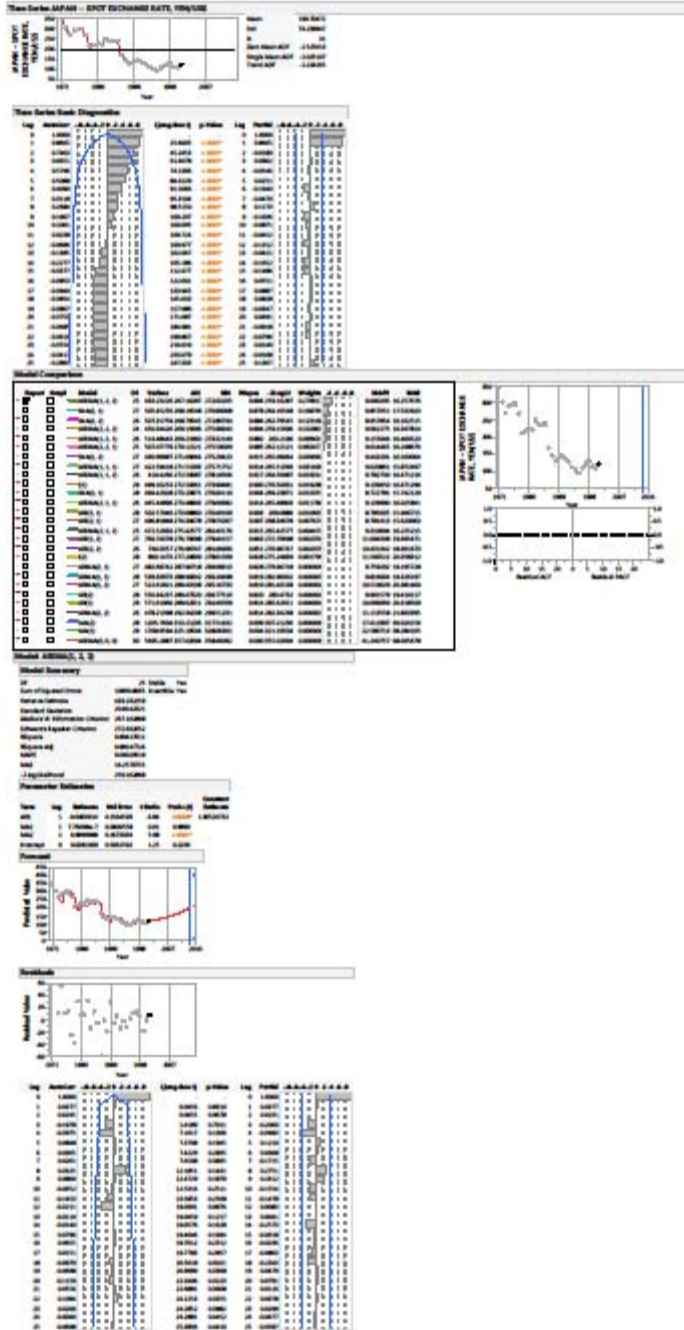


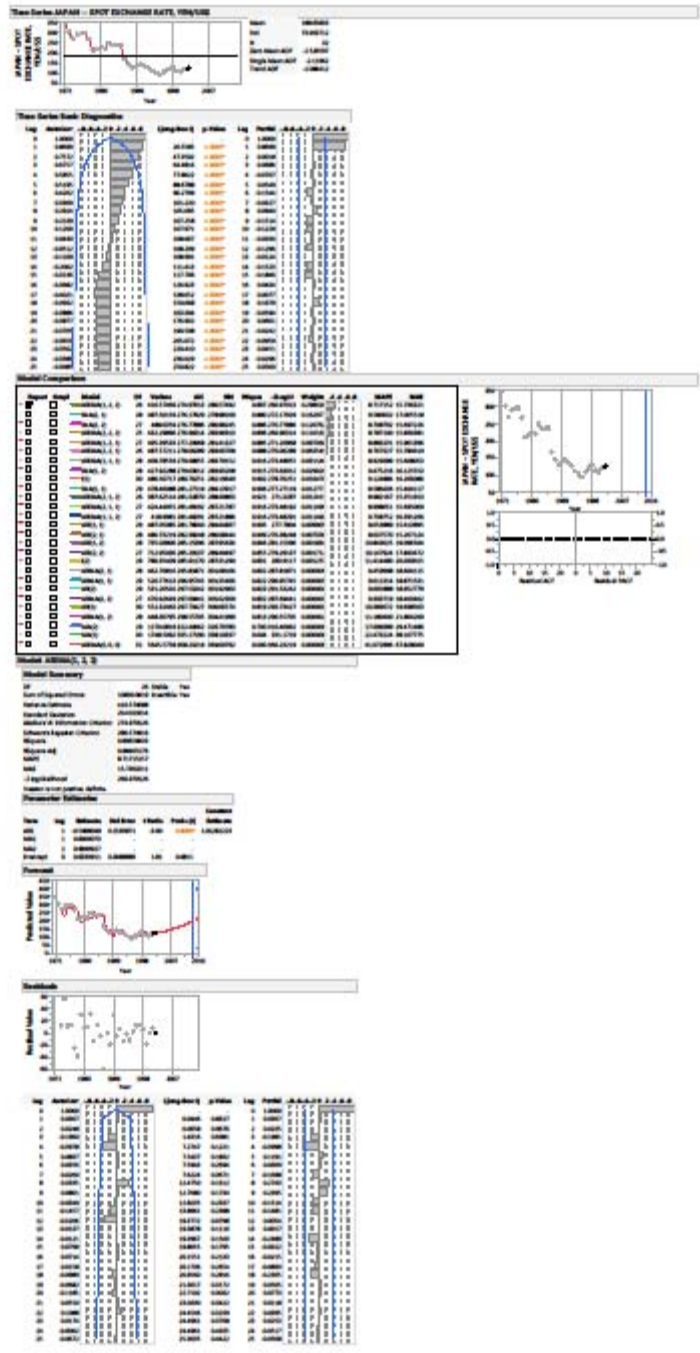


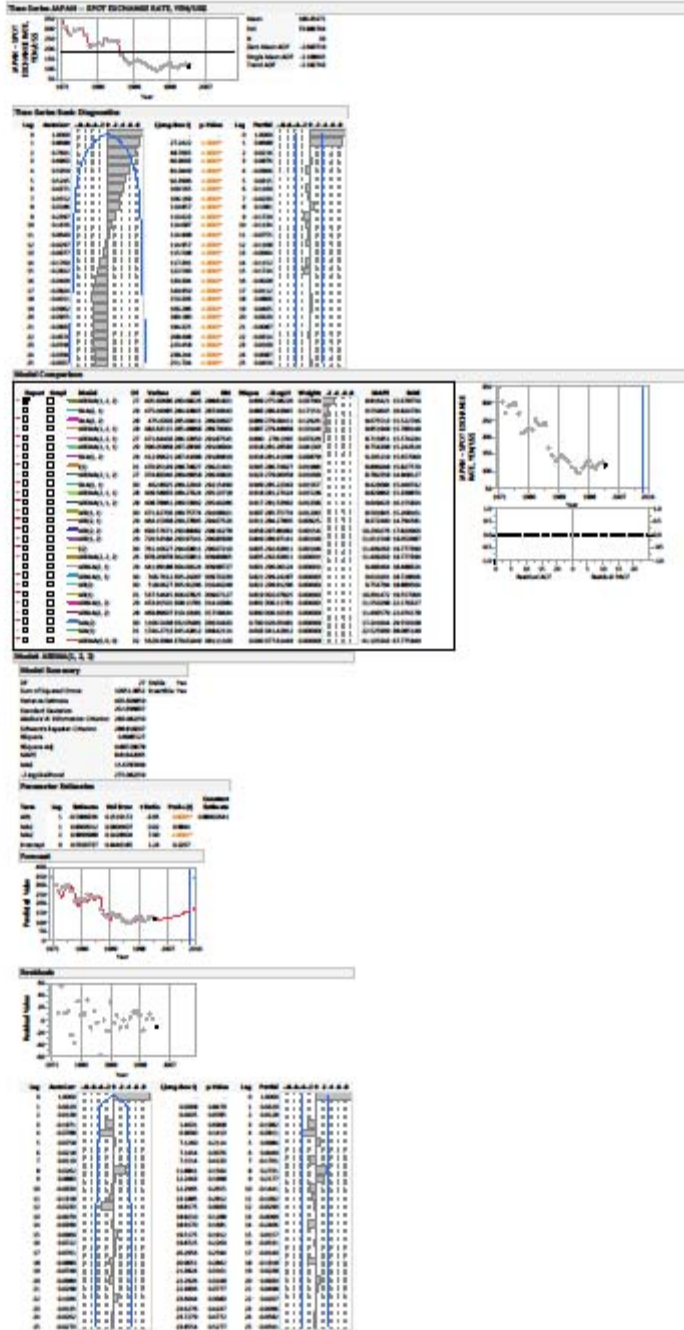


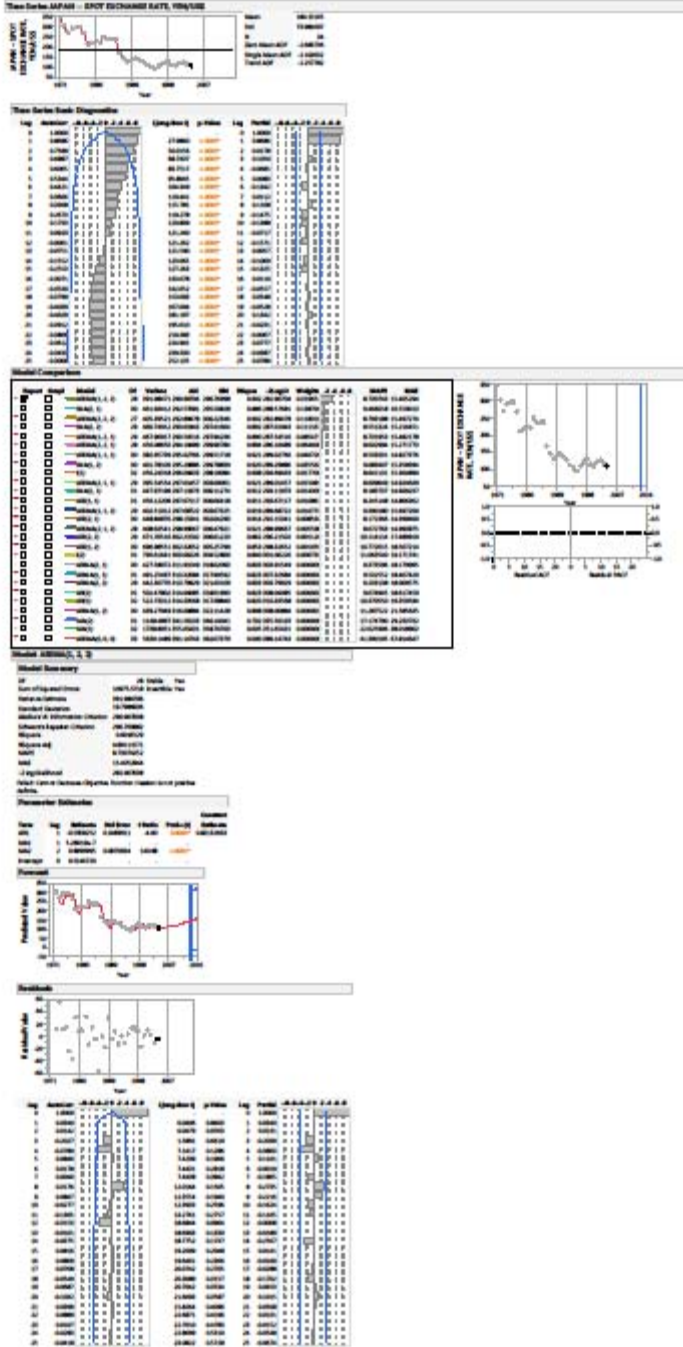


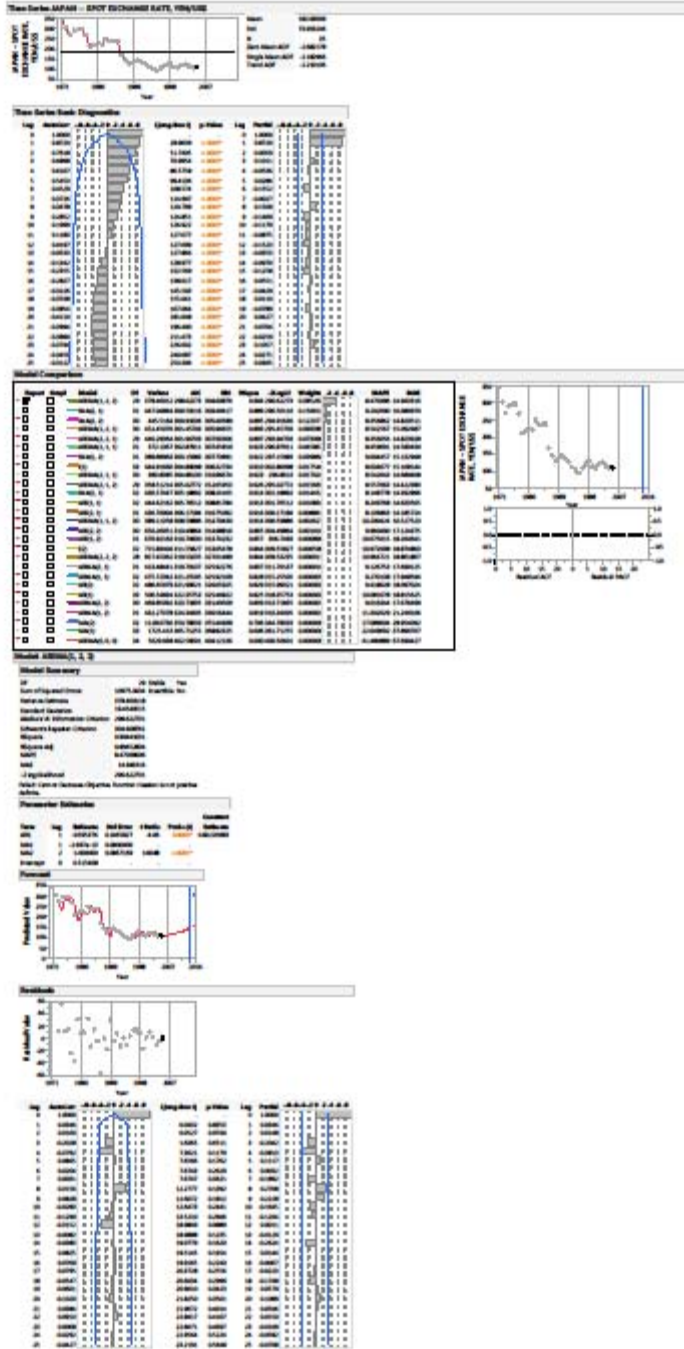


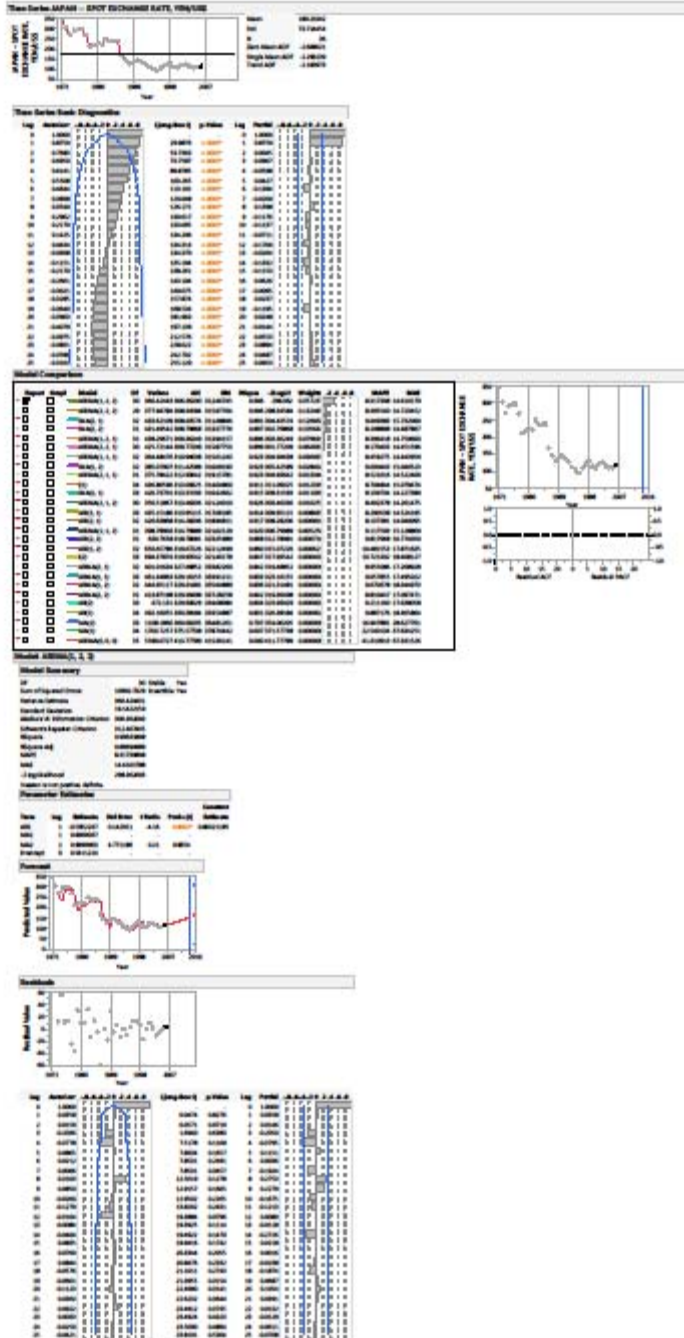


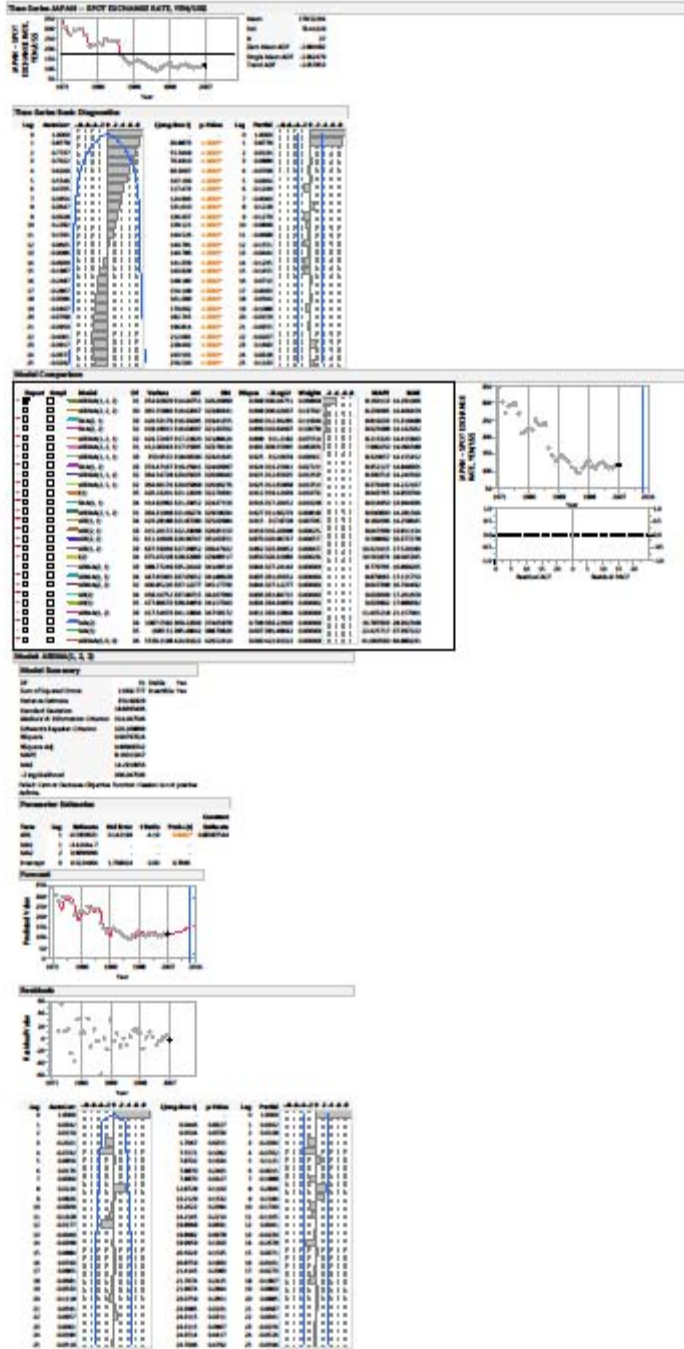


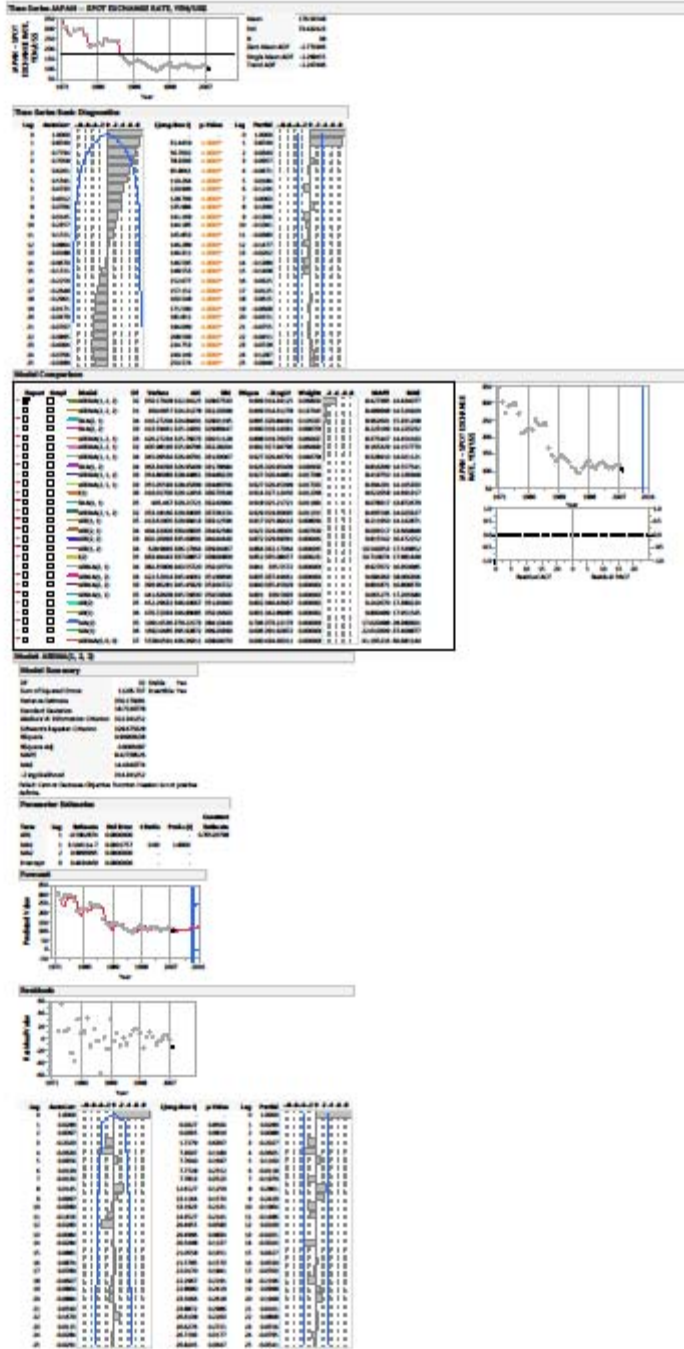


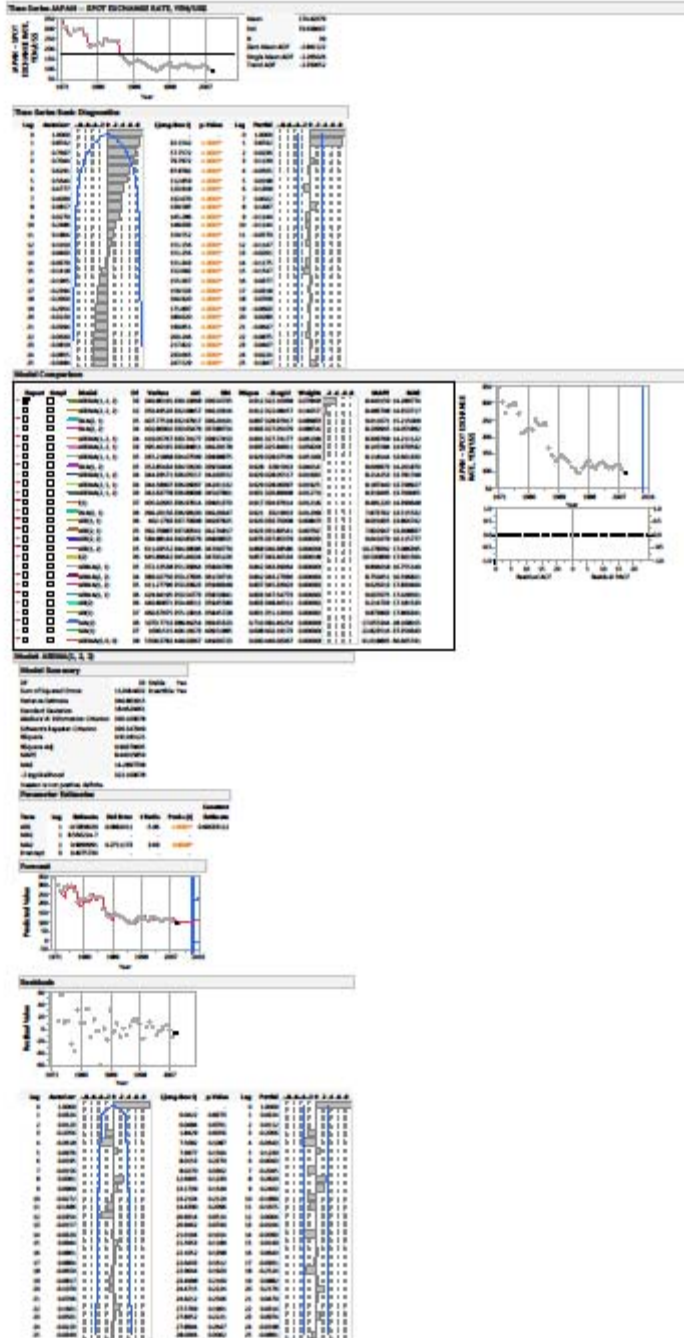


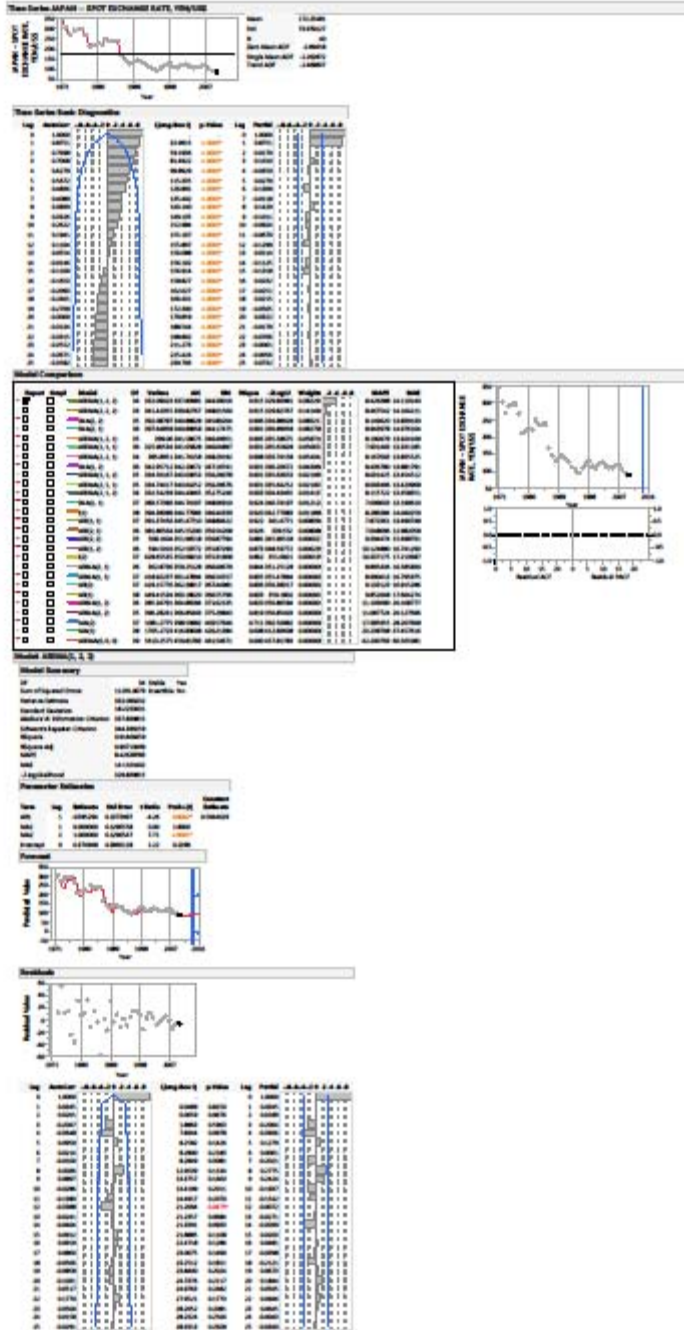




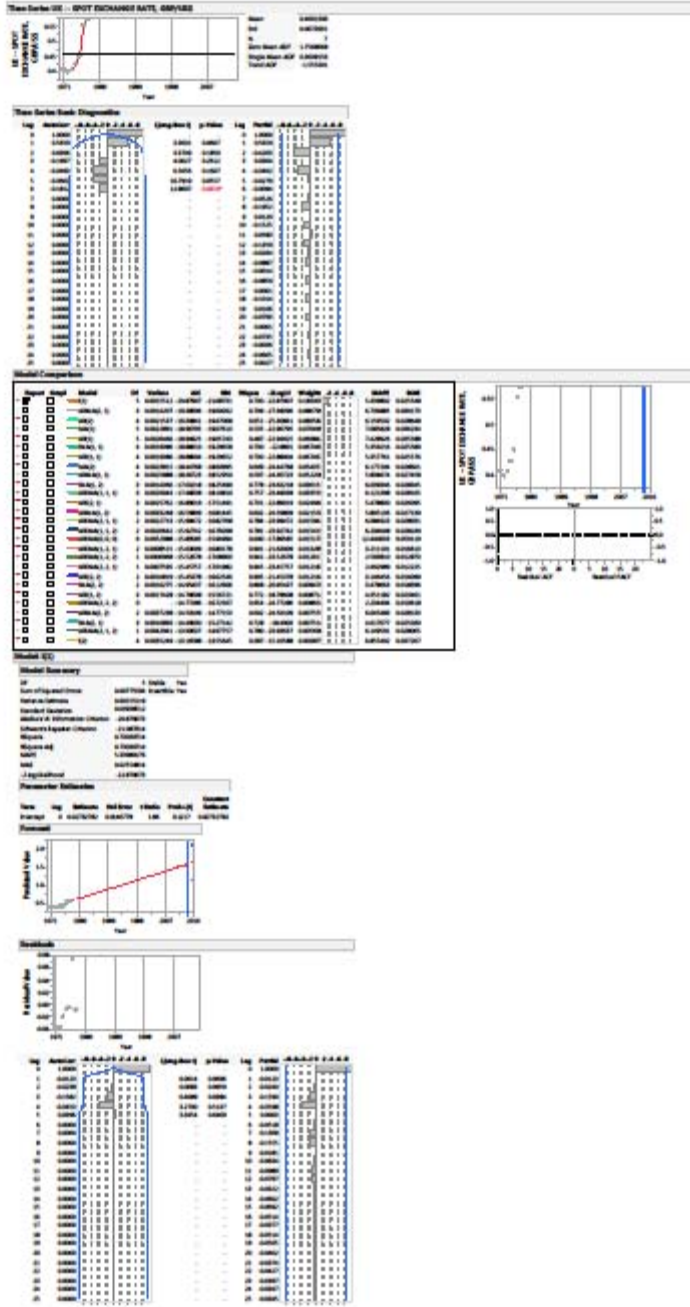


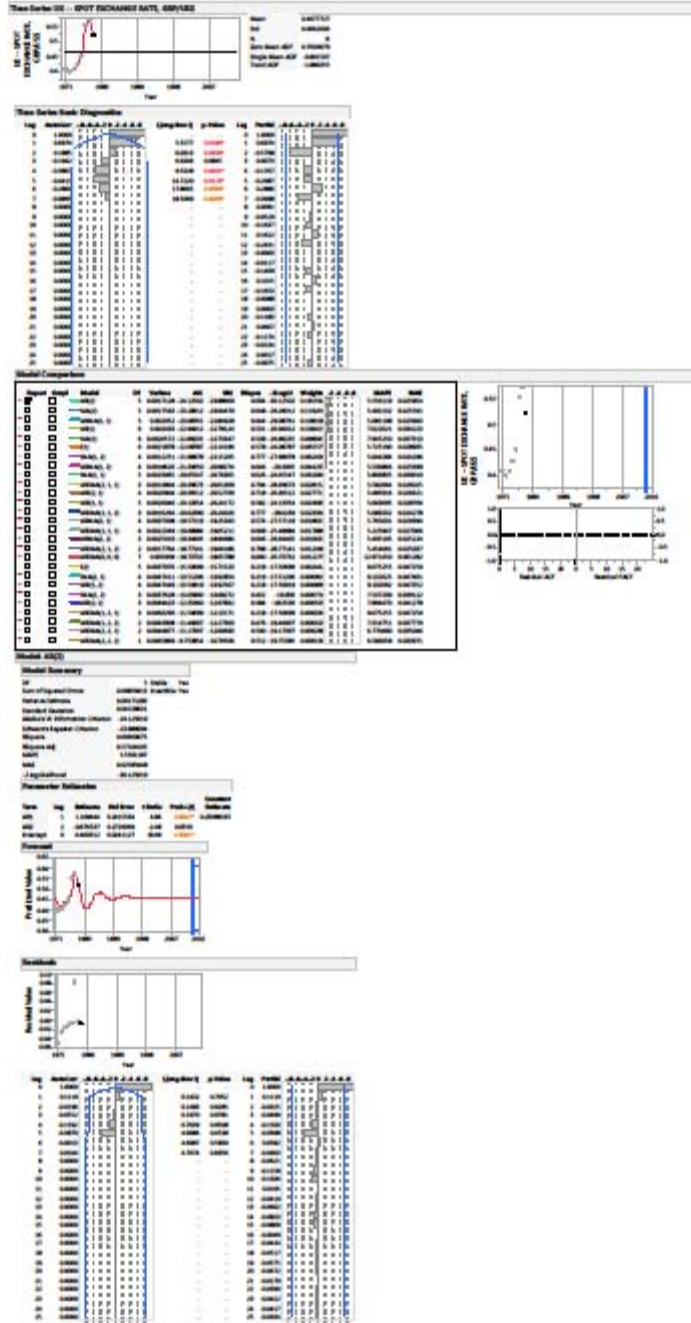


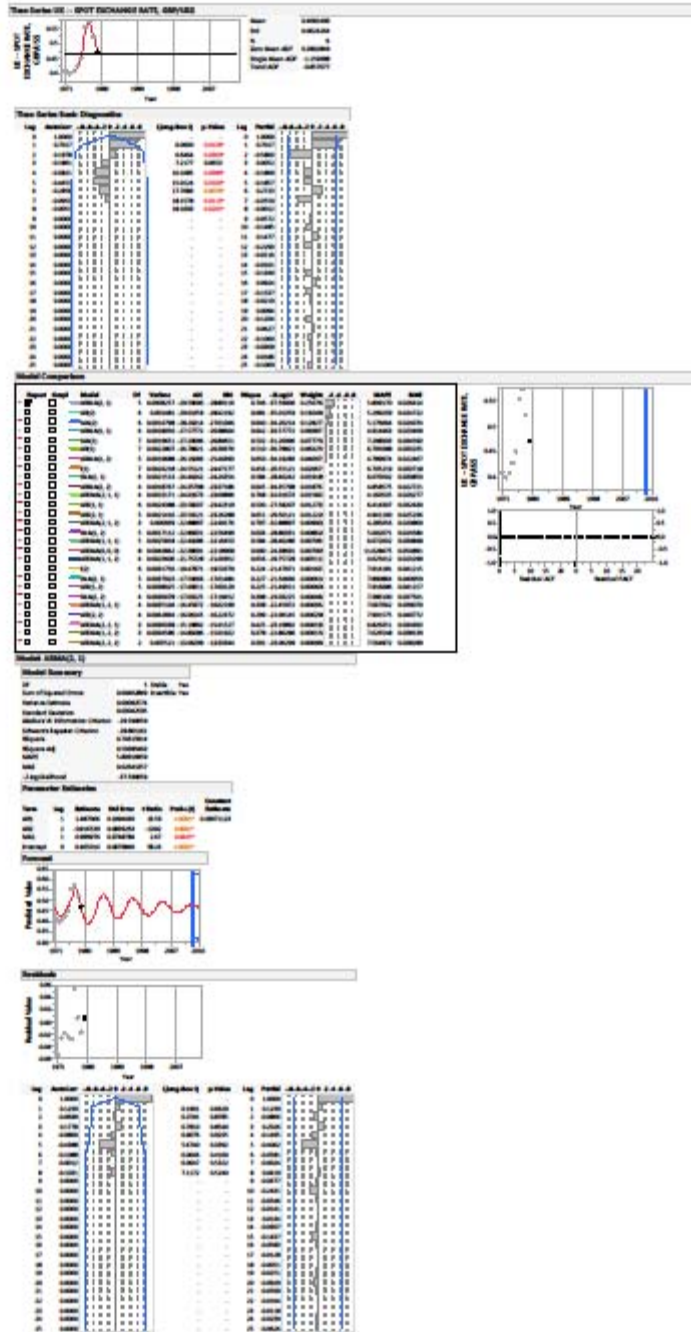


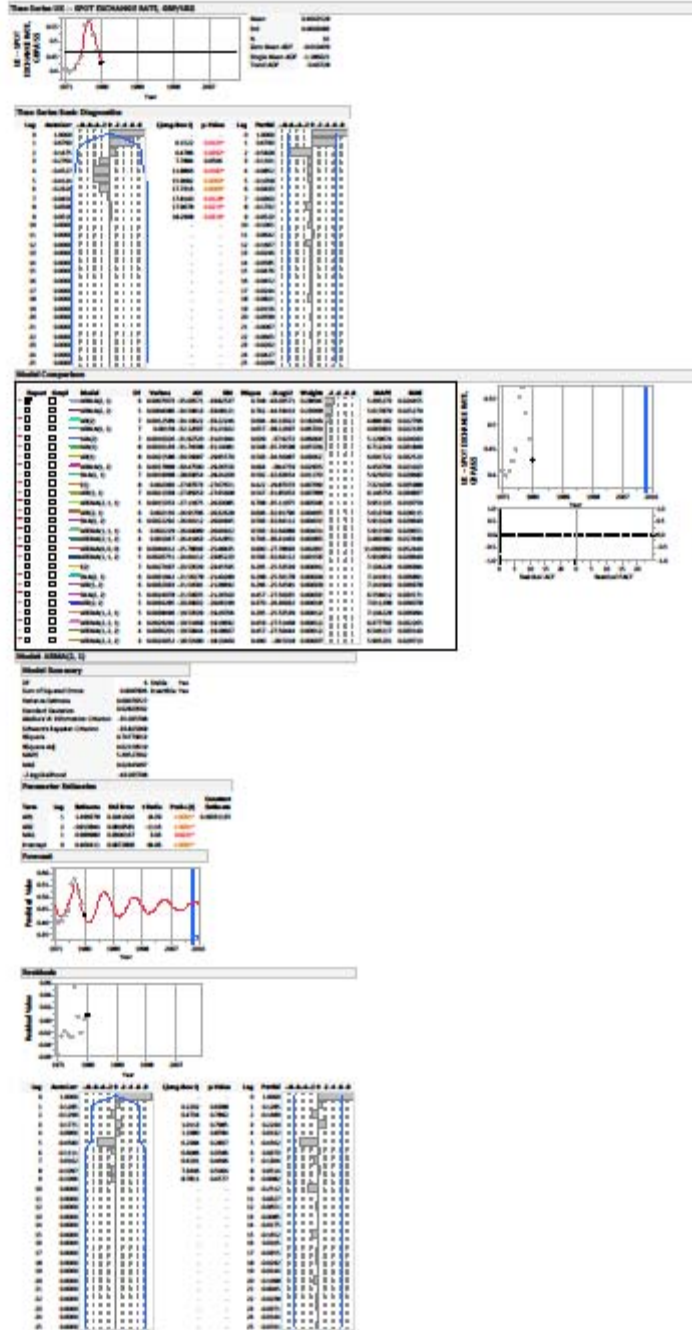


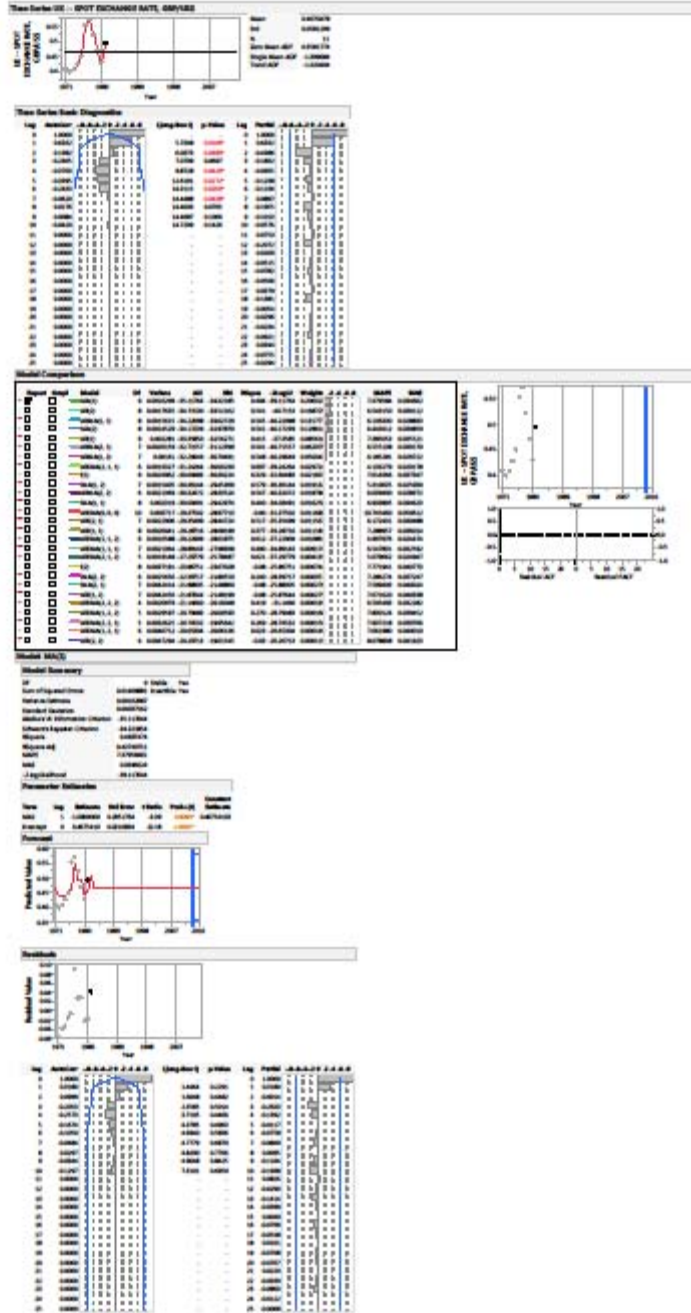
## United Kingdom

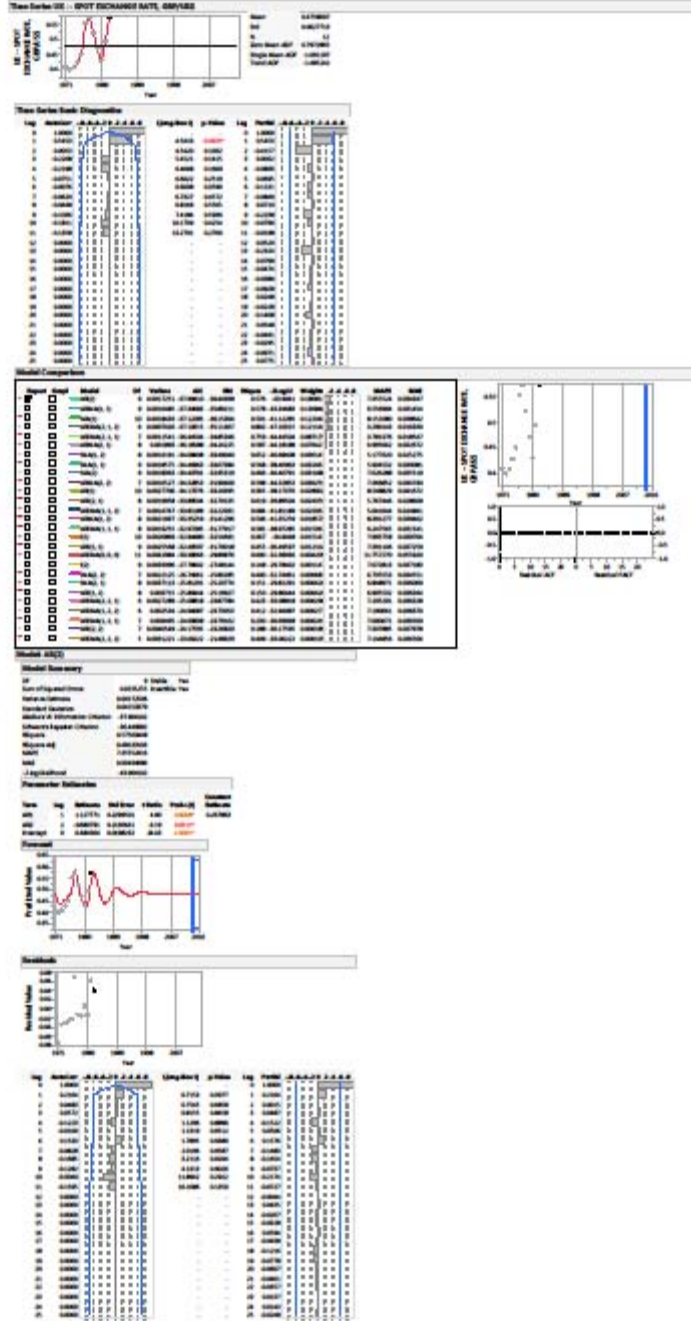


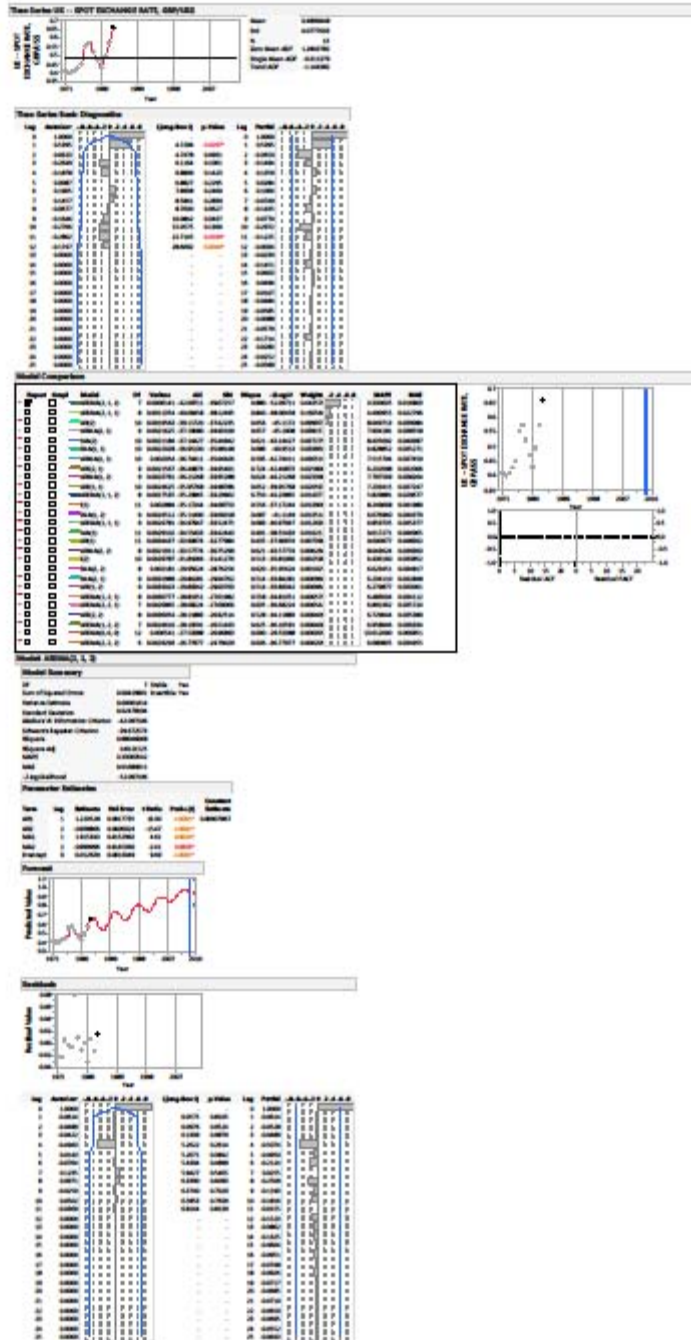


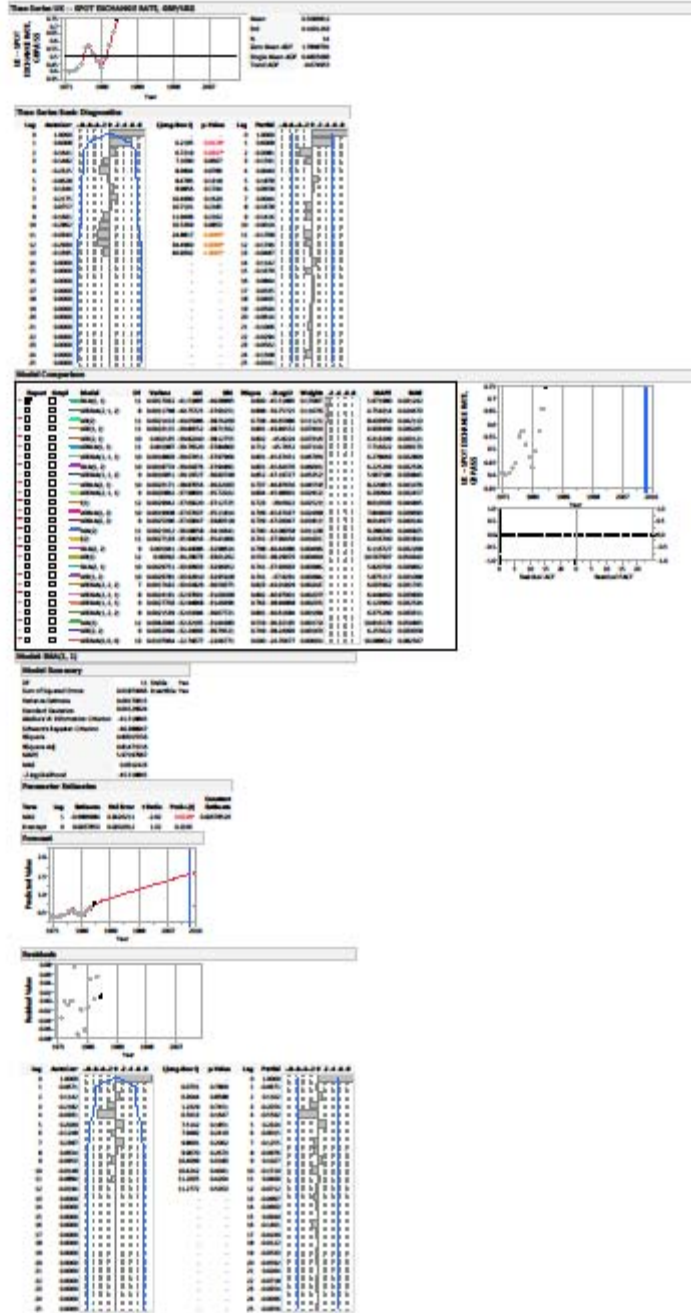


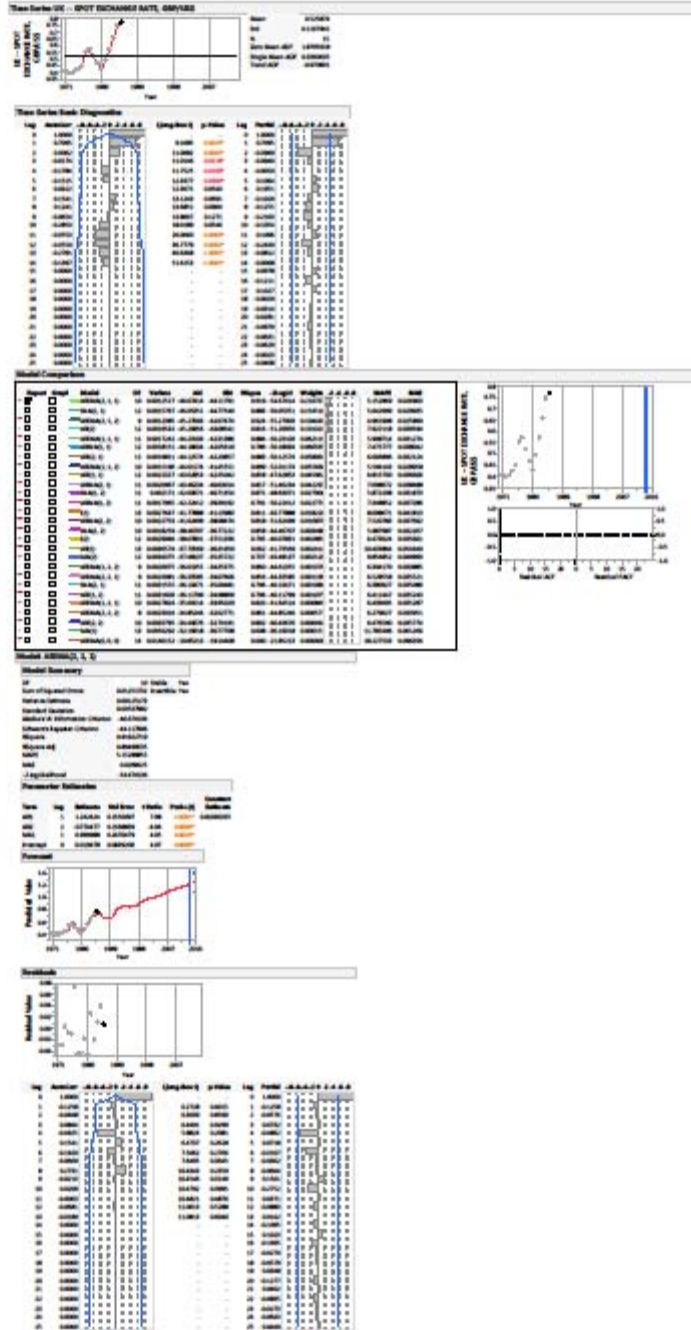


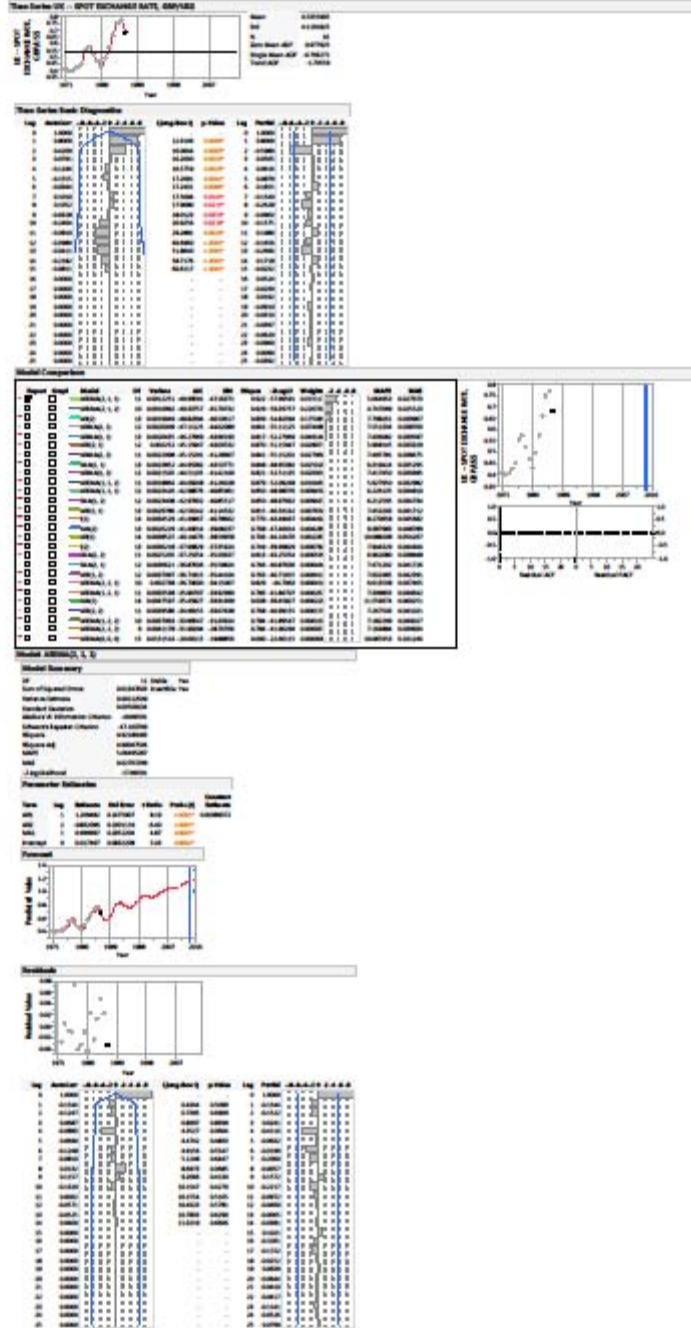


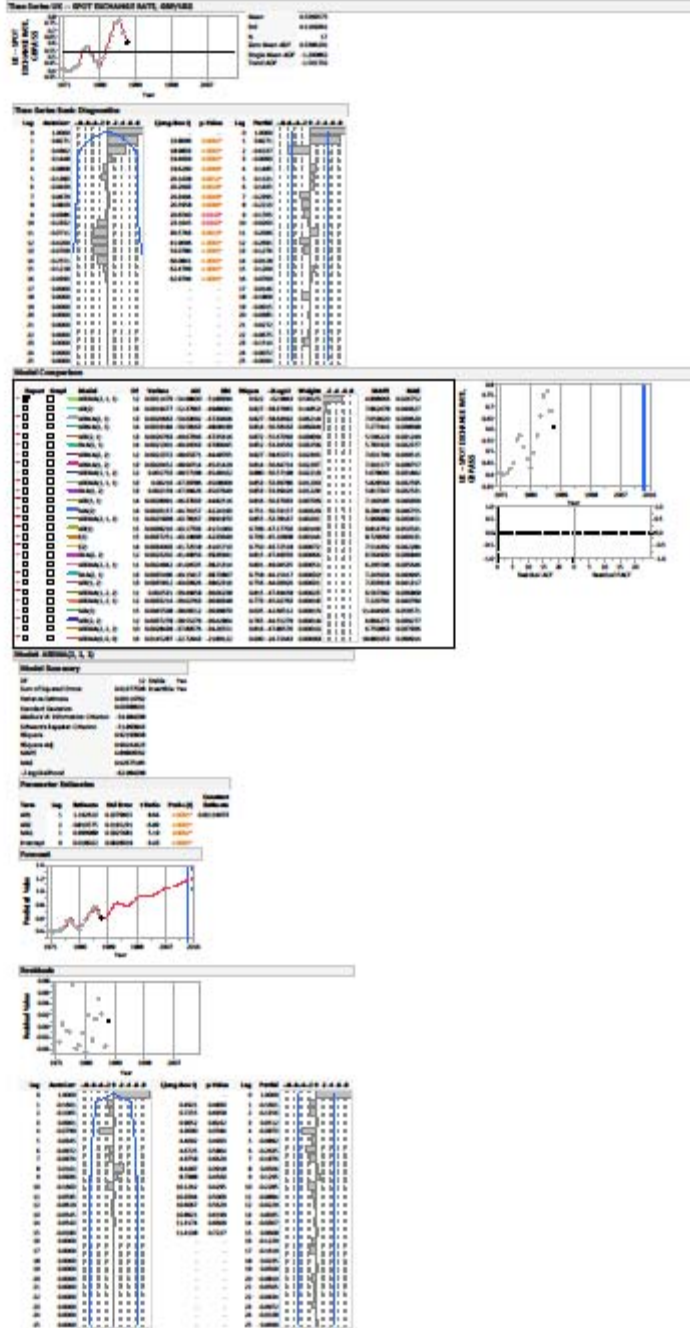


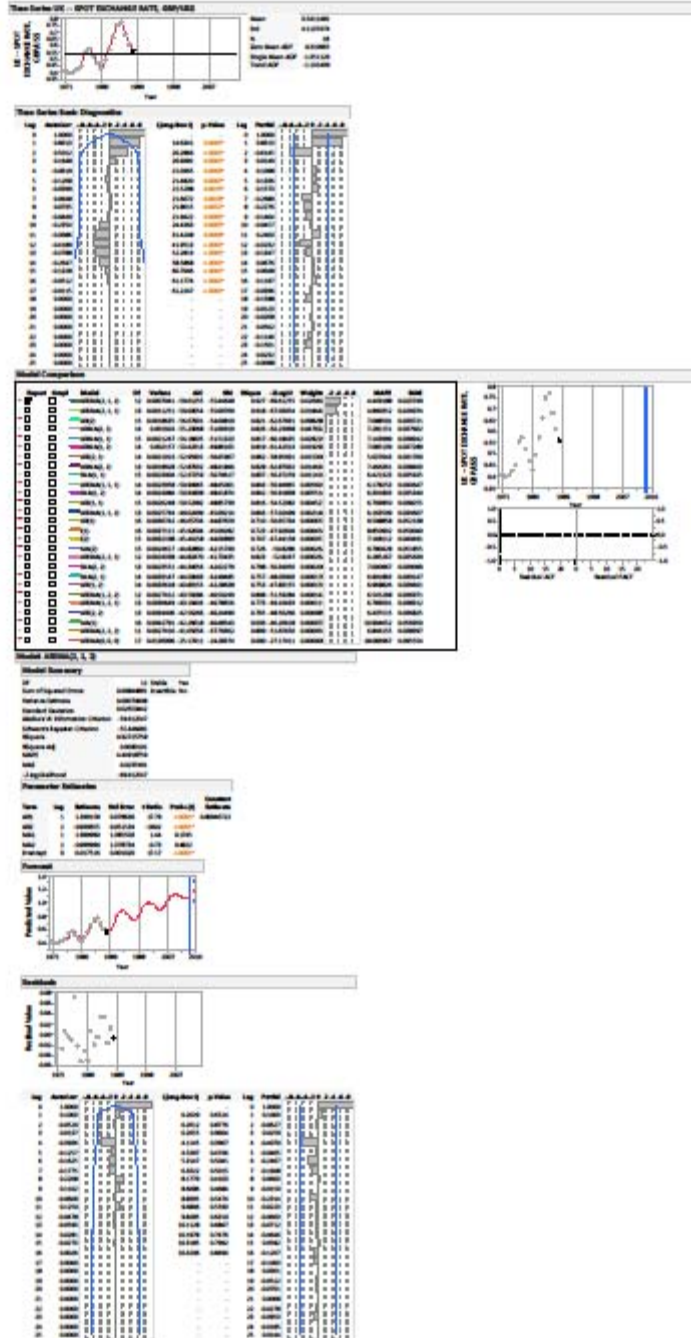


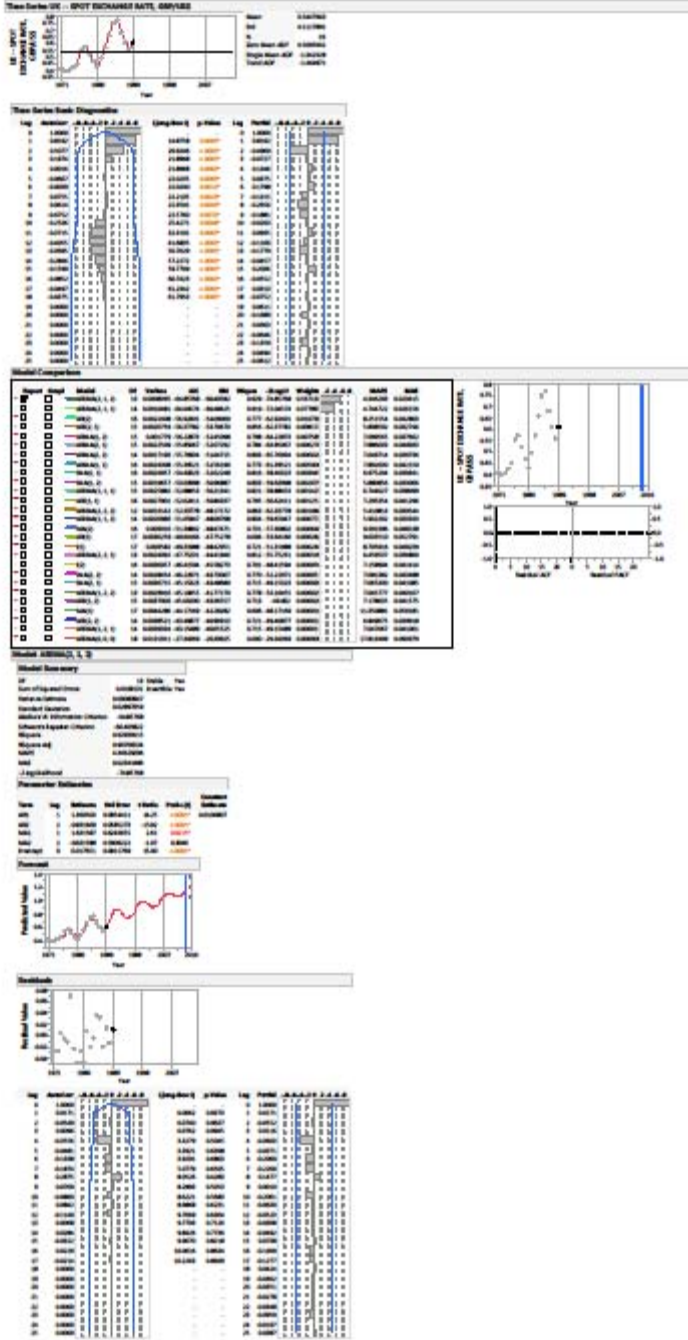


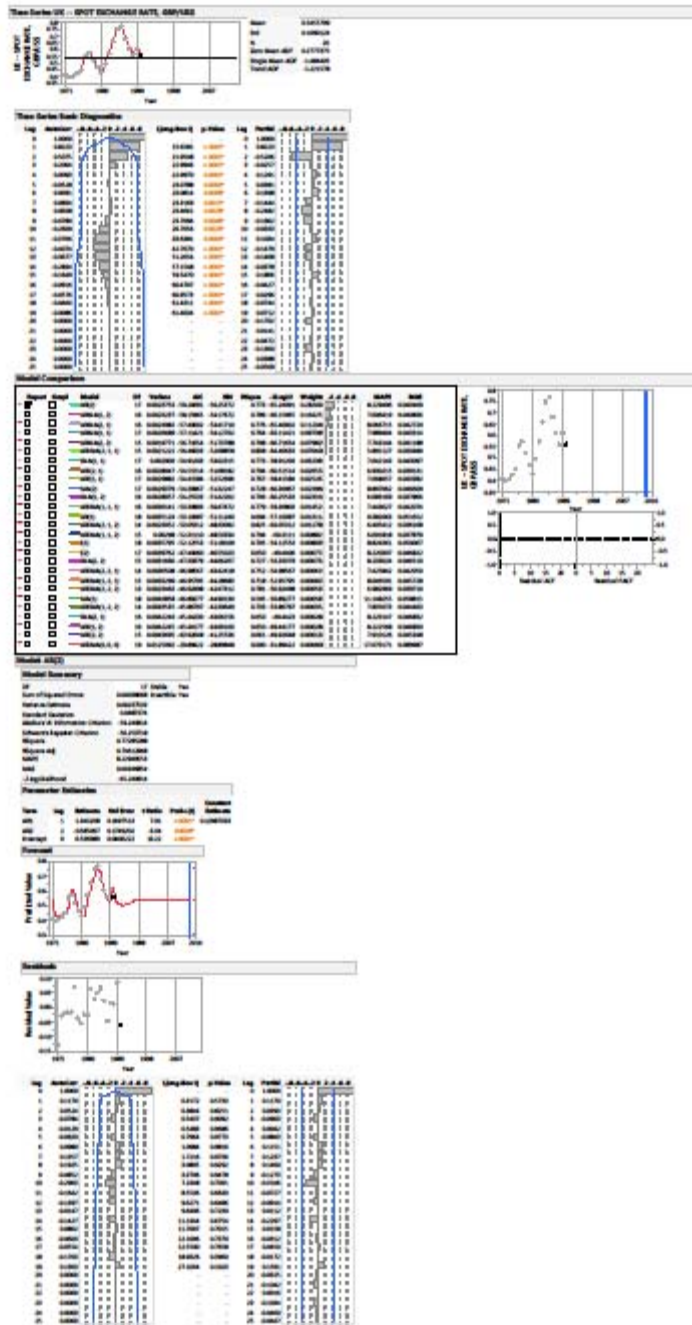


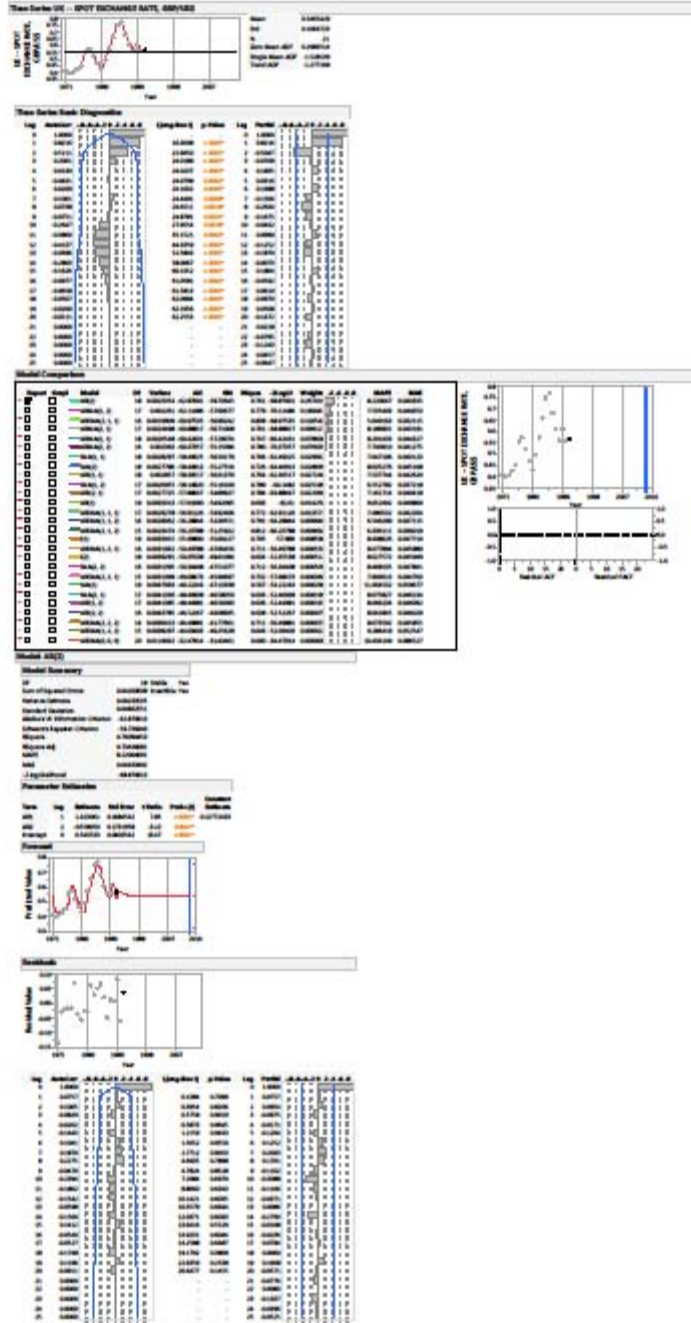


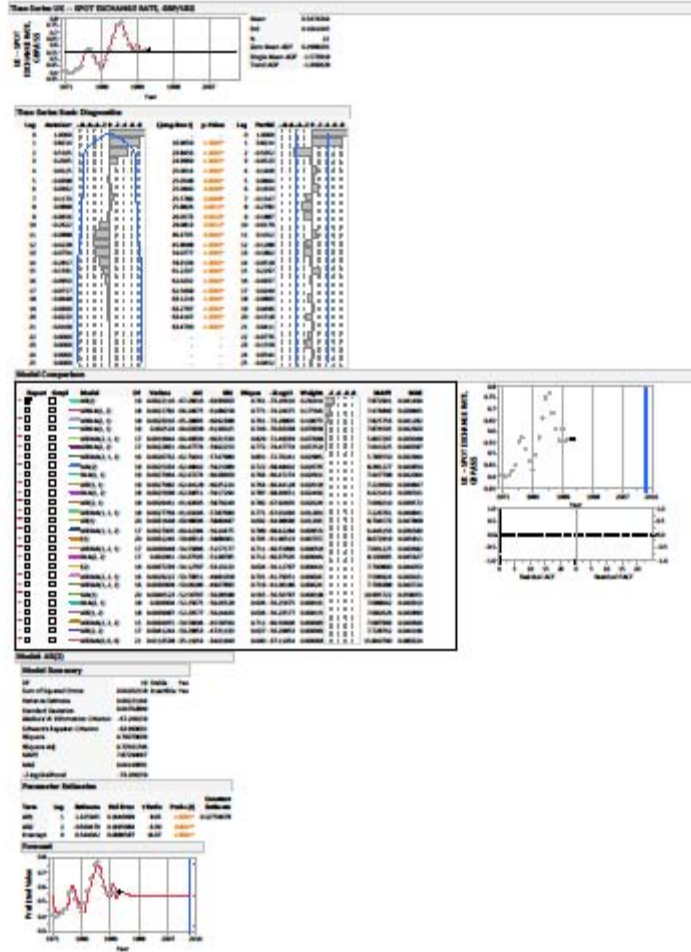


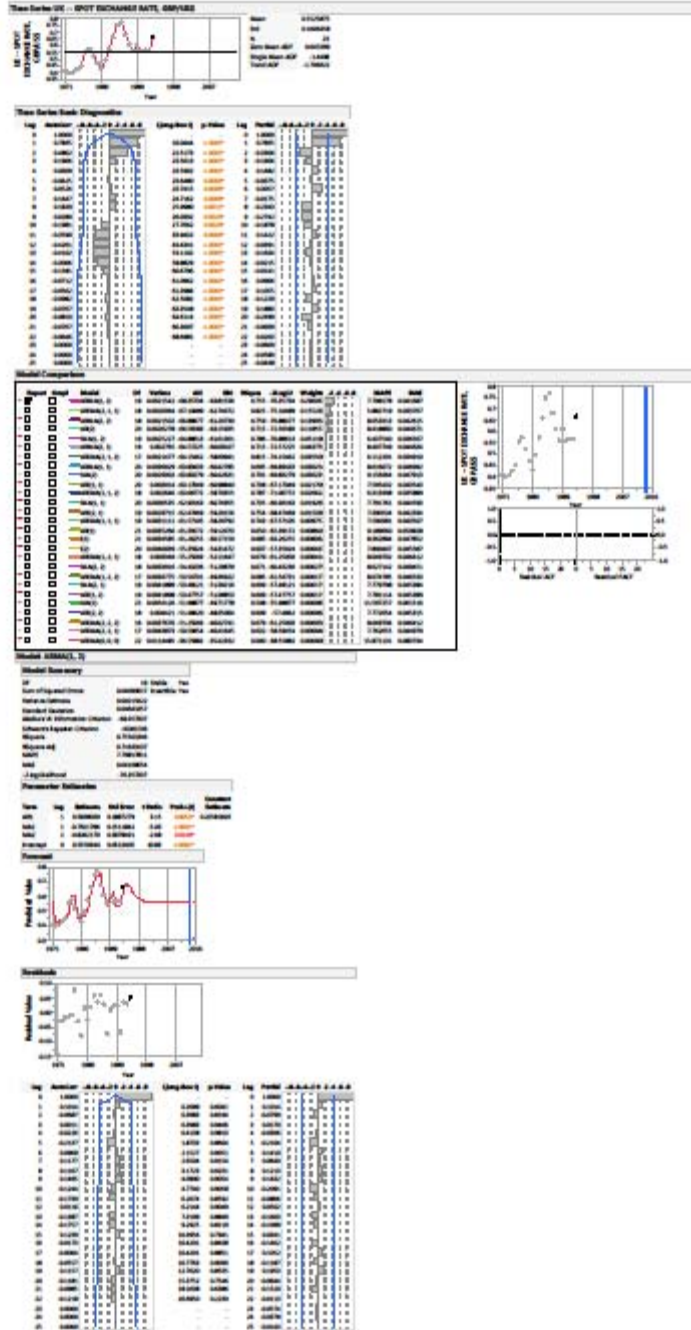


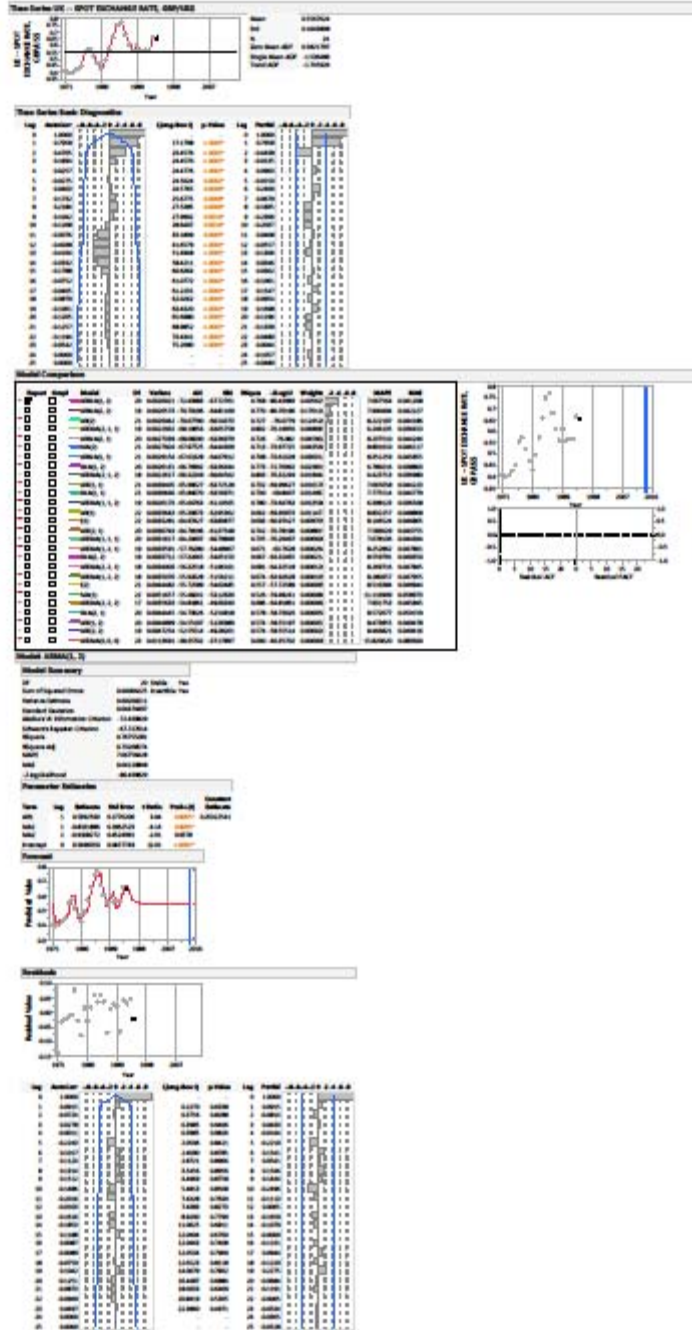


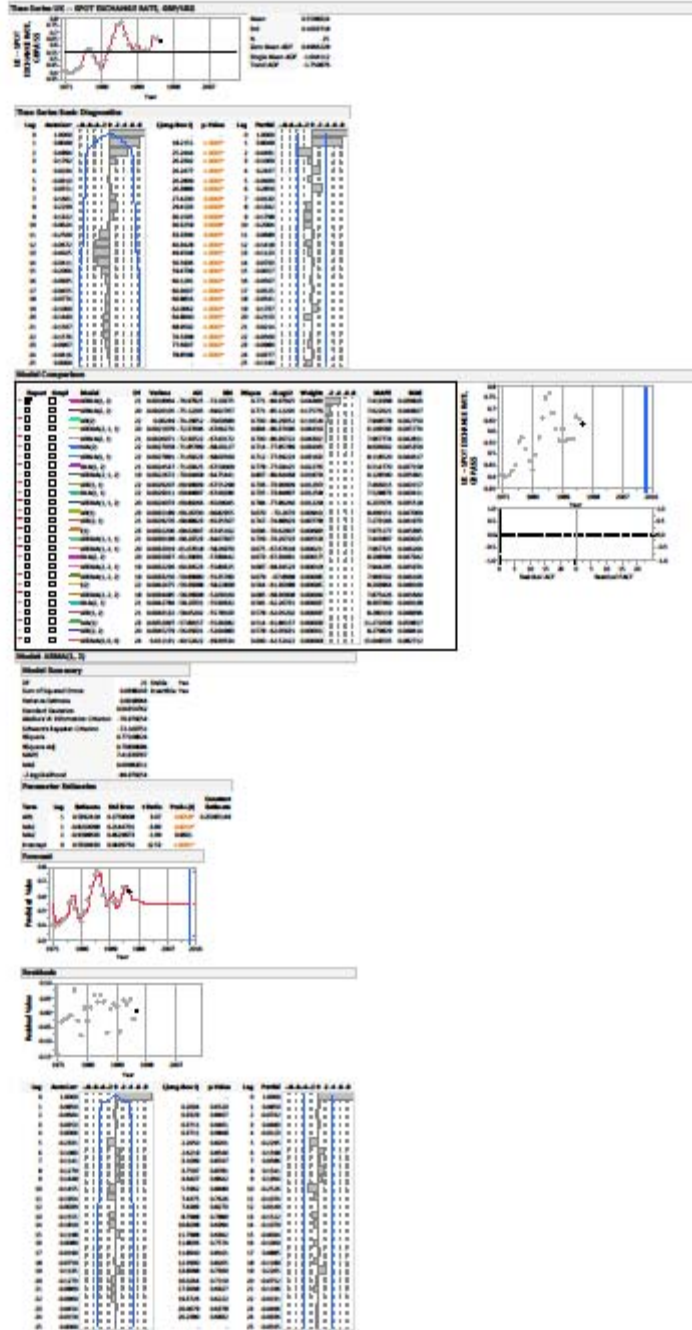


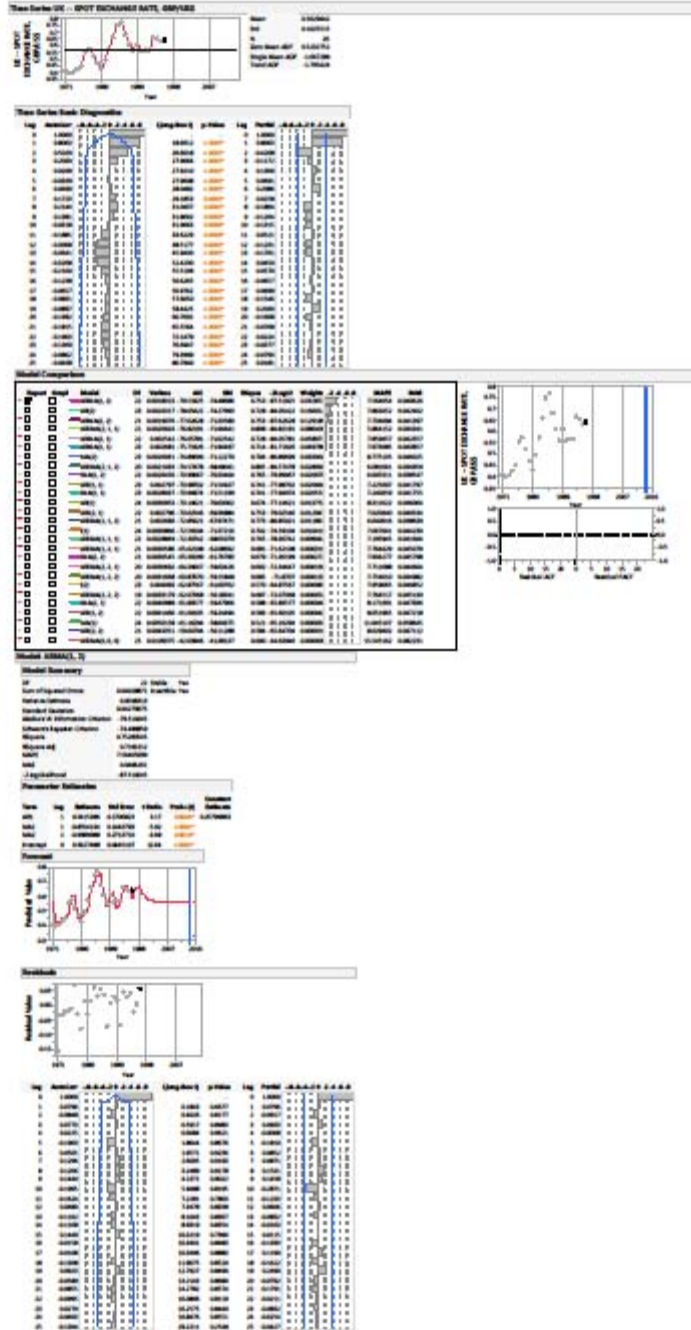


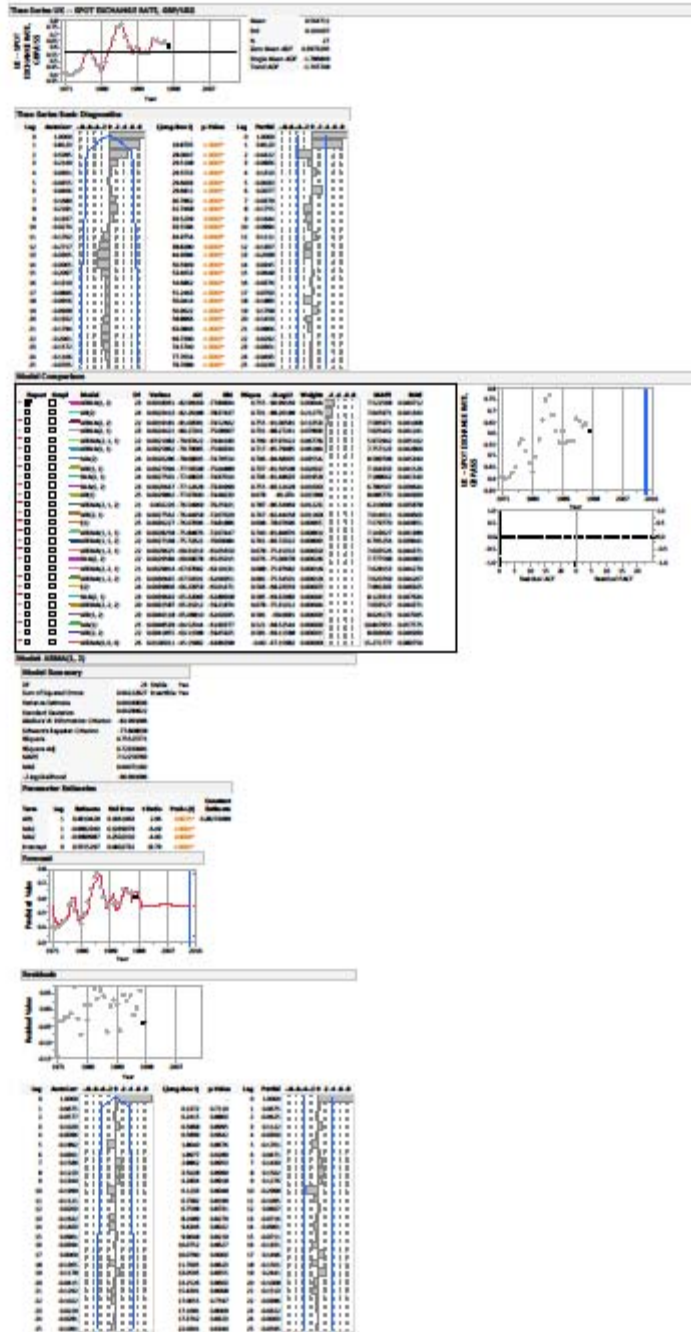


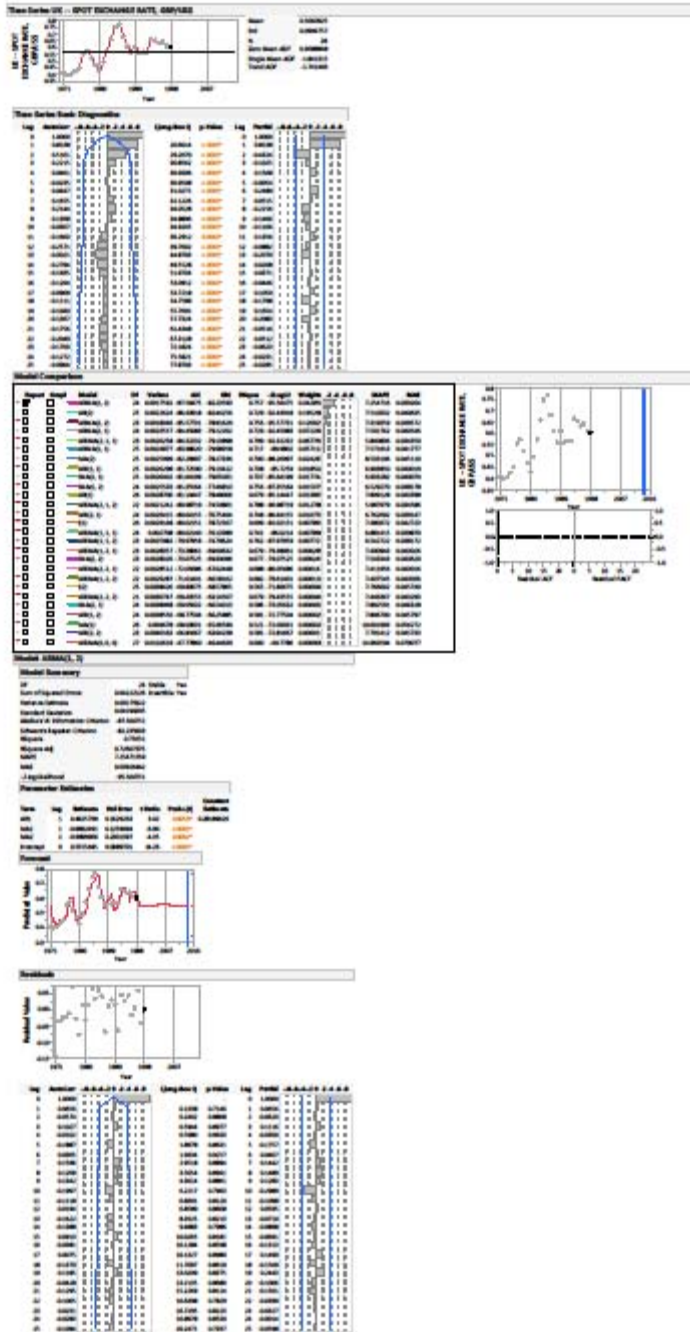


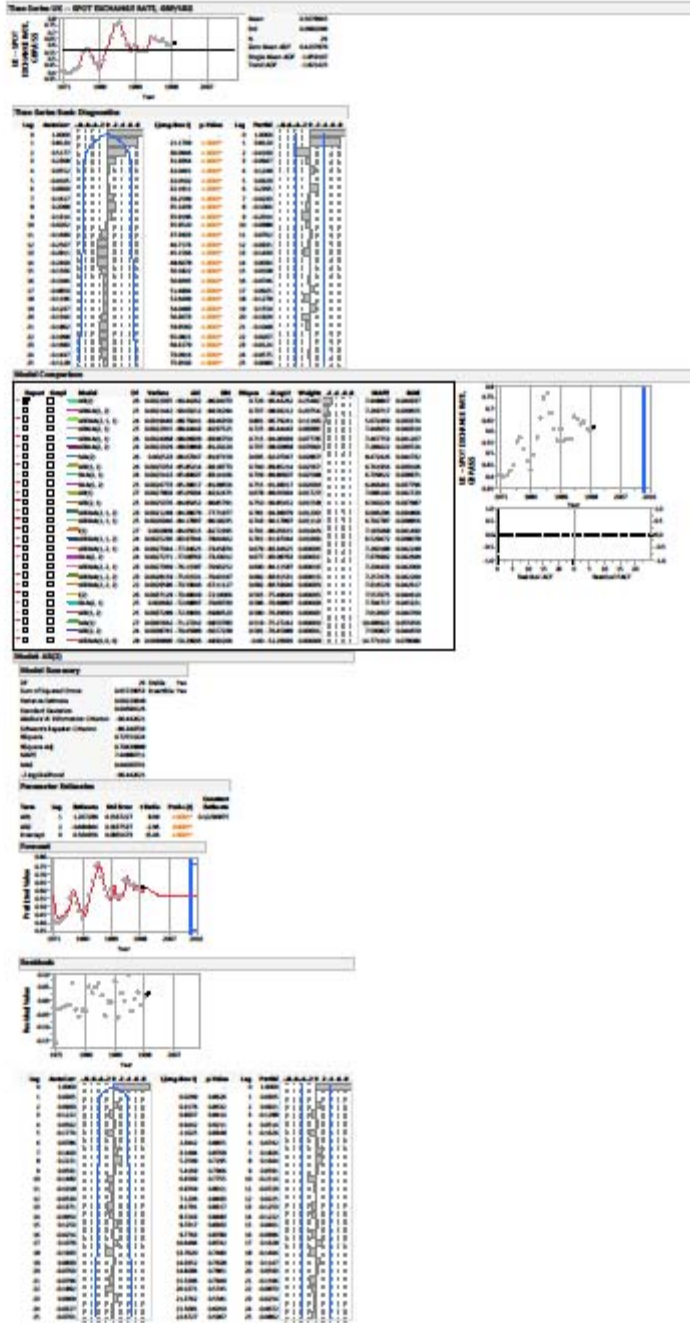


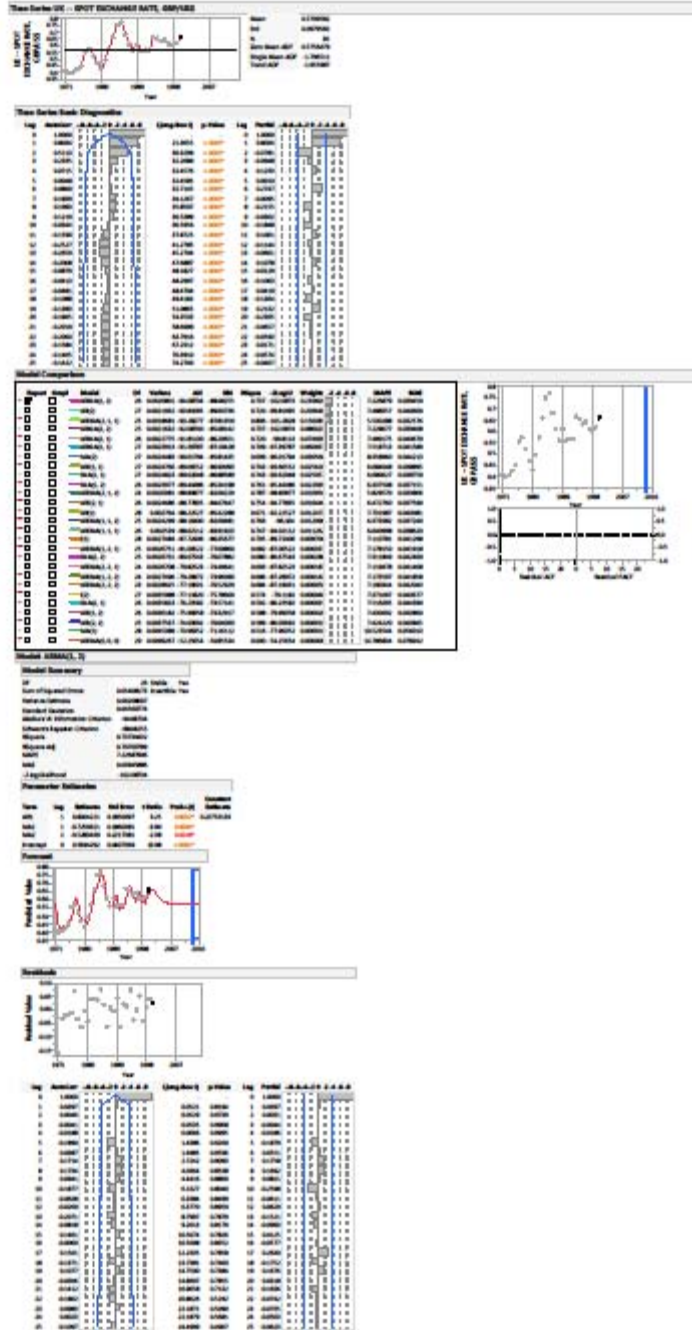


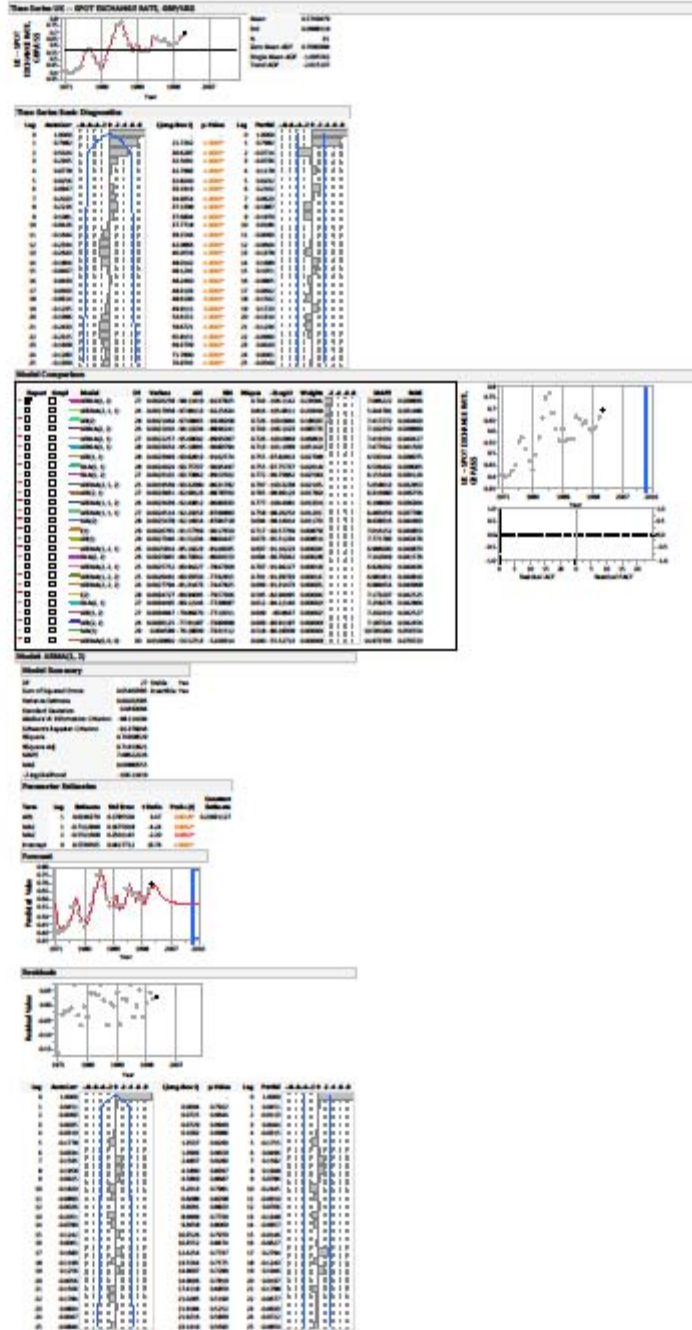


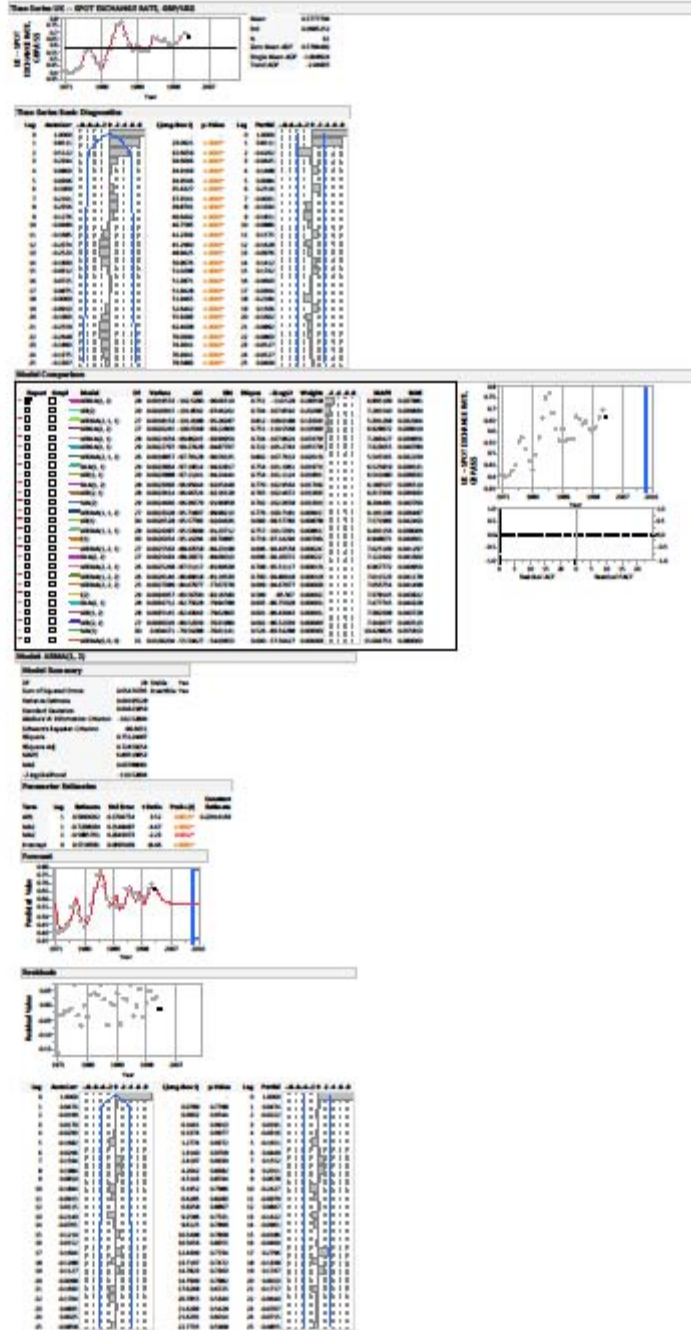


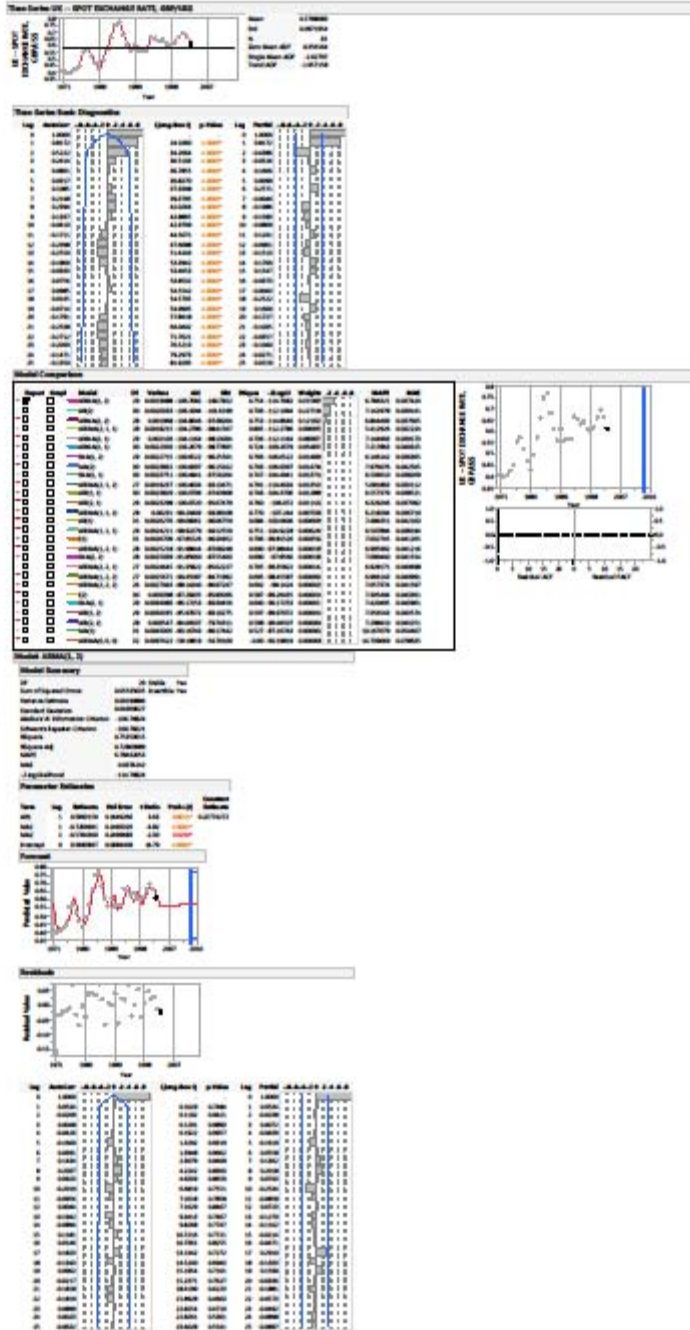




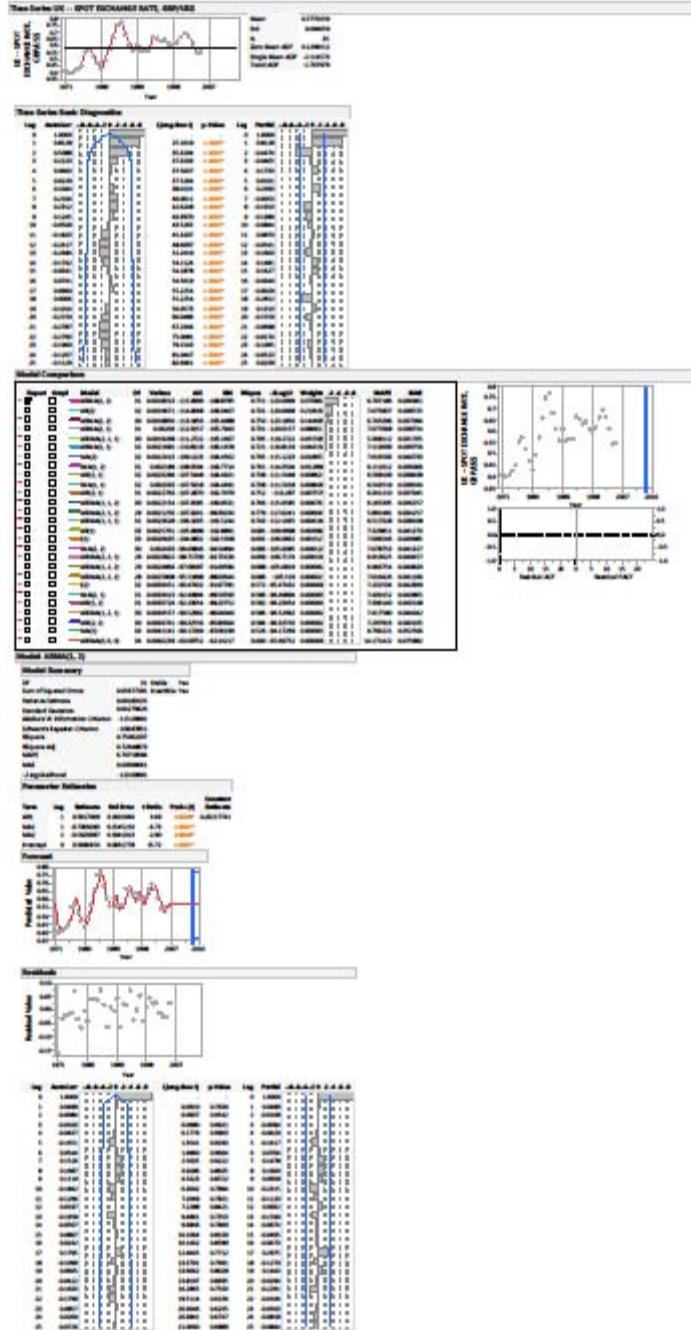




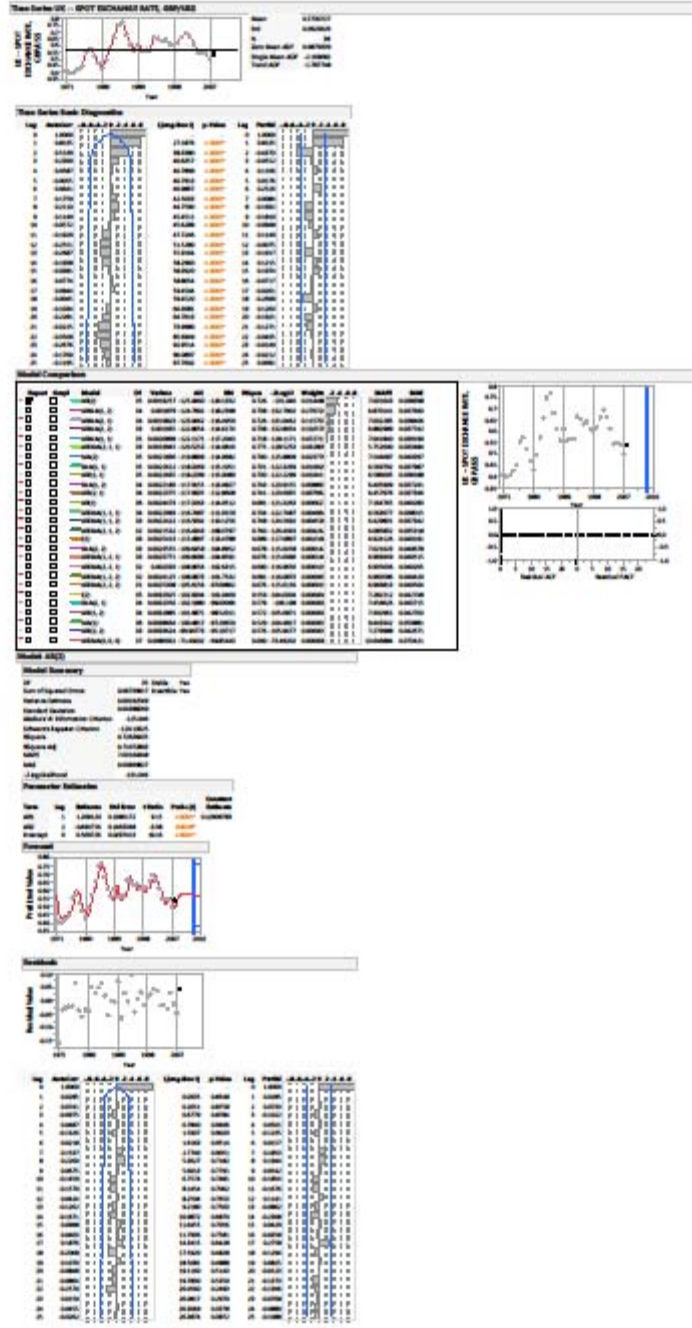


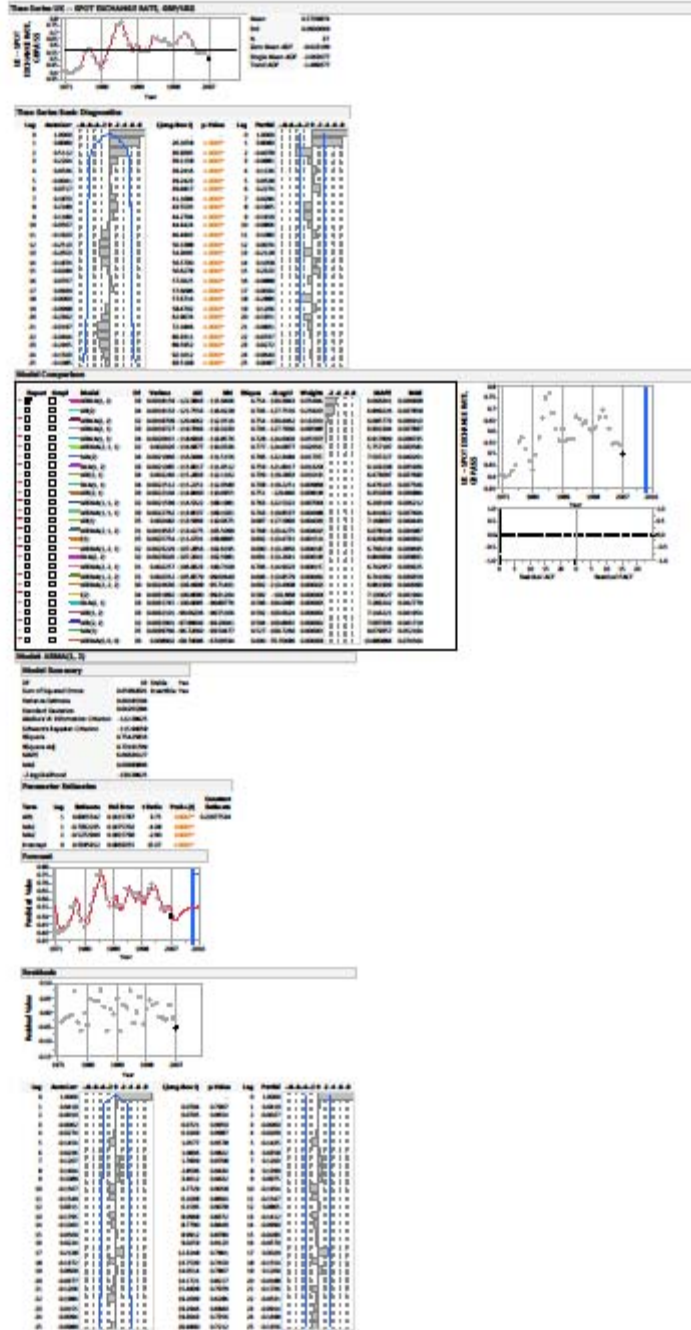




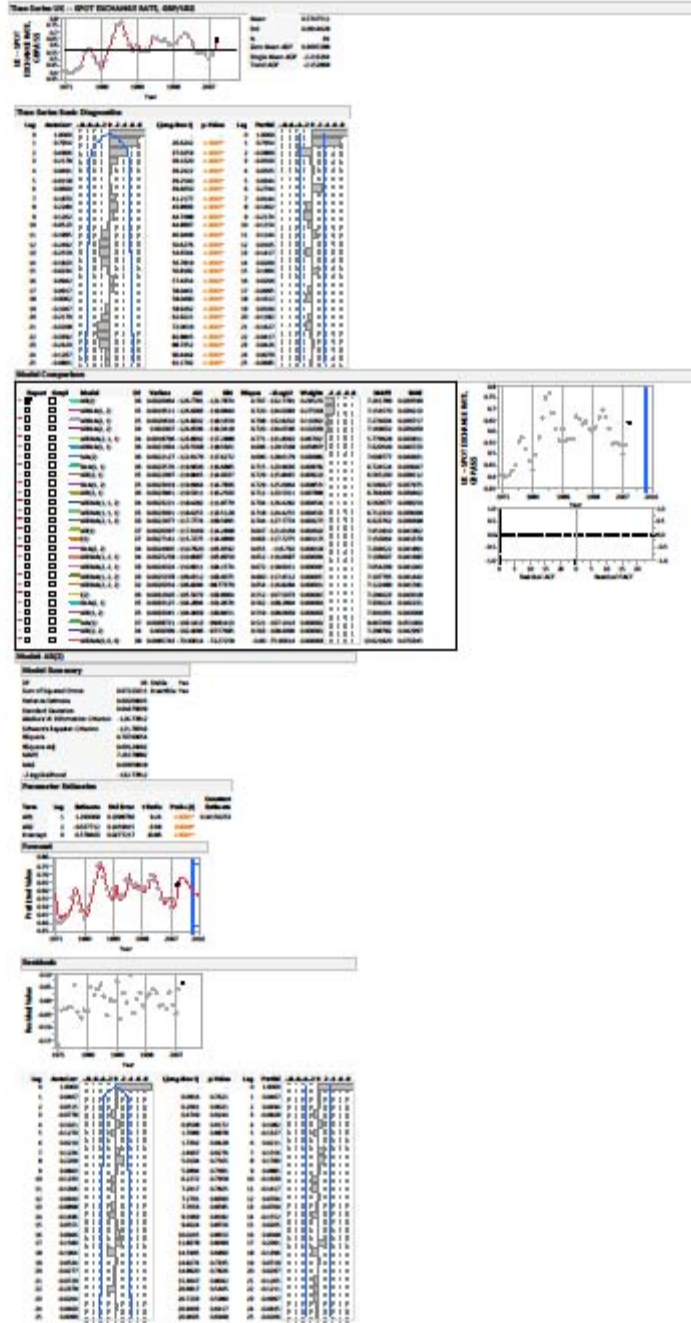














## Appendix B: Forward Rate Forecasts

### FY06-FY14

#### Denmark

Subject		Long-term interest rates, Per cent per annum									
Frequency		Monthly									
Time		Dec-2004	Dec-2005	Dec-2006	Dec-2007	Dec-2008	Dec-2009	Dec-2010	Dec-2011	Dec-2012	Dec-2013
<b>Country</b>											
Denmark	i	3.8462	3.3529	3.7766	4.3344	3.4998	3.5295	3.012	1.8571	1.07	1.89
United States	i	4.23	4.47	4.56	4.1	2.42	3.59	3.29	1.98	1.72	2.9
data extracted on 02 Oct 2014 13:05 UTC. (GMT) from OECD.Stat											
Annual FRB H.10 Rate		5.9891	5.9953	5.9422	5.4413	5.0885	5.3574	5.6265	5.3535	5.7922	5.617
Calculated Forward Rate		6.463413	7.533895	6.916768	5.202203	3.867432	5.428958	6.016372	5.583784	7.611007	7.580035

#### European Union

Subject		Long-term interest rates, Per cent per annum									
Frequency		Monthly									
Time		Dec-2004	Dec-2005	Dec-2006	Dec-2007	Dec-2008	Dec-2009	Dec-2010	Dec-2011	Dec-2012	Dec-2013
<b>Country</b>											
United States	i	4.23	4.47	4.56	4.1	2.42	3.59	3.29	1.98	1.72	2.9
Euro area (18 countries)	i	3.6933	3.409	3.9026	4.3818	3.8981	3.8727	4.0714	4.0908	2.0989	3.3128
data extracted on 02 Oct 2014 13:05 UTC. (GMT) from OECD.Stat											
Annual FRB H.10 Rate		1.2438	1.2449	1.2563	1.3711	1.4726	1.3935	1.3261	1.3931	1.2859	1.3281
Calculated Forward Rate		0.720868	0.647468	0.701873	0.769641	0.970575	0.761816	0.891444	1.226274	0.885995	0.832653

#### Japan

Subject		Long-term interest rates, Per cent per annum									
Frequency		Monthly									
Time		Dec-2004	Dec-2005	Dec-2006	Dec-2007	Dec-2008	Dec-2009	Dec-2010	Dec-2011	Dec-2012	Dec-2013
<b>Country</b>											
Japan	i	1.397	1.488	1.645	1.526	1.214	1.272	1.133	0.971	0.781	0.688
United States	i	4.23	4.47	4.56	4.1	2.42	3.59	3.29	1.98	1.72	2.9
data extracted on 02 Oct 2014 13:05 UTC. (GMT) from OECD.Stat											
Annual FRB H.10 Rate		108.1508	110.1069	116.3121	117.7623	103.3906	93.6827	87.7817	79.6967	79.818	97.5971
Calculated Forward Rate		235.9736	242.0759	244.4973	237.7624	159.7091	189.2621	176.5511	120.4953	121.9006	225.4903

#### Norway

Subject		Long-term interest rates, Per cent per annum									
Frequency		Monthly									
Time		Dec-2004	Dec-2005	Dec-2006	Dec-2007	Dec-2008	Dec-2009	Dec-2010	Dec-2011	Dec-2012	Dec-2013
<b>Country</b>											
Norway	i	3.94	3.83	4.24	4.66	3.77	3.98	3.61	2.38	2.08	2.94
United States	i	4.23	4.47	4.56	4.1	2.42	3.59	3.29	1.98	1.72	2.9
data extracted on 02 Oct 2014 13:05 UTC. (GMT) from OECD.Stat											
Annual FRB H.10 Rate		6.7399	6.4412	6.4095	5.8557	5.6365	6.2908	6.0451	5.6022	5.8181	5.8772
Calculated Forward Rate		7.135562	7.294692	6.80092	5.276337	4.041264	5.798147	5.625484	4.939218	5.138062	5.817533

#### South Korea

Subject		Long-term interest rates, Per cent per annum									
Frequency		Monthly									
Time		Dec-2004	Dec-2005	Dec-2006	Dec-2007	Dec-2008	Dec-2009	Dec-2010	Dec-2011	Dec-2012	Dec-2013
<b>Country</b>											
Korea	i	3.85	5.6	4.95	5.82	4.87	5.31	4.46	3.81	3.13	3.653
United States	i	4.23	4.47	4.56	4.1	2.42	3.59	3.29	1.98	1.72	2.9
data extracted on 02 Oct 2014 13:05 UTC. (GMT) from OECD.Stat											
Annual FRB H.10 Rate		1145.236	1023.749	954.321	928.9717	1098.706	1274.625	1155.739	1106.94	1126.162	1094.675
Calculated Forward Rate		1234.966	848.4709	891.7689	694.6856	640.132	927.1838	908.0806	685.7965	741.6855	917.5225

## United Kingdom

Subject		Long-term interest rates, Per cent per annum									
Frequency		Monthly									
Time		Dec-2004	Dec-2005	Dec-2006	Dec-2007	Dec-2008	Dec-2009	Dec-2010	Dec-2011	Dec-2012	Dec-2013
<b>Country</b>											
United Kingdom	i	4.5316	4.2186	4.6195	4.6937	3.6238	3.8871	3.587	2.1704	1.8361	3.0879
United States	i	4.23	4.47	4.56	4.1	2.42	3.59	3.29	1.98	1.72	2.9
data extracted on 02 Oct. 2014 13:05 UTC (GMT) from OECD.Stat											
Annual FRB H 10 Rate		1.833	1.8204	1.8434	2.002	1.8545	1.5661	1.5452	1.6043	1.5853	1.5642
Calculated Forward Rate		0.515808	0.575793	0.536732	0.447416	0.398841	0.599711	0.605263	0.585891	0.604973	0.609919

# FY91-FY12

## Japan

Subject													
Unit													
Frequency													
Time	Dec-1977	Dec-1978	Dec-1979	Dec-1980	Dec-1981	Dec-1982	Dec-1983	Dec-1984	Dec-1985	Dec-1986	Dec-1987	Dec-1988	
<b>Country</b>													
Japan	i	..	..	..	..	..	..	..	..	..	..	..	
United States	i	7.69	9.01	10.39	12.84	13.72	10.54	11.83	11.5	9.26	7.11	8.99	9.11
Data extracted on 12 Dec 2014 14:14 UTC (GMD from OECD.Stat)													
Japan FRB H10 Annual Rate		268.6194	210.3854	219.0168	226.6309	220.6281	249.0601	237.5535	237.4622	238.4673	168.3496	144.6023	128.1742
Japan Calculated Forward Rate		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

Subject														
Unit														
Frequency														
Time	Dec-1989	Dec-1990	Dec-1991	Dec-1992	Dec-1993	Dec-1994	Dec-1995	Dec-1996	Dec-1997	Dec-1998	Dec-1999	Dec-2000	Dec-2001	
<b>Country</b>														
Japan	i	5.52	6.454	5.719	4.848	3.396	4.561	2.983	2.597	1.939	1.488	1.767	1.624	1.334
United States	i	7.84	8.08	7.09	6.77	5.77	7.81	5.71	6.3	5.81	4.65	6.28	5.24	5.09
Data extracted on 12 Dec 2014 14:14 UTC (GMD from OECD.Stat)														
Japan FRB H10 Annual Rate		138.0738	144.9987	134.5909	126.7801	111.0755	102.179	93.9649	108.78	121.0581	130.9892	113.7342	107.804	121.568
Japan Calculated Forward Rate		141.1095	147.2134	136.3363	129.1041	113.6258	105.354	96.4531	112.7062	125.6551	135.0704	118.7779	111.6399	126.074

Subject													
Unit													
Frequency													
Time	Dec-2002	Dec-2003	Dec-2004	Dec-2005	Dec-2006	Dec-2007	Dec-2008	Dec-2009	Dec-2010	Dec-2011	Dec-2012	Dec-2013	
<b>Country</b>													
Japan	i	0.975	1.33	1.397	1.488	1.645	1.526	1.214	1.272	1.133	0.971	0.781	0.688
United States	i	4.03	4.27	4.23	4.47	4.56	4.1	2.42	3.59	3.29	1.98	1.72	2.9
Data extracted on 12 Dec 2014 14:14 UTC (GMD from OECD.Stat)													
Japan FRB H10 Annual Rate		125.2204	115.9387	108.1508	110.1069	116.3121	117.7623	103.3906	93.6827	87.7817	79.6867	79.818	97.5971
Japan Calculated Forward Rate		129.0089	119.3026	111.1725	113.3421	119.6477	120.7479	104.6225	95.82699	89.65394	80.49311	80.56168	99.7412

## United Kingdom

Subject													
Unit													
Frequency													
Time	Dec-1977	Dec-1978	Dec-1979	Dec-1980	Dec-1981	Dec-1982	Dec-1983	Dec-1984	Dec-1985	Dec-1986	Dec-1987	Dec-1988	
<b>Country</b>													
United Kingdom	i	10.7	13.12	15.02	13.78	16	11.58	10.77	10.87	10.78	10.98	9.63	10.14
United States	i	7.69	9.01	10.39	12.84	13.72	10.54	11.83	11.5	9.26	7.11	8.99	9.11
Data extracted on 12 Dec 2014 14:14 UTC (GMD from OECD.Stat)													
UK FRB H10 Annual Rate		0.573099	0.521288	0.471165	0.430182	0.493998	0.572082	0.659674	0.748055	0.770772	0.681338	0.60983	0.561388
UK Calculated Forward Rate		0.557516	0.502328	0.452199	0.426628	0.484288	0.56675	0.665987	0.752306	0.760197	0.657579	0.60627	0.556138

Subject														
Unit														
Frequency														
Time	Dec-1989	Dec-1990	Dec-1991	Dec-1992	Dec-1993	Dec-1994	Dec-1995	Dec-1996	Dec-1997	Dec-1998	Dec-1999	Dec-2000	Dec-2001	
<b>Country</b>														
United Kingdom	i	10.56	10.84	9.66	8.32	6.4253	8.5814	7.4926	7.5716	6.3739	4.5175	5.389	4.9118	4.8828
United States	i	7.84	8.08	7.09	6.77	5.77	7.81	5.71	6.3	5.81	4.65	6.28	5.24	5.09
Data extracted on 12 Dec 2014 14:14 UTC (GMD from OECD.Stat)														
UK FRB H10 Annual Rate		0.610426	0.560507	0.565803	0.566155	0.665956	0.652784	0.633513	0.640738	0.61065	0.603391	0.618353	0.659805	0.694637
UK Calculated Forward Rate		0.595408	0.54655	0.552543	0.558054	0.661856	0.648147	0.623007	0.633164	0.607413	0.604156	0.623581	0.661869	0.695943

Subject													
Unit													
Frequency													
Time	Dec-2002	Dec-2003	Dec-2004	Dec-2005	Dec-2006	Dec-2007	Dec-2008	Dec-2009	Dec-2010	Dec-2011	Dec-2012	Dec-2013	
<b>Country</b>													
United Kingdom	i	4.5644	4.896	4.5316	4.2186	4.6195	4.6937	3.6238	3.8871	3.587	2.1704	1.8361	3.0879
United States	i	4.03	4.27	4.23	4.47	4.56	4.1	2.42	3.59	3.29	1.98	1.72	2.9
<u>Data extracted on 12 Dec 2014 14:14 UTC (GMT) from OECD.Stat</u>													
UK FRB H10 Annual Rate		0.665557	0.611733	0.545554	0.54933	0.542476	0.4995	0.539229	0.638529	0.647165	0.623325	0.630795	0.638904
UK Calculated Forward Rate		0.662156	0.608082	0.54398	0.550655	0.542167	0.496668	0.532965	0.636703	0.64531	0.622163	0.630076	0.638139

**Appendix C: Futures**

**FY06-FY14**

**European Union**

Average of Euro to USD		
Years	Date	Total
2013	Oct	0.732991705
2012	Oct	0.770624623
2011	Oct	0.728977666
2010	Oct	0.720026364
2009	Oct	0.675165562
2008	Oct	0.754012097
2007	Oct	0.701582711
2006	Oct	0.789643299
2005	Oct	0.828827559
2004	Oct	0.800114072
2003	Oct	0.856002481
2002	Oct	1.021620631
2001	Oct	1.107302109
2000	Oct	1.169556793
1999	Oct	0.929993531
Grand Total		0.835054699

Average of Euro to USD		
Years	Total	
2014	0.744733428	
2013	0.75277953	
2012	0.777854465	
2011	0.719483617	
2010	0.755444893	
2009	0.719262728	
2008	0.683924227	
2007	0.729647768	
2006	0.793435775	
2005	0.803080213	
2004	0.805704513	
2003	0.886499712	
2002	1.06336226	
2001	1.118317511	
2000	1.081889524	
1999	0.936301806	
Grand Total	0.835942518	

## Japan

Average of Yen to USD		
Years	Date	Total
2013	Oct	97.78940069
2012	Oct	78.96329455
2011	Oct	76.58292475
2010	Oct	81.76505396
2009	Oct	90.3353353
2008	Oct	99.55121715
2007	Oct	114.9870261
2006	Oct	117.5925598
2005	Oct	114.0557714
2004	Oct	108.4265293
2003	Oct	109.3489943
2002	Oct	123.5326104
2001	Oct	120.9850909
2000	Oct	107.2278872
1999	Oct	104.9935285
Grand Total		103.0803856

Average of Yen to USD		
Years	Total	
2014	103.6883616	
2013	97.61270849	
2012	79.77700579	
2011	79.63488988	
2010	87.6621709	
2009	93.58702798	
2008	103.0321677	
2007	116.932514	
2006	115.3288983	
2005	109.5269983	
2004	107.897813	
2003	115.6952539	
2002	124.8138453	
2001	120.8111715	
2000	106.6763637	
1999	112.7846297	
Grand Total	104.7229766	

## United Kingdom

Average of GBP to USD		
Years	Date	Total
2013	Oct	0.621699499
2012	Oct	0.622270698
2011	Oct	0.634591903
2010	Oct	0.630976595
2009	Oct	0.617178349
2008	Oct	0.59378909
2007	Oct	0.489819463
2006	Oct	0.532564132
2005	Oct	0.567164058
2004	Oct	0.555978994
2003	Oct	0.598227276
2002	Oct	0.644377656
2001	Oct	0.691771963
2000	Oct	0.688401391
1999	Oct	0.603163807
Grand Total		0.606070366

Average of GBP to USD		
Years	Total	
2014	0.60249054	
2013	0.639784535	
2012	0.631075791	
2011	0.624153433	
2010	0.647897072	
2009	0.640611169	
2008	0.54680069	
2007	0.500270964	
2006	0.542664332	
2005	0.55134956	
2004	0.548522976	
2003	0.614723026	
2002	0.668817186	
2001	0.695941312	
2000	0.660440922	
1999	0.618399451	
Grand Total	0.608069322	

## FY79-FY12

### Japan

Annual Average	Forecast
FY	Yen/Dollar
1979	264.0917
1980	207.9966
1981	216.8655
1982	225.4607
1983	217.3627
1984	246.7859
1985	236.2854
1986	235.8201
1987	237.5039
1988	167.769
1989	143.8275
1990	127.425
1991	137.1201
1992	144.6454
1993	134.8046
1994	126.8095
1995	111.0374
1996	101.7484
1997	93.26634
1998	107.8765
1999	119.9822
2000	129.7989
2001	112.7846
2002	106.6764
2003	120.8112
2004	124.8138
2005	115.6953
2006	107.8978
2007	109.527
2008	115.3289
2009	116.9325
2010	103.0322
2011	93.58703
2012	87.66217

October Average	Forecast
FY	Yen/Dollar
1979	253.29041
1980	181.5734621
1981	227.6081012
1982	208.1839721
1983	228.1281019
1984	269.7545888
1985	231.5982716
1986	244.8924616
1987	214.0548674
1988	156.1110392
1989	142.3666985
1990	127.9531133
1991	141.5974481
1992	129.5548474
1993	130.9372955
1994	121.3797352
1995	106.8821186
1996	97.88388355
1997	99.83112984
1998	111.4926127
1999	120.1484895
2000	119.7346427
2001	104.9935285
2002	107.2278872
2003	120.9850909
2004	123.5326104
2005	109.3489943
2006	108.4265293
2007	114.0557714
2008	117.5925598
2009	114.9870261
2010	99.55121715
2011	90.3353353
2012	81.76505396

## United Kingdom

Annual Average	Forecast
FY	Pound/Dollar
1979	0.575878
1980	0.523158
1981	0.473427
1982	0.431988
1983	0.496243
1984	0.572026
1985	0.660256
1986	0.750918
1987	0.782931
1988	0.686305
1989	0.613733
1990	0.564453
1991	0.61611
1992	0.568721
1993	0.572387
1994	0.575308
1995	0.668885
1996	0.653831
1997	0.634083
1998	0.641478
1999	0.611632
2000	0.60512
2001	0.618399
2002	0.660441
2003	0.695941
2004	0.668817
2005	0.614723
2006	0.548523
2007	0.55135
2008	0.542664
2009	0.500271
2010	0.546801
2011	0.640611
2012	0.647897

October Average	Forecast
FY	Pound/Dollar
1979	0.562642156
1980	0.500231006
1981	0.46668024
1982	0.415380592
1983	0.542111693
1984	0.588763958
1985	0.666970742
1986	0.819272748
1987	0.707101774
1988	0.706091537
1989	0.603199476
1990	0.578881677
1991	0.636935573
1992	0.518308289
1993	0.585820276
1994	0.609991384
1995	0.668184616
1996	0.622679339
1997	0.634363475
1998	0.630774927
1999	0.613698387
2000	0.592527696
2001	0.603163807
2002	0.688401391
2003	0.691771963
2004	0.644377656
2005	0.598227276
2006	0.555978994
2007	0.567164058
2008	0.532564132
2009	0.489819463
2010	0.59378909
2011	0.617178349
2012	0.630976595

**Appendix D: Random Walk**

**FY06-FY14**

**Denmark**

**Model: I(1)**

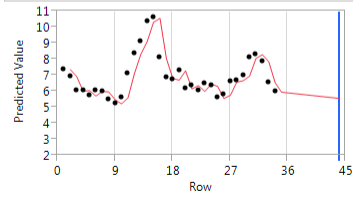
**Model Summary**

DF	32	Stable	Yes
Sum of Squared Errors	22.2354216	Invertible	Yes
Variance Estimate	0.69485692		
Standard Deviation	0.83358078		
Akaike's 'A' Information Criterion	82.6208509		
Schwarz's Bayesian Criterion	84.1173585		
RSquare	0.59761376		
RSquare Adj	0.59761376		
MAPE	8.89659855		
MAE	0.62958182		
-2LogLikelihood	80.6208509		

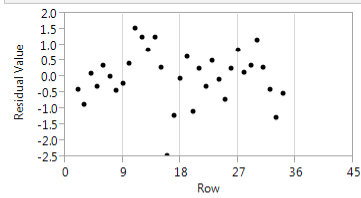
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant
Intercept	0	-0.0429000	0.1423058	-0.30	0.7650	-0.0429

**Forecast**



**Residuals**



Lag	AutoCorr	-.8	-.6	-.4	-.2	0	.2	.4	.6	.8	Ljung-Box Q	p-Value	Lag	Partial	-.8	-.6	-.4	-.2	0	.2	.4	.6	.8	
0	1.0000												0	1.0000										
1	0.3732										5.0281	0.0249*	1	0.3732										
2	-0.0478										5.1134	0.0776	2	-0.2174										
3	-0.1569										6.0612	0.1087	3	-0.0659										
4	-0.0734										6.2758	0.1795	4	0.0138										
5	-0.2617										9.1019	0.1051	5	-0.3271										
6	-0.2556										11.8971	0.0643	6	-0.0624										
7	-0.0986										12.3290	0.0902	7	-0.0283										
8	0.0788										12.6162	0.1258	8	0.0035										
9	-0.0232										12.6421	0.1795	9	-0.1484										
10	-0.2505										15.7935	0.1057	10	-0.3438										
11	-0.1629										17.1868	0.1025	11	-0.0668										
12	-0.0041										17.1877	0.1427	12	-0.1258										
13	0.0605										17.3989	0.1817	13	-0.0706										
14	-0.0743										17.7343	0.2191	14	-0.2595										
15	0.1061										18.4570	0.2394	15	-0.0215										
16	0.2394										22.3506	0.1322	16	-0.0544										
17	0.3237										29.9141	0.0270*	17	0.1328										
18	0.1098										30.8422	0.0300*	18	-0.0155										
19	-0.0101										30.8506	0.0419*	19	-0.0989										
20	-0.0666										31.2451	0.0520	20	-0.0819										
21	-0.1311										32.8999	0.0473*	21	-0.1708										
22	-0.1309										34.6979	0.0417*	22	0.1090										
23	-0.0529										35.0207	0.0518	23	0.0188										
24	-0.0140										35.0459	0.0677	24	-0.1518										
25	-0.0004										35.0459	0.0874	25	-0.0230										

**Model: I(1)**

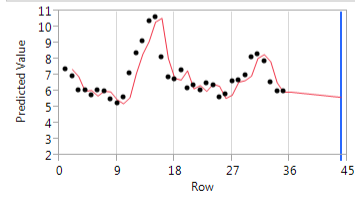
**Model Summary**

DF	33	Stable	Yes
Sum of Squared Errors	22.2377615	Invertible	Yes
Variance Estimate	0.67387156		
Standard Deviation	0.8208968		
Akaike's 'A' Information Criterion	84.052484		
Schwarz's Bayesian Criterion	85.5788445		
RSquare	0.6033672		
RSquare Adj	0.6033672		
MAPE	8.65957941		
MAE	0.61233893		
-2LogLikelihood	82.052484		

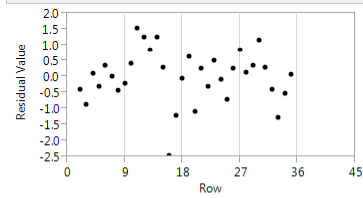
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant
Intercept	0	-0.0414559	0.1388542	-0.30	0.7672	-0.0414559

**Forecast**



**Residuals**



Lag	AutoCorr	-.8	-.6	-.4	-.2	0	.2	.4	.6	.8	Ljung-Box Q	p-Value	Lag	Partial	-.8	-.6	-.4	-.2	0	.2	.4	.6	.8	
0	1.0000												0	1.0000										
1	0.3720										5.1319	0.0235*	1	0.3720										
2	-0.0507										5.2304	0.0732	2	-0.2195										
3	-0.1580										6.2157	0.0106	3	-0.0650										
4	-0.0730										6.4333	0.1690	4	0.0134										
5	-0.2594										9.2730	0.0987	5	-0.3251										
6	-0.2550										12.1153	0.0594	6	-0.0644										
7	-0.0984										12.5545	0.0837	7	-0.0291										
8	0.0806										12.8601	0.1168	8	0.0056										
9	-0.0227										12.8854	0.1679	9	-0.1506										
10	-0.2520										16.1240	0.0961	10	-0.3436										
11	-0.1630										17.5379	0.0929	11	-0.0664										
12	-0.0029										17.5383	0.1304	12	-0.1277										
13	0.0600										17.7482	0.1673	13	-0.0732										
14	-0.0734										18.0784	0.2032	14	-0.2579										
15	0.1038										18.7728	0.2242	15	-0.0281										
16	0.2407										22.7125	0.1216	16	-0.0514										
17	0.3235										30.2482	0.0246*	17	0.1284										
18	0.1071										31.1265	0.0278*	18	-0.0194										
19	-0.0156										31.1464	0.0389*	19	-0.1025										
20	-0.0663										31.5302	0.0486*	20	-0.0832										
21	-0.1286										33.0875	0.0453*	21	-0.1714										
22	-0.1291										34.7881	0.0406*	22	0.1024										
23	-0.0502										35.0685	0.0512	23	0.0196										
24	-0.0107										35.0824	0.0672	24	-0.1545										
25	0.0006										35.0824	0.0867	25	-0.0279										

**Model: I(1)**

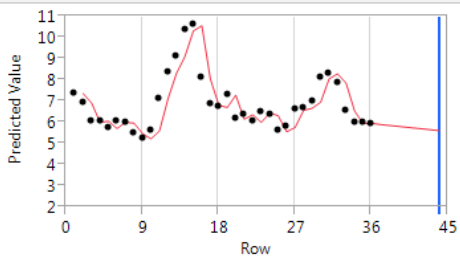
**Model Summary**

DF	34	Stable	Yes
Sum of Squared Errors	22.2378932	Invertible	Yes
Variance Estimate	0.65405568		
Standard Deviation	0.80873709		
Akaike's 'A' Information Criterion	85.4514359		
Schwarz's Bayesian Criterion	87.0067839		
RSquare	0.60932533		
RSquare Adj	0.60932533		
MAPE	8.41791119		
MAE	0.59520473		
-2LogLikelihood	83.4514359		

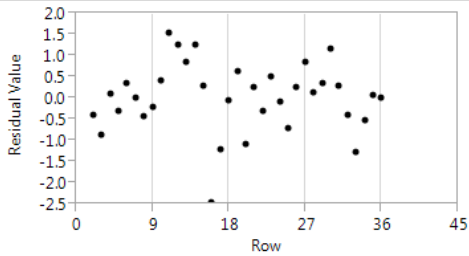
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0417886	0.1346576	-0.31	0.7582	-0.0417886

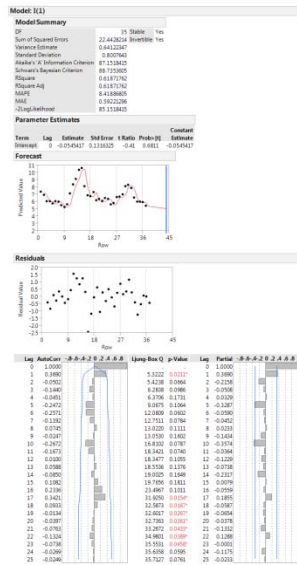
**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.3719		5.2693	0.0217*	1	0.3719	
2	-0.0504		5.3691	0.0683	2	-0.2191	
3	-0.1573		6.3702	0.0949	3	-0.0645	
4	-0.0728		6.5914	0.1591	4	0.0132	
5	-0.2595		9.4978	0.0908	5	-0.3249	
6	-0.2555		12.4139	0.0533	6	-0.0649	
7	-0.0986		12.8632	0.0755	7	-0.0286	
8	0.0805		13.1743	0.1060	8	0.0058	
9	-0.0231		13.2010	0.1537	9	-0.1511	
10	-0.2521		16.4940	0.0863	10	-0.3431	
11	-0.1627		17.9215	0.0834	11	-0.0665	
12	-0.0028		17.9219	0.1181	12	-0.1277	
13	0.0597		18.1317	0.1526	13	-0.0726	
14	-0.0733		18.4634	0.1865	14	-0.2573	
15	0.1037		19.1593	0.2066	15	-0.0285	
16	0.2413		23.1266	0.1104	16	-0.0498	
17	0.3232		30.6417	0.0221*	17	0.1278	
18	0.1072		31.5166	0.0251*	18	-0.0185	
19	-0.0150		31.5348	0.0352*	19	-0.1015	
20	-0.0649		31.8989	0.0444*	20	-0.0825	
21	-0.1287		33.4310	0.0417*	21	-0.1706	
22	-0.1297		35.1073	0.0378*	22	0.1025	
23	-0.0506		35.3836	0.0476*	23	0.0208	
24	-0.0113		35.3986	0.0627	24	-0.1545	
25	-0.0002		35.3986	0.0812	25	-0.0275	



**Model: I(1)**

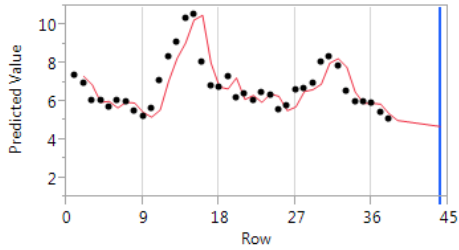
**Model Summary**

DF	36	Stable	Yes
Sum of Squared Errors	22.5293752	Invertible	Yes
Variance Estimate	0.62581598		
Standard Deviation	0.79108532		
Akaike's 'A' Information Criterion	88.6458295		
Schwarz's Bayesian Criterion	90.2567474		
RSquare	0.63521142		
RSquare Adj	0.63521142		
MAPE	8.35222347		
MAE	0.58492184		
-2LogLikelihood	86.6458295		

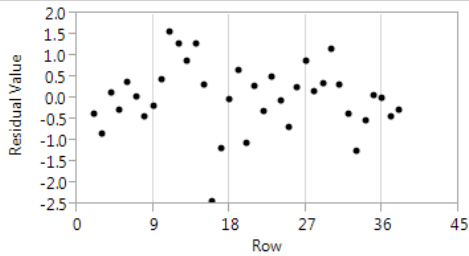
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0626027	0.1282829	-0.49	0.6285	-0.0626027

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3736	5.5959	0.0180*	1	0.3736
2	-0.0495	5.6968	0.0579	2	-0.2198
3	-0.1437	6.5734	0.0868	3	-0.0477
4	-0.0372	6.6339	0.1565	4	0.0426
5	-0.2290	8.9977	0.1092	5	-0.3174
6	-0.2498	11.9012	0.0642	6	-0.0581
7	-0.1212	12.6073	0.0823	7	-0.0402
8	0.0602	12.7878	0.1194	8	0.0107
9	-0.0283	12.8292	0.1705	9	-0.1321
10	-0.2680	16.6682	0.0820	10	-0.3479
11	-0.1785	18.4358	0.0720	11	-0.0396
12	0.0056	18.4376	0.1030	12	-0.1045
13	0.0664	18.7024	0.1326	13	-0.0722
14	-0.0850	19.1559	0.1591	14	-0.2251
15	0.1007	19.8206	0.1789	15	0.0343
16	0.2366	23.6656	0.0971	16	-0.0355
17	0.3372	31.8675	0.0156*	17	0.1735
18	0.1068	32.7338	0.0180*	18	-0.0254
19	-0.0214	32.7706	0.0255*	19	-0.0856
20	-0.0388	32.8985	0.0346*	20	-0.0109
21	-0.0601	33.2240	0.0438*	21	-0.1095
22	-0.0991	34.1689	0.0472*	22	0.1379
23	-0.0762	34.7672	0.0548	23	0.0053
24	-0.0421	34.9638	0.0689	24	-0.1272
25	-0.0353	35.1134	0.0862	25	0.0027

**Model: I(1)**

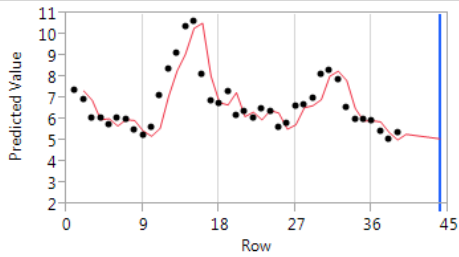
**Model Summary**

DF	37	Stable	Yes
Sum of Squared Errors	22.6363773	Invertible	Yes
Variance Estimate	0.61179398		
Standard Deviation	0.7821726		
Akaike's 'A' Information Criterion	90.154267		
Schwarz's Bayesian Criterion	91.7918532		
RSquare	0.64462524		
RSquare Adj	0.64462524		
MAPE	8.28836991		
MAE	0.57733463		
-2LogLikelihood	88.154267		

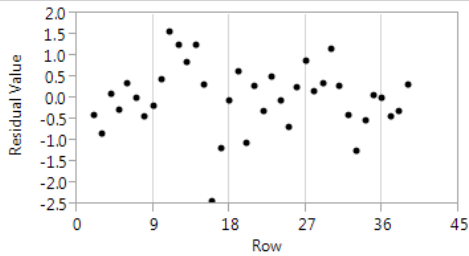
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0538789	0.1253131	-0.43	0.6697	-0.0538789

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000		.	.	0	1.0000	
1	0.3675		5.5473	0.0185*	1	0.3675	
2	-0.0562		5.6809	0.0584	2	-0.2211	
3	-0.1436		6.5768	0.0867	3	-0.0451	
4	-0.0368		6.6375	0.1563	4	0.0383	
5	-0.2362		9.2081	0.1010	5	-0.3237	
6	-0.2677		12.6118	0.0496*	6	-0.0781	
7	-0.1277		13.4117	0.0627	7	-0.0400	
8	0.0626		13.6102	0.0925	8	0.0066	
9	-0.0125		13.6184	0.1366	9	-0.1190	
10	-0.2620		17.3459	0.0671	10	-0.3597	
11	-0.1751		19.0723	0.0598	11	-0.0578	
12	0.0189		19.0933	0.0863	12	-0.0956	
13	0.0713		19.4027	0.1111	13	-0.0951	
14	-0.0931		19.9520	0.1317	14	-0.2357	
15	0.0996		20.6080	0.1498	15	0.0235	
16	0.2429		24.6832	0.0756	16	-0.0586	
17	0.3312		32.6246	0.0126*	17	0.1529	
18	0.1106		33.5541	0.0143*	18	-0.0100	
19	-0.0370		33.6638	0.0201*	19	-0.1244	
20	-0.0296		33.7378	0.0280*	20	0.0142	
21	-0.0607		34.0671	0.0356*	21	-0.1306	
22	-0.1161		35.3467	0.0356*	22	0.1066	
23	-0.1121		36.6205	0.0356*	23	-0.0006	
24	-0.0392		36.7870	0.0459*	24	-0.1366	
25	-0.0181		36.8252	0.0600	25	0.0112	

**Model: I(1)**

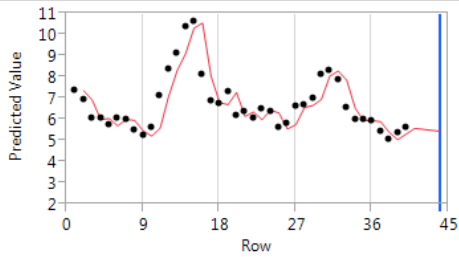
**Model Summary**

DF	38	Stable	Yes
Sum of Squared Errors	22.7380179	Invertible	Yes
Variance Estimate	0.59836889		
Standard Deviation	0.77354308		
Akaike's 'A' Information Criterion	91.6357959		
Schwarz's Bayesian Criterion	93.2993576		
RSquare	0.64956615		
RSquare Adj	0.64956615		
MAPE	8.21935947		
MAE	0.5701357		
-2LogLikelihood	89.6357959		

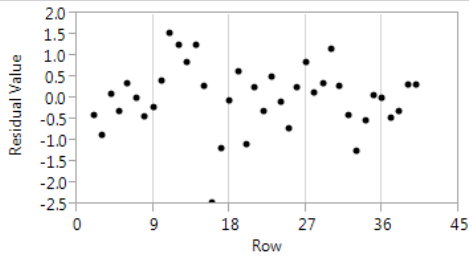
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0455974	0.1220747	-0.37	0.7108	-0.0455974

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3703	5.7688	0.0163*	1	0.3703
2	-0.0606	5.9275	0.0516	2	-0.2291
3	-0.1498	6.9236	0.0744	3	-0.0457
4	-0.0374	6.9873	0.1366	4	0.0411
5	-0.2349	9.5823	0.0880	5	-0.3281
6	-0.2746	13.2367	0.0394*	6	-0.0844
7	-0.1459	14.2999	0.0461*	7	-0.0575
8	0.0553	14.4577	0.0706	8	0.0066
9	-0.0098	14.4628	0.1068	9	-0.1245
10	-0.2452	17.7767	0.0588	10	-0.3482
11	-0.1694	19.4148	0.0540	11	-0.0681
12	0.0215	19.4422	0.0784	12	-0.1122
13	0.0843	19.8796	0.0983	13	-0.0915
14	-0.0876	20.3706	0.1189	14	-0.2598
15	0.0899	20.9090	0.1398	15	0.0155
16	0.2407	24.9366	0.0710	16	-0.0665
17	0.3368	33.1832	0.0107*	17	0.1293
18	0.1060	34.0389	0.0125*	18	-0.0290
19	-0.0332	34.1271	0.0178*	19	-0.1074
20	-0.0447	34.2955	0.0242*	20	-0.0189
21	-0.0519	34.5347	0.0317*	21	-0.1106
22	-0.1164	35.8080	0.0318*	22	0.0800
23	-0.1287	37.4629	0.0291*	23	-0.0308
24	-0.0746	38.0558	0.0342*	24	-0.1432
25	-0.0154	38.0828	0.0454*	25	-0.0009

**Model: I(1)**

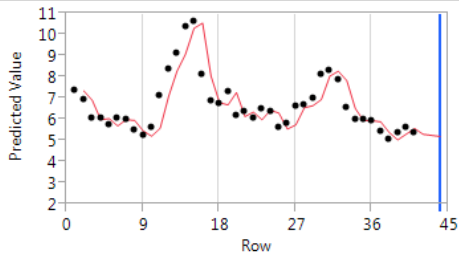
**Model Summary**

DF	39	Stable	Yes
Sum of Squared Errors	22.788437	Invertible	Yes
Variance Estimate	0.5843189		
Standard Deviation	0.76440755		
Akaike's 'A' Information Criterion	93.0100349		
Schwarz's Bayesian Criterion	94.6989143		
RSquare	0.65813676		
RSquare Adj	0.65813676		
MAPE	8.11942435		
MAE	0.56185162		
-2LogLikelihood	91.0100349		

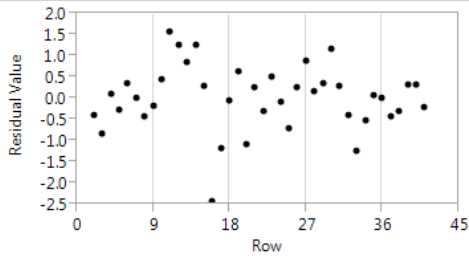
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0512825	0.1191494	-0.43	0.6693	-0.0512825

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3664	5.7832	0.0162*	1	0.3664
2	-0.0634	5.9606	0.0508	2	-0.2282
3	-0.1462	6.9315	0.0741	3	-0.0415
4	-0.0324	6.9806	0.1369	4	0.0414
5	-0.2340	9.6088	0.0871	5	-0.3277
6	-0.2742	13.3246	0.0382*	6	-0.0839
7	-0.1397	14.3186	0.0458*	7	-0.0520
8	0.0684	14.5641	0.0682	8	0.0194
9	-0.0050	14.5654	0.1036	9	-0.1245
10	-0.2469	17.9797	0.0553	10	-0.3433
11	-0.1803	19.8640	0.0472*	11	-0.0792
12	0.0178	19.8829	0.0693	12	-0.1000
13	0.0820	20.3012	0.0880	13	-0.0793
14	-0.0968	20.9070	0.1040	14	-0.2622
15	0.0868	21.4128	0.1241	15	0.0332
16	0.2470	25.6837	0.0586	16	-0.0580
17	0.3369	33.9737	0.0085*	17	0.1329
18	0.1007	34.7473	0.0102*	18	-0.0171
19	-0.0300	34.8192	0.0147*	19	-0.0959
20	-0.0473	35.0068	0.0201*	20	-0.0311
21	-0.0410	35.1550	0.0271*	21	-0.0813
22	-0.1222	36.5488	0.0265*	22	0.0614
23	-0.1278	38.1628	0.0245*	23	-0.0137
24	-0.0622	38.5694	0.0303*	24	-0.1215
25	0.0096	38.5797	0.0406*	25	0.0062

**Model: I(1)**

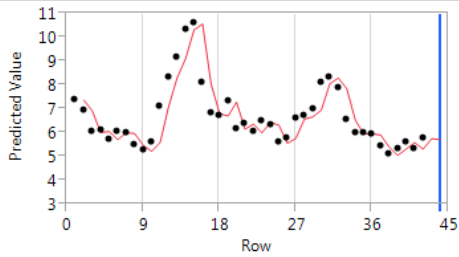
**Model Summary**

DF	40	Stable	Yes
Sum of Squared Errors	23.0226642	Invertible	Yes
Variance Estimate	0.57556661		
Standard Deviation	0.75866106		
Akaike's 'A' Information Criterion	94.6921494		
Schwarz's Bayesian Criterion	96.4057214		
RSquare	0.65846343		
RSquare Adj	0.65846343		
MAPE	8.1254412		
MAE	0.55931053		
-2LogLikelihood	92.6921494		

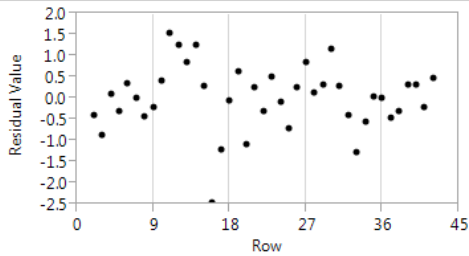
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0393317	0.1173223	-0.34	0.7392	-0.0393317

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3577	5.6407	0.0175*	1	0.3577
2	-0.0567	5.7859	0.0554	2	-0.2118
3	-0.1385	6.6758	0.0830	3	-0.0458
4	-0.0391	6.7486	0.1498	4	0.0302
5	-0.2417	9.6101	0.0871	5	-0.3191
6	-0.2723	13.3437	0.0379*	6	-0.0911
7	-0.1381	14.3326	0.0456*	7	-0.0559
8	0.0552	14.4952	0.0697	8	0.0093
9	-0.0328	14.5546	0.1039	9	-0.1478
10	-0.2538	18.2185	0.0514	10	-0.3386
11	-0.1729	19.9763	0.0457*	11	-0.1052
12	0.0422	20.0846	0.0655	12	-0.0784
13	0.0896	20.5904	0.0814	13	-0.0963
14	-0.0912	21.1331	0.0983	14	-0.2855
15	0.1046	21.8745	0.1111	15	0.0220
16	0.2501	26.2839	0.0502	16	-0.0871
17	0.3188	33.7478	0.0090*	17	0.1209
18	0.0982	34.4871	0.0110*	18	-0.0127
19	-0.0194	34.5172	0.0160*	19	-0.1177
20	-0.0534	34.7570	0.0214*	20	-0.0694
21	-0.0352	34.8661	0.0292*	21	-0.0497
22	-0.1438	36.7860	0.0250*	22	0.0030
23	-0.1136	38.0494	0.0252*	23	0.0294
24	-0.0633	38.4653	0.0310*	24	-0.1541
25	-0.0164	38.4950	0.0414*	25	-0.0568

## European Union

**Model: I(1)**

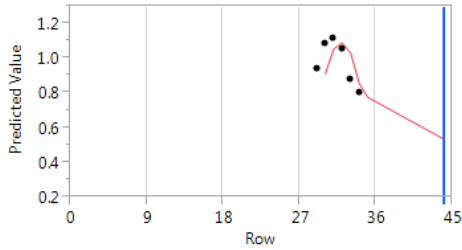
**Model Summary**

DF	4	Stable	Yes
Sum of Squared Errors	0.0586345	Invertible	Yes
Variance Estimate	0.01465863		
Standard Deviation	0.12107281		
Akaike's 'A' Information Criterion	-6.0399639		
Schwarz's Bayesian Criterion	-6.430526		
RSquare	0.22234563		
RSquare Adj	0.22234563		
MAPE	9.50903853		
MAE	0.09290083		
-2LogLikelihood	-8.0399639		

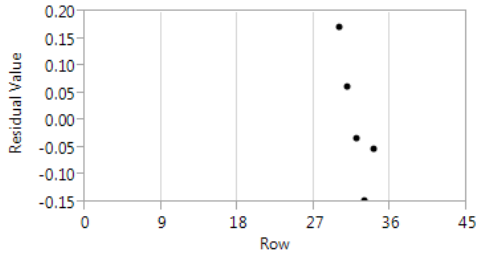
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0269430	0.0484296	-0.56	0.6076	-0.026943

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3575	1.1180	0.2903	1	0.3575
2	-0.2187	1.6762	0.4325	2	-0.3973
3	-0.4856	5.8023	0.1216	3	-0.3190
4	-0.1532	6.6233	0.1572	4	0.1361
5	0.0000	.	.	5	-0.2557
6	0.0000	.	.	6	-0.1761
7	0.0000	.	.	7	0.0689
8	0.0000	.	.	8	-0.1918
9	0.0000	.	.	9	-0.1067
10	0.0000	.	.	10	0.0299
11	0.0000	.	.	11	-0.1492
12	0.0000	.	.	12	-0.0694
13	0.0000	.	.	13	0.0056
14	0.0000	.	.	14	-0.1179
15	0.0000	.	.	15	-0.0482
16	0.0000	.	.	16	-0.0099
17	0.0000	.	.	17	-0.0939
18	0.0000	.	.	18	-0.0361
19	0.0000	.	.	19	-0.0194
20	0.0000	.	.	20	-0.0755
21	0.0000	.	.	21	-0.0292
22	0.0000	.	.	22	-0.0248
23	0.0000	.	.	23	-0.0612
24	0.0000	.	.	24	-0.0254
25	0.0000	.	.	25	-0.0275

**Model: I(1)**

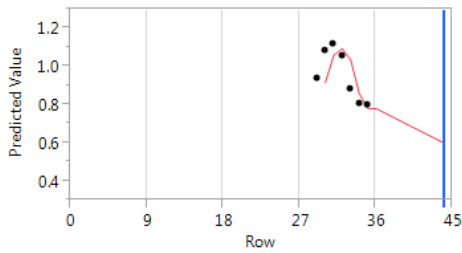
**Model Summary**

DF	5	Stable	Yes
Sum of Squared Errors	0.05920796	Invertible	Yes
Variance Estimate	0.01184159		
Standard Deviation	0.10881908		
Akaike's 'A' Information Criterion	-8.68349		
Schwarz's Bayesian Criterion	-8.8917305		
RSquare	0.43158162		
RSquare Adj	0.43158162		
MAPE	8.4872811		
MAE	0.08178945		
-2LogLikelihood	-10.68349		

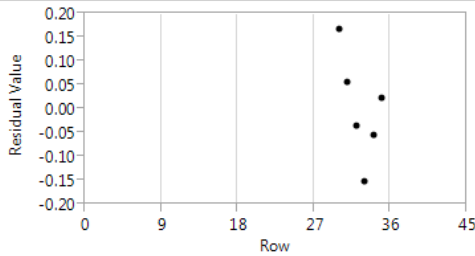
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0225709	0.0405518	-0.56	0.6018	-0.0225709

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.3431		1.1302	0.2877	1	0.3431
2	-0.2693		2.0006	0.3678	2	-0.4387
3	-0.4962		5.9397	0.1146	3	-0.2985
4	-0.1393		6.4054	0.1708	4	0.0996
5	0.0617		6.5880	0.2531	5	-0.2150
6	0.0000		.	.	6	-0.2330
7	0.0000		.	.	7	0.0888
8	0.0000		.	.	8	-0.1684
9	0.0000		.	.	9	-0.1632
10	0.0000		.	.	10	0.0588
11	0.0000		.	.	11	-0.1273
12	0.0000		.	.	12	-0.1299
13	0.0000		.	.	13	0.0449
14	0.0000		.	.	14	-0.1041
15	0.0000		.	.	15	-0.1051
16	0.0000		.	.	16	0.0332
17	0.0000		.	.	17	-0.0867
18	0.0000		.	.	18	-0.0877
19	0.0000		.	.	19	0.0247
20	0.0000		.	.	20	-0.0739
21	0.0000		.	.	21	-0.0744
22	0.0000		.	.	22	0.0179
23	0.0000		.	.	23	-0.0638
24	0.0000		.	.	24	-0.0640
25	0.0000		.	.	25	0.0125

**Model: I(1)**

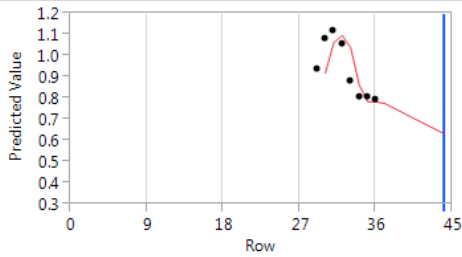
**Model Summary**

DF	6	Stable	Yes
Sum of Squared Errors	0.05940813	Invertible	Yes
Variance Estimate	0.00990136		
Standard Deviation	0.09950555		
Akaike's 'A' Information Criterion	-11.519501		
Schwarz's Bayesian Criterion	-11.573591		
RSquare	0.53106782		
RSquare Adj	0.53106782		
MAPE	7.51794169		
MAE	0.07197648		
-2LogLikelihood	-13.519501		

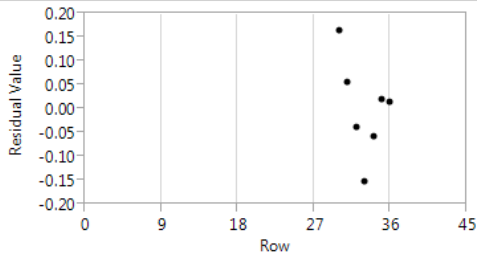
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0203878	0.0348199	-0.59	0.5795	-0.0203878

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.3536		1.3132	0.2518	1	0.3536
2	-0.2742		2.2602	0.3230	2	-0.4563
3	-0.5282		6.6549	0.0837	3	-0.3258
4	-0.1542		7.1541	0.1280	4	0.1218
5	0.0666		7.2938	0.1997	5	-0.2447
6	0.0364		7.3770	0.2874	6	-0.2213
7	0.0000		.	.	7	0.0708
8	0.0000		.	.	8	-0.1586
9	0.0000		.	.	9	-0.1679
10	0.0000		.	.	10	0.0435
11	0.0000		.	.	11	-0.1126
12	0.0000		.	.	12	-0.1328
13	0.0000		.	.	13	0.0246
14	0.0000		.	.	14	-0.0838
15	0.0000		.	.	15	-0.1082
16	0.0000		.	.	16	0.0112
17	0.0000		.	.	17	-0.0647
18	0.0000		.	.	18	-0.0897
19	0.0000		.	.	19	0.0016
20	0.0000		.	.	20	-0.0515
21	0.0000		.	.	21	-0.0753
22	0.0000		.	.	22	-0.0053
23	0.0000		.	.	23	-0.0423
24	0.0000		.	.	24	-0.0638
25	0.0000		.	.	25	-0.0102

**Model: I(1)**

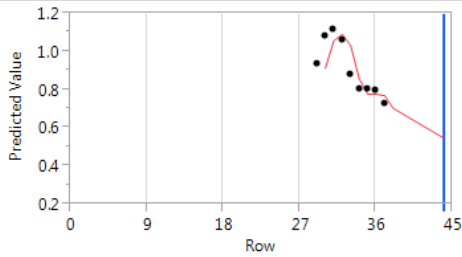
**Model Summary**

DF	7	Stable	Yes
Sum of Squared Errors	0.06128054	Invertible	Yes
Variance Estimate	0.00875436		
Standard Deviation	0.09356475		
Akaike's 'A' Information Criterion	-14.270859		
Schwarz's Bayesian Criterion	-14.191418		
RSquare	0.62559614		
RSquare Adj	0.62559614		
MAPE	7.34407503		
MAE	0.0687618		
-2LogLikelihood	-16.270859		

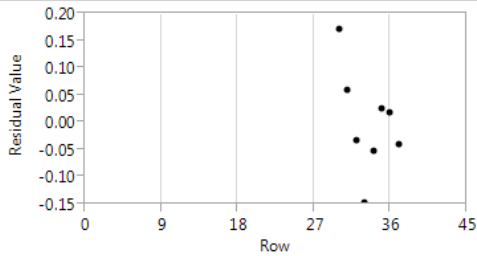
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0261702	0.0309426	-0.85	0.4256	-0.0261702

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.3168		1.1473	0.2841	1	0.3168
2	-0.3036		2.3766	0.3047	2	-0.4491
3	-0.4893		6.2078	0.1019	3	-0.2891
4	-0.0354		6.2328	0.1824	4	0.1843
5	0.1113		6.5632	0.2552	5	-0.2612
6	0.0129		6.5698	0.3625	6	-0.1392
7	-0.1127		7.5863	0.3705	7	-0.0032
8	0.0000		.	.	8	-0.0522
9	0.0000		.	.	9	-0.2047
10	0.0000		.	.	10	0.0001
11	0.0000		.	.	11	0.0055
12	0.0000		.	.	12	-0.2012
13	0.0000		.	.	13	0.0096
14	0.0000		.	.	14	-0.0022
15	0.0000		.	.	15	-0.1408
16	0.0000		.	.	16	-0.0334
17	0.0000		.	.	17	0.0167
18	0.0000		.	.	18	-0.1016
19	0.0000		.	.	19	-0.0663
20	0.0000		.	.	20	0.0341
21	0.0000		.	.	21	-0.0809
22	0.0000		.	.	22	-0.0740
23	0.0000		.	.	23	0.0286
24	0.0000		.	.	24	-0.0549
25	0.0000		.	.	25	-0.0771

**Model: I(1)**

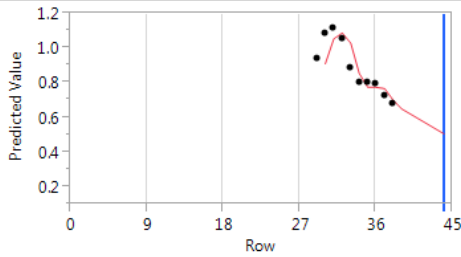
**Model Summary**

DF	8	Stable	Yes
Sum of Squared Errors	0.06179683	Invertible	Yes
Variance Estimate	0.0077246		
Standard Deviation	0.08788972		
Akaike's 'A' Information Criterion	-17.289257		
Schwarz's Bayesian Criterion	-17.092032		
RSquare	0.70679932		
RSquare Adj	0.70679932		
MAPE	6.86749287		
MAE	0.06350187		
-2LogLikelihood	-19.289257		

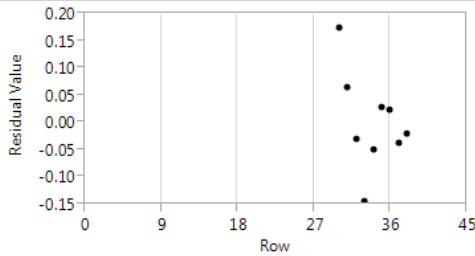
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0288480	0.0276218	-1.04	0.3268	-0.028848

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.3225		1.2869	0.2566	1	0.3225
2	-0.3169		2.7075	0.2583	2	-0.4698
3	-0.5032		6.8847	0.0757	3	-0.2885
4	-0.0171		6.8905	0.1418	4	0.2197
5	0.1699		7.6050	0.1794	5	-0.2295
6	0.0327		7.6402	0.2657	6	-0.1555
7	-0.1278		8.4483	0.2947	7	0.0535
8	-0.0601		8.8057	0.3589	8	-0.0927
9	0.0000		.	.	9	-0.1717
10	0.0000		.	.	10	-0.0157
11	0.0000		.	.	11	-0.0056
12	0.0000		.	.	12	-0.1566
13	0.0000		.	.	13	-0.0354
14	0.0000		.	.	14	0.0197
15	0.0000		.	.	15	-0.1202
16	0.0000		.	.	16	-0.0563
17	0.0000		.	.	17	0.0177
18	0.0000		.	.	18	-0.0793
19	0.0000		.	.	19	-0.0718
20	0.0000		.	.	20	0.0095
21	0.0000		.	.	21	-0.0458
22	0.0000		.	.	22	-0.0759
23	0.0000		.	.	23	-0.0027
24	0.0000		.	.	24	-0.0236
25	0.0000		.	.	25	-0.0701

**Model: I(1)**

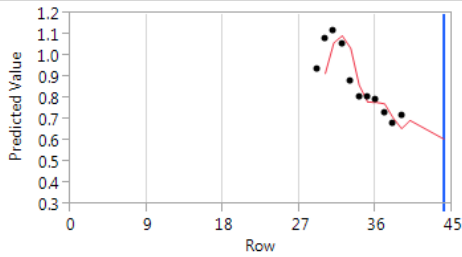
**Model Summary**

DF	9	Stable	Yes
Sum of Squared Errors	0.06588464	Invertible	Yes
Variance Estimate	0.00732052		
Standard Deviation	0.08556001		
Akaike's 'A' Information Criterion	-19.84558		
Schwarz's Bayesian Criterion	-19.542995		
RSquare	0.72033141		
RSquare Adj	0.72033141		
MAPE	7.1503407		
MAE	0.06389112		
-2LogLikelihood	-21.84558		

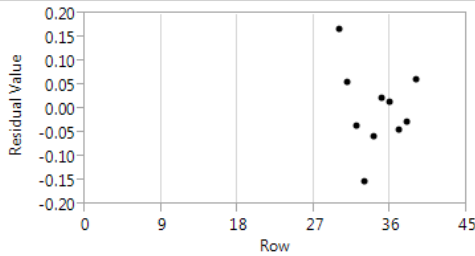
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0221085	0.0256675	-0.86	0.4114	-0.0221085

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.2976		1.1808	0.2772	1	0.2976
2	-0.3154		2.6727	0.2628	2	-0.4432
3	-0.4370		5.9460	0.1143	3	-0.2316
4	0.0123		5.9490	0.2030	4	0.1668
5	0.1043		6.2101	0.2863	5	-0.2452
6	-0.1247		6.6767	0.3518	6	-0.2599
7	-0.1708		7.8436	0.3466	7	0.0213
8	-0.0197		7.8668	0.4466	8	-0.1691
9	0.1534		10.6896	0.2976	9	-0.0638
10	0.0000		.	.	10	-0.1688
11	0.0000		.	.	11	0.0562
12	0.0000		.	.	12	-0.1139
13	0.0000		.	.	13	-0.1909
14	0.0000		.	.	14	0.0825
15	0.0000		.	.	15	-0.0938
16	0.0000		.	.	16	-0.1654
17	0.0000		.	.	17	0.0725
18	0.0000		.	.	18	-0.0923
19	0.0000		.	.	19	-0.0788
20	0.0000		.	.	20	-0.0398
21	0.0000		.	.	21	-0.0176
22	0.0000		.	.	22	-0.0449
23	0.0000		.	.	23	-0.1069
24	0.0000		.	.	24	0.0325
25	0.0000		.	.	25	-0.0305

**Model: I(1)**

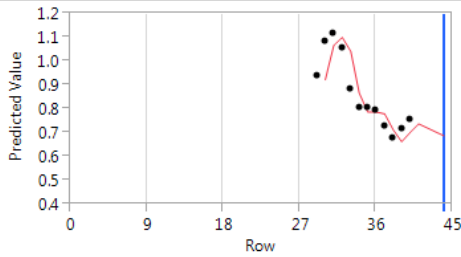
**Model Summary**

DF	10	Stable	Yes
Sum of Squared Errors	0.0690045	Invertible	Yes
Variance Estimate	0.00690045		
Standard Deviation	0.08306894		
Akaike's 'A' Information Criterion	-22.56962		
Schwarz's Bayesian Criterion	-22.171725		
RSquare	0.72083652		
RSquare Adj	0.72083652		
MAPE	7.16421756		
MAE	0.06292432		
-2LogLikelihood	-24.56962		

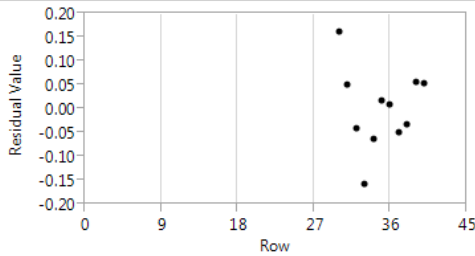
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0167829	0.0238788	-0.70	0.4982	-0.0167829

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.3481		1.7326	0.1881	1	0.3481
2	-0.3040		3.2007	0.2018	2	-0.4837
3	-0.4394		6.6527	0.0838	3	-0.1695
4	0.0243		6.6647	0.1547	4	0.2351
5	0.1140		6.9746	0.2225	5	-0.3158
6	-0.1685		7.7863	0.2542	6	-0.2807
7	-0.2969		10.9377	0.1414	7	-0.0123
8	-0.0705		11.1744	0.1920	8	-0.1715
9	0.1684		13.2022	0.1537	9	-0.1479
10	0.1245		15.4175	0.1176	10	-0.0511
11	0.0000		.	.	11	-0.0485
12	0.0000		.	.	12	-0.0685
13	0.0000		.	.	13	-0.2116
14	0.0000		.	.	14	-0.0326
15	0.0000		.	.	15	-0.0140
16	0.0000		.	.	16	-0.2014
17	0.0000		.	.	17	-0.0157
18	0.0000		.	.	18	0.0157
19	0.0000		.	.	19	-0.1646
20	0.0000		.	.	20	-0.0655
21	0.0000		.	.	21	-0.0084
22	0.0000		.	.	22	-0.0853
23	0.0000		.	.	23	-0.0817
24	0.0000		.	.	24	-0.0394
25	0.0000		.	.	25	-0.0130

**Model: I(1)**

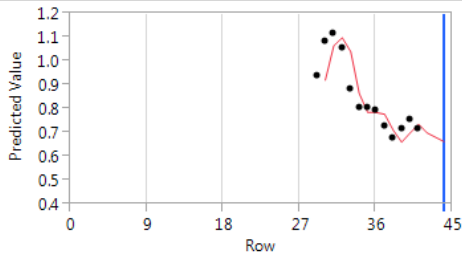
**Model Summary**

DF	11	Stable	Yes
Sum of Squared Errors	0.0693525	Invertible	Yes
Variance Estimate	0.00630477		
Standard Deviation	0.0794026		
Akaike's 'A' Information Criterion	-25.786991		
Schwarz's Bayesian Criterion	-25.302085		
RSquare	0.7381795		
RSquare Adj	0.7381795		
MAPE	6.786377		
MAE	0.05930434		
-2LogLikelihood	-27.786991		

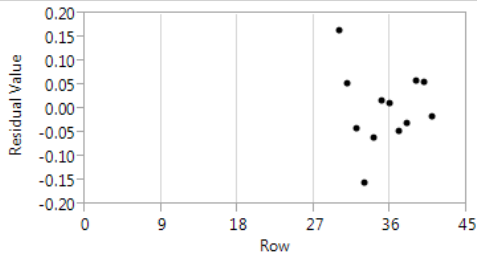
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0184066	0.0219453	-0.84	0.4195	-0.0184066

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.3276		1.6387	0.2005	1	0.3276
2	-0.3243		3.4053	0.1822	2	-0.4834
3	-0.4345		6.9287	0.0742	3	-0.1733
4	0.0360		6.9559	0.1382	4	0.2079
5	0.1112		7.2527	0.2025	5	-0.3046
6	-0.1724		8.0845	0.2320	6	-0.2725
7	-0.2787		10.6944	0.1525	7	-0.0384
8	-0.0241		10.7188	0.2181	8	-0.1330
9	0.1857		12.6495	0.1791	9	-0.1514
10	0.1154		13.7689	0.1838	10	-0.0459
11	-0.0420		14.0645	0.2294	11	-0.0804
12	0.0000		.	.	12	-0.0265
13	0.0000		.	.	13	-0.2282
14	0.0000		.	.	14	-0.0417
15	0.0000		.	.	15	0.0300
16	0.0000		.	.	16	-0.2096
17	0.0000		.	.	17	-0.0248
18	0.0000		.	.	18	0.0340
19	0.0000		.	.	19	-0.1649
20	0.0000		.	.	20	-0.0644
21	0.0000		.	.	21	0.0043
22	0.0000		.	.	22	-0.0833
23	0.0000		.	.	23	-0.0581
24	0.0000		.	.	24	-0.0572
25	0.0000		.	.	25	-0.0056

**Model: I(1)**

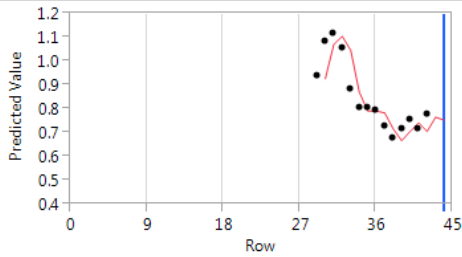
**Model Summary**

DF	12	Stable	Yes
Sum of Squared Errors	0.07500434	Invertible	Yes
Variance Estimate	0.00625036		
Standard Deviation	0.07905923		
Akaike's 'A' Information Criterion	-28.12466		
Schwarz's Bayesian Criterion	-27.559711		
RSquare	0.721274		
RSquare Adj	0.721274		
MAPE	7.00283313		
MAE	0.06029857		
-2LogLikelihood	-30.12466		

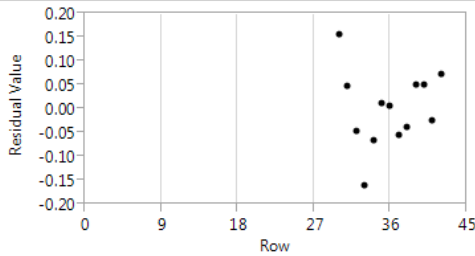
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0123875	0.0210628	-0.59	0.5674	-0.0123875

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.2968		1.4318	0.2315	1	0.2968
2	-0.2277		2.3510	0.3087	2	-0.3463
3	-0.3268		4.4336	0.2183	3	-0.1657
4	0.0071		4.4347	0.3504	4	0.1337
5	0.0516		4.4997	0.4799	5	-0.1541
6	-0.1516		5.1396	0.5260	6	-0.2163
7	-0.2417		7.0387	0.4249	7	-0.1171
8	-0.0913		7.3635	0.4980	8	-0.1026
9	-0.0044		7.3644	0.5992	9	-0.2044
10	0.0423		7.4806	0.6794	10	-0.0556
11	-0.0054		7.4834	0.7587	11	-0.1221
12	0.1511		11.9337	0.4510	12	0.0906
13	0.0000		.	.	13	-0.2680
14	0.0000		.	.	14	0.0117
15	0.0000		.	.	15	-0.0413
16	0.0000		.	.	16	-0.2077
17	0.0000		.	.	17	-0.0196
18	0.0000		.	.	18	-0.0318
19	0.0000		.	.	19	-0.0996
20	0.0000		.	.	20	-0.0756
21	0.0000		.	.	21	-0.0007
22	0.0000		.	.	22	-0.1160
23	0.0000		.	.	23	-0.0226
24	0.0000		.	.	24	-0.1239
25	0.0000		.	.	25	0.0270

## Japan

**Model: I(1)**

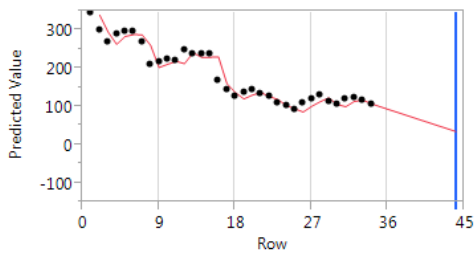
**Model Summary**

DF	32	Stable	Yes
Sum of Squared Errors	14599.7817	Invertible	Yes
Variance Estimate	456.243179		
Standard Deviation	21.3598497		
Akaike's 'A' Information Criterion	296.694335		
Schwarz's Bayesian Criterion	298.190843		
RSquare	0.90789038		
RSquare Adj	0.90789038		
MAPE	8.64113147		
MAE	15.3648898		
-2LogLikelihood	294.694335		

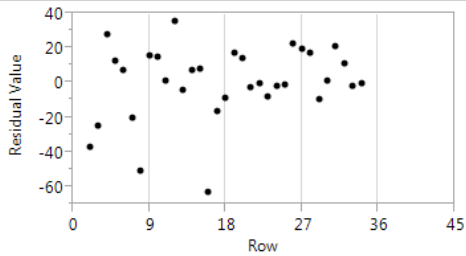
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-7.261664	3.661337	-1.98	0.0560	-7.2616636

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000				0	1.0000
1	0.1686		1.0260	0.3111	1	0.1686
2	-0.1788		2.2177	0.3299	2	-0.2133
3	-0.1916		3.6311	0.3041	3	-0.1284
4	-0.3641		8.9102	0.0634	4	-0.3749
5	0.1825		10.2839	0.0676	5	0.2964
6	0.0983		10.6970	0.0982	6	-0.2149
7	-0.0517		10.8158	0.1469	7	-0.0088
8	0.2621		13.9902	0.0820	8	0.2461
9	0.0511		14.1159	0.1183	9	0.1108
10	-0.1478		15.2125	0.1245	10	-0.2581
11	-0.1660		16.6589	0.1184	11	-0.0683
12	-0.2581		20.3236	0.0612	12	-0.0210
13	0.0852		20.7426	0.0782	13	-0.0012
14	0.1996		23.1655	0.0576	14	-0.1221
15	0.0665		23.4494	0.0751	15	0.1223
16	0.0726		23.8076	0.0938	16	0.0235
17	-0.0263		23.8573	0.1234	17	0.0476
18	-0.0741		24.2803	0.1461	18	-0.0447
19	-0.0527		24.5090	0.1773	19	0.0700
20	-0.0461		24.6976	0.2132	20	0.0404
21	0.0800		25.3133	0.2338	21	0.0492
22	0.1143		26.6852	0.2234	22	-0.0722
23	-0.0534		27.0141	0.2554	23	-0.1186
24	-0.1349		29.3485	0.2073	24	-0.1073
25	-0.0958		30.6737	0.2001	25	-0.0052

**Model: I(1)**

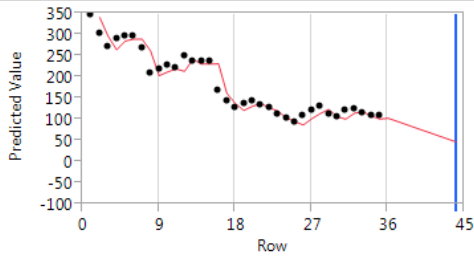
**Model Summary**

DF	33	Stable	Yes
Sum of Squared Errors	14682.2499	Invertible	Yes
Variance Estimate	444.916663		
Standard Deviation	21.0930477		
Akaike's 'A' Information Criterion	304.800977		
Schwarz's Bayesian Criterion	306.327338		
RSquare	0.91000045		
RSquare Adj	0.91000045		
MAPE	8.63467667		
MAE	15.1681443		
-2LogLikelihood	302.800977		

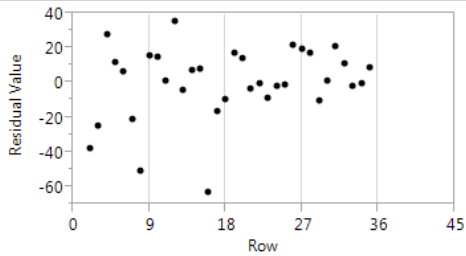
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-6.990553	3.564192	-1.96	0.0583	-6.9905529

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.1666		1.0298	0.3102	1	0.1666
2	-0.1803		2.2729	0.3210	2	-0.2140
3	-0.1844		3.6150	0.3062	3	-0.1210
4	-0.3491		8.5873	0.0723	4	-0.3616
5	0.1825		9.9936	0.0754	5	0.2910
6	0.0913		10.3581	0.1104	6	-0.2113
7	-0.0419		10.4377	0.1651	7	0.0164
8	0.2723		13.9277	0.0837	8	0.2512
9	0.0647		14.1324	0.1177	9	0.1230
10	-0.1471		15.2364	0.1237	10	-0.2465
11	-0.1650		16.6858	0.1175	11	-0.0410
12	-0.2610		20.4771	0.0586	12	-0.0552
13	0.0853		20.9008	0.0749	13	0.0186
14	0.1976		23.2902	0.0557	14	-0.1176
15	0.0749		23.6513	0.0713	15	0.1494
16	0.0827		24.1169	0.0870	16	-0.0084
17	-0.0319		24.1904	0.1144	17	0.0684
18	-0.0840		24.7300	0.1325	18	-0.0560
19	-0.0918		25.4178	0.1472	19	0.0332
20	-0.0418		25.5708	0.1805	20	0.0509
21	0.0830		26.2188	0.1982	21	0.0328
22	0.1099		27.4506	0.1946	22	-0.0807
23	-0.0319		27.5636	0.2327	23	-0.1149
24	-0.1339		29.7583	0.1929	24	-0.0934
25	-0.0861		30.7661	0.1969	25	-0.0093

**Model: I(1)**

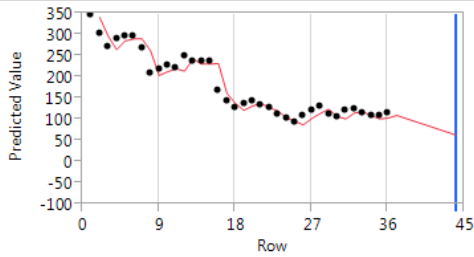
**Model Summary**

DF	34	Stable	Yes
Sum of Squared Errors	14851.4027	Invertible	Yes
Variance Estimate	436.805961		
Standard Deviation	20.8999034		
Akaike's 'A' Information Criterion	313.093251		
Schwarz's Bayesian Criterion	314.648599		
RSquare	0.91092743		
RSquare Adj	0.91092743		
MAPE	8.70484411		
MAE	15.0794741		
-2LogLikelihood	311.093251		

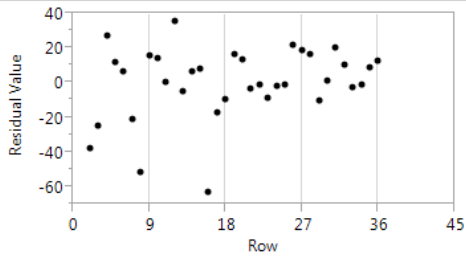
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-6.613531	3.481918	-1.90	0.0660	-6.6135314

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.1717	1.1230	0.2893	1	0.1717
2	-0.1803	2.3988	0.3014	2	-0.2162
3	-0.1850	3.7841	0.2857	3	-0.1192
4	-0.3361	8.5041	0.0748	4	-0.3468
5	0.1989	10.2111	0.0695	5	0.3095
6	0.0912	10.5822	0.1022	6	-0.2182
7	-0.0519	10.7066	0.1519	7	0.0217
8	0.2830	14.5479	0.0686	8	0.2860
9	0.0806	14.8716	0.0945	9	0.1290
10	-0.1260	15.6940	0.1087	10	-0.2392
11	-0.1627	17.1226	0.1043	11	-0.0355
12	-0.2584	20.8819	0.0521	12	-0.0046
13	0.0780	21.2404	0.0683	13	-0.0238
14	0.1961	23.6110	0.0510	14	-0.0987
15	0.0708	23.9357	0.0662	15	0.1459
16	0.0935	24.5312	0.0785	16	0.0418
17	-0.0172	24.5524	0.1052	17	0.0132
18	-0.0912	25.1854	0.1199	18	-0.0390
19	-0.1053	26.0827	0.1279	19	0.0124
20	-0.0976	26.9053	0.1379	20	0.0042
21	0.0873	27.6107	0.1515	21	0.0472
22	0.1129	28.8815	0.1483	22	-0.1112
23	-0.0372	29.0311	0.1793	23	-0.1302
24	-0.1028	30.2743	0.1758	24	-0.0748
25	-0.0846	31.2022	0.1824	25	0.0228

**Model: I(1)**

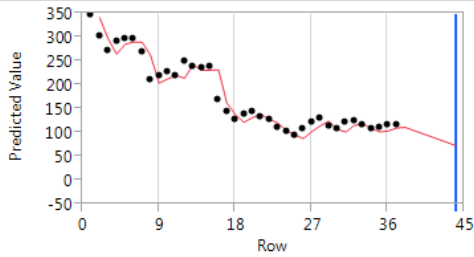
**Model Summary**

DF	35	Stable	Yes
Sum of Squared Errors	14914.6202	Invertible	Yes
Variance Estimate	426.132007		
Standard Deviation	20.6429651		
Akaike's 'A' Information Criterion	321.120393		
Schwarz's Bayesian Criterion	322.703912		
RSquare	0.91224944		
RSquare Adj	0.91224944		
MAPE	8.64376522		
MAE	14.8597043		
-2LogLikelihood	319.120393		

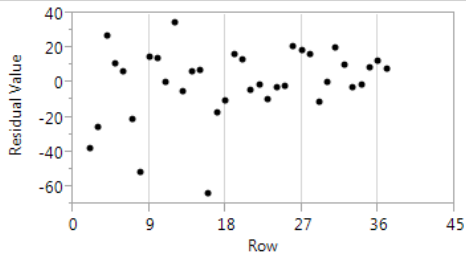
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-6.389539	3.392073	-1.88	0.0679	-6.3895389

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.1773		1.2292	0.2676	1	0.1773
2	-0.1757		2.4709	0.2907	2	-0.2138
3	-0.1851		3.8912	0.2735	3	-0.1183
4	-0.3362		8.7243	0.0684	4	-0.3437
5	0.2035		10.5523	0.0610	5	0.3217
6	0.1016		11.0231	0.0877	6	-0.2099
7	-0.0519		11.1504	0.1322	7	0.0185
8	0.2756		14.8617	0.0619	8	0.2878
9	0.0888		15.2616	0.0840	9	0.1480
10	-0.1154		15.9620	0.1007	10	-0.2427
11	-0.1498		17.1893	0.1024	11	-0.0245
12	-0.2572		20.9611	0.0510	12	0.0039
13	0.0775		21.3180	0.0669	13	0.0012
14	0.1914		23.5959	0.0512	14	-0.1315
15	0.0698		23.9136	0.0666	15	0.1662
16	0.0907		24.4766	0.0796	16	0.0370
17	-0.0103		24.4842	0.1069	17	0.0313
18	-0.0819		24.9940	0.1251	18	-0.0748
19	-0.1098		25.9636	0.1312	19	0.0283
20	-0.1063		26.9294	0.1373	20	-0.0066
21	0.0525		27.1810	0.1649	21	0.0097
22	0.1154		28.4822	0.1602	22	-0.1039
23	-0.0347		28.6086	0.1936	23	-0.1412
24	-0.1060		29.8900	0.1884	24	-0.0769
25	-0.0661		30.4340	0.2084	25	0.0337

**Model: I(1)**

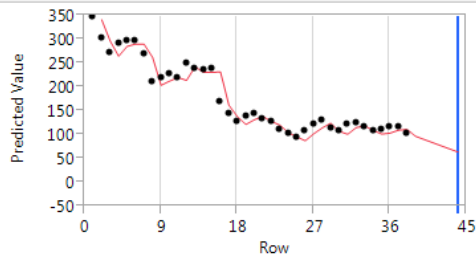
**Model Summary**

DF	36	Stable	Yes
Sum of Squared Errors	14976.6131	Invertible	Yes
Variance Estimate	416.017031		
Standard Deviation	20.3964955		
Akaike's 'A' Information Criterion	329.124559		
Schwarz's Bayesian Criterion	330.735477		
RSquare	0.91431774		
RSquare Adj	0.91431774		
MAPE	8.62205819		
MAE	14.6913167		
-2LogLikelihood	327.124559		

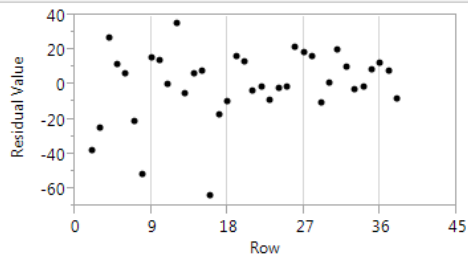
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-6.605273	3.307330	-2.00	0.0534	-6.605273

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.1730		1.1993	0.2735	1	0.1730	
2	-0.1809		2.5479	0.2797	2	-0.2173	
3	-0.1886		4.0568	0.2554	3	-0.1221	
4	-0.3342		8.9395	0.0626	4	-0.3438	
5	0.2041		10.8180	0.0551	5	0.3137	
6	0.0960		11.2474	0.0810	6	-0.2143	
7	-0.0617		11.4302	0.1209	7	0.0045	
8	0.2745		15.1805	0.0557	8	0.2928	
9	0.0944		15.6393	0.0748	9	0.1478	
10	-0.1234		16.4526	0.0874	10	-0.2590	
11	-0.1596		17.8661	0.0847	11	-0.0322	
12	-0.2682		22.0171	0.0373*	12	-0.0017	
13	0.0770		22.3738	0.0498*	13	-0.0029	
14	0.1908		24.6568	0.0381*	14	-0.1568	
15	0.0743		25.0188	0.0497*	15	0.1922	
16	0.0913		25.5911	0.0601	16	0.0311	
17	-0.0078		25.5954	0.0822	17	0.0319	
18	-0.0885		26.1906	0.0955	18	-0.0994	
19	-0.1182		27.3115	0.0976	19	0.0625	
20	-0.1009		28.1761	0.1053	20	-0.0129	
21	0.0613		28.5148	0.1261	21	0.0160	
22	0.1490		30.6504	0.1035	22	-0.0721	
23	-0.0374		30.7946	0.1279	23	-0.1530	
24	-0.1080		32.0883	0.1248	24	-0.0620	
25	-0.0626		32.5588	0.1425	25	0.0426	

**Model: I(1)**

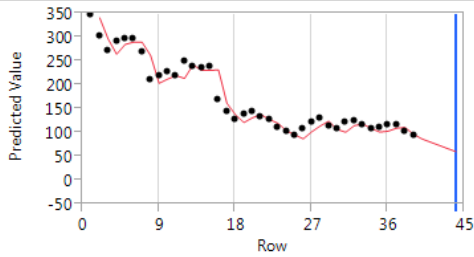
**Model Summary**

DF	37	Stable	Yes
Sum of Squared Errors	14985.9861	Invertible	Yes
Variance Estimate	405.026651		
Standard Deviation	20.1252739		
Akaike's 'A' Information Criterion	336.976144		
Schwarz's Bayesian Criterion	338.61373		
RSquare	0.91709092		
RSquare Adj	0.91709092		
MAPE	8.48121951		
MAE	14.3906485		
-2LogLikelihood	334.976144		

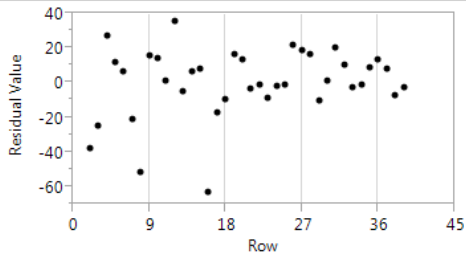
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-6.686921	3.221508	-2.08	0.0449*	-6.6869211

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.1747	1.2535	0.2629	1	0.1747
2	-0.1820	2.6526	0.2655	2	-0.2192
3	-0.1909	4.2351	0.2372	3	-0.1233
4	-0.3357	9.2720	0.0546	4	-0.3452
5	0.2042	11.1926	0.0477*	5	0.3152
6	0.0966	11.6363	0.0706	6	-0.2185
7	-0.0633	11.8330	0.1062	7	0.0036
8	0.2704	15.5376	0.0495*	8	0.2884
9	0.0942	16.0030	0.0668	9	0.1494
10	-0.1210	16.7980	0.0790	10	-0.2616
11	-0.1630	18.2934	0.0750	11	-0.0387
12	-0.2721	22.6202	0.0311*	12	-0.0031
13	0.0723	22.9378	0.0424*	13	-0.0048
14	0.1905	25.2371	0.0323*	14	-0.1612
15	0.0746	25.6053	0.0424*	15	0.1848
16	0.0931	26.2043	0.0512	16	0.0421
17	-0.0074	26.2082	0.0707	17	0.0285
18	-0.0876	26.7919	0.0830	18	-0.1021
19	-0.1210	27.9628	0.0841	19	0.0559
20	-0.1043	28.8822	0.0901	20	0.0001
21	0.0631	29.2386	0.1084	21	0.0119
22	0.1524	31.4453	0.0874	22	-0.0714
23	-0.0242	31.5044	0.1109	23	-0.1375
24	-0.1090	32.7955	0.1085	24	-0.0655
25	-0.0636	33.2686	0.1245	25	0.0477

**Model: I(1)**

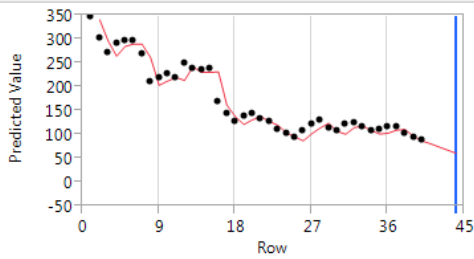
**Model Summary**

DF	38	Stable	Yes
Sum of Squared Errors	14986.5879	Invertible	Yes
Variance Estimate	394.383892		
Standard Deviation	19.859101		
Akaike's 'A' Information Criterion	344.779828		
Schwarz's Bayesian Criterion	346.44339		
RSquare	0.91999298		
RSquare Adj	0.91999298		
MAPE	8.28638409		
MAE	14.0402592		
-2LogLikelihood	342.779828		

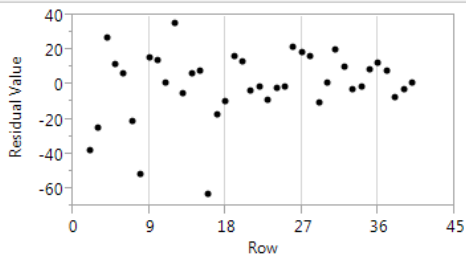
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-6.666769	3.138886	-2.12	0.0402*	-6.6667693

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.1745	1.2808	0.2578	1	0.1745
2	-0.1825	2.7204	0.2566	2	-0.2196
3	-0.1905	4.3326	0.2277	3	-0.1228
4	-0.3350	9.4600	0.0506	4	-0.3449
5	0.2046	11.4293	0.0435*	5	0.3154
6	0.0966	11.8810	0.0647	6	-0.2189
7	-0.0636	12.0830	0.0979	7	0.0048
8	0.2709	15.8670	0.0443*	8	0.2887
9	0.0953	16.3506	0.0599	9	0.1506
10	-0.1210	17.1577	0.0709	10	-0.2617
11	-0.1635	18.6843	0.0670	11	-0.0384
12	-0.2712	23.0388	0.0274*	12	-0.0017
13	0.0733	23.3692	0.0375*	13	-0.0039
14	0.1917	25.7206	0.0281*	14	-0.1605
15	0.0746	26.0911	0.0371*	15	0.1851
16	0.0930	26.6922	0.0450*	16	0.0445
17	-0.0079	26.6967	0.0627	17	0.0261
18	-0.0877	27.2824	0.0738	18	-0.1014
19	-0.1212	28.4561	0.0750	19	0.0557
20	-0.1036	29.3599	0.0809	20	0.0028
21	0.0640	29.7239	0.0977	21	0.0087
22	0.1519	31.8946	0.0792	22	-0.0709
23	-0.0251	31.9573	0.1010	23	-0.1382
24	-0.1124	33.3038	0.0978	24	-0.0690
25	-0.0633	33.7611	0.1131	25	0.0487

**Model: I(1)**

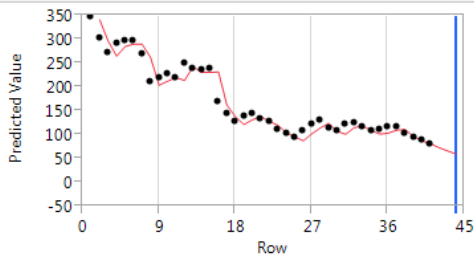
**Model Summary**

DF	39	Stable	Yes
Sum of Squared Errors	14988.549	Invertible	Yes
Variance Estimate	384.321769		
Standard Deviation	19.6041263		
Akaike's 'A' Information Criterion	352.561576		
Schwarz's Bayesian Criterion	354.250455		
RSquare	0.9230868		
RSquare Adj	0.9230868		
MAPE	8.12315818		
MAE	13.7264813		
-2LogLikelihood	350.561576		

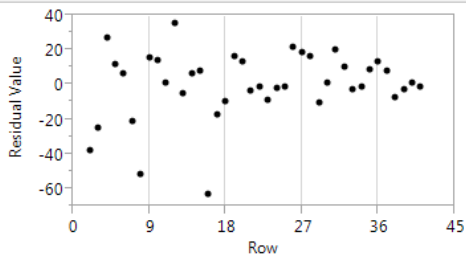
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-6.702225	3.060929	-2.19	0.0346*	-6.702225

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.1745	1.3111	0.2522	1	0.1745
2	-0.1821	2.7764	0.2495	2	-0.2192
3	-0.1897	4.4100	0.2205	3	-0.1221
4	-0.3357	9.6675	0.0464*	4	-0.3456
5	0.2034	11.6540	0.0398*	5	0.3149
6	0.0958	12.1074	0.0596	6	-0.2195
7	-0.0633	12.3114	0.0908	7	0.0056
8	0.2712	16.1727	0.0400*	8	0.2870
9	0.0944	16.6553	0.0544	9	0.1491
10	-0.1228	17.5001	0.0640	10	-0.2633
11	-0.1636	19.0507	0.0602	11	-0.0374
12	-0.2702	23.4300	0.0243*	12	-0.0029
13	0.0717	23.7497	0.0335*	13	-0.0070
14	0.1898	26.0782	0.0253*	14	-0.1609
15	0.0725	26.4318	0.0337*	15	0.1840
16	0.0931	27.0389	0.0411*	16	0.0427
17	-0.0076	27.0431	0.0574	17	0.0222
18	-0.0868	27.6190	0.0681	18	-0.0961
19	-0.1211	28.7913	0.0693	19	0.0539
20	-0.1033	29.6871	0.0751	20	0.0024
21	0.0627	30.0350	0.0913	21	0.0048
22	0.1503	32.1441	0.0750	22	-0.0643
23	-0.0242	32.2018	0.0960	23	-0.1397
24	-0.1108	33.4901	0.0941	24	-0.0682
25	-0.0573	33.8576	0.1110	25	0.0549

**Model: I(1)**

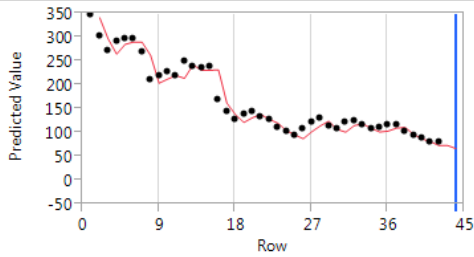
**Model Summary**

DF	40	Stable	Yes
Sum of Squared Errors	15033.9739	Invertible	Yes
Variance Estimate	375.849347		
Standard Deviation	19.3868344		
Akaike's 'A' Information Criterion	360.437287		
Schwarz's Bayesian Criterion	362.150859		
RSquare	0.92559181		
RSquare Adj	0.92559181		
MAPE	8.13099561		
MAE	13.5459388		
-2LogLikelihood	358.437287		

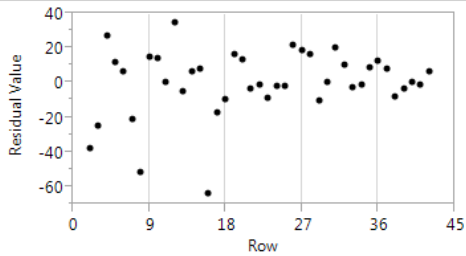
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-6.535798	2.990486	-2.19	0.0348*	-6.5357976

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.1729	1.3173	0.2511	1	0.1729
2	-0.1819	2.8124	0.2451	2	-0.2183
3	-0.1909	4.5027	0.2120	3	-0.1243
4	-0.3384	9.9603	0.0411*	4	-0.3483
5	0.2062	12.0423	0.0342*	5	0.3171
6	0.1009	12.5549	0.0507	6	-0.2143
7	-0.0601	12.7421	0.0786	7	0.0047
8	0.2692	16.6149	0.0344*	8	0.2859
9	0.0924	17.0855	0.0474*	9	0.1569
10	-0.1183	17.8810	0.0570	10	-0.2563
11	-0.1538	19.2718	0.0564	11	-0.0286
12	-0.2688	23.6657	0.0226*	12	-0.0066
13	0.0669	23.9476	0.0316*	13	-0.0058
14	0.1970	26.4818	0.0225*	14	-0.1435
15	0.0806	26.9225	0.0294*	15	0.1852
16	0.1023	27.6607	0.0347*	16	0.0489
17	-0.0085	27.6660	0.0490*	17	0.0266
18	-0.0876	28.2539	0.0583	18	-0.0709
19	-0.1247	29.4992	0.0585	19	0.0235
20	-0.1035	30.3981	0.0637	20	0.0110
21	0.0608	30.7241	0.0784	21	0.0031
22	0.1559	32.9782	0.0622	22	-0.0396
23	-0.0166	33.0052	0.0810	23	-0.1703
24	-0.1148	34.3708	0.0783	24	-0.0604
25	-0.0646	34.8310	0.0913	25	0.0461

## Norway

**Model: I(1)**

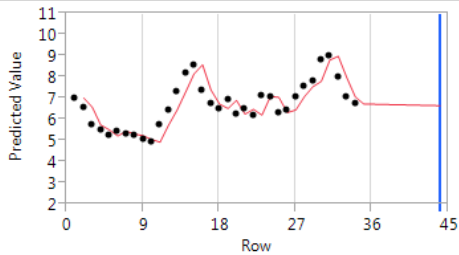
**Model Summary**

DF	32	Stable	Yes
Sum of Squared Errors	11.5553431	Invertible	Yes
Variance Estimate	0.36110447		
Standard Deviation	0.60091969		
Akaike's 'A' Information Criterion	61.0210756		
Schwarz's Bayesian Criterion	62.5175832		
RSquare	0.69572126		
RSquare Adj	0.69572126		
MAPE	7.23189546		
MAE	0.4957405		
-2LogLikelihood	59.0210756		

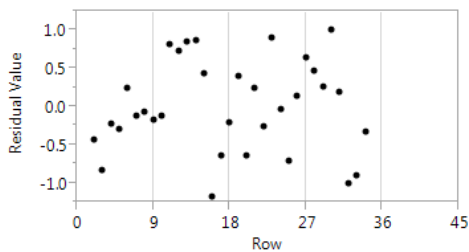
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0085545	0.1024230	-0.08	0.9340	-0.0085545

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3660	4.8338	0.0279*	1	0.3660
2	-0.0078	4.8361	0.0891	2	-0.1637
3	-0.1982	6.3478	0.0959	3	-0.1601
4	-0.0874	6.6522	0.1554	4	0.0604
5	-0.2551	9.3356	0.0964	5	-0.3185
6	-0.1865	10.8231	0.0940	6	-0.0194
7	-0.0112	10.8287	0.1463	7	0.0729
8	0.0507	10.9476	0.2047	8	-0.1296
9	-0.0611	11.1272	0.2671	9	-0.0967
10	-0.2408	14.0391	0.1712	10	-0.2867
11	-0.1904	15.9425	0.1433	11	-0.1355
12	-0.0181	15.9606	0.1930	12	0.0321
13	0.0441	16.0728	0.2452	13	-0.1412
14	-0.0016	16.0730	0.3089	14	-0.1388
15	0.2417	19.8227	0.1788	15	0.2217
16	0.3163	26.6211	0.0459*	16	-0.0038
17	0.2594	31.4794	0.0175*	17	0.1553
18	0.0019	31.4797	0.0253*	18	0.0109
19	-0.1060	32.4064	0.0281*	19	-0.1775
20	-0.1972	35.8603	0.0160*	20	-0.0427
21	-0.1821	39.0508	0.0097*	21	-0.0771
22	-0.0416	39.2327	0.0133*	22	0.1145
23	-0.0131	39.2525	0.0186*	23	-0.0663
24	-0.0242	39.3274	0.0252*	24	-0.1896
25	-0.0624	39.8902	0.0299*	25	0.0228

**Model: I(1)**

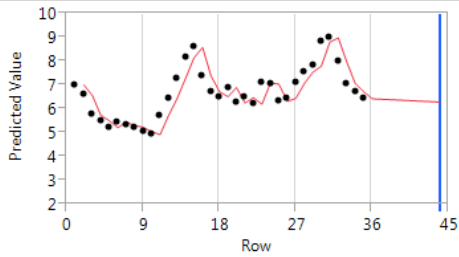
**Model Summary**

DF	33	Stable	Yes
Sum of Squared Errors	11.6370515	Invertible	Yes
Variance Estimate	0.35263792		
Standard Deviation	0.59383325		
Akaike's 'A' Information Criterion	62.0341619		
Schwarz's Bayesian Criterion	63.5605224		
RSquare	0.69407345		
RSquare Adj	0.69407345		
MAPE	7.12671438		
MAE	0.48868962		
-2LogLikelihood	60.0341619		

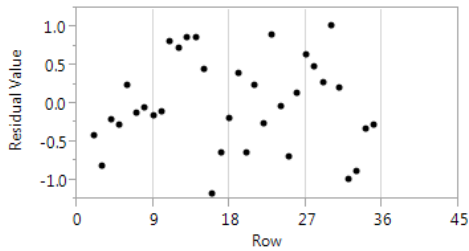
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0170882	0.0998988	-0.17	0.8652	-0.0170882

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3720	5.1318	0.0235*	1	0.3720
2	0.0157	5.1413	0.0765	2	-0.1424
3	-0.1698	6.2793	0.0988	3	-0.1463
4	-0.0887	6.6002	0.1586	4	0.0431
5	-0.2760	9.8149	0.0807	5	-0.3227
6	-0.1898	11.3899	0.0770	6	0.0014
7	-0.0212	11.4103	0.1217	7	0.0559
8	0.0361	11.4716	0.1764	8	-0.1199
9	-0.0628	11.6647	0.2329	9	-0.0844
10	-0.2209	14.1538	0.1661	10	-0.2862
11	-0.1877	16.0287	0.1401	11	-0.1325
12	-0.0405	16.1199	0.1858	12	0.0257
13	0.0490	16.2600	0.2354	13	-0.0877
14	-0.0091	16.2650	0.2975	14	-0.1615
15	0.2552	20.4592	0.1550	15	0.2488
16	0.3042	26.7533	0.0443*	16	-0.0169
17	0.2627	31.7215	0.0163*	17	0.1467
18	0.0178	31.7459	0.0236*	18	0.0321
19	-0.0750	32.2045	0.0296*	19	-0.1783
20	-0.2054	35.8942	0.0158*	20	-0.0584
21	-0.2012	39.7040	0.0081*	21	-0.0645
22	-0.0627	40.1045	0.0105*	22	0.0945
23	-0.0317	40.2161	0.0145*	23	-0.0718
24	-0.0449	40.4633	0.0191*	24	-0.1676
25	-0.0604	40.9598	0.0232*	25	-0.0192

**Model: I(1)**

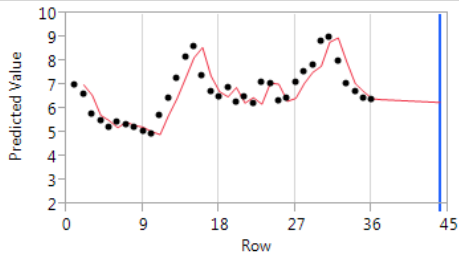
**Model Summary**

DF	34	Stable	Yes
Sum of Squared Errors	11.6372589	Invertible	Yes
Variance Estimate	0.34227232		
Standard Deviation	0.58504044		
Akaike's 'A' Information Criterion	62.7859325		
Schwarz's Bayesian Criterion	64.3412806		
RSquare	0.6946709		
RSquare Adj	0.6946709		
MAPE	6.92823492		
MAE	0.4750849		
-2LogLikelihood	60.7859325		

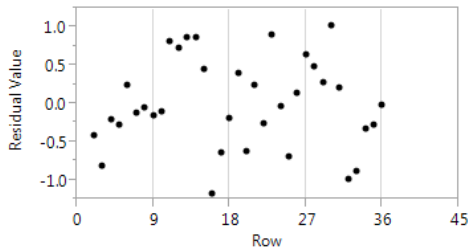
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0175057	0.0976062	-0.18	0.8587	-0.0175057

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3723	5.2801	0.0216*	1	0.3723
2	0.0161	5.2903	0.0710	2	-0.1422
3	-0.1686	6.4405	0.0920	3	-0.1452
4	-0.0873	6.7590	0.1492	4	0.0439
5	-0.2761	10.0493	0.0739	5	-0.3236
6	-0.1910	11.6776	0.0696	6	0.0015
7	-0.0214	11.6988	0.1109	7	0.0571
8	0.0356	11.7596	0.1623	8	-0.1210
9	-0.0635	11.9606	0.2155	9	-0.0840
10	-0.2211	14.4918	0.1517	10	-0.2857
11	-0.1868	16.3749	0.1278	11	-0.1320
12	-0.0405	16.4671	0.1708	12	0.0263
13	0.0478	16.6018	0.2182	13	-0.0884
14	-0.0088	16.6067	0.2777	14	-0.1590
15	0.2548	20.8109	0.1430	15	0.2480
16	0.3050	27.1518	0.0398*	16	-0.0157
17	0.2622	32.0973	0.0146*	17	0.1457
18	0.0181	32.1222	0.0213*	18	0.0316
19	-0.0742	32.5672	0.0270*	19	-0.1776
20	-0.2039	36.1572	0.0147*	20	-0.0580
21	-0.2016	39.9181	0.0076*	21	-0.0648
22	-0.0637	40.3226	0.0099*	22	0.0940
23	-0.0328	40.4384	0.0137*	23	-0.0726
24	-0.0459	40.6860	0.0180*	24	-0.1679
25	-0.0615	41.1756	0.0220*	25	-0.0183

**Model: I(1)**

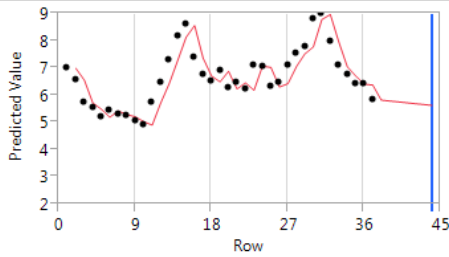
**Model Summary**

DF	35	Stable	Yes
Sum of Squared Errors	11.9168812	Invertible	Yes
Variance Estimate	0.34048232		
Standard Deviation	0.58350863		
Akaike's 'A' Information Criterion	64.3633081		
Schwarz's Bayesian Criterion	65.9468271		
RSquare	0.69265642		
RSquare Adj	0.69265642		
MAPE	6.93611446		
MAE	0.47434136		
-2LogLikelihood	62.3633081		

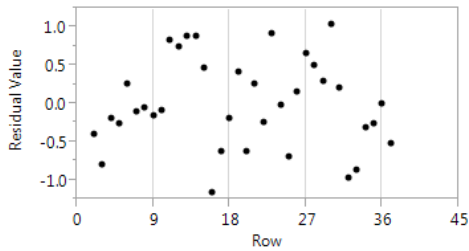
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0324028	0.0959127	-0.34	0.7375	-0.0324028

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3647	5.1996	0.0226*	1	0.3647
2	0.0299	5.2356	0.0730	2	-0.1189
3	-0.1480	6.1434	0.1048	3	-0.1367
4	-0.0425	6.2208	0.1833	4	0.0801
5	-0.2212	8.3799	0.1365	5	-0.2842
6	-0.1905	10.0349	0.1232	6	-0.0396
7	-0.0622	10.2173	0.1766	7	0.0490
8	0.0262	10.2509	0.2479	8	-0.0721
9	-0.0803	10.5777	0.3058	9	-0.1173
10	-0.2430	13.6846	0.1879	10	-0.2584
11	-0.1887	15.6327	0.1553	11	-0.0994
12	-0.0091	15.6374	0.2084	12	0.0343
13	0.0466	15.7665	0.2620	13	-0.0734
14	-0.0513	15.9300	0.3177	14	-0.1690
15	0.2589	20.2960	0.1609	15	0.3187
16	0.2862	25.9000	0.0555	16	-0.0506
17	0.2839	31.7048	0.0164*	17	0.1766
18	-0.0010	31.7049	0.0238*	18	-0.0257
19	-0.0635	32.0296	0.0310*	19	-0.1649
20	-0.1705	34.5144	0.0228*	20	-0.0350
21	-0.1430	36.3784	0.0198*	21	-0.0645
22	-0.0813	37.0235	0.0235*	22	0.0857
23	-0.0707	37.5490	0.0285*	23	-0.1112
24	-0.0831	38.3359	0.0320*	24	-0.1771
25	-0.0937	39.4283	0.0334*	25	-0.0110

**Model: I(1)**

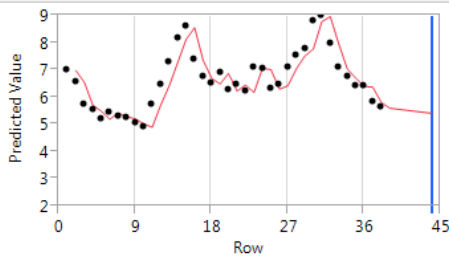
**Model Summary**

DF	36	Stable	Yes
Sum of Squared Errors	11.9508314	Invertible	Yes
Variance Estimate	0.33196754		
Standard Deviation	0.57616624		
Akaike's 'A' Information Criterion	65.1871201		
Schwarz's Bayesian Criterion	66.798038		
RSquare	0.69962637		
RSquare Adj	0.69962637		
MAPE	6.82202757		
MAE	0.46588766		
-2LogLikelihood	63.1871201		

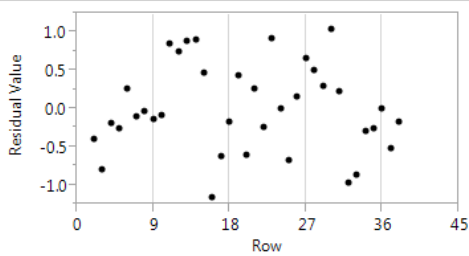
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0374514	0.0933294	-0.40	0.6906	-0.0374514

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3720	5.5473	0.0185*	1	0.3720
2	0.0306	5.5858	0.0612	2	-0.1251
3	-0.1426	6.4488	0.0917	3	-0.1283
4	-0.0366	6.5073	0.1643	4	0.0848
5	-0.2059	8.4192	0.1346	5	-0.2737
6	-0.1732	9.8154	0.1326	6	-0.0225
7	-0.0635	10.0093	0.1880	7	0.0352
8	0.0118	10.0162	0.2639	8	-0.0765
9	-0.0831	10.3723	0.3212	9	-0.1005
10	-0.2491	13.6894	0.1876	10	-0.2674
11	-0.1980	15.8652	0.1462	11	-0.0879
12	-0.0117	15.8731	0.1971	12	0.0457
13	0.0566	16.0654	0.2456	13	-0.0718
14	-0.0515	16.2317	0.2994	14	-0.1635
15	0.2437	20.1278	0.1671	15	0.3195
16	0.2891	25.8691	0.0559	16	-0.0318
17	0.2790	31.4869	0.0174*	17	0.1555
18	0.0084	31.4922	0.0252*	18	-0.0112
19	-0.0697	31.8817	0.0322*	19	-0.1793
20	-0.1672	34.2542	0.0245*	20	-0.0369
21	-0.1327	35.8417	0.0228*	21	-0.0568
22	-0.0629	36.2220	0.0287*	22	0.0820
23	-0.0773	36.8375	0.0338*	23	-0.1149
24	-0.0962	37.8647	0.0358*	24	-0.1797
25	-0.1070	39.2425	0.0348*	25	-0.0138

**Model: I(1)**

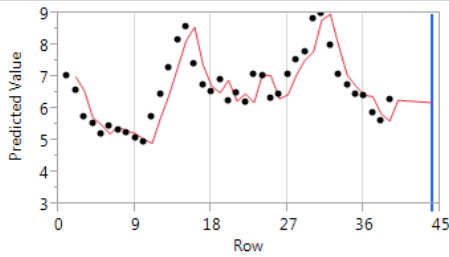
**Model Summary**

DF	37	Stable	Yes
Sum of Squared Errors	12.4167587	Invertible	Yes
Variance Estimate	0.33558807		
Standard Deviation	0.57929964		
Akaike's 'A' Information Criterion	67.334843		
Schwarz's Bayesian Criterion	68.9724292		
RSquare	0.68878766		
RSquare Adj	0.68878766		
MAPE	6.99133949		
MAE	0.47440305		
-2LogLikelihood	65.334843		

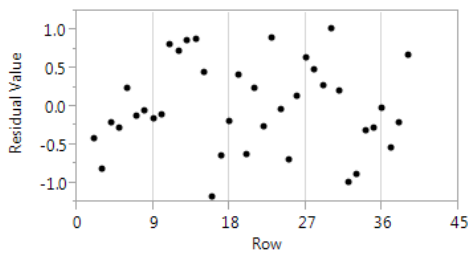
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0192474	0.0925914	-0.21	0.8365	-0.0192474

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.3473		4.9557	0.0260*	1	0.3473	
2	-0.0014		4.9558	0.0839	2	-0.1388	
3	-0.1401		5.8076	0.1214	3	-0.1059	
4	-0.0533		5.9346	0.2041	4	0.0430	
5	-0.2186		8.1358	0.1489	5	-0.2657	
6	-0.2191		10.4162	0.1082	6	-0.0848	
7	-0.1210		11.1335	0.1329	7	-0.0307	
8	0.0164		11.1472	0.1935	8	-0.0183	
9	-0.0289		11.1910	0.2628	9	-0.0927	
10	-0.2278		14.0073	0.1727	10	-0.3061	
11	-0.1653		15.5451	0.1589	11	-0.0802	
12	0.0249		15.5815	0.2112	12	0.0000	
13	0.0649		15.8376	0.2580	13	-0.0993	
14	-0.0852		16.2971	0.2956	14	-0.2043	
15	0.2338		19.9091	0.1754	15	0.2846	
16	0.3284		27.3609	0.0376*	16	0.0344	
17	0.2550		32.0676	0.0148*	17	0.0426	
18	0.0230		32.1077	0.0214*	18	0.0548	
19	-0.1018		32.9363	0.0244*	19	-0.1522	
20	-0.1382		34.5492	0.0226*	20	-0.0379	
21	-0.1385		36.2637	0.0204*	21	-0.0507	
22	-0.0948		37.1173	0.0230*	22	0.0851	
23	-0.1395		39.0903	0.0194*	23	-0.1359	
24	-0.0697		39.6184	0.0235*	24	-0.1575	
25	-0.0556		39.9800	0.0293*	25	-0.0115	

**Model: I(1)**

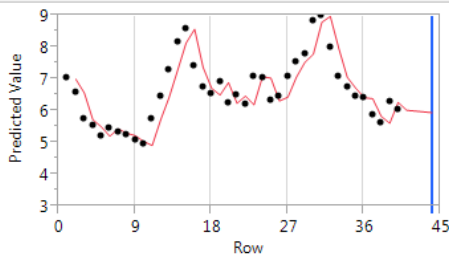
**Model Summary**

DF	38	Stable	Yes
Sum of Squared Errors	12.4667246	Invertible	Yes
Variance Estimate	0.3280717		
Standard Deviation	0.57277544		
Akaike's 'A' Information Criterion	68.1977608		
Schwarz's Bayesian Criterion	69.8613225		
RSquare	0.69003938		
RSquare Adj	0.69003938		
MAPE	6.88571552		
MAE	0.46700316		
-2LogLikelihood	66.1977608		

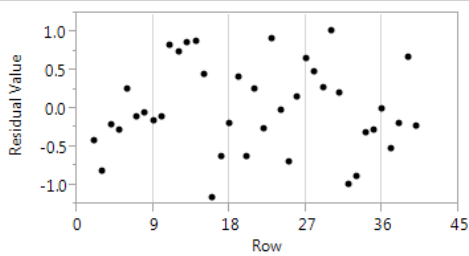
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0250538	0.0906730	-0.28	0.7838	-0.0250538

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.3339		4.6909	0.0303*	1	0.3339	
2	0.0025		4.6912	0.0958	2	-0.1227	
3	-0.1293		5.4342	0.1426	3	-0.1021	
4	-0.0520		5.5580	0.2347	4	0.0336	
5	-0.2120		7.6706	0.1753	5	-0.2479	
6	-0.2115		9.8384	0.1316	6	-0.0898	
7	-0.1033		10.3721	0.1685	7	-0.0151	
8	0.0360		10.4388	0.2356	8	0.0039	
9	-0.0304		10.4880	0.3124	9	-0.1038	
10	-0.2439		13.7682	0.1838	10	-0.3059	
11	-0.1688		15.3963	0.1651	11	-0.0746	
12	0.0162		15.4119	0.2197	12	0.0004	
13	0.0525		15.5814	0.2725	13	-0.0790	
14	-0.0884		16.0809	0.3085	14	-0.1927	
15	0.2451		20.0839	0.1687	15	0.2836	
16	0.3277		27.5515	0.0357*	16	0.0499	
17	0.2378		31.6613	0.0166*	17	0.0319	
18	0.0272		31.7177	0.0237*	18	0.0714	
19	-0.1058		32.6129	0.0266*	19	-0.1613	
20	-0.1263		33.9563	0.0264*	20	-0.0427	
21	-0.1451		35.8263	0.0229*	21	-0.0603	
22	-0.0912		36.6086	0.0261*	22	0.0931	
23	-0.1277		38.2371	0.0240*	23	-0.1383	
24	-0.0478		38.4802	0.0309*	24	-0.1504	
25	-0.0628		38.9305	0.0374*	25	-0.0099	

**Model: I(1)**

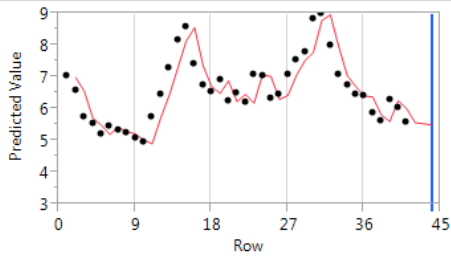
**Model Summary**

DF	39	Stable	Yes
Sum of Squared Errors	12.6369551	Invertible	Yes
Variance Estimate	0.32402449		
Standard Deviation	0.56923149		
Akaike's 'A' Information Criterion	69.4249232		
Schwarz's Bayesian Criterion	71.1138026		
RSquare	0.69329126		
RSquare Adj	0.69329126		
MAPE	6.85902912		
MAE	0.463875		
-2LogLikelihood	67.4249232		

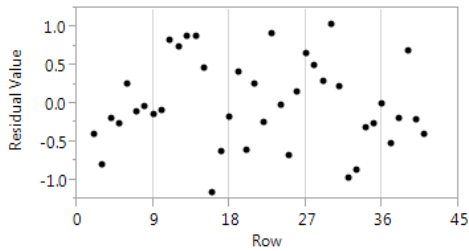
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0355000	0.0889496	-0.40	0.6920	-0.0355

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000			0	1.0000
1	0.3370	4.8926	0.0270*	1	0.3370
2	-0.0188	4.9083	0.0859	2	-0.1494
3	-0.1204	5.5666	0.1347	3	-0.0724
4	-0.0327	5.6165	0.2297	4	0.0403
5	-0.2075	7.6834	0.1746	5	-0.2607
6	-0.1982	9.6238	0.1414	6	-0.0568
7	-0.0898	10.0344	0.1866	7	-0.0205
8	0.0666	10.2674	0.2468	8	0.0363
9	0.0056	10.2691	0.3291	9	-0.0678
10	-0.2445	13.6166	0.1912	10	-0.3232
11	-0.1984	15.8978	0.1450	11	-0.0675
12	0.0074	15.9011	0.1958	12	0.0194
13	0.0352	15.9782	0.2503	13	-0.0822
14	-0.1098	16.7578	0.2693	14	-0.1633
15	0.2362	20.5066	0.1533	15	0.3090
16	0.3460	28.8863	0.0247*	16	0.0525
17	0.2357	32.9436	0.0115*	17	0.0277
18	-0.0032	32.9444	0.0170*	18	0.0419
19	-0.0962	33.6851	0.0200*	19	-0.1187
20	-0.1332	35.1759	0.0192*	20	-0.0728
21	-0.1226	36.5053	0.0192*	21	-0.0518
22	-0.1041	37.5164	0.0207*	22	0.0684
23	-0.1204	38.9480	0.0201*	23	-0.1276
24	-0.0262	39.0203	0.0272*	24	-0.1388
25	-0.0229	39.0791	0.0362*	25	0.0072

**Model: I(1)**

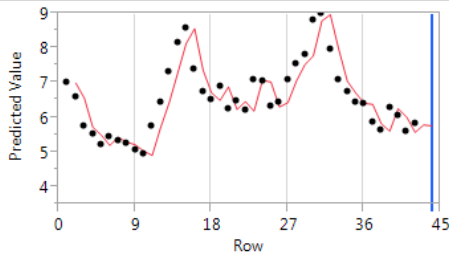
**Model Summary**

DF	40	Stable	Yes
Sum of Squared Errors	12.6986156	Invertible	Yes
Variance Estimate	0.31746539		
Standard Deviation	0.56344067		
Akaike's 'A' Information Criterion	70.2977171		
Schwarz's Bayesian Criterion	72.0112891		
RSquare	0.69597826		
RSquare Adj	0.69597826		
MAPE	6.81684526		
MAE	0.45955419		
-2LogLikelihood	68.2977171		

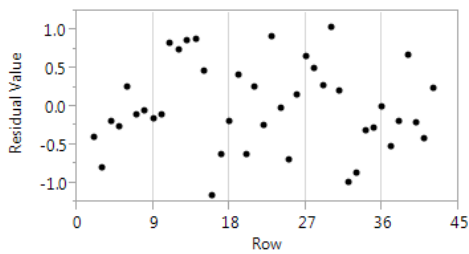
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0293683	0.0867101	-0.34	0.7366	-0.0293683

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.3271		4.7162	0.0299*	1	0.3271	
2	-0.0237		4.7416	0.0934	2	-0.1464	
3	-0.1071		5.2742	0.1528	3	-0.0577	
4	-0.0370		5.3393	0.2542	4	0.0209	
5	-0.2175		7.6561	0.1762	5	-0.2589	
6	-0.1982		9.6341	0.1409	6	-0.0555	
7	-0.0956		10.1085	0.1825	7	-0.0408	
8	0.0590		10.2945	0.2450	8	0.0417	
9	-0.0131		10.3039	0.3264	9	-0.0879	
10	-0.2641		14.2712	0.1610	10	-0.3402	
11	-0.1947		16.4995	0.1236	11	-0.0698	
12	0.0269		16.5437	0.1676	12	0.0171	
13	0.0407		16.6478	0.2159	13	-0.0830	
14	-0.0991		17.2895	0.2411	14	-0.1685	
15	0.2481		21.4621	0.1227	15	0.2828	
16	0.3474		29.9729	0.0181*	16	0.0597	
17	0.2209		33.5579	0.0096*	17	0.0305	
18	-0.0036		33.5589	0.0143*	18	0.0367	
19	-0.0780		34.0466	0.0181*	19	-0.0934	
20	-0.1373		35.6291	0.0170*	20	-0.1076	
21	-0.1170		36.8350	0.0176*	21	-0.0322	
22	-0.1154		38.0701	0.0180*	22	0.0599	
23	-0.1113		39.2832	0.0185*	23	-0.1151	
24	-0.0297		39.3749	0.0249*	24	-0.1467	
25	-0.0352		39.5112	0.0327*	25	-0.0027	

## Singapore

**Model: I(1)**

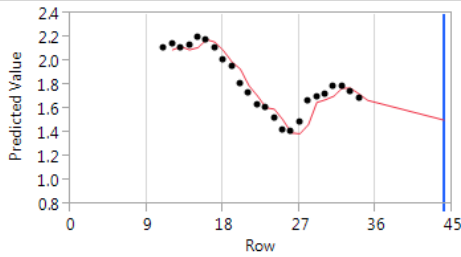
**Model Summary**

DF	22	Stable	Yes
Sum of Squared Errors	0.12468523	Invertible	Yes
Variance Estimate	0.00566751		
Standard Deviation	0.07528287		
Akaike's 'A' Information Criterion	-52.73034		
Schwarz's Bayesian Criterion	-51.594846		
RSquare	0.90952117		
RSquare Adj	0.90952117		
MAPE	3.37838394		
MAE	0.05884272		
-2LogLikelihood	-54.73034		

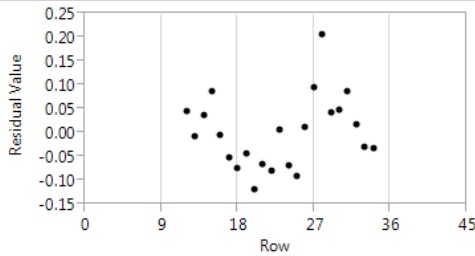
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0184174	0.0153513	-1.20	0.2430	-0.0184174

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000		.	.	0	1.0000	
1	0.5597		8.1875	0.0042*	1	0.5597	
2	0.2642		10.0983	0.0064*	2	-0.0715	
3	0.1261		10.5555	0.0144*	3	0.0112	
4	0.0688		10.6987	0.0302*	4	0.0109	
5	-0.1212		11.1680	0.0481*	5	-0.2344	
6	-0.3913		16.3481	0.0120*	6	-0.3411	
7	-0.3162		19.9418	0.0057*	7	0.1216	
8	-0.2936		23.2457	0.0031*	8	-0.1674	
9	-0.2743		26.3355	0.0018*	9	-0.0679	
10	-0.3768		32.6144	0.0003*	10	-0.2454	
11	-0.2203		34.9400	0.0003*	11	0.0754	
12	-0.0118		34.9472	0.0005*	12	-0.0138	
13	0.1036		35.5643	0.0007*	13	0.0946	
14	0.0824		35.9977	0.0010*	14	-0.1565	
15	0.0858		36.5270	0.0015*	15	-0.0115	
16	0.1787		39.1488	0.0010*	16	-0.1067	
17	0.0647		39.5503	0.0015*	17	-0.1651	
18	-0.0028		39.5512	0.0024*	18	-0.0470	
19	-0.0024		39.5521	0.0037*	19	0.0816	
20	-0.0024		39.5532	0.0057*	20	-0.2129	
21	-0.0084		39.5733	0.0084*	21	0.0734	
22	-0.0124		39.6621	0.0118*	22	0.0413	
23	0.0000		.	.	23	-0.0599	
24	0.0000		.	.	24	-0.0697	
25	0.0000		.	.	25	0.0013	

**Model: I(1)**

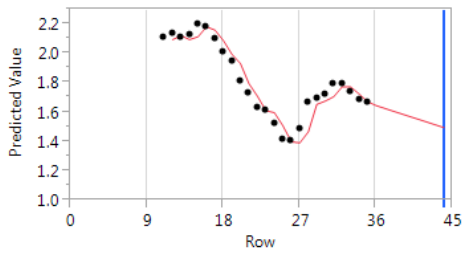
**Model Summary**

DF	23	Stable	Yes
Sum of Squared Errors	0.12474478	Invertible	Yes
Variance Estimate	0.00542369		
Standard Deviation	0.07364568		
Akaike's 'A' Information Criterion	-56.119892		
Schwarz's Bayesian Criterion	-54.941838		
RSquare	0.91075802		
RSquare Adj	0.91075802		
MAPE	3.25597316		
MAE	0.05669201		
-2LogLikelihood	-58.119892		

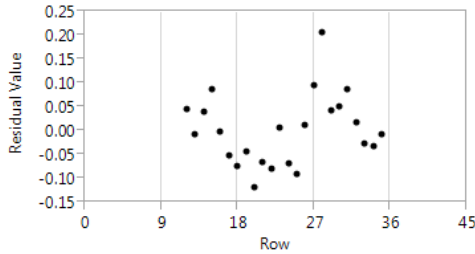
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0187458	0.0147160	-1.27	0.2154	-0.0187458

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.5615	8.5530	0.0034*	1	0.5615
2	0.2659	10.5584	0.0051*	2	-0.0721
3	0.1250	11.0226	0.0116*	3	0.0079
4	0.0630	11.1465	0.0250*	4	0.0054
5	-0.1247	11.6573	0.0398*	5	-0.2311
6	-0.3943	17.0463	0.0091*	6	-0.3433
7	-0.3294	21.0301	0.0037*	7	0.1045
8	-0.3002	24.5454	0.0019*	8	-0.1534
9	-0.2756	27.7062	0.0011*	9	-0.0706
10	-0.3714	33.8548	0.0002*	10	-0.2432
11	-0.2160	36.0935	0.0002*	11	0.0754
12	-0.0121	36.1011	0.0003*	12	-0.0234
13	0.1088	36.7725	0.0004*	13	0.0904
14	0.0872	37.2465	0.0007*	14	-0.1539
15	0.0941	37.8600	0.0009*	15	-0.0068
16	0.1822	40.4482	0.0007*	16	-0.1060
17	0.0698	40.8823	0.0010*	17	-0.1687
18	0.0011	40.8824	0.0016*	18	-0.0522
19	-0.0017	40.8827	0.0025*	19	0.0821
20	-0.0076	40.8917	0.0038*	20	-0.2153
21	-0.0107	40.9156	0.0057*	21	0.0782
22	-0.0119	40.9598	0.0083*	22	0.0352
23	-0.0028	40.9645	0.0120*	23	-0.0571
24	0.0000	.	.	24	-0.0759
25	0.0000	.	.	25	0.0082

**Model: I(1)**

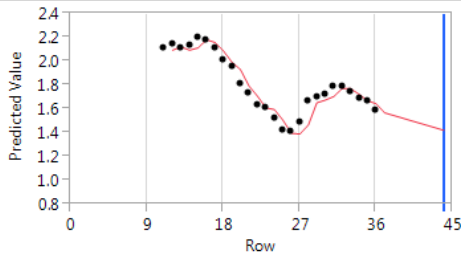
**Model Summary**

DF	24	Stable	Yes
Sum of Squared Errors	0.12785881	Invertible	Yes
Variance Estimate	0.00532745		
Standard Deviation	0.07298938		
Akaike's 'A' Information Criterion	-58.945687		
Schwarz's Bayesian Criterion	-57.726811		
RSquare	0.9113026		
RSquare Adj	0.9113026		
MAPE	3.25422348		
MAE	0.05642912		
-2LogLikelihood	-60.945687		

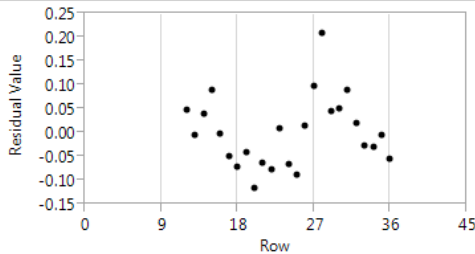
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0210240	0.0143031	-1.47	0.1546	-0.021024

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.5503	8.5175	0.0035*	1	0.5503
2	0.2739	10.7198	0.0047*	2	-0.0415
3	0.1342	11.2724	0.0103*	3	0.0000
4	0.0523	11.3604	0.0228*	4	-0.0191
5	-0.1624	12.2502	0.0315*	5	-0.2576
6	-0.4090	18.1940	0.0058*	6	-0.3205
7	-0.3422	22.5865	0.0020*	7	0.0655
8	-0.3866	28.5219	0.0004*	8	-0.2536
9	-0.3149	32.7044	0.0002*	9	0.0173
10	-0.3720	38.9305	<.0001*	10	-0.2664
11	-0.1731	40.3753	<.0001*	11	0.0912
12	0.0175	40.3911	<.0001*	12	-0.0156
13	0.1046	41.0061	<.0001*	13	0.0162
14	0.1229	41.9336	0.0001*	14	-0.1490
15	0.1247	42.9837	0.0002*	15	-0.0294
16	0.2336	47.0750	<.0001*	16	-0.0757
17	0.0887	47.7391	<.0001*	17	-0.1688
18	0.0352	47.8586	0.0002*	18	-0.0760
19	0.0240	47.9232	0.0003*	19	0.0346
20	-0.0046	47.9261	0.0004*	20	-0.1853
21	-0.0484	48.3214	0.0006*	21	0.0257
22	-0.0287	48.5070	0.0009*	22	0.0814
23	0.0005	48.5071	0.0014*	23	-0.1081
24	-0.0205	48.7894	0.0020*	24	-0.0220
25	0.0000	.	.	25	-0.0603

**Model: I(1)**

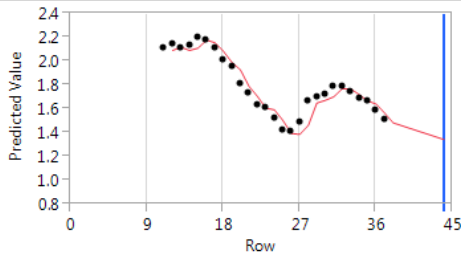
**Model Summary**

DF	25	Stable	Yes
Sum of Squared Errors	0.13139878	Invertible	Yes
Variance Estimate	0.00525595		
Standard Deviation	0.07249794		
Akaike's 'A' Information Criterion	-61.693185		
Schwarz's Bayesian Criterion	-60.435089		
RSquare	0.91357857		
RSquare Adj	0.91357857		
MAPE	3.26595755		
MAE	0.05629172		
-2LogLikelihood	-63.693185		

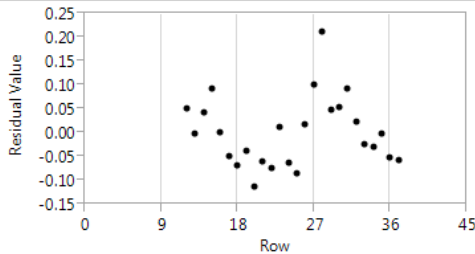
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0233577	0.0139414	-1.68	0.1063	-0.0233577

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.5598		9.1270	0.0025*	1	0.5598	
2	0.2691		11.3241	0.0035*	2	-0.0645	
3	0.1447		11.9869	0.0074*	3	0.0299	
4	0.0617		12.1130	0.0165*	4	-0.0283	
5	-0.1678		13.0892	0.0226*	5	-0.2773	
6	-0.4397		20.1266	0.0026*	6	-0.3513	
7	-0.3575		25.0228	0.0008*	7	0.0956	
8	-0.3976		31.4179	0.0001*	8	-0.2856	
9	-0.4021		38.3420	<.0001*	9	-0.0959	
10	-0.4091		45.9566	<.0001*	10	-0.1895	
11	-0.1777		47.4897	<.0001*	11	0.0679	
12	0.0550		47.6469	<.0001*	12	0.0218	
13	0.1323		48.6267	<.0001*	13	0.0442	
14	0.1184		49.4772	<.0001*	14	-0.2500	
15	0.1591		51.1527	<.0001*	15	-0.0377	
16	0.2583		56.0084	<.0001*	16	-0.0906	
17	0.1390		57.5716	<.0001*	17	-0.1636	
18	0.0533		57.8306	<.0001*	18	-0.0884	
19	0.0562		58.1591	<.0001*	19	0.0247	
20	0.0187		58.2016	<.0001*	20	-0.2255	
21	-0.0463		58.5142	<.0001*	21	0.0641	
22	-0.0686		59.3718	<.0001*	22	0.0254	
23	-0.0185		59.4550	<.0001*	23	-0.0661	
24	-0.0184		59.5784	<.0001*	24	-0.1006	
25	-0.0223		59.9394	0.0001*	25	-0.0122	

**Model: I(1)**

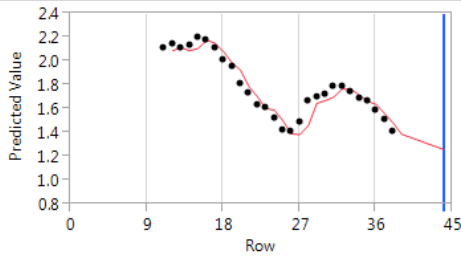
**Model Summary**

DF	26	Stable	Yes
Sum of Squared Errors	0.13600238	Invertible	Yes
Variance Estimate	0.00523086		
Standard Deviation	0.07232469		
Akaike's 'A' Information Criterion	-64.232153		
Schwarz's Bayesian Criterion	-62.936316		
RSquare	0.9176161		
RSquare Adj	0.9176161		
MAPE	3.30624181		
MAE	0.05648313		
-2LogLikelihood	-66.232153		

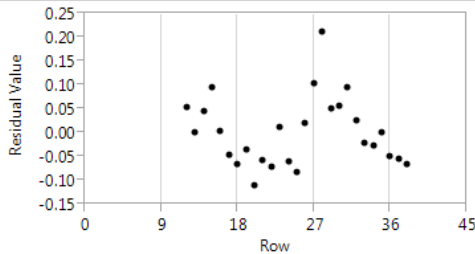
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0259185	0.0136589	-1.90	0.0689	-0.0259185

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000		.	.	0	1.0000	
1	0.5696		9.7695	0.0018*	1	0.5696	
2	0.2868		12.3450	0.0021*	2	-0.0557	
3	0.1416		12.9988	0.0046*	3	0.0013	
4	0.0731		13.1808	0.0104*	4	0.0051	
5	-0.1506		13.9881	0.0157*	5	-0.2807	
6	-0.4352		21.0499	0.0018*	6	-0.3671	
7	-0.3906		27.0225	0.0003*	7	0.0637	
8	-0.4111		33.9859	<.0001*	8	-0.2465	
9	-0.4107		41.3238	<.0001*	9	-0.1379	
10	-0.5004		52.8566	<.0001*	10	-0.3106	
11	-0.2231		55.2926	<.0001*	11	0.1716	
12	0.0417		55.3835	<.0001*	12	0.0086	
13	0.1698		56.9957	<.0001*	13	0.0761	
14	0.1484		58.3217	<.0001*	14	-0.2103	
15	0.1506		59.8015	<.0001*	15	-0.1457	
16	0.2877		65.6917	<.0001*	16	-0.1091	
17	0.1629		67.7684	<.0001*	17	-0.2001	
18	0.1071		68.7658	<.0001*	18	-0.0634	
19	0.0726		69.2811	<.0001*	19	0.0131	
20	0.0507		69.5690	<.0001*	20	-0.2400	
21	-0.0215		69.6294	<.0001*	21	0.0278	
22	-0.0670		70.3334	<.0001*	22	0.0962	
23	-0.0643		71.1424	<.0001*	23	-0.0984	
24	-0.0409		71.5787	<.0001*	24	-0.0717	
25	-0.0211		71.7537	<.0001*	25	-0.1415	

**Model: I(1)**

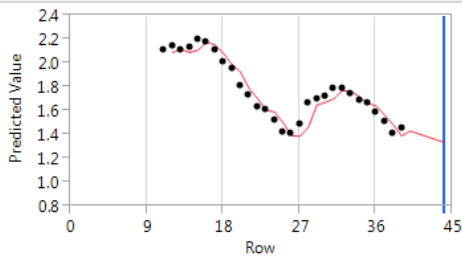
**Model Summary**

DF	27	Stable	Yes
Sum of Squared Errors	0.14023067	Invertible	Yes
Variance Estimate	0.00519373		
Standard Deviation	0.07206753		
Akaike's 'A' Information Criterion	-66.846232		
Schwarz's Bayesian Criterion	-65.514028		
RSquare	0.91968199		
RSquare Adj	0.91968199		
MAPE	3.36265691		
MAE	0.05699974		
-2LogLikelihood	-68.846232		

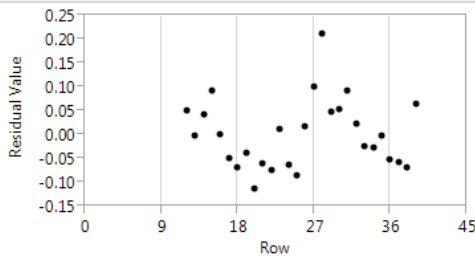
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0235536	0.0133733	-1.76	0.0895	-0.0235536

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.5218		8.4707	0.0036*	1	0.5218	
2	0.2514		10.5133	0.0052*	2	-0.0286	
3	0.1132		10.9441	0.0120*	3	-0.0093	
4	0.0709		11.1200	0.0252*	4	0.0288	
5	-0.1586		12.0381	0.0343*	5	-0.2792	
6	-0.4336		19.2155	0.0038*	6	-0.3595	
7	-0.3703		24.6990	0.0009*	7	0.0350	
8	-0.3572		30.0584	0.0002*	8	-0.1818	
9	-0.3752		36.2826	<.0001*	9	-0.1837	
10	-0.4656		46.3985	<.0001*	10	-0.2781	
11	-0.1199		47.1084	<.0001*	11	0.2380	
12	0.0884		47.5189	<.0001*	12	-0.0406	
13	0.1741		49.2170	<.0001*	13	0.0278	
14	0.1035		49.8591	<.0001*	14	-0.1836	
15	0.1149		50.7121	<.0001*	15	-0.2104	
16	0.2837		56.3468	<.0001*	16	0.0133	
17	0.1262		57.5621	<.0001*	17	-0.1834	
18	0.0781		58.0746	<.0001*	18	-0.0151	
19	0.0197		58.1109	<.0001*	19	-0.0690	
20	0.0339		58.2313	<.0001*	20	-0.1683	
21	-0.0508		58.5412	<.0001*	21	0.0289	
22	-0.0870		59.6004	<.0001*	22	0.0564	
23	-0.0621		60.2475	<.0001*	23	-0.0954	
24	0.0035		60.2501	<.0001*	24	-0.0635	
25	0.0001		60.2501	<.0001*	25	-0.1529	

**Model: I(1)**

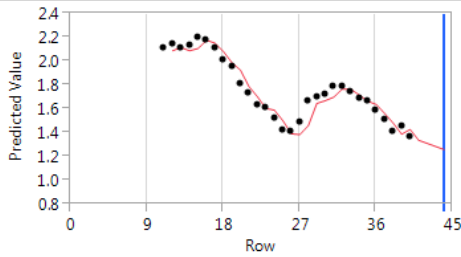
**Model Summary**

DF	28	Stable	Yes
Sum of Squared Errors	0.14467508	Invertible	Yes
Variance Estimate	0.00516697		
Standard Deviation	0.07188162		
Akaike's 'A' Information Criterion	-69.417826		
Schwarz's Bayesian Criterion	-68.05053		
RSquare	0.9236948		
RSquare Adj	0.9236948		
MAPE	3.40109755		
MAE	0.05713175		
-2LogLikelihood	-71.417826		

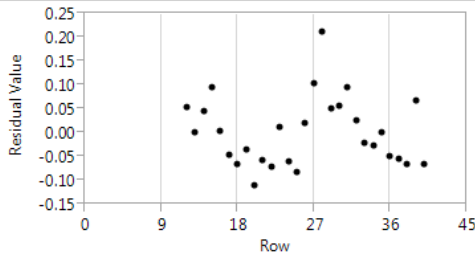
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0258931	0.0131159	-1.97	0.0583	-0.0258931

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.4750	7.2433	0.0071*	1	0.4750
2	0.2742	9.7464	0.0076*	2	0.0627
3	0.1355	10.3817	0.0156*	3	-0.0211
4	0.0911	10.6801	0.0304*	4	0.0270
5	-0.1537	11.5646	0.0413*	5	-0.2695
6	-0.4071	18.0410	0.0061*	6	-0.3545
7	-0.3464	22.9440	0.0017*	7	-0.0095
8	-0.3542	28.3147	0.0004*	8	-0.1410
9	-0.4031	35.6187	<.0001*	9	-0.2096
10	-0.4734	46.2205	<.0001*	10	-0.2609
11	-0.1347	47.1261	<.0001*	11	0.1688
12	-0.0104	47.1318	<.0001*	12	-0.0743
13	0.1222	47.9711	<.0001*	13	0.0708
14	0.0923	48.4816	<.0001*	14	-0.1268
15	0.1513	49.9508	<.0001*	15	-0.2231
16	0.3043	56.3541	<.0001*	16	0.0401
17	0.1141	57.3302	<.0001*	17	-0.2443
18	0.1066	58.2597	<.0001*	18	-0.0725
19	0.0439	58.4327	<.0001*	19	-0.1053
20	0.0817	59.0999	<.0001*	20	-0.0972
21	-0.0343	59.2320	<.0001*	21	-0.0266
22	-0.0541	59.6079	<.0001*	22	0.0279
23	-0.0379	59.8229	<.0001*	23	-0.0268
24	0.0031	59.8246	<.0001*	24	-0.0900
25	-0.0419	60.2197	<.0001*	25	-0.1251

**Model: I(1)**

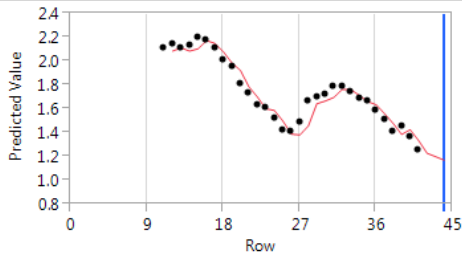
**Model Summary**

DF	29	Stable	Yes
Sum of Squared Errors	0.15094039	Invertible	Yes
Variance Estimate	0.00520484		
Standard Deviation	0.07214459		
Akaike's 'A' Information Criterion	-71.625717		
Schwarz's Bayesian Criterion	-70.22452		
RSquare	0.92897951		
RSquare Adj	0.92897951		
MAPE	3.48945035		
MAE	0.05781667		
-2LogLikelihood	-73.625717		

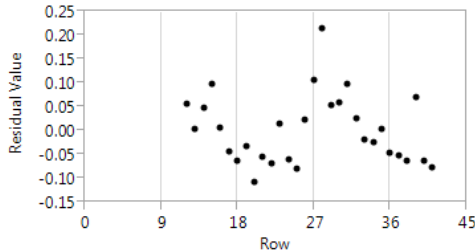
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0285767	0.0129504	-2.21	0.0354*	-0.0285767

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.4892		7.9226	0.0049*	1	0.4892	
2	0.2276		9.6994	0.0078*	2	-0.0154	
3	0.1636		10.6507	0.0138*	3	0.0763	
4	0.1147		11.1362	0.0251*	4	0.0106	
5	-0.1222		11.7101	0.0390*	5	-0.2540	
6	-0.3898		17.7877	0.0068*	6	-0.3409	
7	-0.3164		21.9668	0.0026*	7	0.0041	
8	-0.3254		26.5872	0.0008*	8	-0.1675	
9	-0.3943		33.6950	0.0001*	9	-0.1682	
10	-0.4985		45.6236	<.0001*	10	-0.2994	
11	-0.1540		46.8213	<.0001*	11	0.2197	
12	-0.0324		46.8774	<.0001*	12	-0.1416	
13	0.0077		46.8807	<.0001*	13	0.0304	
14	0.0358		46.9574	<.0001*	14	-0.1278	
15	0.1342		48.1107	<.0001*	15	-0.1062	
16	0.3338		55.7526	<.0001*	16	0.0599	
17	0.1375		57.1482	<.0001*	17	-0.2133	
18	0.0906		57.8052	<.0001*	18	-0.1092	
19	0.0747		58.2922	<.0001*	19	-0.1502	
20	0.1032		59.3148	<.0001*	20	-0.0979	
21	0.0206		59.3603	<.0001*	21	0.0634	
22	-0.0363		59.5183	<.0001*	22	-0.0344	
23	-0.0034		59.5199	<.0001*	23	-0.0290	
24	0.0262		59.6301	<.0001*	24	0.0025	
25	-0.0419		59.9663	0.0001*	25	-0.1536	

**Model: I(1)**

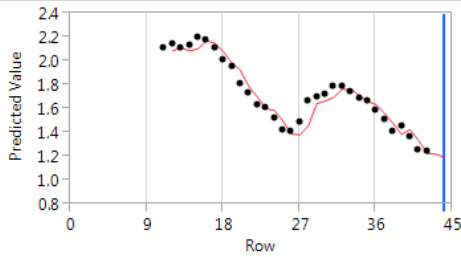
**Model Summary**

DF	30	Stable	Yes
Sum of Squared Errors	0.15137849	Invertible	Yes
Variance Estimate	0.00504595		
Standard Deviation	0.07103485		
Akaike's 'A' Information Criterion	-75.006548		
Schwarz's Bayesian Criterion	-73.57256		
RSquare	0.93548809		
RSquare Adj	0.93548809		
MAPE	3.43180165		
MAE	0.05661582		
-2LogLikelihood	-77.006548		

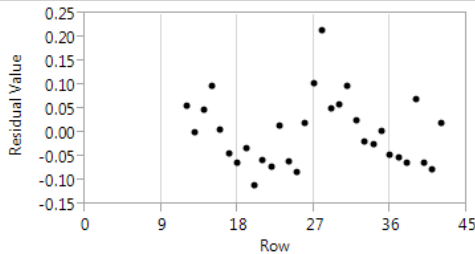
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	-0.0278903	0.0125508	-2.22	0.0340*	-0.0278903

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.4771		7.7622	0.0053*	1	0.4771
2	0.2181		9.4395	0.0089*	2	-0.0124
3	0.1726		10.5280	0.0146*	3	0.0948
4	0.1059		10.9532	0.0271*	4	-0.0133
5	-0.1290		11.6084	0.0406*	5	-0.2431
6	-0.3954		18.0067	0.0062*	6	-0.3492
7	-0.3158		22.2585	0.0023*	7	-0.0063
8	-0.3286		27.0621	0.0007*	8	-0.1682
9	-0.3973		34.4013	<.0001*	9	-0.1582
10	-0.4951		46.3423	<.0001*	10	-0.3158
11	-0.1419		47.3721	<.0001*	11	0.2219
12	-0.0256		47.4072	<.0001*	12	-0.1508
13	0.0134		47.4175	<.0001*	13	0.0594
14	0.0643		47.6662	<.0001*	14	-0.1384
15	0.1480		49.0664	<.0001*	15	-0.0985
16	0.3363		56.7801	<.0001*	16	0.0311
17	0.1271		57.9599	<.0001*	17	-0.2169
18	0.0833		58.5062	<.0001*	18	-0.1253
19	0.0779		59.0239	<.0001*	19	-0.1480
20	0.0949		59.8610	<.0001*	20	-0.0917
21	0.0143		59.8819	<.0001*	21	0.0631
22	-0.0502		60.1685	<.0001*	22	-0.0548
23	-0.0075		60.1757	<.0001*	23	-0.0160
24	0.0177		60.2215	<.0001*	24	-0.0027
25	-0.0479		60.6119	<.0001*	25	-0.1679

## South Korea

**Model: I(1)**

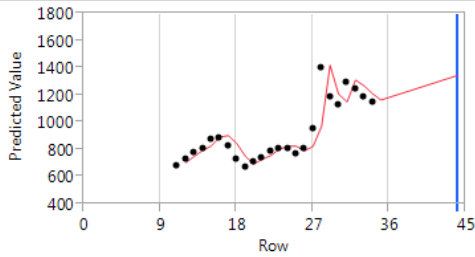
**Model Summary**

DF	22	Stable	Yes
Sum of Squared Errors	325699.712	Invertible	Yes
Variance Estimate	14804.5324		
Standard Deviation	121.673877		
Akaike's 'A' Information Criterion	287.110621		
Schwarz's Bayesian Criterion	288.246115		
RSquare	0.69072007		
RSquare Adj	0.69072007		
MAPE	7.26194213		
MAE	75.4146605		
-2LogLikelihood	285.110621		

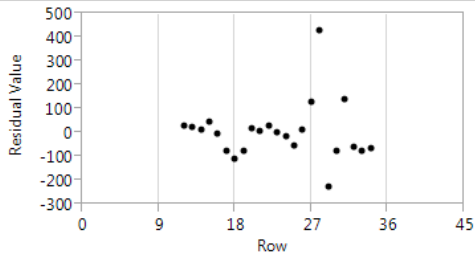
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	19.963609	24.80775	0.80	0.4296	19.9636085

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000		.	.	0	1.0000	
1	-0.0461		0.0555	0.8138	1	-0.0461	
2	-0.2986		2.4970	0.2869	2	-0.3014	
3	0.0694		2.6353	0.4513	3	0.0414	
4	0.0232		2.6516	0.6177	4	-0.0671	
5	-0.0556		2.7505	0.7384	5	-0.0268	
6	-0.0953		3.0577	0.8016	6	-0.1268	
7	-0.0138		3.0645	0.8790	7	-0.0513	
8	0.0057		3.0658	0.9302	8	-0.0677	
9	-0.1367		3.8328	0.9221	9	-0.1738	
10	-0.1295		4.5750	0.9177	10	-0.2025	
11	-0.0100		4.5798	0.9498	11	-0.1774	
12	0.0396		4.6618	0.9683	12	-0.1255	
13	0.0459		4.7828	0.9797	13	-0.0701	
14	-0.0005		4.7828	0.9886	14	-0.1012	
15	0.0774		5.2131	0.9902	15	-0.0163	
16	0.0765		5.6940	0.9911	16	-0.0251	
17	-0.0095		5.7027	0.9950	17	-0.0425	
18	-0.0072		5.7086	0.9972	18	-0.0659	
19	-0.0053		5.7127	0.9985	19	-0.1089	
20	-0.0131		5.7458	0.9992	20	-0.1237	
21	-0.0112		5.7817	0.9996	21	-0.1152	
22	-0.0053		5.7979	0.9998	22	-0.0883	
23	0.0000		.	.	23	-0.0735	
24	0.0000		.	.	24	-0.0480	
25	0.0000		.	.	25	-0.0261	

**Model: I(1)**

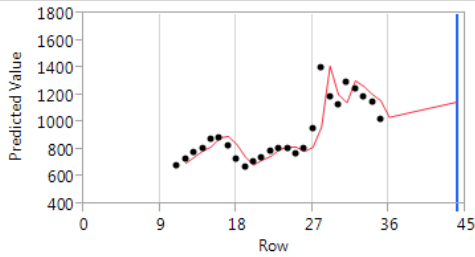
**Model Summary**

DF	23	Stable	Yes
Sum of Squared Errors	344874.363	Invertible	Yes
Variance Estimate	14994.5375		
Standard Deviation	122.452185		
Akaike's 'A' Information Criterion	299.858209		
Schwarz's Bayesian Criterion	301.036263		
RSquare	0.67536967		
RSquare Adj	0.67536967		
MAPE	7.56369291		
MAE	78.1661667		
-2LogLikelihood	297.858209		

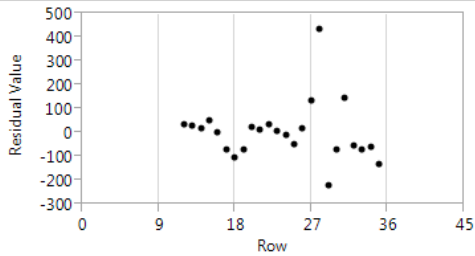
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	14.069825	24.46378	0.58	0.5708	14.0698245

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	-0.0166		0.0075	0.9309	1	-0.0166
2	-0.2499		1.7782	0.4110	2	-0.2502
3	0.0919		2.0292	0.5664	3	0.0881
4	-0.0346		2.0666	0.7235	4	-0.1025
5	-0.0213		2.0814	0.8378	5	0.0267
6	0.0061		2.0827	0.9119	6	-0.0405
7	-0.1810		3.2847	0.8575	7	-0.1819
8	-0.0460		3.3671	0.9093	8	-0.0620
9	-0.1355		4.1305	0.9026	9	-0.2607
10	-0.1019		4.5930	0.9167	10	-0.1293
11	-0.0031		4.5934	0.9492	11	-0.1729
12	0.0357		4.6598	0.9684	12	-0.0460
13	0.0309		4.7138	0.9810	13	-0.0581
14	-0.0036		4.7146	0.9894	14	-0.0962
15	0.0652		5.0094	0.9920	15	0.0014
16	0.1016		5.8140	0.9900	16	-0.0336
17	0.0271		5.8796	0.9940	17	-0.0222
18	0.0215		5.9275	0.9965	18	-0.0602
19	-0.0032		5.9288	0.9981	19	-0.0741
20	-0.0344		6.1135	0.9987	20	-0.0932
21	-0.0190		6.1884	0.9993	21	-0.0950
22	-0.0174		6.2831	0.9996	22	-0.0587
23	-0.0125		6.3806	0.9998	23	-0.0488
24	0.0000		.	.	24	-0.0122
25	0.0000		.	.	25	0.0056

**Model: I(1)**

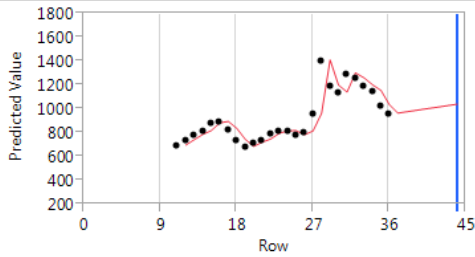
**Model Summary**

DF	24	Stable	Yes
Sum of Squared Errors	351567.406	Invertible	Yes
Variance Estimate	14648.6419		
Standard Deviation	121.031574		
Akaike's 'A' Information Criterion	311.72895		
Schwarz's Bayesian Criterion	312.947825		
RSquare	0.6692537		
RSquare Adj	0.6692537		
MAPE	7.62554249		
MAE	78.3594678		
-2LogLikelihood	309.72895		

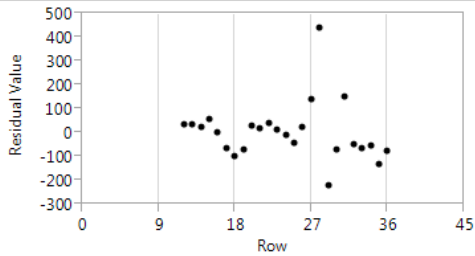
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	10.729904	23.72005	0.45	0.6551	10.729904

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.0155		0.0068	0.9343	1	0.0155
2	-0.2300		1.5592	0.4586	2	-0.2303
3	0.1083		1.9193	0.5893	3	0.1229
4	-0.0195		1.9316	0.7483	4	-0.0859
5	-0.0541		2.0303	0.8449	5	0.0054
6	0.0243		2.0512	0.9149	6	-0.0123
7	-0.1215		2.6050	0.9190	7	-0.1328
8	-0.1425		3.4116	0.9059	8	-0.1325
9	-0.1637		4.5415	0.8723	9	-0.2452
10	-0.1046		5.0338	0.8889	10	-0.1612
11	0.0075		5.0365	0.9294	11	-0.1035
12	0.0376		5.1099	0.9542	12	-0.0314
13	0.0283		5.1550	0.9716	13	-0.0055
14	-0.0115		5.1631	0.9834	14	-0.0655
15	0.0607		5.4115	0.9880	15	0.0095
16	0.0924		6.0522	0.9875	16	-0.0168
17	0.0381		6.1744	0.9919	17	-0.0380
18	0.0427		6.3504	0.9946	18	-0.0394
19	0.0123		6.3675	0.9969	19	-0.0677
20	-0.0358		6.5406	0.9979	20	-0.0601
21	-0.0326		6.7197	0.9986	21	-0.0688
22	-0.0231		6.8400	0.9992	22	-0.0454
23	-0.0208		6.9864	0.9995	23	-0.0335
24	-0.0080		7.0297	0.9997	24	-0.0062
25	0.0000		.	.	25	0.0197

**Model: I(1)**

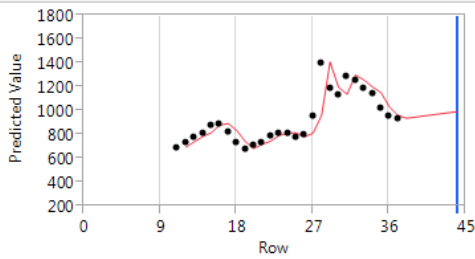
**Model Summary**

DF	25	Stable	Yes
Sum of Squared Errors	352819,049	Invertible	Yes
Variance Estimate	14112,762		
Standard Deviation	118,797146		
Akaike's 'A' Information Criterion	323,190769		
Schwarz's Bayesian Criterion	324,448866		
RSquare	0,66807688		
RSquare Adj	0,66807688		
MAPE	7,48857889		
MAE	76,7333038		
-2LogLikelihood	321,190769		

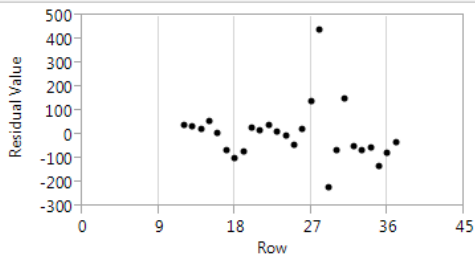
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	9.3422423	22.85857	0.41	0.6862	9.34224231

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000				0	1.0000
1	0.0235		0.0161	0.8990	1	0.0235
2	-0.2156		1.4264	0.4901	2	-0.2163
3	0.1143		1.8400	0.6063	3	0.1318
4	-0.0119		1.8447	0.7643	4	-0.0737
5	-0.0478		1.9239	0.8596	5	0.0119
6	0.0100		1.9275	0.9262	6	-0.0234
7	-0.1130		2.4164	0.9333	7	-0.1191
8	-0.1178		2.9779	0.9357	8	-0.1104
9	-0.2054		4.7843	0.8527	9	-0.2735
10	-0.1177		5.4150	0.8618	10	-0.1502
11	0.0051		5.4163	0.9093	11	-0.1150
12	0.0418		5.5071	0.9389	12	0.0031
13	0.0291		5.5545	0.9609	13	0.0033
14	-0.0124		5.5639	0.9763	14	-0.0449
15	0.0566		5.7762	0.9833	15	0.0192
16	0.0898		6.3638	0.9837	16	-0.0139
17	0.0328		6.4509	0.9896	17	-0.0379
18	0.0481		6.6619	0.9927	18	-0.0488
19	0.0216		6.7104	0.9956	19	-0.0666
20	-0.0300		6.8193	0.9972	20	-0.0577
21	-0.0335		6.9825	0.9982	21	-0.0568
22	-0.0292		7.1373	0.9988	22	-0.0349
23	-0.0235		7.2716	0.9992	23	-0.0298
24	-0.0116		7.3203	0.9996	24	-0.0038
25	-0.0036		7.3297	0.9998	25	0.0184

**Model: I(1)**

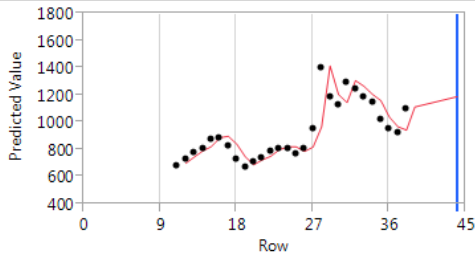
**Model Summary**

DF	26	Stable	Yes
Sum of Squared Errors	377591.892	Invertible	Yes
Variance Estimate	14522.7651		
Standard Deviation	120.510436		
Akaike's 'A' Information Criterion	336.357455		
Schwarz's Bayesian Criterion	337.653292		
RSquare	0.65365595		
RSquare Adj	0.65365595		
MAPE	7.72945476		
MAE	79.8437997		
-2LogLikelihood	334.357455		

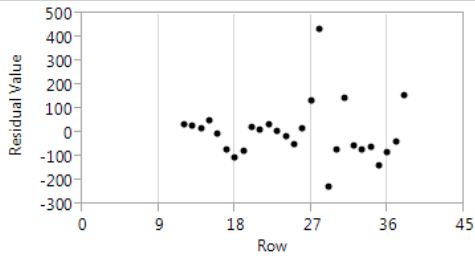
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	15.282693	22.75412	0.67	0.5077	15.2826926

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000				0	1.0000
1	0.0077		0.0018	0.9661	1	0.0077
2	-0.2345		1.7248	0.4222	2	-0.2346
3	0.0507		1.8085	0.6131	3	0.0579
4	-0.0369		1.8548	0.7624	4	-0.0995
5	-0.0762		2.0612	0.8406	5	-0.0505
6	-0.0174		2.0725	0.9129	6	-0.0537
7	-0.0486		2.1649	0.9502	7	-0.0773
8	-0.1454		3.0363	0.9321	8	-0.1716
9	-0.2924		6.7549	0.6626	9	-0.3663
10	0.0656		6.9534	0.7298	10	-0.0491
11	0.0608		7.1345	0.7881	11	-0.1638
12	0.0481		7.2555	0.8403	12	0.0205
13	0.0082		7.2592	0.8883	13	-0.1425
14	-0.0171		7.2767	0.9235	14	-0.1080
15	0.0561		7.4818	0.9429	15	-0.0802
16	0.1008		8.2045	0.9425	16	-0.0438
17	0.0456		8.3673	0.9581	17	-0.0758
18	0.0611		8.6917	0.9665	18	-0.0703
19	-0.0056		8.6948	0.9782	19	-0.0179
20	-0.0659		9.1804	0.9807	20	-0.1029
21	-0.0576		9.6130	0.9835	21	-0.0664
22	-0.0258		9.7170	0.9887	22	-0.1475
23	0.0008		9.7171	0.9929	23	-0.0717
24	-0.0032		9.7198	0.9956	24	-0.0609
25	0.0085		9.7480	0.9973	25	0.0054

**Model: I(1)**

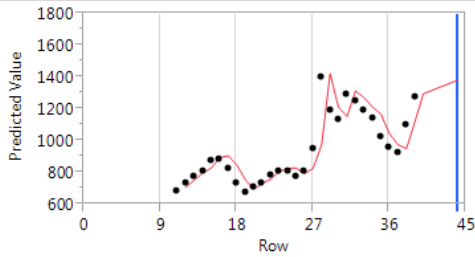
**Model Summary**

DF	27	Stable	Yes
Sum of Squared Errors	402474.374	Invertible	Yes
Variance Estimate	14906.4583		
Standard Deviation	122.092007		
Akaike's 'A' Information Criterion	349.509659		
Schwarz's Bayesian Criterion	350.841864		
RSquare	0.6647056		
RSquare Adj	0.6647056		
MAPE	7.88841582		
MAE	82.72925		
-2LogLikelihood	347.509659		

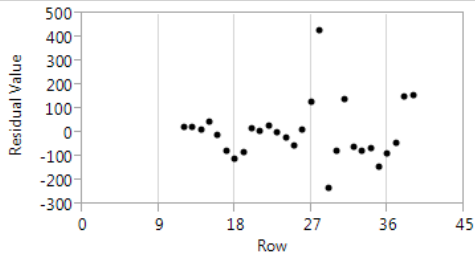
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	21.019707	22.66140	0.93	0.3619	21.0197071

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.0693		0.1492	0.6993	1	0.0693
2	-0.2334		1.9088	0.3850	2	-0.2393
3	0.0162		1.9176	0.5897	3	0.0563
4	-0.0873		2.1846	0.7019	4	-0.1602
5	-0.0964		2.5243	0.7728	5	-0.0598
6	-0.0479		2.6117	0.8558	6	-0.1050
7	-0.0732		2.8261	0.9006	7	-0.1038
8	-0.0851		3.1300	0.9259	8	-0.1335
9	-0.3085		7.3369	0.6021	9	-0.4128
10	-0.0341		7.3912	0.6881	10	-0.1261
11	0.2211		9.8068	0.5478	11	-0.0601
12	0.0960		10.2906	0.5905	12	-0.0348
13	0.0139		10.3013	0.6691	13	-0.1168
14	-0.0369		10.3830	0.7337	14	-0.2238
15	0.0453		10.5155	0.7861	15	-0.0929
16	0.0968		11.1710	0.7988	16	-0.0998
17	0.0619		11.4635	0.8315	17	-0.0463
18	0.0648		11.8167	0.8566	18	-0.1044
19	0.0054		11.8195	0.8932	19	-0.0549
20	-0.0875		12.6227	0.8930	20	-0.0243
21	-0.0941		13.6853	0.8827	21	-0.0840
22	-0.0537		14.0887	0.8983	22	-0.1157
23	-0.0026		14.0898	0.9243	23	-0.1466
24	0.0125		14.1226	0.9438	24	-0.0447
25	0.0098		14.1498	0.9591	25	0.0187

**Model: I(1)**

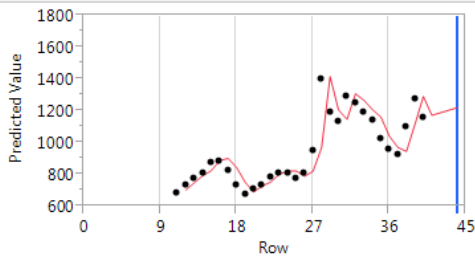
**Model Summary**

DF	28	Stable	Yes
Sum of Squared Errors	421373.11	Invertible	Yes
Variance Estimate	15049.0396		
Standard Deviation	122.674527		
Akaike's 'A' Information Criterion	362.233801		
Schwarz's Bayesian Criterion	363.601097		
RSquare	0.66065775		
RSquare Adj	0.66065775		
MAPE	8.0316774		
MAE	84.5345056		
-2LogLikelihood	360.233801		

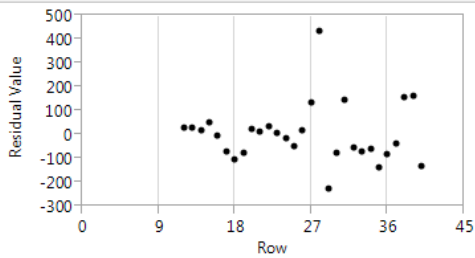
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	16.195362	22.39033	0.72	0.4755	16.1953621

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000				0	1.0000
1	0.0144		0.0066	0.9351	1	0.0144
2	-0.2747		2.5195	0.2837	2	-0.2750
3	0.0265		2.5439	0.4674	3	0.0384
4	-0.0577		2.6637	0.6156	4	-0.1460
5	-0.0481		2.7502	0.7384	5	-0.0264
6	-0.0239		2.7726	0.8368	6	-0.0898
7	-0.0424		2.8460	0.8989	7	-0.0624
8	-0.0574		2.9870	0.9352	8	-0.1066
9	-0.3376		8.1114	0.5230	9	-0.4239
10	-0.0042		8.1123	0.6179	10	-0.0962
11	0.2904		12.3250	0.3397	11	0.0252
12	-0.0449		12.4315	0.4117	12	-0.1340
13	-0.0288		12.4780	0.4889	13	-0.0617
14	-0.0396		12.5722	0.5605	14	-0.2472
15	0.0606		12.8083	0.6171	15	-0.0084
16	0.0972		13.4614	0.6388	16	-0.1000
17	0.0525		13.6683	0.6904	17	-0.0117
18	0.0491		13.8649	0.7379	18	-0.1151
19	0.0001		13.8649	0.7915	19	-0.0422
20	-0.0938		14.7438	0.7909	20	0.0144
21	-0.0675		15.2555	0.8099	21	-0.1769
22	-0.0167		15.2913	0.8494	22	-0.1284
23	0.0231		15.3712	0.8808	23	-0.1340
24	0.0165		15.4204	0.9079	24	-0.0234
25	-0.0023		15.4216	0.9310	25	0.0289

**Model: I(1)**

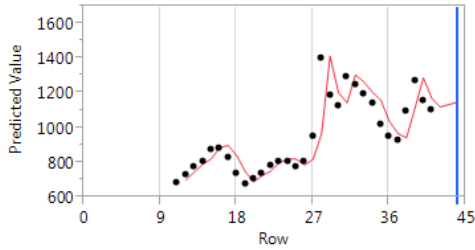
**Model Summary**

DF	29	Stable	Yes
Sum of Squared Errors	425456.555	Invertible	Yes
Variance Estimate	14670.9157		
Standard Deviation	121.123556		
Akaike's 'A' Information Criterion	373.927934		
Schwarz's Bayesian Criterion	375.329132		
RSquare	0.66335027		
RSquare Adj	0.66335027		
MAPE	7.95221542		
MAE	83.7387324		
-2LogLikelihood	371.927934		

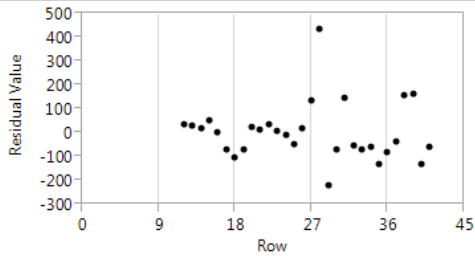
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	14.028887	21.74491	0.65	0.5239	14.0288867

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial
0	1.0000		.	.	0	1.0000
1	0.0347		0.0399	0.8417	1	0.0347
2	-0.2961		3.0461	0.2180	2	-0.2977
3	0.0023		3.0463	0.3845	3	0.0285
4	-0.0524		3.1476	0.5334	4	-0.1562
5	-0.0359		3.1970	0.6696	5	-0.0177
6	-0.0032		3.1975	0.7837	6	-0.0729
7	-0.0316		3.2392	0.8620	7	-0.0494
8	-0.0441		3.3240	0.9124	8	-0.0809
9	-0.3239		8.1199	0.5221	9	-0.4027
10	-0.0244		8.1486	0.6143	10	-0.0690
11	0.3001		12.6990	0.3135	11	0.0498
12	-0.0085		12.7028	0.3910	12	-0.0933
13	-0.0918		13.1785	0.4341	13	-0.0907
14	-0.0588		13.3862	0.4964	14	-0.2080
15	0.0574		13.5973	0.5563	15	0.0045
16	0.1030		14.3251	0.5745	16	-0.0495
17	0.0515		14.5206	0.6300	17	0.0070
18	0.0462		14.6912	0.6831	18	-0.0742
19	-0.0060		14.6943	0.7418	19	-0.0353
20	-0.0966		15.5908	0.7417	20	0.0330
21	-0.0719		16.1426	0.7616	21	-0.1404
22	-0.0066		16.1478	0.8085	22	-0.1302
23	0.0383		16.3491	0.8399	23	-0.0942
24	0.0280		16.4745	0.8702	24	0.0308
25	-0.0006		16.4746	0.9000	25	0.0619

**Model: I(1)**

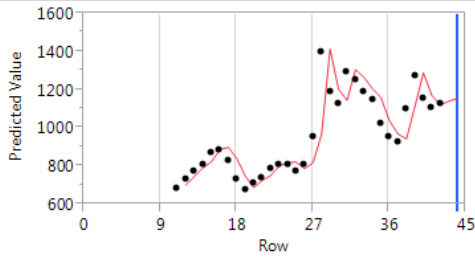
**Model Summary**

DF	30	Stable	Yes
Sum of Squared Errors	425482.655	Invertible	Yes
Variance Estimate	14182.7552		
Standard Deviation	119.091373		
Akaike's 'A' Information Criterion	385.310949		
Schwarz's Bayesian Criterion	386.744936		
RSquare	0.67022582		
RSquare Adj	0.67022582		
MAPE	7.71064606		
MAE	81.21041		
-2LogLikelihood	383.310949		

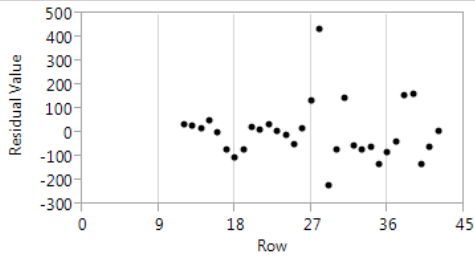
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	14.196410	21.03760	0.67	0.5050	14.1964097

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.0340		0.0393	0.8428	1	0.0340	
2	-0.2977		3.1660	0.2054	2	-0.2992	
3	0.0042		3.1666	0.3666	3	0.0303	
4	-0.0505		3.2631	0.5148	4	-0.1554	
5	-0.0362		3.3147	0.6516	5	-0.0171	
6	-0.0042		3.3155	0.7683	6	-0.0736	
7	-0.0333		3.3628	0.8495	7	-0.0509	
8	-0.0449		3.4525	0.9028	8	-0.0819	
9	-0.3249		8.3604	0.4983	9	-0.4054	
10	-0.0252		8.3915	0.5907	10	-0.0719	
11	0.3017		13.0481	0.2902	11	0.0483	
12	-0.0095		13.0529	0.3652	12	-0.0955	
13	-0.0946		13.5620	0.4054	13	-0.0939	
14	-0.0538		13.7360	0.4696	14	-0.2062	
15	0.0590		13.9586	0.5287	15	0.0005	
16	0.1033		14.6863	0.5477	16	-0.0503	
17	0.0511		14.8770	0.6043	17	0.0030	
18	0.0461		15.0445	0.6589	18	-0.0743	
19	-0.0059		15.0475	0.7196	19	-0.0380	
20	-0.0961		15.9057	0.7225	20	0.0329	
21	-0.0716		16.4307	0.7450	21	-0.1419	
22	-0.0062		16.4350	0.7937	22	-0.1339	
23	0.0375		16.6148	0.8277	23	-0.0939	
24	0.0267		16.7193	0.8604	24	0.0282	
25	-0.0016		16.7197	0.8917	25	0.0596	

## United Kingdom

**Model: I(1)**

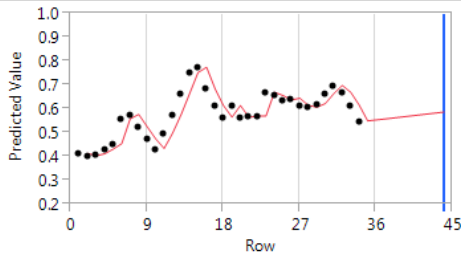
**Model Summary**

DF	32	Stable	Yes
Sum of Squared Errors	0.08789509	Invertible	Yes
Variance Estimate	0.00274672		
Standard Deviation	0.05240917		
Akaike's 'A' Information Criterion	-99.97798		
Schwarz's Bayesian Criterion	-98.481473		
RSquare	0.68996517		
RSquare Adj	0.68996517		
MAPE	7.21692271		
MAE	0.04221588		
-2LogLikelihood	-101.97798		

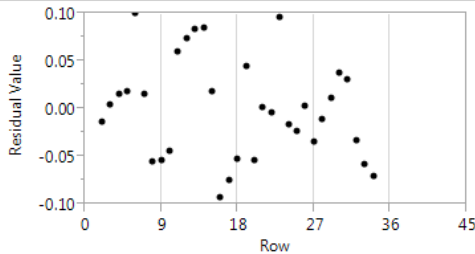
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	0.00413400	0.0089746	0.46	0.6482	0.004134

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3897	5.4808	0.0192*	1	0.3897
2	-0.0360	5.5290	0.0630	2	-0.2215
3	-0.4231	12.4195	0.0061*	3	-0.3963
4	-0.3615	17.6230	0.0015*	4	-0.0647
5	-0.2637	20.4907	0.0010*	5	-0.2002
6	-0.0675	20.6855	0.0021*	6	-0.1484
7	0.1953	22.3790	0.0022*	7	0.1264
8	0.3531	28.1394	0.0004*	8	0.1128
9	0.1616	29.3961	0.0006*	9	-0.1691
10	-0.0395	29.4744	0.0010*	10	0.0109
11	-0.1112	30.1239	0.0015*	11	0.1387
12	-0.0186	30.1428	0.0027*	12	0.1006
13	-0.1454	31.3641	0.0030*	13	-0.2164
14	-0.1846	33.4348	0.0025*	14	-0.1004
15	-0.0563	33.6385	0.0038*	15	0.0885
16	0.1839	35.9374	0.0030*	16	0.0854
17	0.3075	42.7635	0.0005*	17	0.1733
18	0.1282	44.0300	0.0006*	18	-0.0676
19	-0.0408	44.1676	0.0009*	19	-0.1021
20	-0.1533	46.2552	0.0007*	20	0.0122
21	-0.2439	51.9789	0.0002*	21	-0.0271
22	-0.1404	54.0484	0.0002*	22	0.1134
23	-0.0030	54.0495	0.0003*	23	-0.0535
24	0.1388	56.5216	0.0002*	24	-0.2078
25	0.1242	58.7487	0.0002*	25	-0.0483

**Model: I(1)**

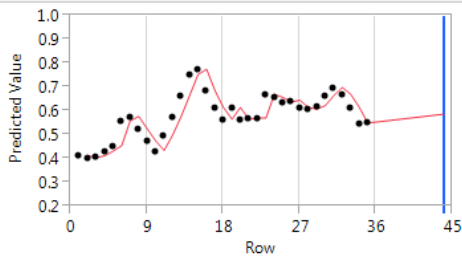
**Model Summary**

DF	33	Stable	Yes
Sum of Squared Errors	0.08789521	Invertible	Yes
Variance Estimate	0.00266349		
Standard Deviation	0.05160902		
Akaike's 'A' Information Criterion	-104.08317		
Schwarz's Bayesian Criterion	-102.55681		
RSquare	0.69115932		
RSquare Adj	0.69115932		
MAPE	7.00654636		
MAE	0.04098476		
-2LogLikelihood	-106.08317		

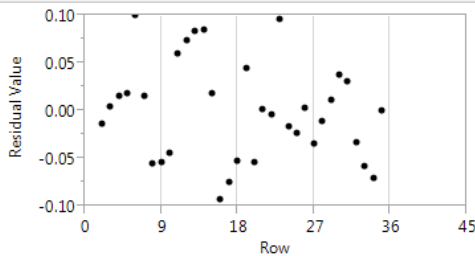
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	0.00412347	0.0087124	0.47	0.6391	0.00412347

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3900	5.6405	0.0176*	1	0.3900
2	-0.0357	5.6894	0.0582	2	-0.2215
3	-0.4229	12.7509	0.0052*	3	-0.3962
4	-0.3616	18.0846	0.0012*	4	-0.0646
5	-0.2638	21.0222	0.0008*	5	-0.2000
6	-0.0675	21.2215	0.0017*	6	-0.1481
7	0.1953	22.9506	0.0017*	7	0.1267
8	0.3533	28.8252	0.0003*	8	0.1130
9	0.1616	30.1038	0.0004*	9	-0.1693
10	-0.0394	30.1828	0.0008*	10	0.0112
11	-0.1112	30.8404	0.0012*	11	0.1389
12	-0.0189	30.8604	0.0021*	12	0.0998
13	-0.1454	32.0931	0.0023*	13	-0.2160
14	-0.1846	34.1785	0.0019*	14	-0.1003
15	-0.0561	34.3816	0.0030*	15	0.0884
16	0.1838	36.6779	0.0023*	16	0.0851
17	0.3077	43.4957	0.0004*	17	0.1740
18	0.1286	44.7600	0.0004*	18	-0.0677
19	-0.0405	44.8935	0.0007*	19	-0.1022
20	-0.1533	46.9490	0.0006*	20	0.0124
21	-0.2442	52.5626	0.0002*	21	-0.0271
22	-0.1407	54.5827	0.0001*	22	0.1134
23	-0.0033	54.5839	0.0002*	23	-0.0536
24	0.1385	56.9331	0.0002*	24	-0.2078
25	0.1244	59.0367	0.0001*	25	-0.0484

**Model: I(1)**

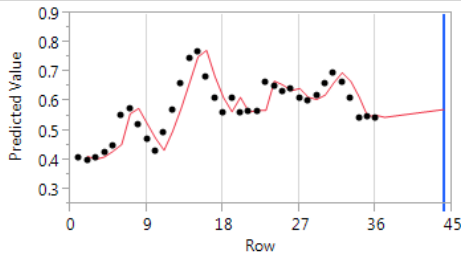
**Model Summary**

DF	34	Stable	Yes
Sum of Squared Errors	0.08801228	Invertible	Yes
Variance Estimate	0.0025886		
Standard Deviation	0.05087825		
Akaike's 'A' Information Criterion	-108.17125		
Schwarz's Bayesian Criterion	-106.6159		
RSquare	0.69238442		
RSquare Adj	0.69238442		
MAPE	6.86164846		
MAE	0.04011845		
-2LogLikelihood	-110.17125		

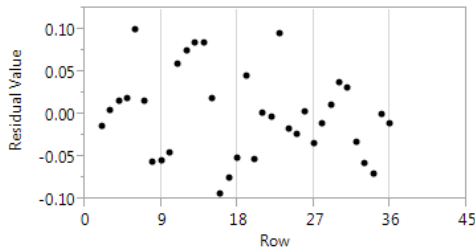
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	0.00380983	0.0084664	0.45	0.6556	0.00380983

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.3895		5.7795	0.0162*	1	0.3895	
2	-0.2029		5.8079	0.0548	2	-0.2106	
3	-0.4149		12.7737	0.0052*	3	-0.3950	
4	-0.3566		18.0851	0.0012*	4	-0.0617	
5	-0.2672		21.1663	0.0008*	5	-0.1966	
6	-0.0721		21.3986	0.0016*	6	-0.1412	
7	0.1937		23.1342	0.0016*	7	0.1361	
8	0.3544		29.1578	0.0003*	8	0.1169	
9	0.1660		30.5309	0.0004*	9	-0.1642	
10	-0.0394		30.6114	0.0007*	10	0.0043	
11	-0.1081		31.2416	0.0010*	11	0.1454	
12	-0.0170		31.2578	0.0018*	12	0.1054	
13	-0.1576		32.7201	0.0019*	13	-0.2398	
14	-0.1847		34.8244	0.0016*	14	-0.0851	
15	-0.0567		35.0327	0.0024*	15	0.0927	
16	0.1900		37.4938	0.0018*	16	0.0812	
17	0.3019		44.0489	0.0003*	17	0.1647	
18	0.1348		45.4323	0.0004*	18	-0.0505	
19	-0.0308		45.5089	0.0006*	19	-0.1071	
20	-0.1410		47.2252	0.0005*	20	0.0146	
21	-0.2454		52.7939	0.0001*	21	-0.0159	
22	-0.1506		55.0547	0.0001*	22	0.1094	
23	-0.0136		55.0746	0.0002*	23	-0.0594	
24	0.1291		57.0359	0.0002*	24	-0.2133	
25	0.1164		58.7913	0.0002*	25	-0.0402	

**Model: I(1)**

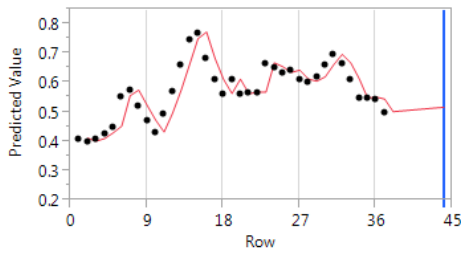
**Model Summary**

DF	35	Stable	Yes
Sum of Squared Errors	0.09014033	Invertible	Yes
Variance Estimate	0.00257544		
Standard Deviation	0.05074877		
Akaike's 'A' Information Criterion	-111.47306		
Schwarz's Bayesian Criterion	-109.88954		
RSquare	0.69187147		
RSquare Adj	0.69187147		
MAPE	6.9266179		
MAE	0.04030176		
-2LogLikelihood	-113.47306		

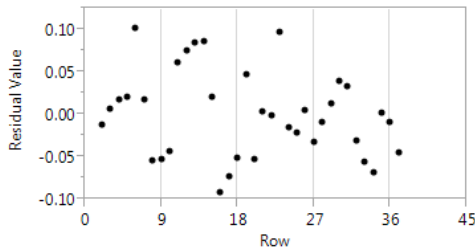
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	0.00251024	0.0083268	0.30	0.7648	0.00251024

**Forecast**



**Residuals**



Lag	AutoCorr	Ljung-Box Q	p-Value	Lag	Partial
0	1.0000	.	.	0	1.0000
1	0.3861	5.8252	0.0158*	1	0.3861
2	-0.0260	5.8524	0.0536	2	-0.2057
3	-0.3688	11.4896	0.0094*	3	-0.3402
4	-0.3175	15.7998	0.0033*	4	-0.0577
5	-0.2437	18.4207	0.0025*	5	-0.1793
6	-0.0862	18.7595	0.0046*	6	-0.1179
7	0.1703	20.1271	0.0053*	7	0.1447
8	0.3411	25.8116	0.0011*	8	0.1406
9	0.1692	27.2622	0.0013*	9	-0.1328
10	-0.0203	27.2839	0.0023*	10	0.0147
11	-0.1073	27.9137	0.0033*	11	0.0967
12	-0.0058	27.9156	0.0057*	12	0.1306
13	-0.1472	29.2051	0.0061*	13	-0.2038
14	-0.2324	32.5636	0.0033*	14	-0.1756
15	-0.0559	32.7668	0.0051*	15	0.1408
16	0.1836	35.0727	0.0039*	16	0.0871
17	0.3222	42.5458	0.0006*	17	0.1390
18	0.1078	43.4285	0.0007*	18	-0.1042
19	-0.0032	43.4293	0.0011*	19	-0.0037
20	-0.0981	44.2521	0.0014*	20	0.0145
21	-0.1896	47.5297	0.0008*	21	-0.0195
22	-0.1554	49.8884	0.0006*	22	0.1101
23	-0.0557	50.2144	0.0009*	23	-0.0752
24	0.0831	51.0022	0.0011*	24	-0.1808
25	0.0744	51.6913	0.0013*	25	-0.0707

**Model: I(1)**

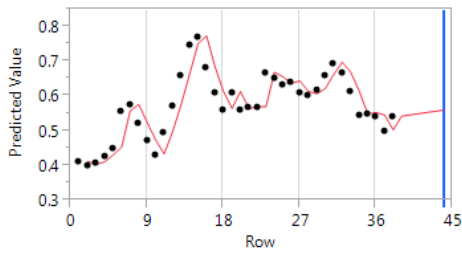
**Model Summary**

DF	36	Stable	Yes
Sum of Squared Errors	0.09148808	Invertible	Yes
Variance Estimate	0.00254134		
Standard Deviation	0.05041166		
Akaike's 'A' Information Criterion	-115.08973		
Schwarz's Bayesian Criterion	-113.47882		
RSquare	0.68886575		
RSquare Adj	0.68886575		
MAPE	6.9241261		
MAE	0.04019124		
-2LogLikelihood	-117.08973		

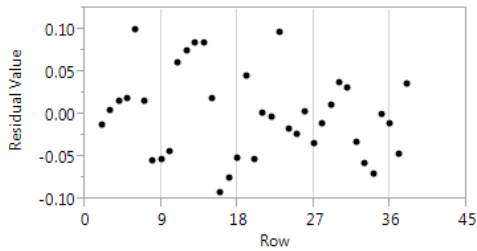
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	0.00351614	0.0081779	0.43	0.6698	0.00351614

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000		.	.	0	1.0000	
1	0.3617		5.2444	0.0220*	1	0.3617	
2	-0.0300		5.2816	0.0713	2	-0.1851	
3	-0.3633		10.8843	0.0124*	3	-0.3378	
4	-0.3411		15.9715	0.0031*	4	-0.1171	
5	-0.2630		19.0900	0.0018*	5	-0.1833	
6	-0.0982		19.5387	0.0033*	6	-0.1372	
7	0.1796		21.0895	0.0036*	7	0.1165	
8	0.3503		27.1966	0.0007*	8	0.1389	
9	0.1701		28.6884	0.0007*	9	-0.1297	
10	-0.0248		28.7212	0.0014*	10	-0.0183	
11	-0.1191		29.5084	0.0019*	11	0.0739	
12	-0.0034		29.5090	0.0033*	12	0.1724	
13	-0.1525		30.9076	0.0035*	13	-0.1956	
14	-0.2340		34.3420	0.0018*	14	-0.2102	
15	-0.0153		34.3572	0.0030*	15	0.1715	
16	0.1805		36.5952	0.0024*	16	0.0738	
17	0.3184		43.9098	0.0004*	17	0.1596	
18	0.0852		44.4615	0.0005*	18	-0.1063	
19	0.0150		44.4796	0.0008*	19	0.0219	
20	-0.1176		45.6542	0.0009*	20	-0.0457	
21	-0.2177		49.9302	0.0004*	21	-0.0110	
22	-0.1911		53.4429	0.0002*	22	0.0945	
23	-0.0484		53.6846	0.0003*	23	-0.0723	
24	0.1150		55.1528	0.0003*	24	-0.1705	
25	0.1071		56.5324	0.0003*	25	-0.0965	

**Model: I(1)**

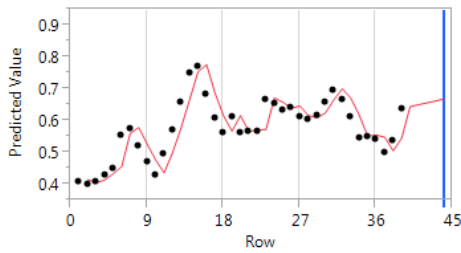
**Model Summary**

DF	37	Stable	Yes
Sum of Squared Errors	0.10042118	Invertible	Yes
Variance Estimate	0.00271409		
Standard Deviation	0.05209689		
Akaike's 'A' Information Criterion	-115.72747		
Schwarz's Bayesian Criterion	-114.08988		
RSquare	0.66264604		
RSquare Adj	0.66264604		
MAPE	7.15036444		
MAE	0.0416795		
-2LogLikelihood	-117.72747		

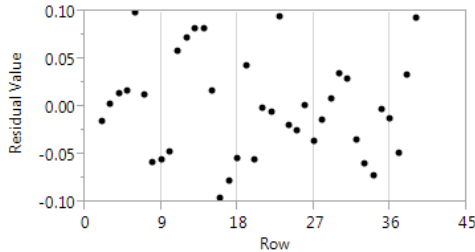
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	0.00603676	0.0083367	0.72	0.4735	0.00603676

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000		.	.	0	1.0000	
1	0.3637		5.4336	0.0198*	1	0.3637	
2	-0.0711		5.6472	0.0594	2	-0.2344	
3	-0.3412		10.7019	0.0135*	3	-0.2731	
4	-0.3106		15.0145	0.0047*	4	-0.1158	
5	-0.3037		19.2626	0.0017*	5	-0.2814	
6	-0.1432		20.2365	0.0025*	6	-0.1353	
7	0.1305		21.0722	0.0037*	7	0.0560	
8	0.3449		27.0982	0.0007*	8	0.1109	
9	0.1866		28.9235	0.0007*	9	-0.1198	
10	-0.0138		28.9339	0.0013*	10	-0.0595	
11	-0.1188		29.7291	0.0017*	11	-0.0067	
12	-0.0335		29.7945	0.0030*	12	0.1154	
13	-0.1325		30.8616	0.0035*	13	-0.1166	
14	-0.2314		34.2542	0.0019*	14	-0.2182	
15	-0.0293		34.3111	0.0031*	15	0.0742	
16	0.2544		38.7813	0.0012*	16	0.1615	
17	0.2862		44.7108	0.0003*	17	0.0825	
18	0.0795		45.1912	0.0004*	18	-0.0518	
19	-0.0385		45.3096	0.0006*	19	0.0089	
20	-0.0663		45.6809	0.0009*	20	0.0395	
21	-0.2495		51.2466	0.0002*	21	-0.1497	
22	-0.2462		57.0032	<.0001*	22	0.0233	
23	-0.1356		58.8678	<.0001*	23	-0.1185	
24	0.1172		60.3603	<.0001*	24	-0.0903	
25	0.1732		63.8675	<.0001*	25	-0.0777	

**Model: I(1)**

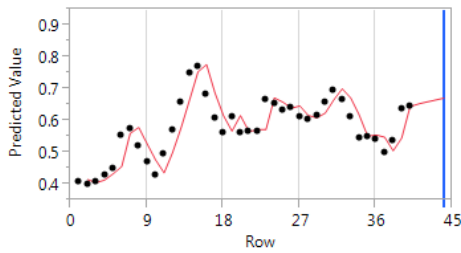
**Model Summary**

DF	38	Stable	Yes
Sum of Squared Errors	0.10042777	Invertible	Yes
Variance Estimate	0.00264284		
Standard Deviation	0.05140852		
Akaike's 'A' Information Criterion	-119.83604		
Schwarz's Bayesian Criterion	-118.17248		
RSquare	0.6676623		
RSquare Adj	0.6676623		
MAPE	6.97790208		
MAE	0.04067916		
-2LogLikelihood	-121.83604		

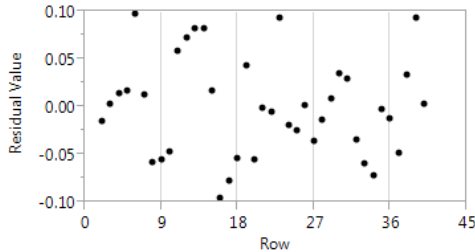
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	0.00610343	0.0081195	0.75	0.4569	0.00610343

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000		.	.	0	1.0000	
1	0.3661		5.6387	0.0176*	1	0.3661	
2	-0.0702		5.8516	0.0536	2	-0.2358	
3	-0.3423		11.0566	0.0114*	3	-0.2742	
4	-0.3108		15.4709	0.0038*	4	-0.1132	
5	-0.3036		19.8060	0.0014*	5	-0.2813	
6	-0.1449		20.8237	0.0020*	6	-0.1365	
7	0.1290		21.6556	0.0029*	7	0.0577	
8	0.3439		27.7559	0.0005*	8	0.1093	
9	0.1873		29.6249	0.0005*	9	-0.1214	
10	-0.0129		29.6341	0.0010*	10	-0.0588	
11	-0.1186		30.4370	0.0014*	11	-0.0072	
12	-0.0337		30.5042	0.0023*	12	0.1136	
13	-0.1333		31.5964	0.0028*	13	-0.1195	
14	-0.2313		35.0174	0.0015*	14	-0.2167	
15	-0.0299		35.0771	0.0024*	15	0.0756	
16	0.2538		39.5569	0.0009*	16	0.1597	
17	0.2886		45.6097	0.0002*	17	0.0829	
18	0.0794		46.0896	0.0003*	18	-0.0549	
19	-0.0385		46.2080	0.0005*	19	0.0116	
20	-0.0678		46.5944	0.0007*	20	0.0378	
21	-0.2484		52.0760	0.0002*	21	-0.1498	
22	-0.2475		57.8381	<.0001*	22	0.0213	
23	-0.1376		59.7315	<.0001*	23	-0.1189	
24	0.1147		61.1339	<.0001*	24	-0.0926	
25	0.1735		64.5714	<.0001*	25	-0.0771	

**Model: I(1)**

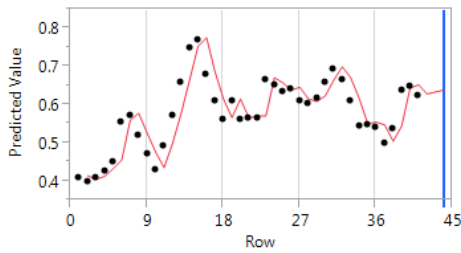
**Model Summary**

DF	39	Stable	Yes
Sum of Squared Errors	0.101302	Invertible	Yes
Variance Estimate	0.00259749		
Standard Deviation	0.05096555		
Akaike's 'A' Information Criterion	-123.62606		
Schwarz's Bayesian Criterion	-121.93718		
RSquare	0.66670894		
RSquare Adj	0.66670894		
MAPE	6.91420307		
MAE	0.04037335		
-2LogLikelihood	-125.62606		

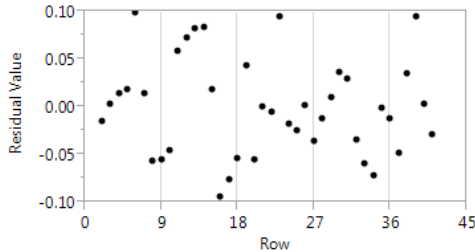
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	0.00535482	0.0079505	0.67	0.5046	0.00535482

**Forecast**



**Residuals**



Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000		.	.	0	1.0000	
1	0.3623		5.6533	0.0174*	1	0.3623	
2	-0.0971		6.0698	0.0481*	2	-0.2628	
3	-0.3500		11.6330	0.0088*	3	-0.2602	
4	-0.2948		15.6874	0.0035*	4	-0.1038	
5	-0.2986		19.9679	0.0013*	5	-0.3099	
6	-0.1445		20.9990	0.0018*	6	-0.1392	
7	0.1482		22.1179	0.0024*	7	0.0736	
8	0.3586		28.8675	0.0003*	8	0.0985	
9	0.1967		30.9651	0.0003*	9	-0.0983	
10	-0.0208		30.9893	0.0006*	10	-0.0465	
11	-0.1282		31.9418	0.0008*	11	-0.0106	
12	-0.0371		32.0244	0.0014*	12	0.1259	
13	-0.1299		33.0750	0.0017*	13	-0.1017	
14	-0.2204		36.2131	0.0010*	14	-0.1926	
15	-0.0308		36.2770	0.0016*	15	0.0589	
16	0.2589		40.9684	0.0006*	16	0.1554	
17	0.2921		47.2005	0.0001*	17	0.0996	
18	0.0511		47.4002	0.0002*	18	-0.0706	
19	-0.0366		47.5074	0.0003*	19	0.0575	
20	-0.0670		47.8850	0.0004*	20	0.0182	
21	-0.2298		52.5532	0.0002*	21	-0.1363	
22	-0.2584		58.7859	<.0001*	22	-0.0001	
23	-0.1209		60.2295	<.0001*	23	-0.0929	
24	0.1367		62.1917	<.0001*	24	-0.0758	
25	0.2008		66.7094	<.0001*	25	-0.0499	

**Model: I(1)**

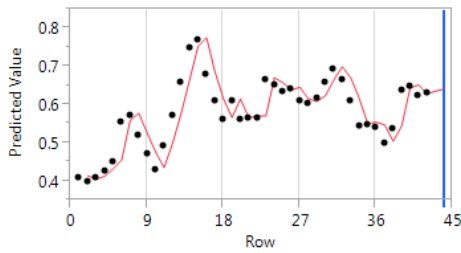
**Model Summary**

DF	40	Stable	Yes
Sum of Squared Errors	0.10130636	Invertible	Yes
Variance Estimate	0.00253266		
Standard Deviation	0.05032553		
Akaike's 'A' Information Criterion	-127.77734		
Schwarz's Bayesian Criterion	-126.06377		
RSquare	0.66923119		
RSquare Adj	0.66923119		
MAPE	6.75417411		
MAE	0.0394415		
-2LogLikelihood	-129.77734		

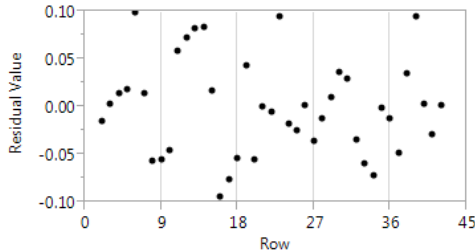
**Parameter Estimates**

Term	Lag	Estimate	Std Error	t Ratio	Prob> t	Constant Estimate
Intercept	0	0.00540643	0.0077630	0.70	0.4902	0.00540643

**Forecast**



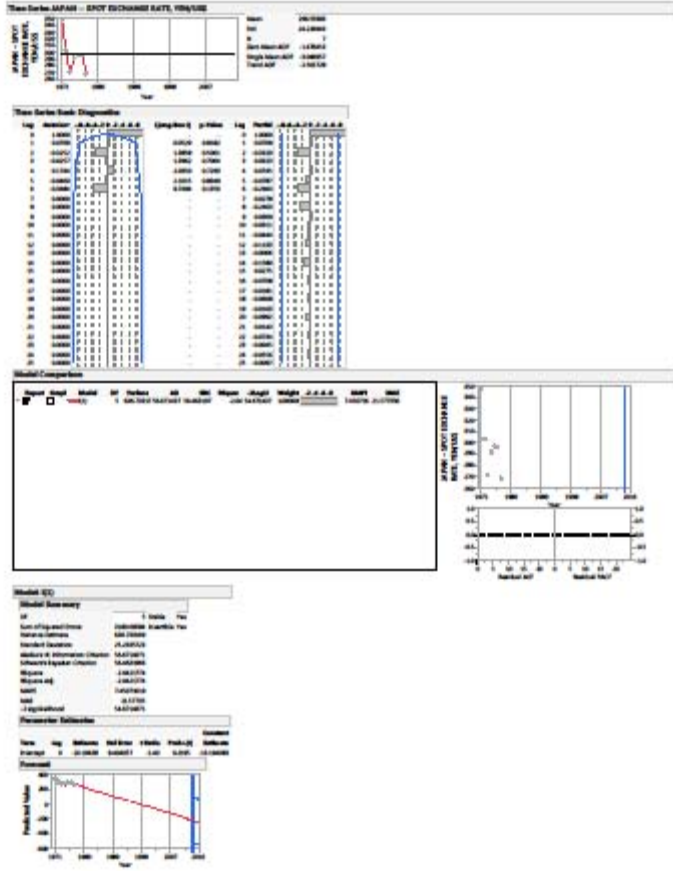
**Residuals**

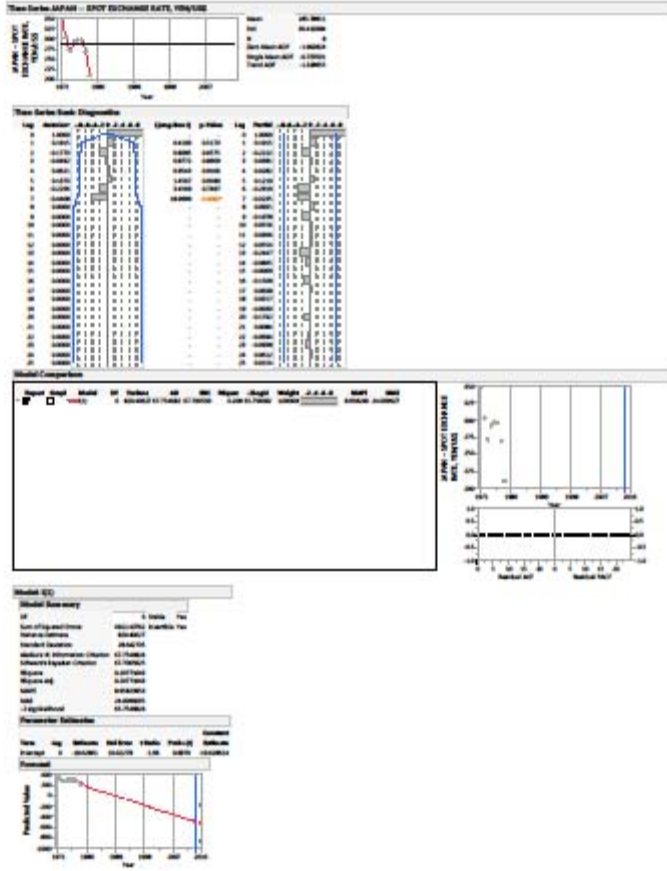


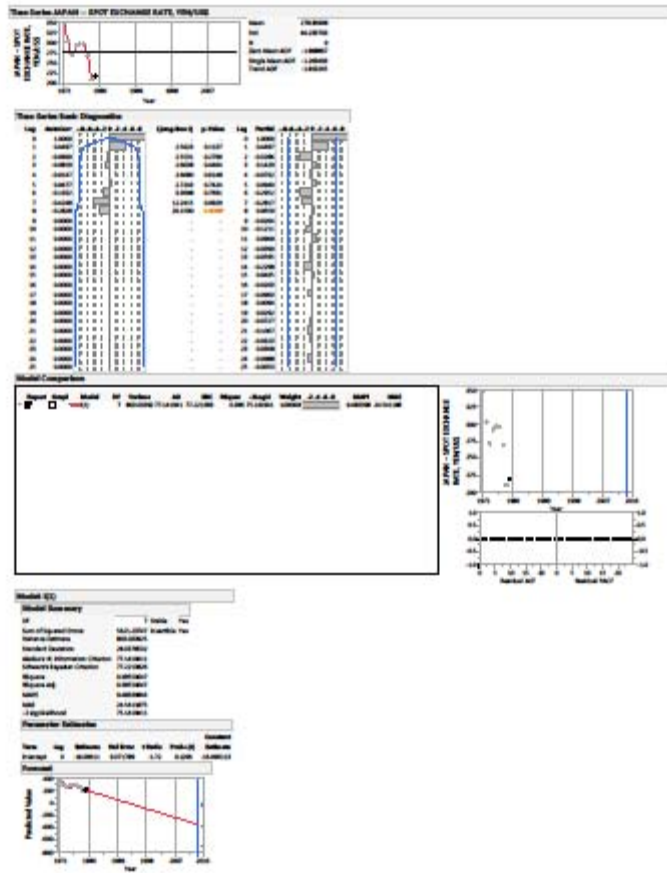
Lag	AutoCorr		Ljung-Box Q	p-Value	Lag	Partial	
0	1.0000				0	1.0000	
1	0.3616		5.7641	0.0164*	1	0.3616	
2	-0.0970		6.1895	0.0453*	2	-0.2621	
3	-0.3481		11.8103	0.0081*	3	-0.2582	
4	-0.2940		15.9282	0.0031*	4	-0.1049	
5	-0.2995		20.3214	0.0011*	5	-0.3102	
6	-0.1446		21.3747	0.0016*	6	-0.1373	
7	0.1483		22.5146	0.0021*	7	0.0732	
8	0.3571		29.3265	0.0003*	8	0.0972	
9	0.1955		31.4314	0.0002*	9	-0.0973	
10	-0.0215		31.4578	0.0005*	10	-0.0485	
11	-0.1276		32.4148	0.0007*	11	-0.0117	
12	-0.0363		32.4950	0.0012*	12	0.1262	
13	-0.1296		33.5530	0.0014*	13	-0.1022	
14	-0.2205		36.7280	0.0008*	14	-0.1937	
15	-0.0315		36.7954	0.0014*	15	0.0562	
16	0.2589		41.5229	0.0005*	16	0.1566	
17	0.2916		47.7670	<.0001*	17	0.1005	
18	0.0507		47.9644	0.0002*	18	-0.0720	
19	-0.0347		48.0608	0.0003*	19	0.0577	
20	-0.0671		48.4393	0.0004*	20	0.0154	
21	-0.2298		53.0930	0.0001*	21	-0.1333	
22	-0.2595		59.3421	<.0001*	22	-0.0014	
23	-0.1199		60.7511	<.0001*	23	-0.0922	
24	0.1356		62.6577	<.0001*	24	-0.0773	
25	0.1992		67.0307	<.0001*	25	-0.0504	

**FY79-FY12**

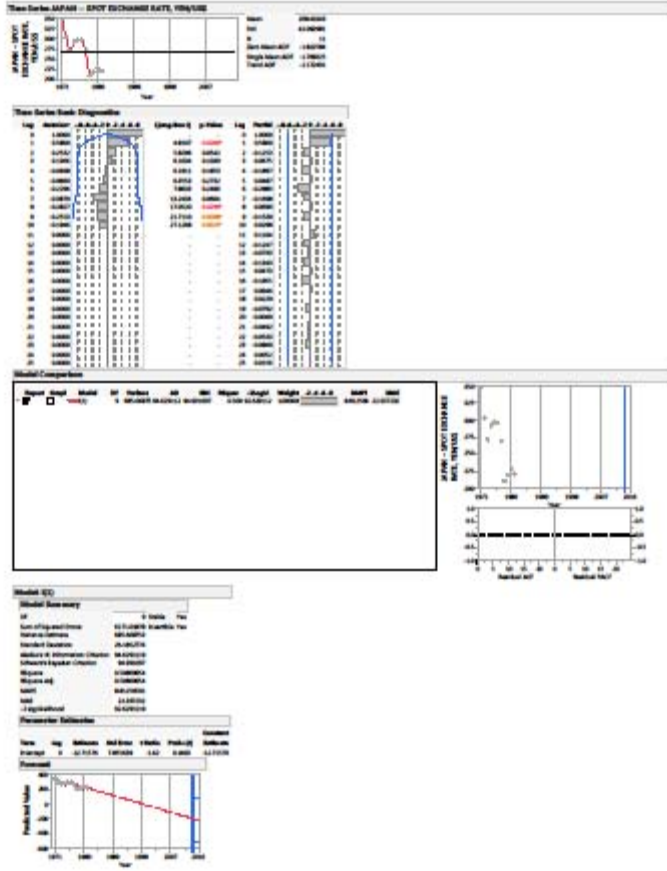
**Japan**

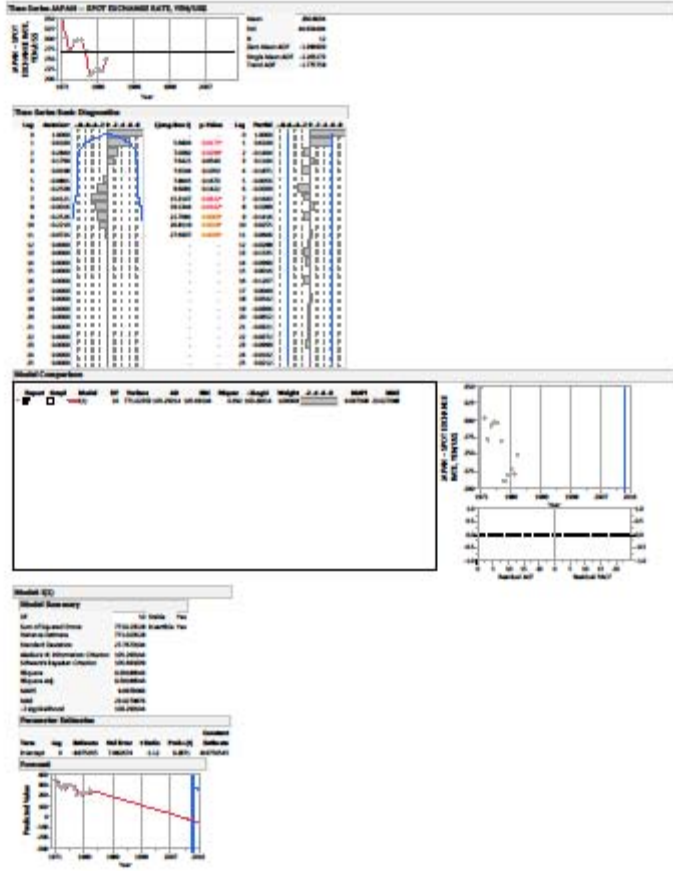


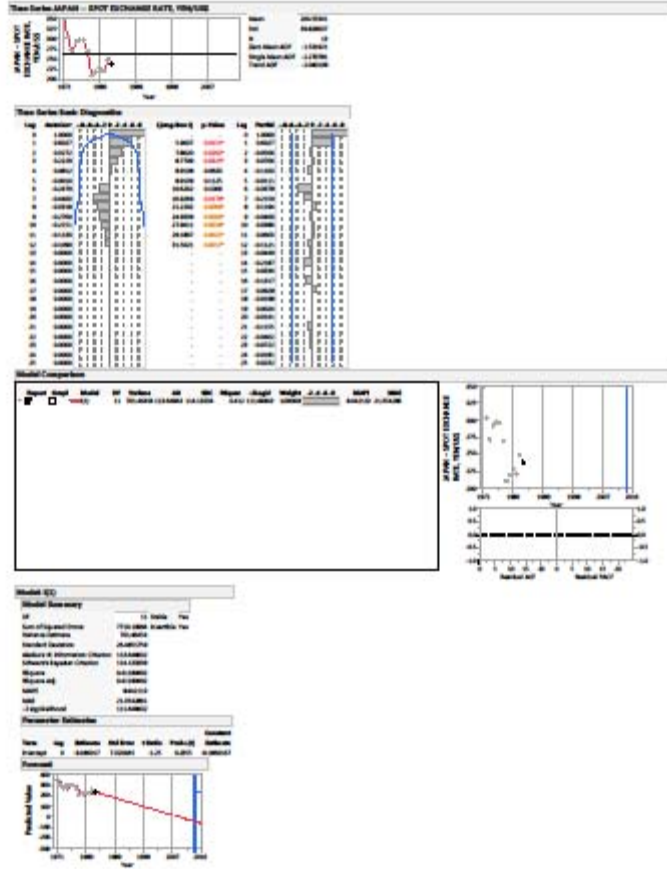




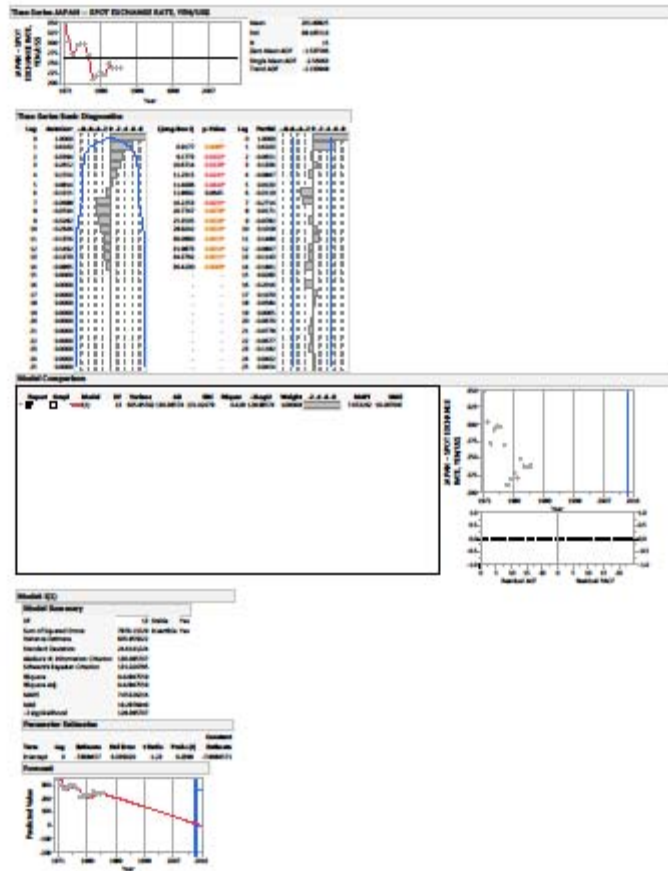


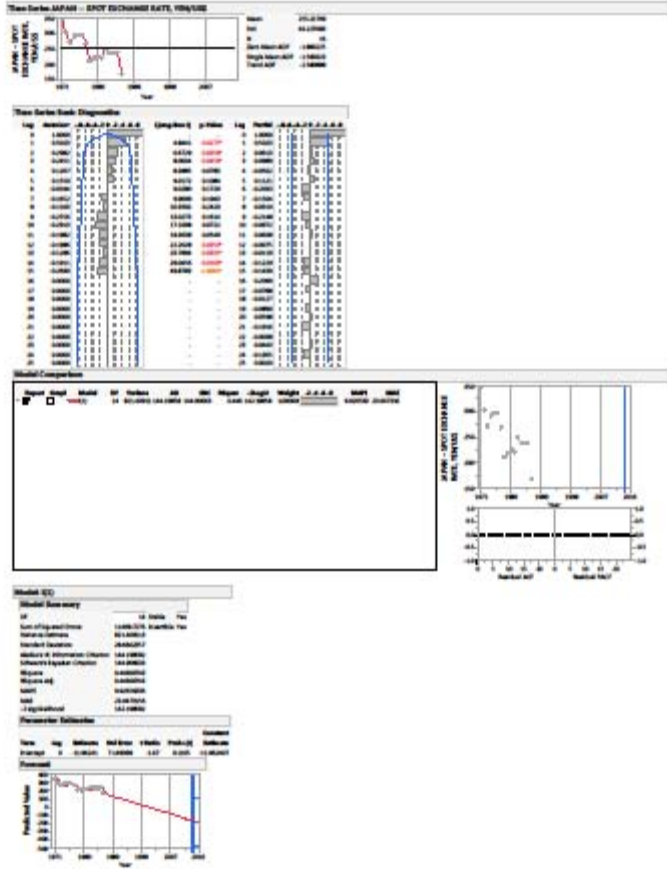


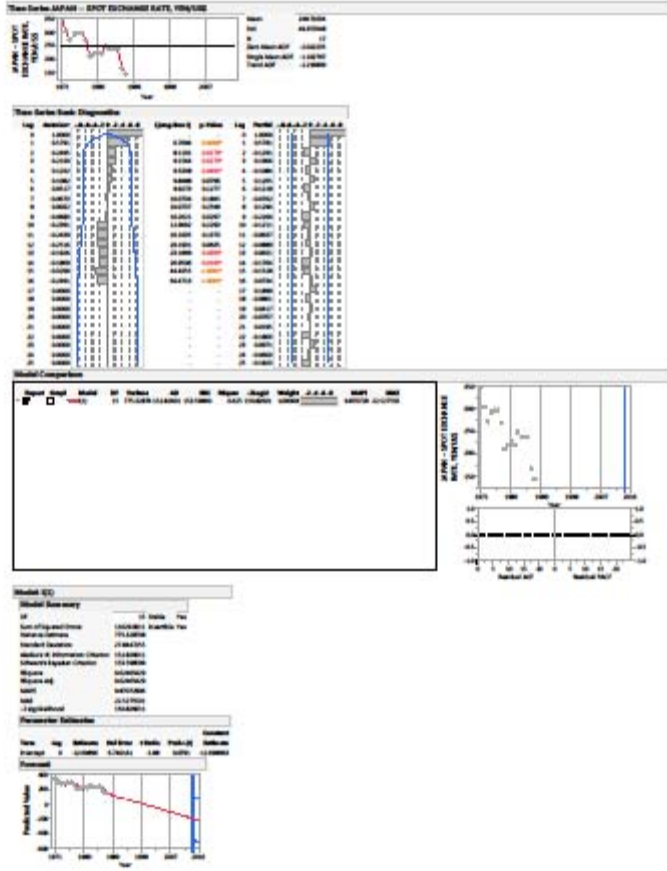


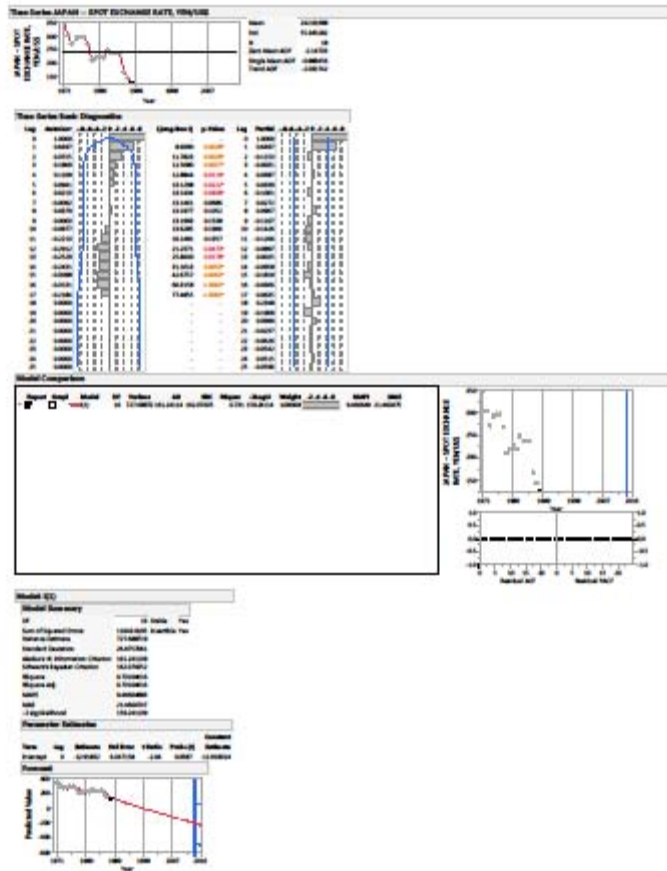


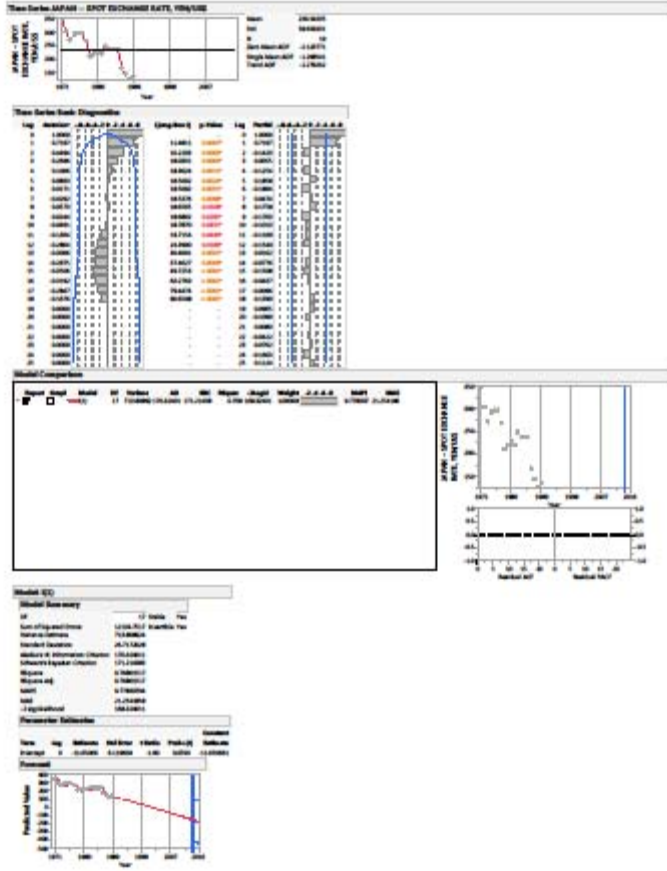


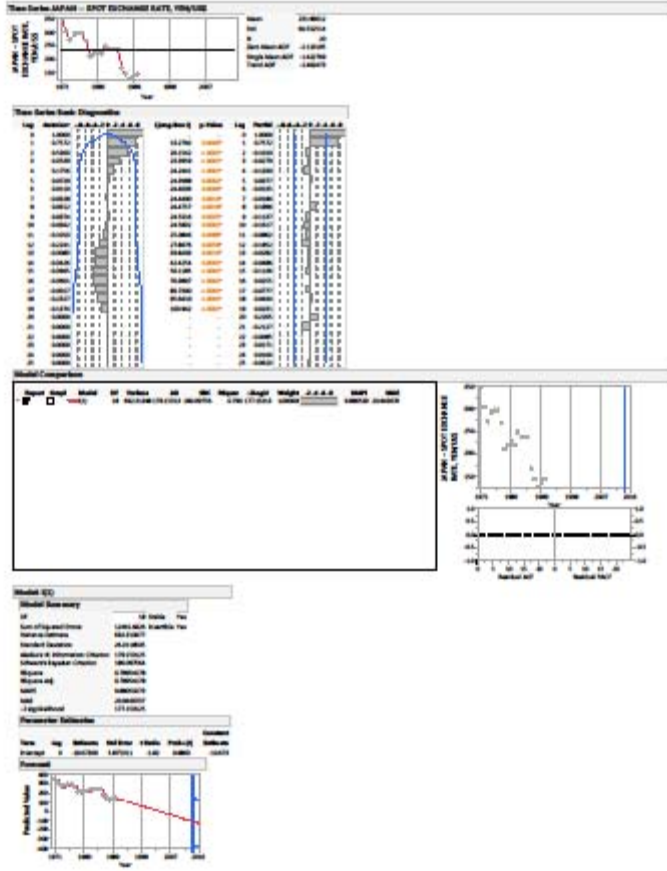






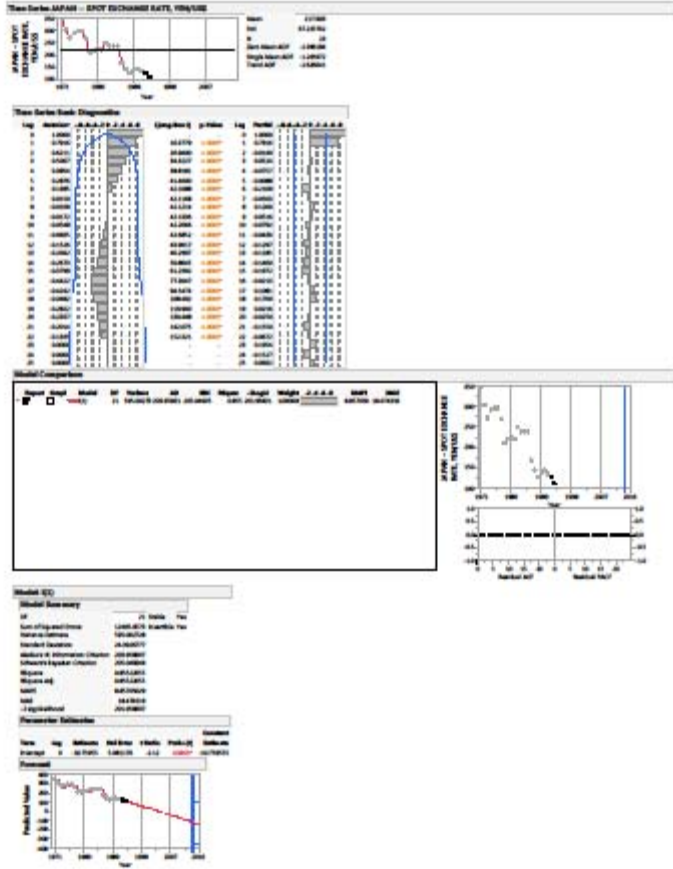


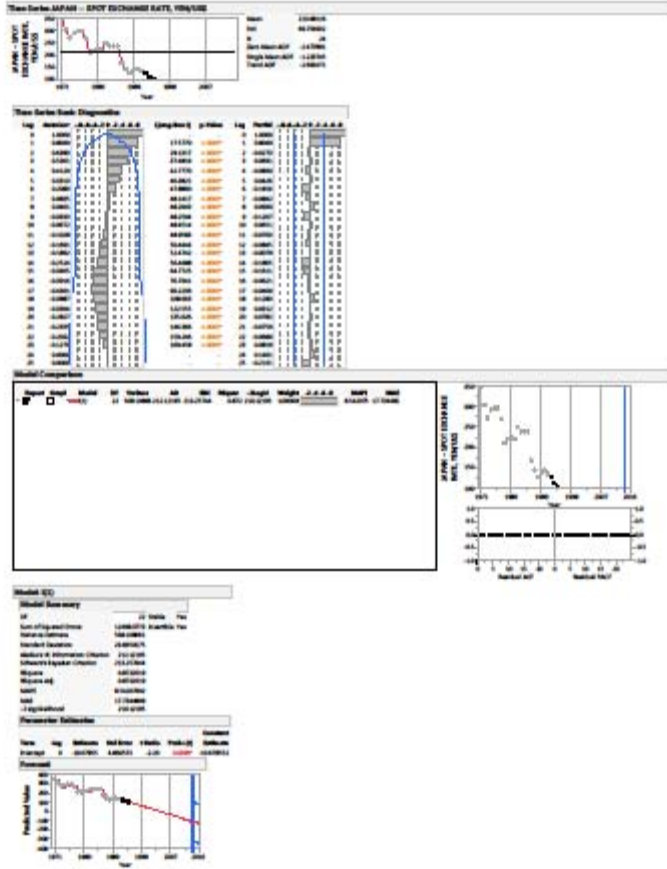




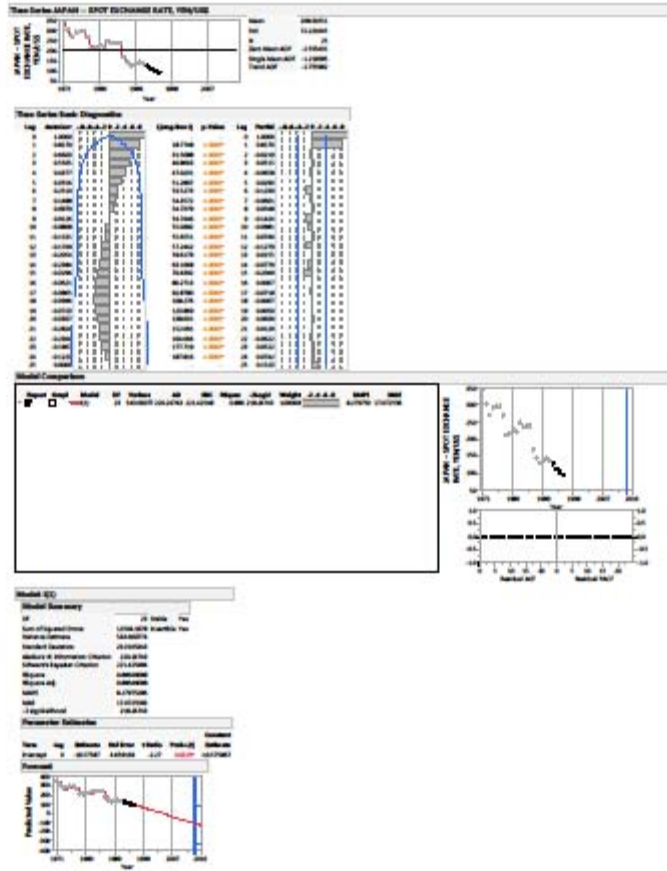


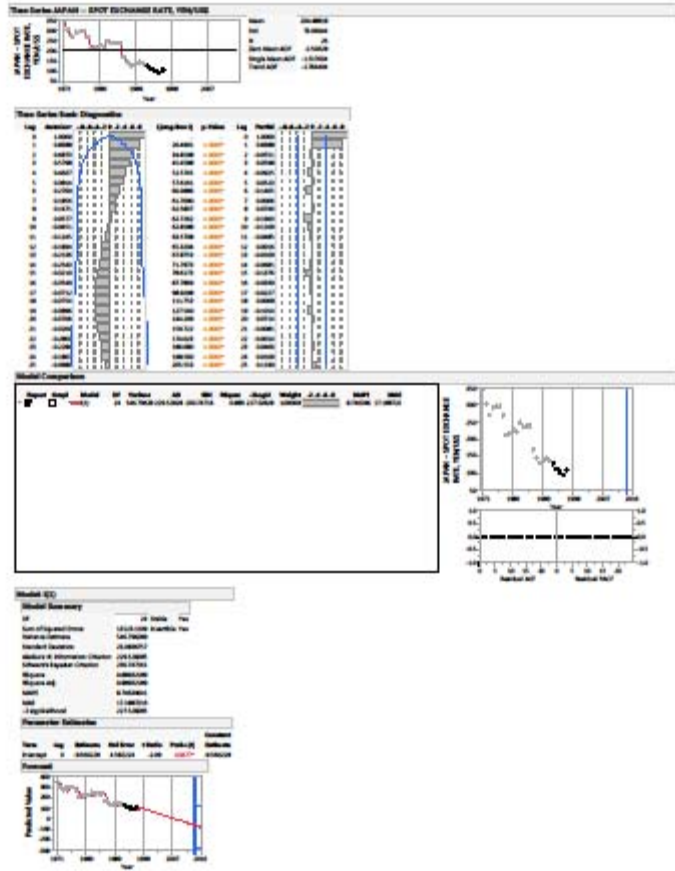


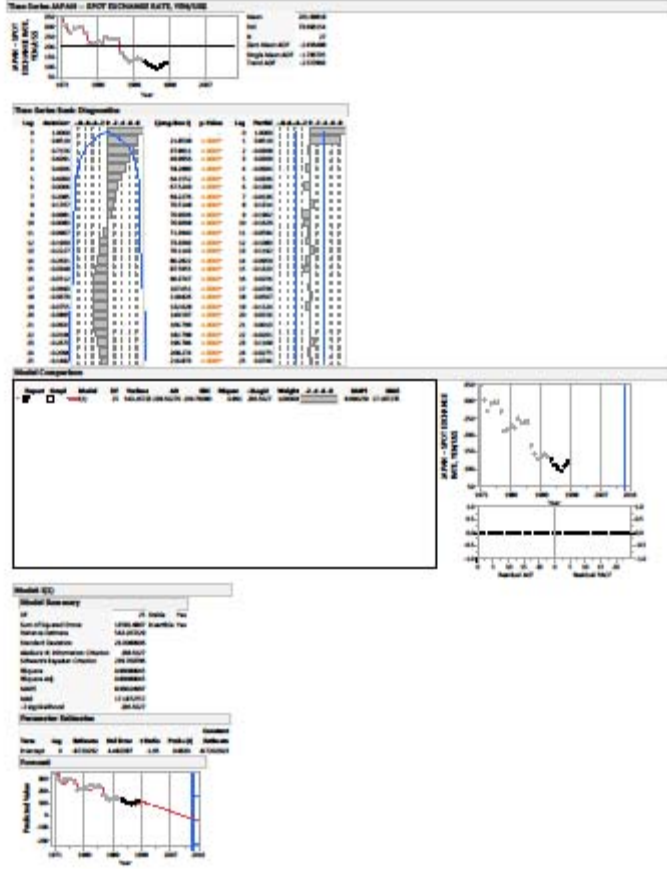


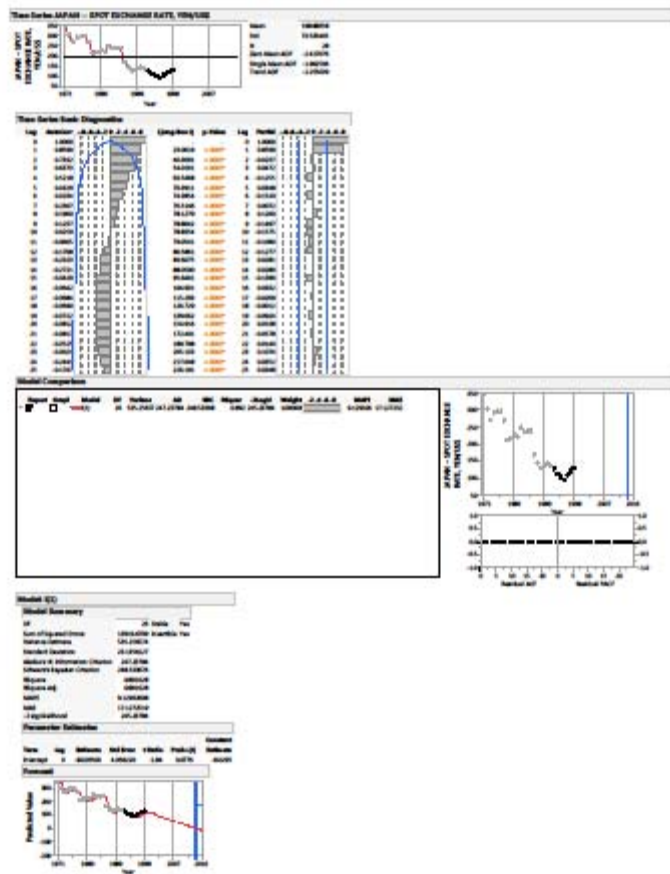


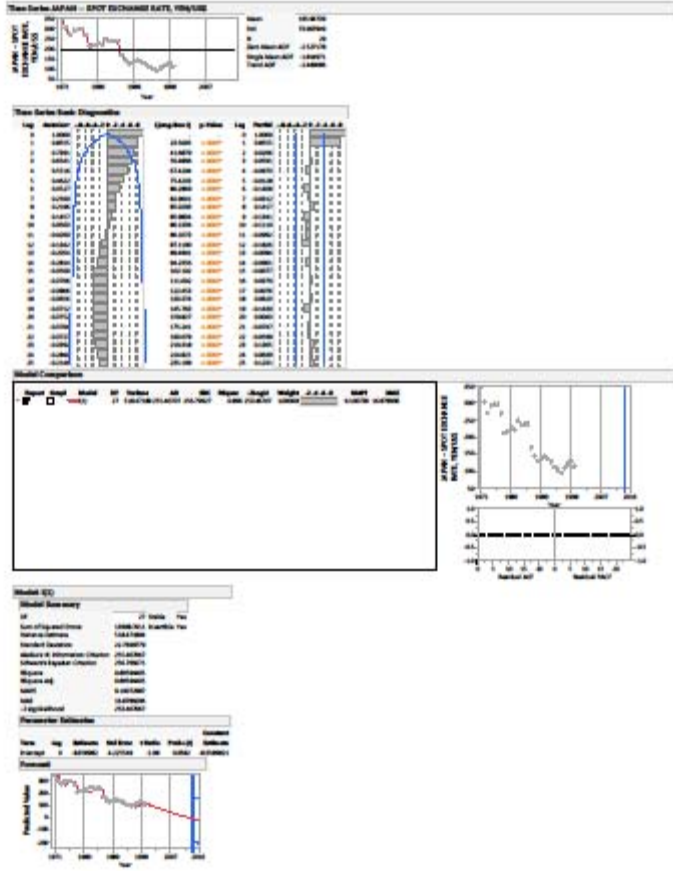
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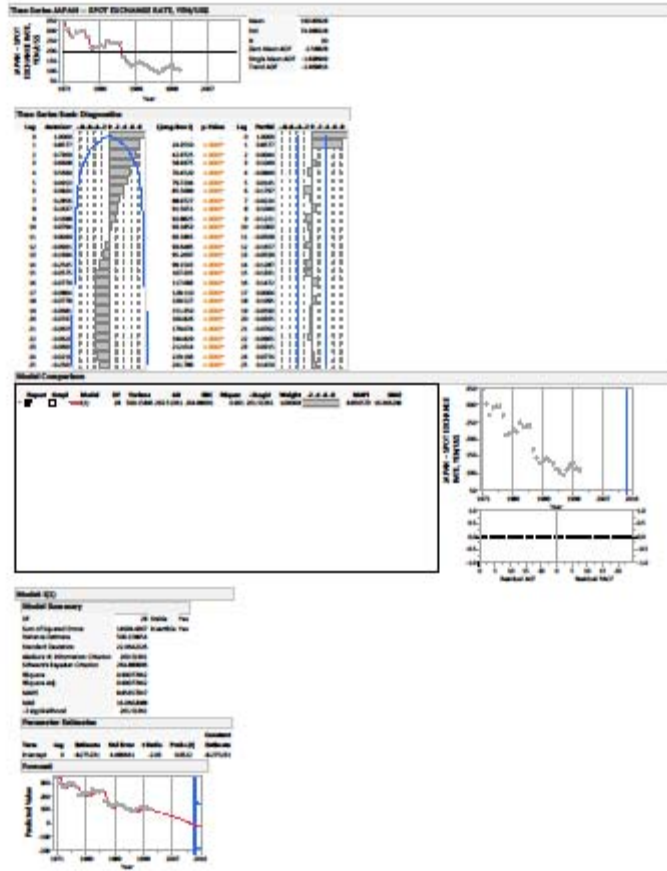


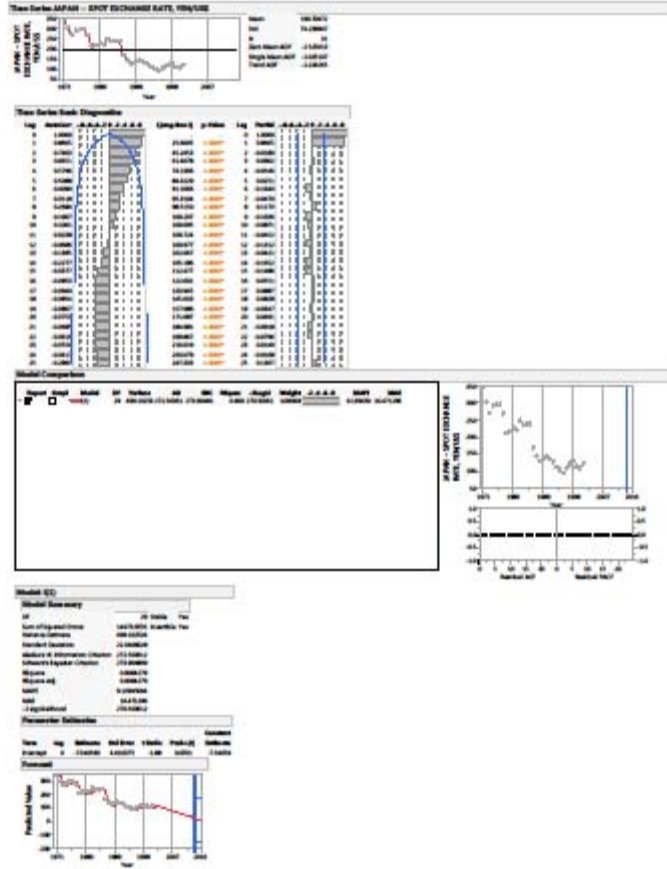


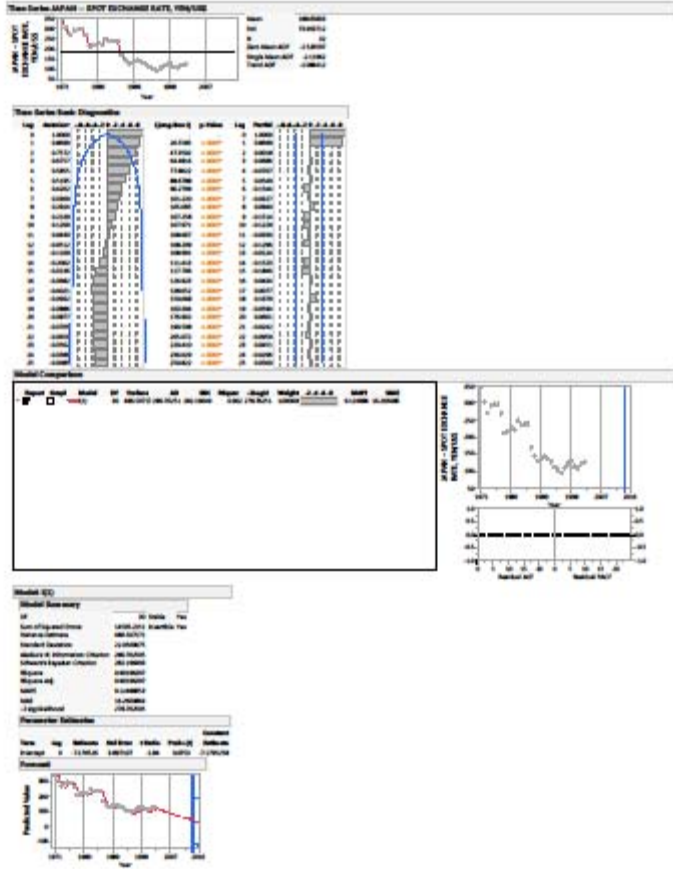


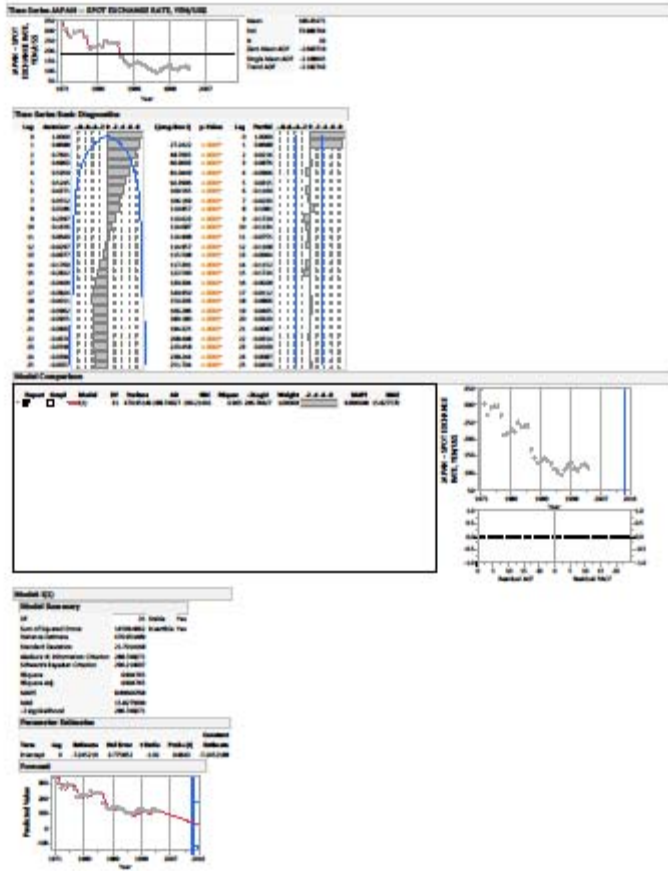


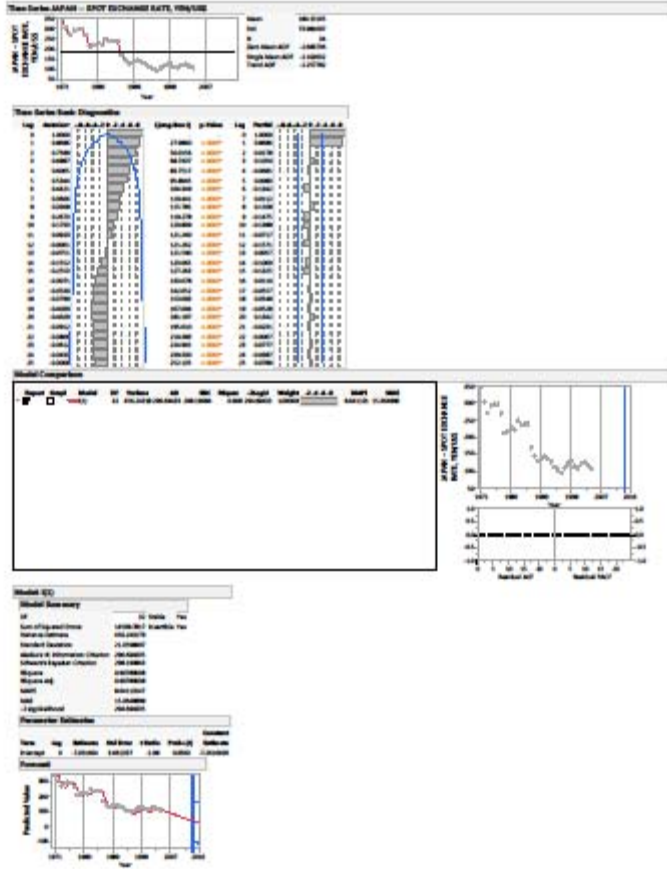


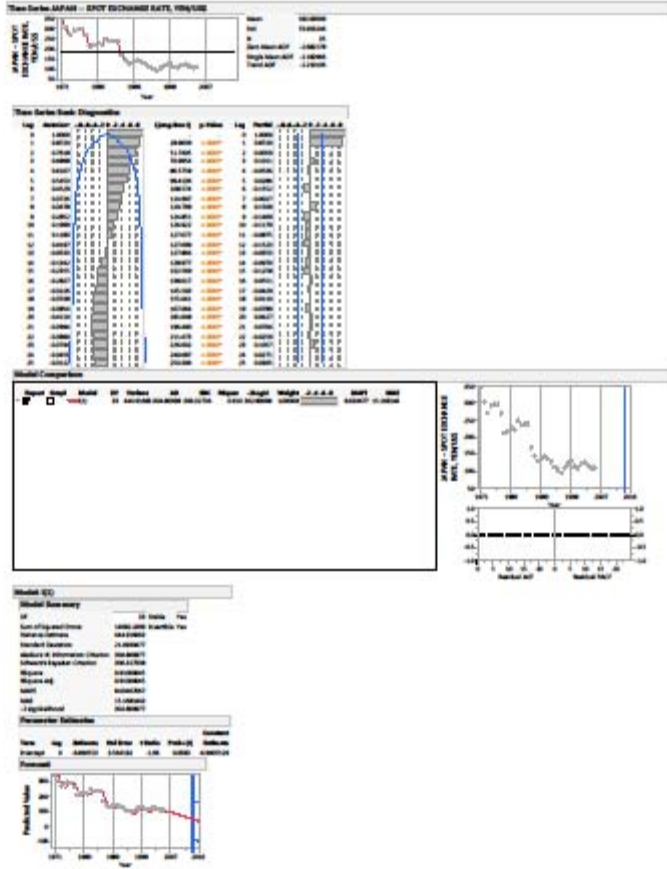


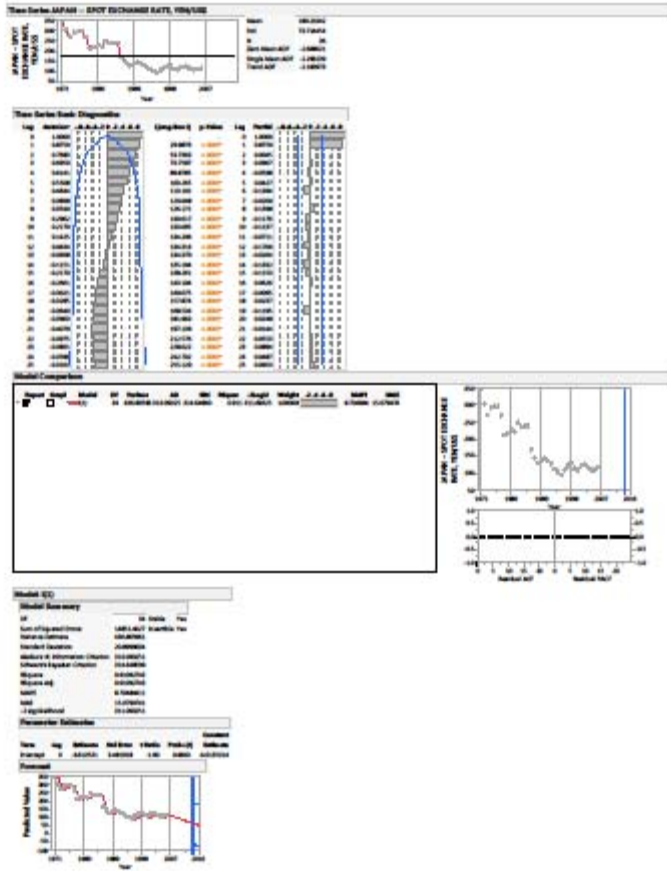


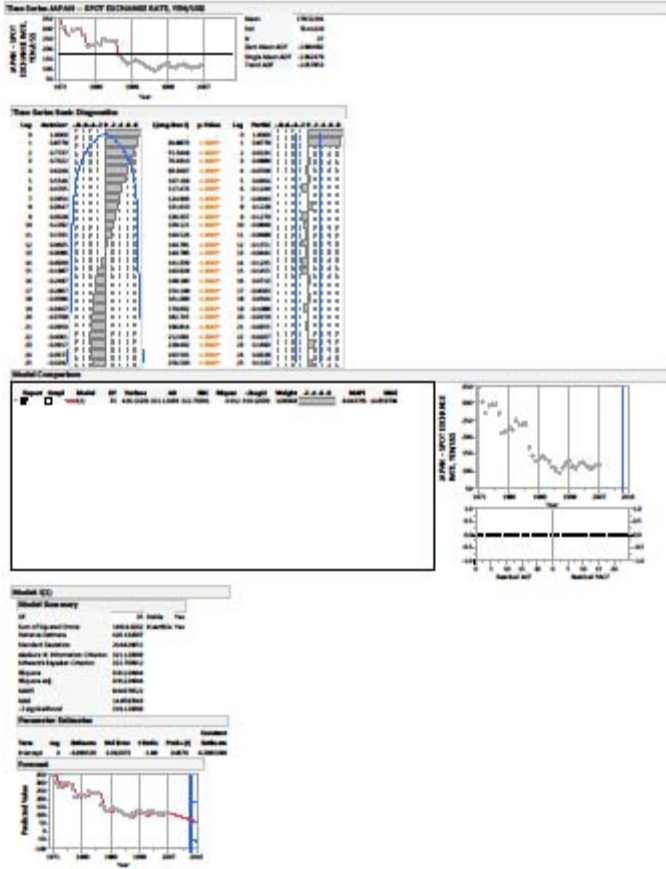


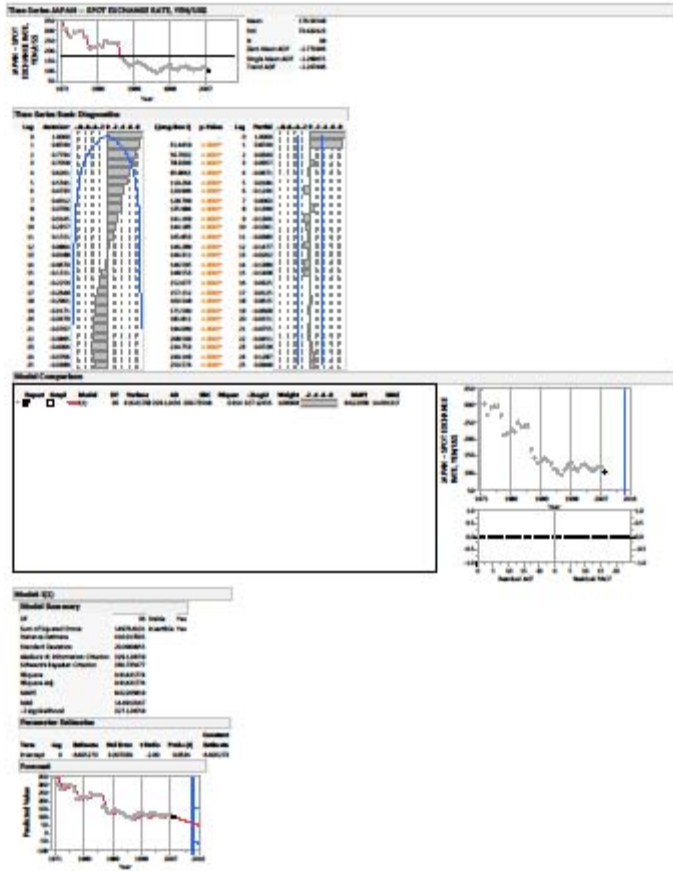




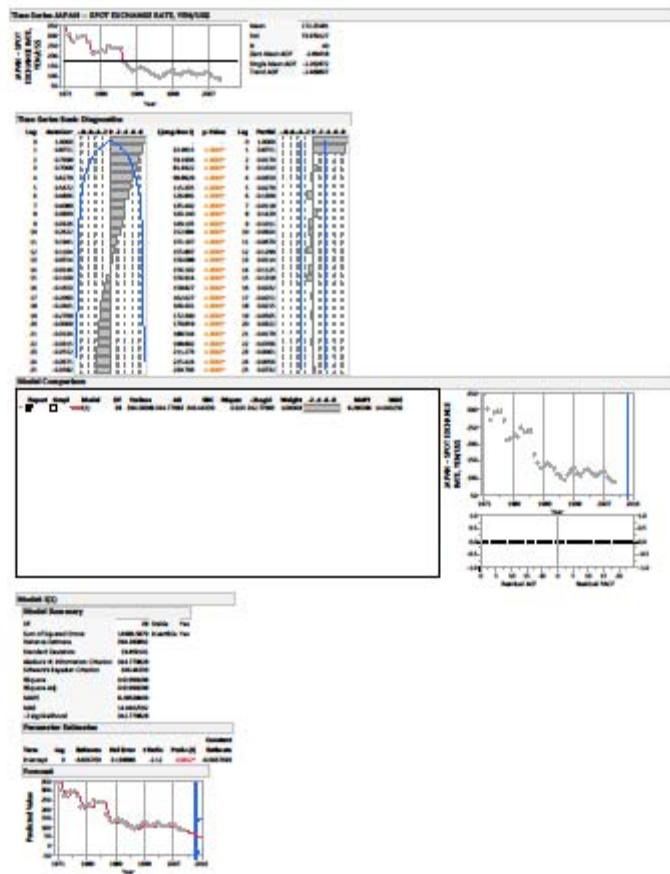






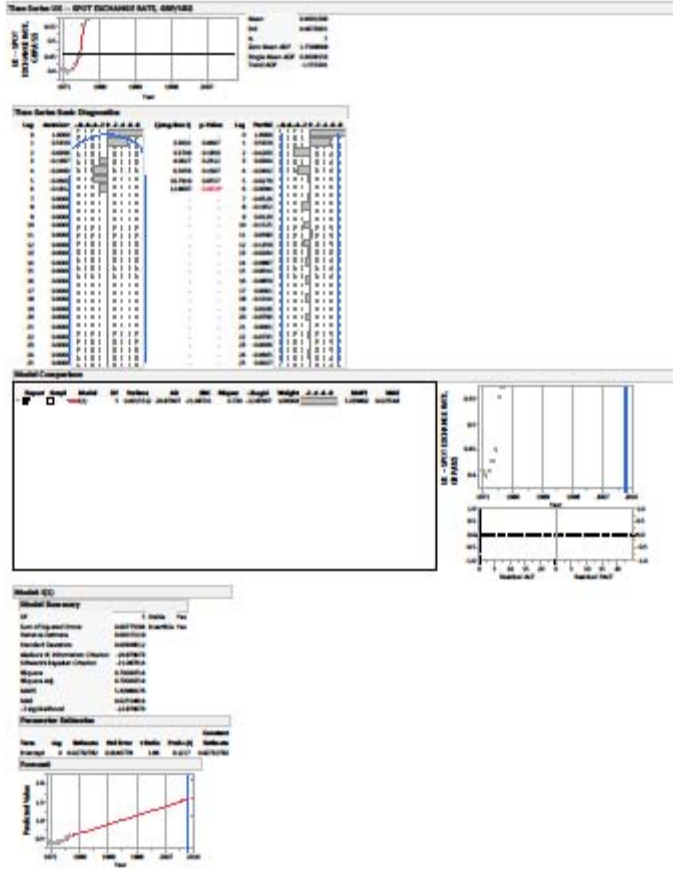


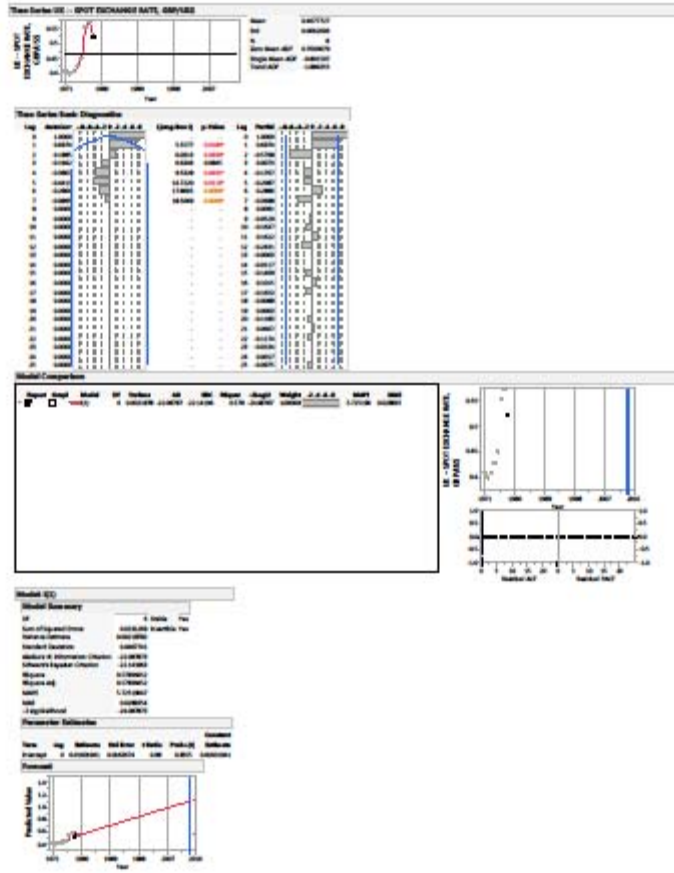


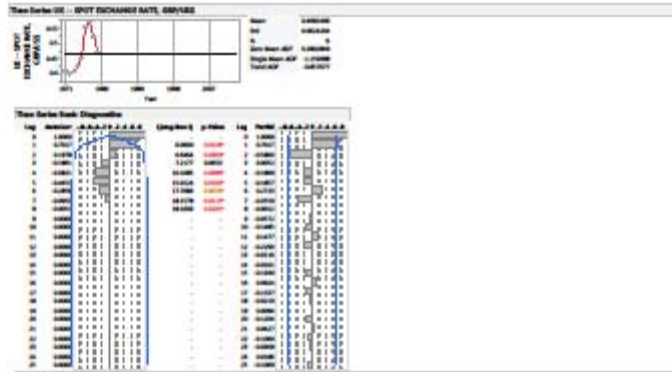




## United Kingdom



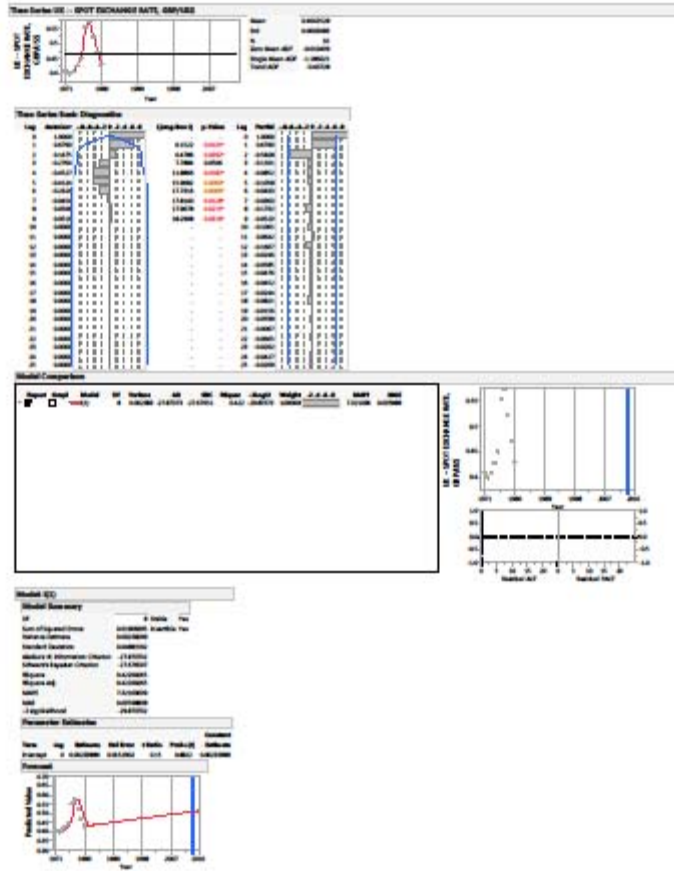


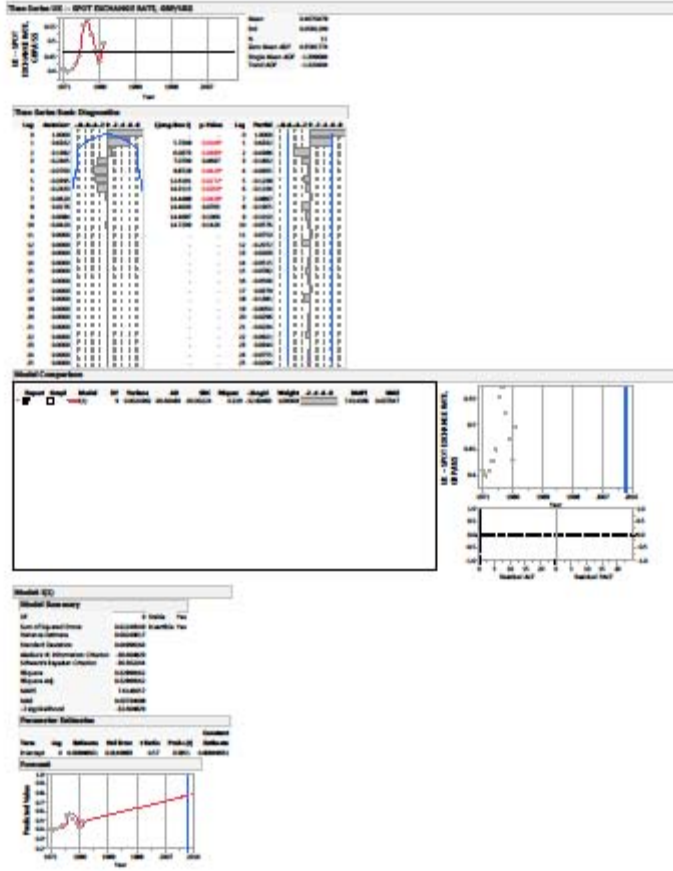


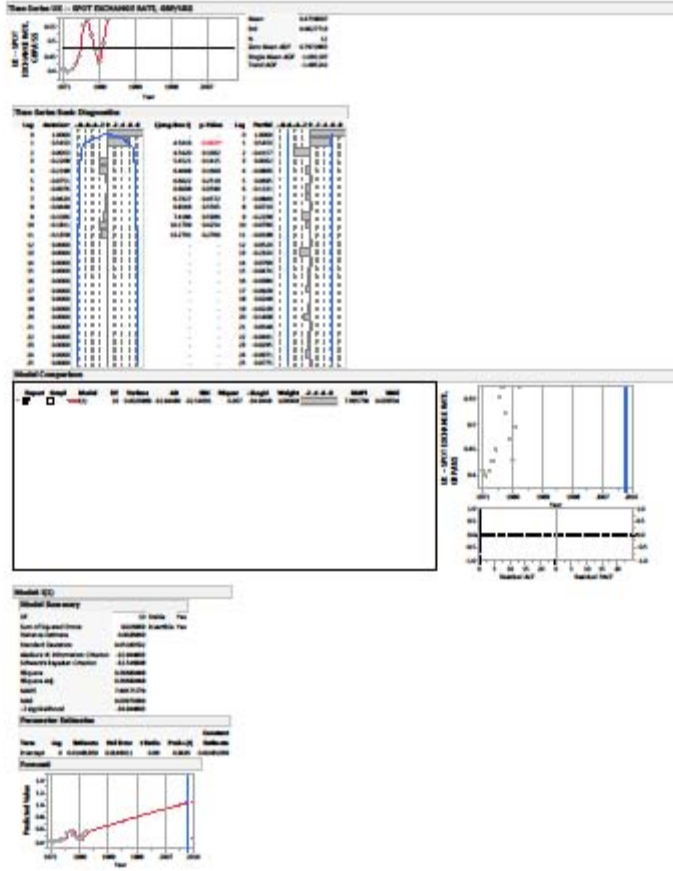
Time Series Desk: Diagnostics

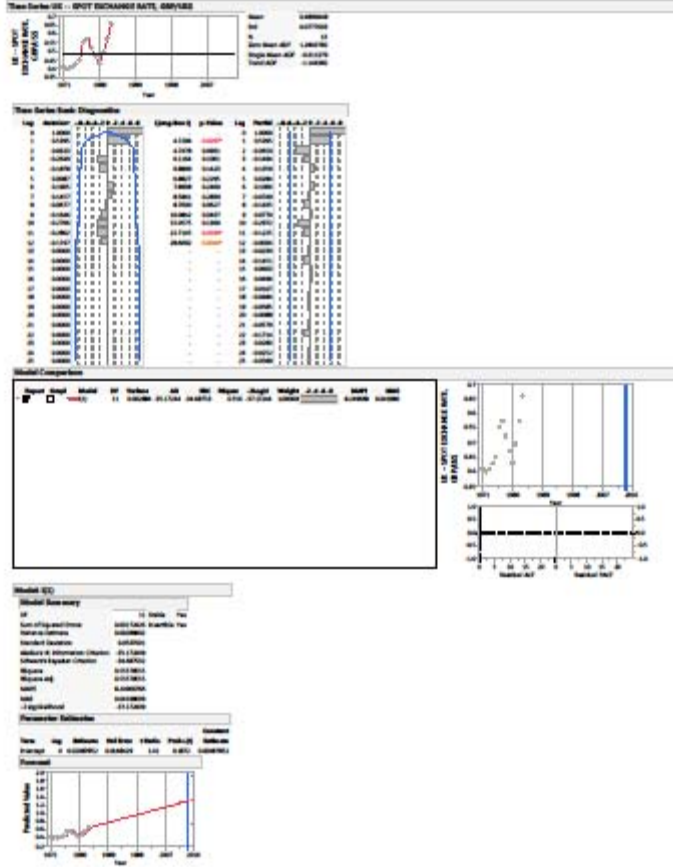
lag	Autocorr	P.A.C.F	Ljung-Box	p-Value	lag	Portm	P.A.C.F	P.A.C.F	P.A.C.F
1	0.2000	0.2000	0.0000	0.6553	1	0.0000	0.2000	0.2000	0.2000
2	0.0333	0.0333	0.0000	0.9985	2	0.0000	0.0333	0.0333	0.0333
3	-0.0333	-0.0333	0.0000	0.9985	3	0.0000	-0.0333	-0.0333	-0.0333
4	0.0000	0.0000	0.0000	1.0000	4	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	1.0000	5	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	1.0000	6	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	1.0000	7	0.0000	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	1.0000	8	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	1.0000	9	0.0000	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000	1.0000	10	0.0000	0.0000	0.0000	0.0000
11	0.0000	0.0000	0.0000	1.0000	11	0.0000	0.0000	0.0000	0.0000
12	0.0000	0.0000	0.0000	1.0000	12	0.0000	0.0000	0.0000	0.0000
13	0.0000	0.0000	0.0000	1.0000	13	0.0000	0.0000	0.0000	0.0000
14	0.0000	0.0000	0.0000	1.0000	14	0.0000	0.0000	0.0000	0.0000
15	0.0000	0.0000	0.0000	1.0000	15	0.0000	0.0000	0.0000	0.0000
16	0.0000	0.0000	0.0000	1.0000	16	0.0000	0.0000	0.0000	0.0000
17	0.0000	0.0000	0.0000	1.0000	17	0.0000	0.0000	0.0000	0.0000
18	0.0000	0.0000	0.0000	1.0000	18	0.0000	0.0000	0.0000	0.0000
19	0.0000	0.0000	0.0000	1.0000	19	0.0000	0.0000	0.0000	0.0000
20	0.0000	0.0000	0.0000	1.0000	20	0.0000	0.0000	0.0000	0.0000
21	0.0000	0.0000	0.0000	1.0000	21	0.0000	0.0000	0.0000	0.0000
22	0.0000	0.0000	0.0000	1.0000	22	0.0000	0.0000	0.0000	0.0000
23	0.0000	0.0000	0.0000	1.0000	23	0.0000	0.0000	0.0000	0.0000
24	0.0000	0.0000	0.0000	1.0000	24	0.0000	0.0000	0.0000	0.0000
25	0.0000	0.0000	0.0000	1.0000	25	0.0000	0.0000	0.0000	0.0000
26	0.0000	0.0000	0.0000	1.0000	26	0.0000	0.0000	0.0000	0.0000
27	0.0000	0.0000	0.0000	1.0000	27	0.0000	0.0000	0.0000	0.0000
28	0.0000	0.0000	0.0000	1.0000	28	0.0000	0.0000	0.0000	0.0000
29	0.0000	0.0000	0.0000	1.0000	29	0.0000	0.0000	0.0000	0.0000
30	0.0000	0.0000	0.0000	1.0000	30	0.0000	0.0000	0.0000	0.0000

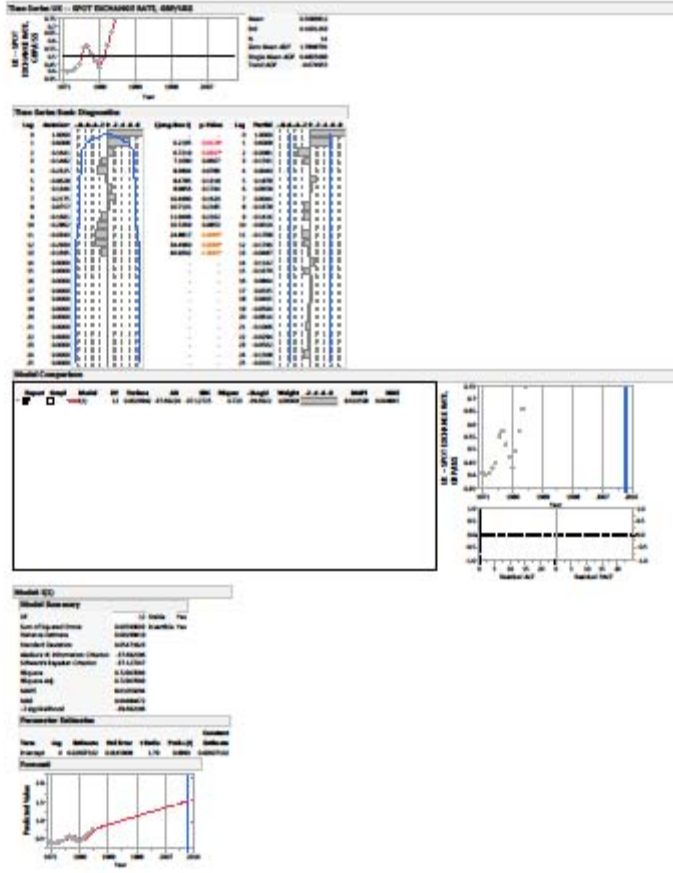


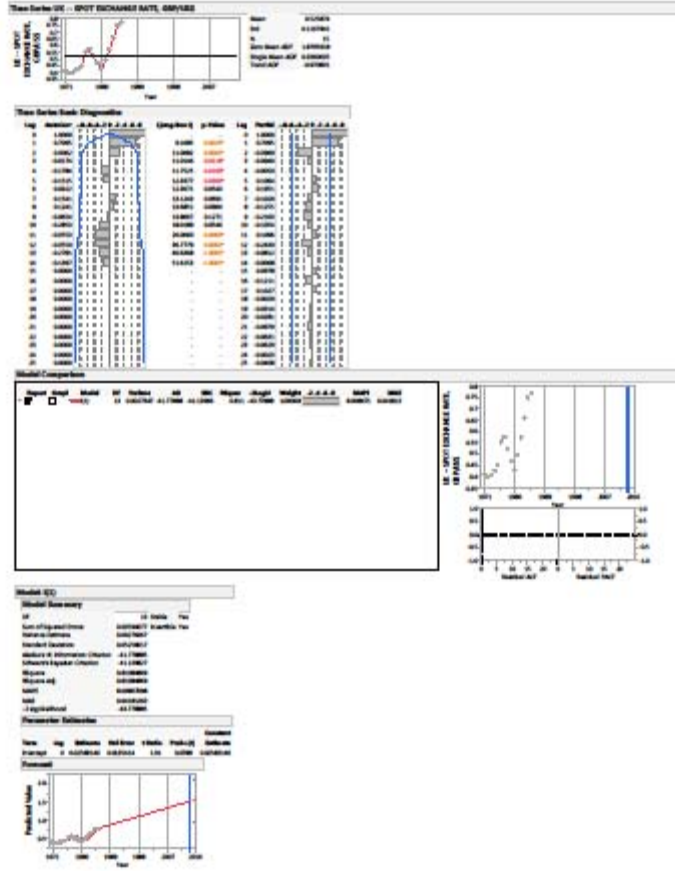


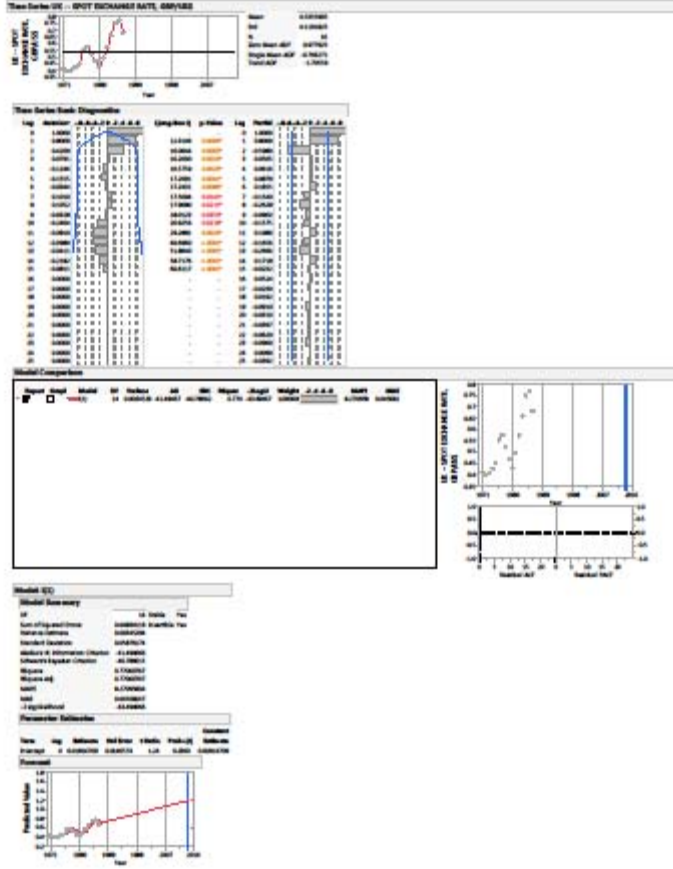


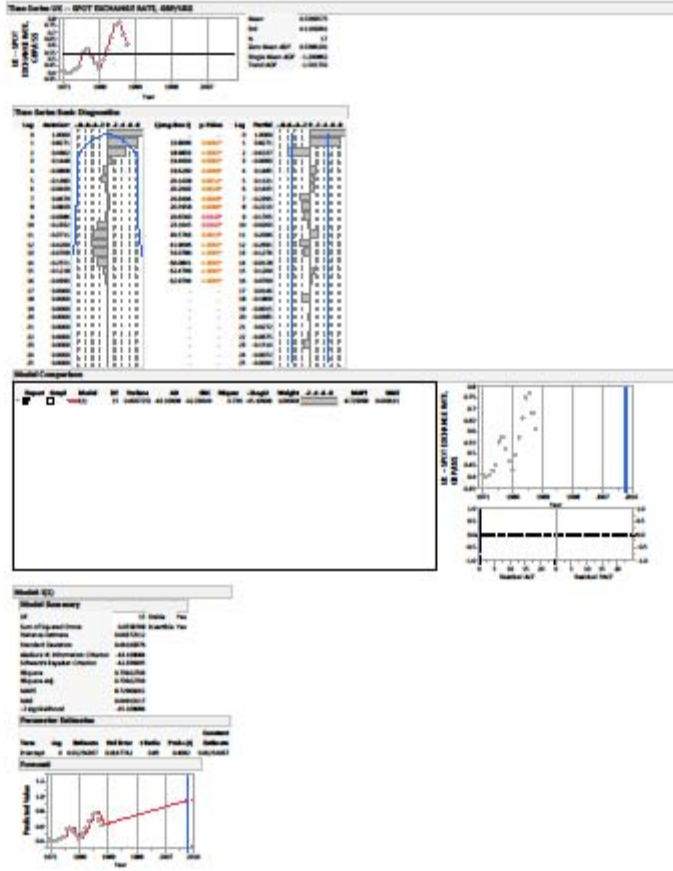




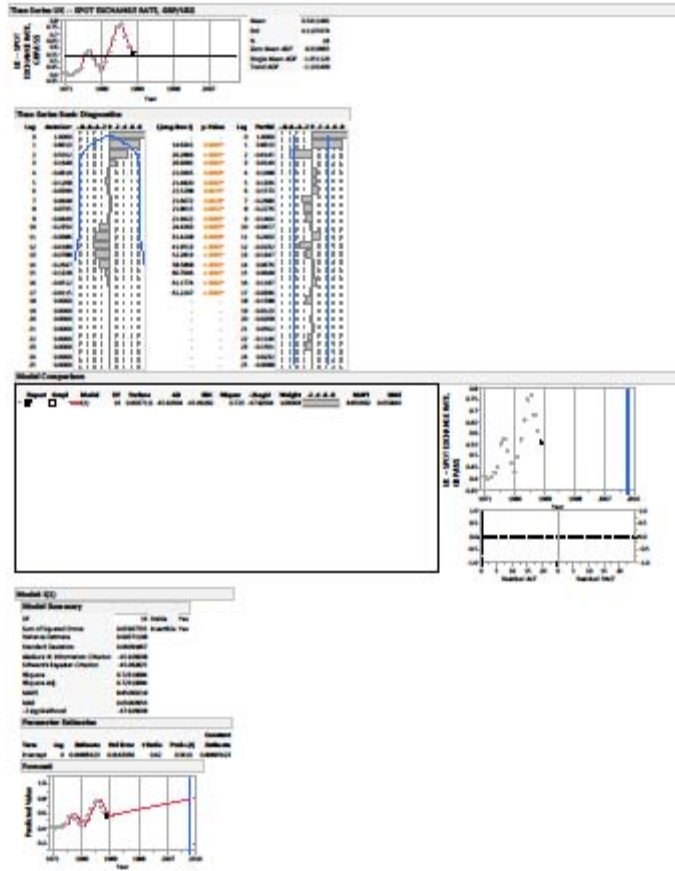


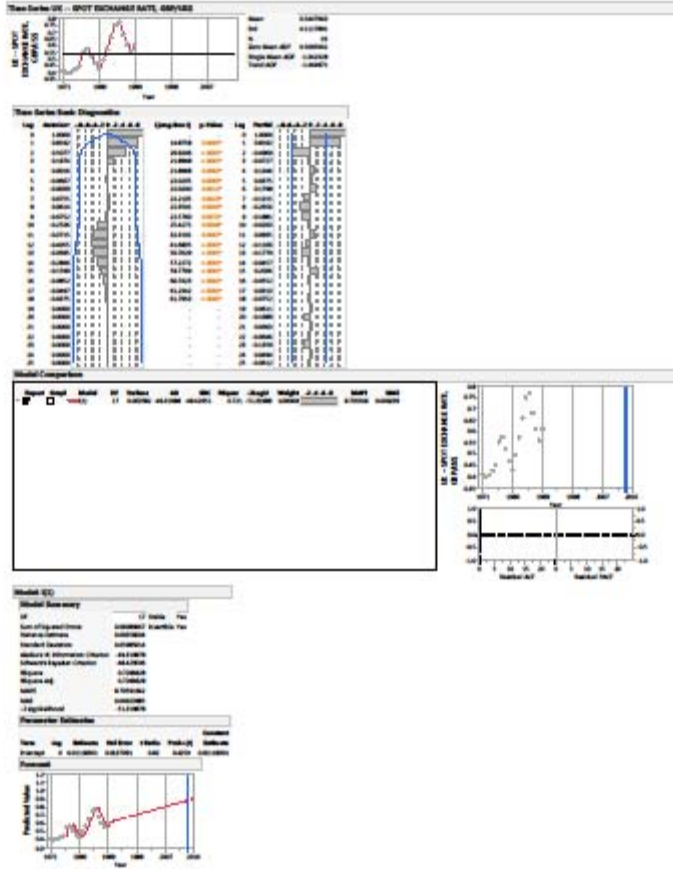


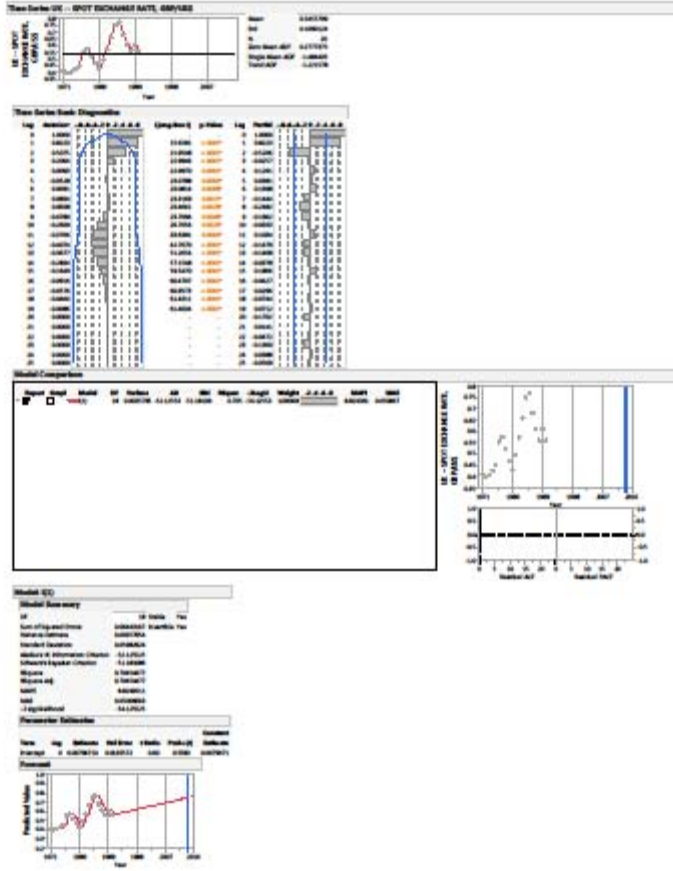


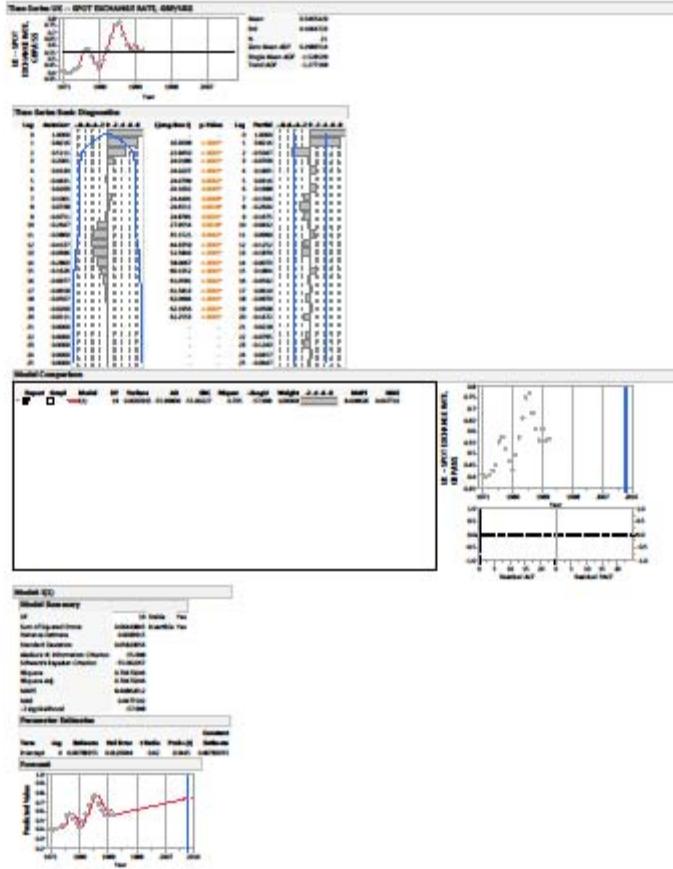


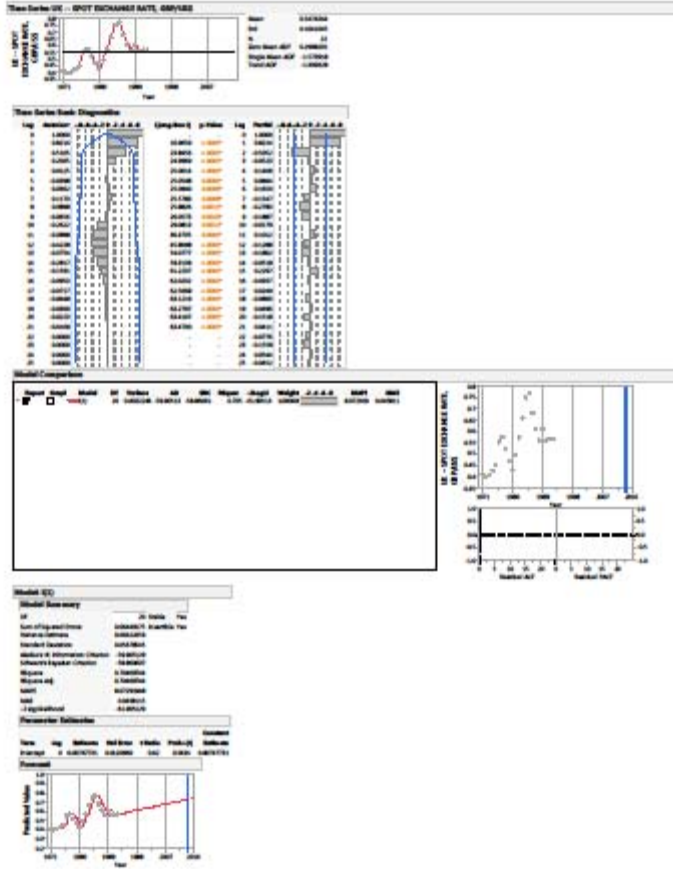
UK - Time Series of UK -- SPOT EXCHANGE RATE, GBP/US\$ 10

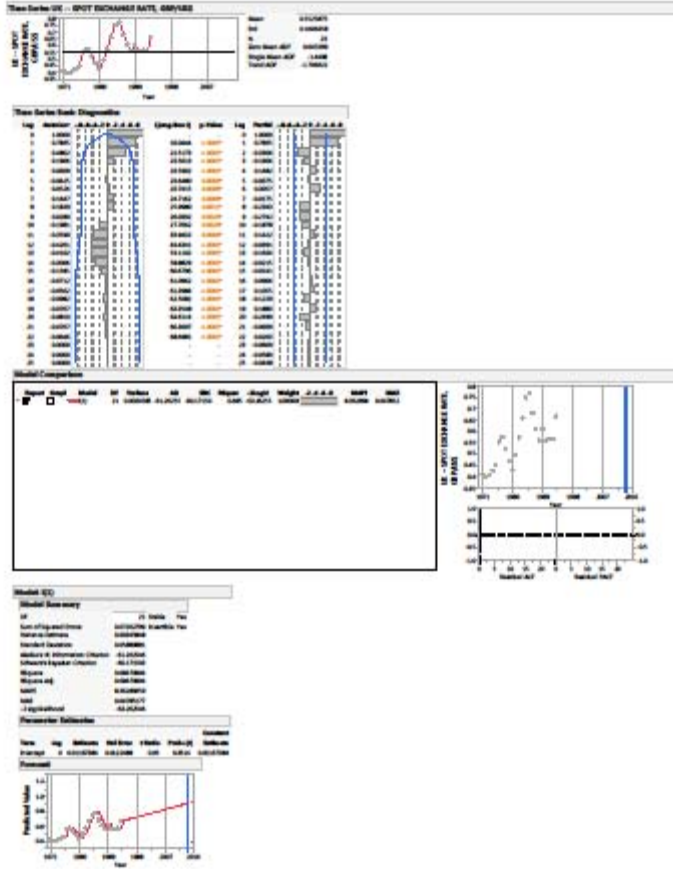


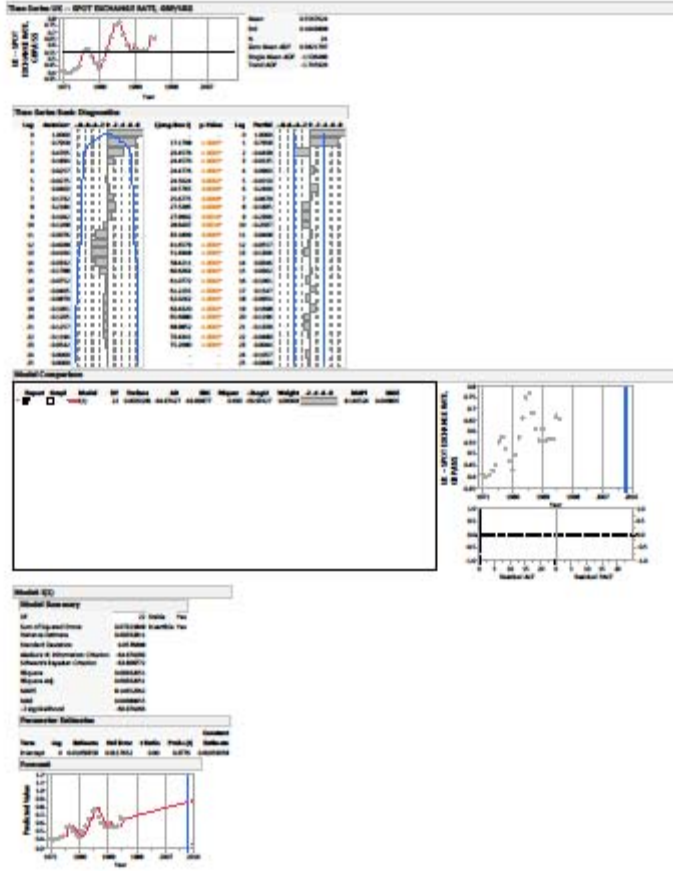


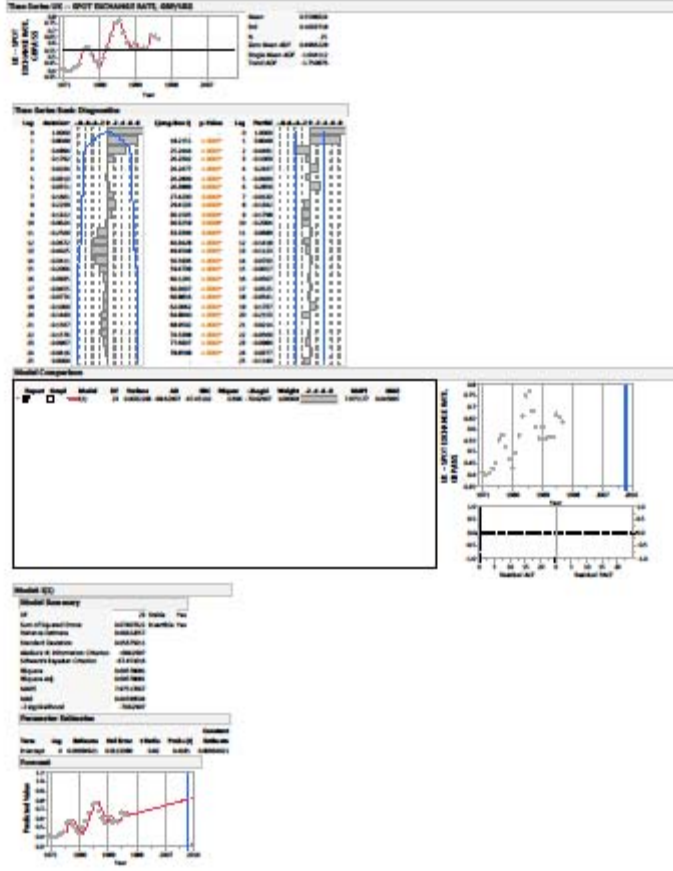


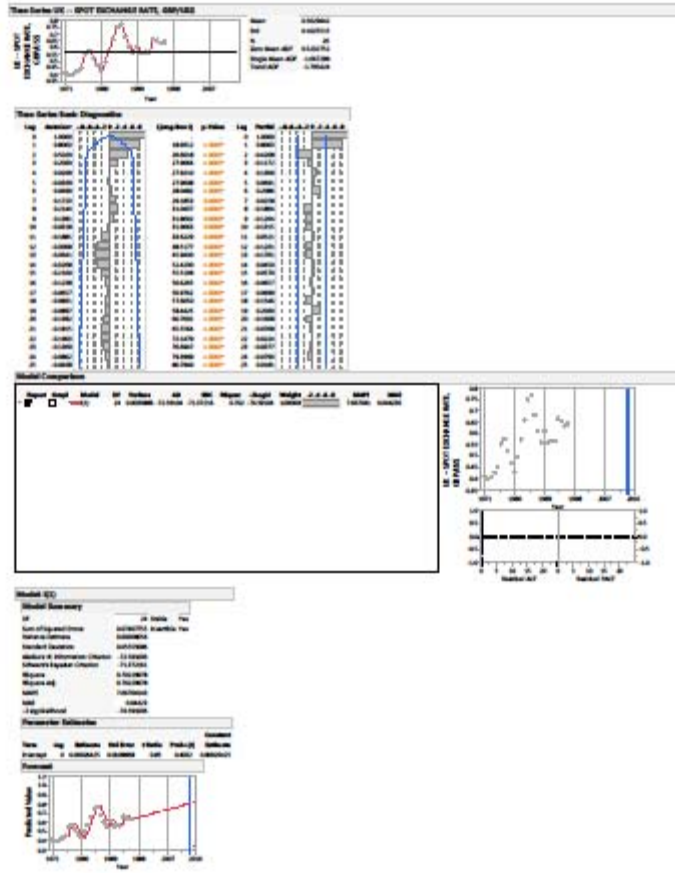


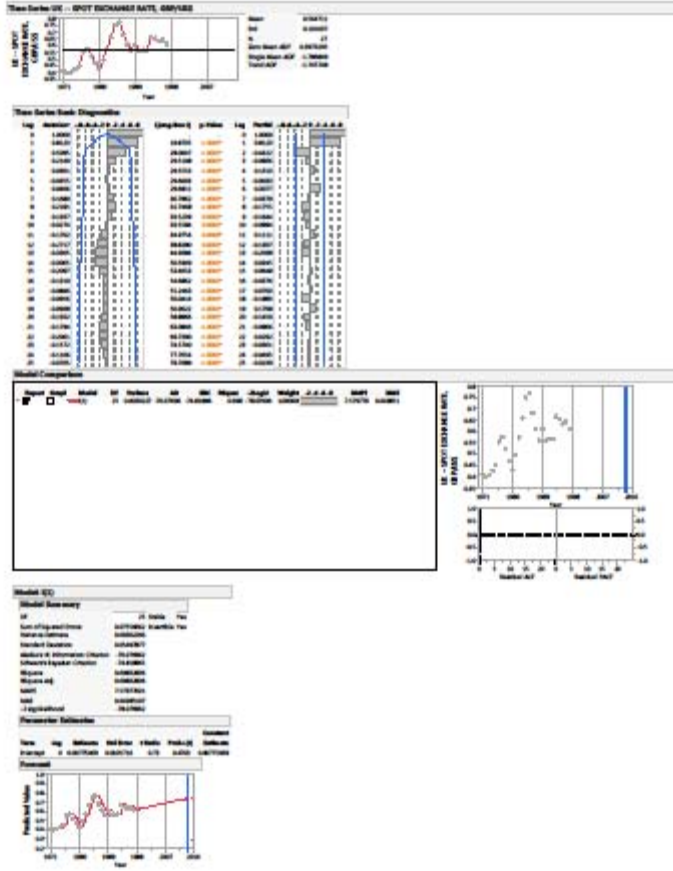


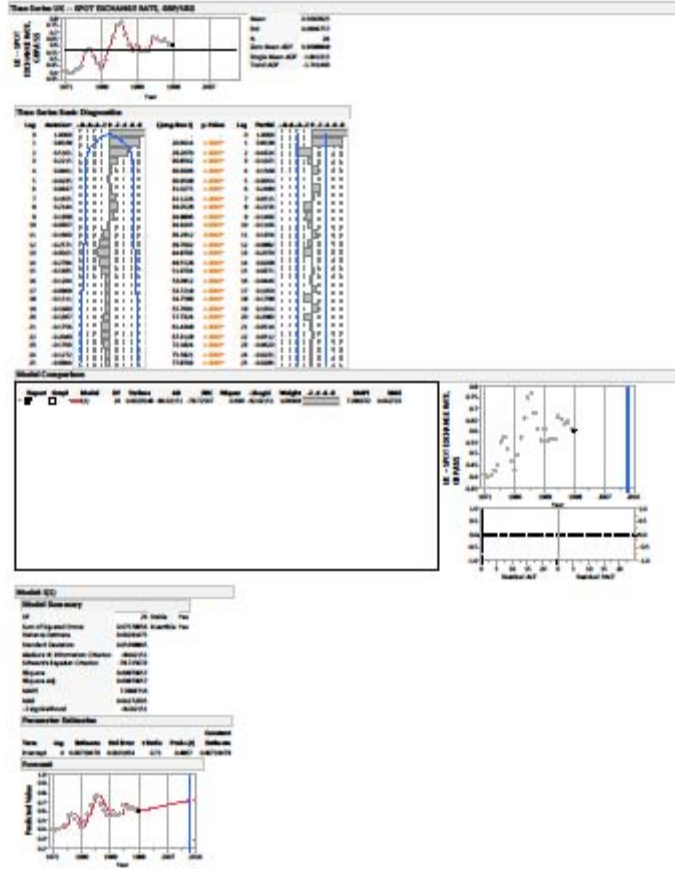








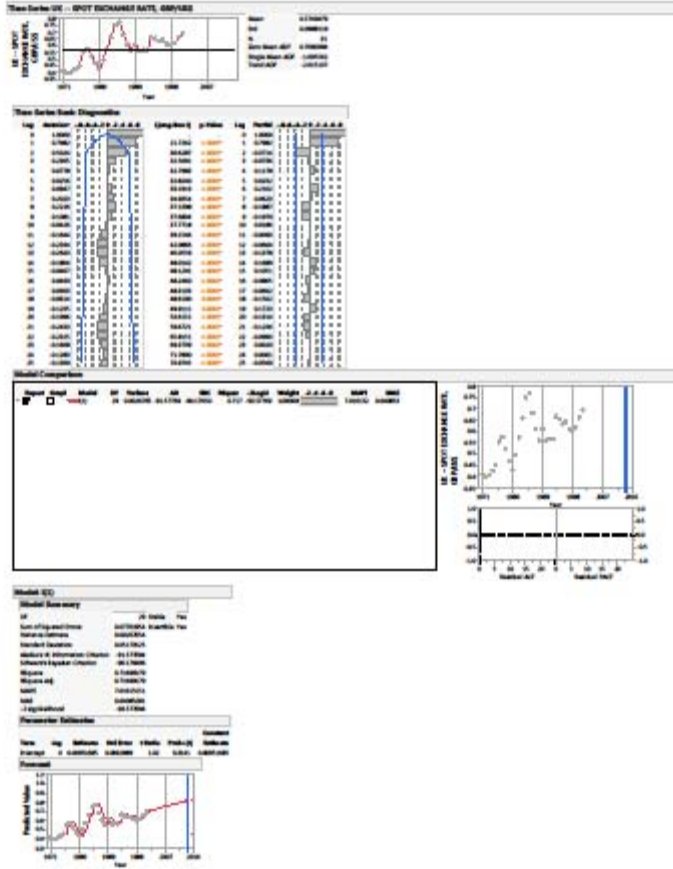


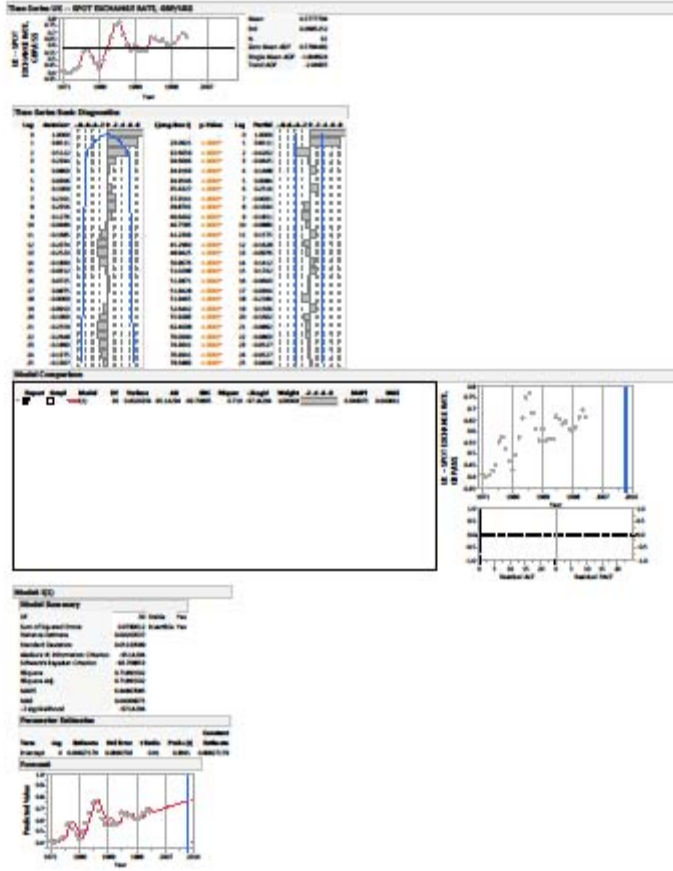


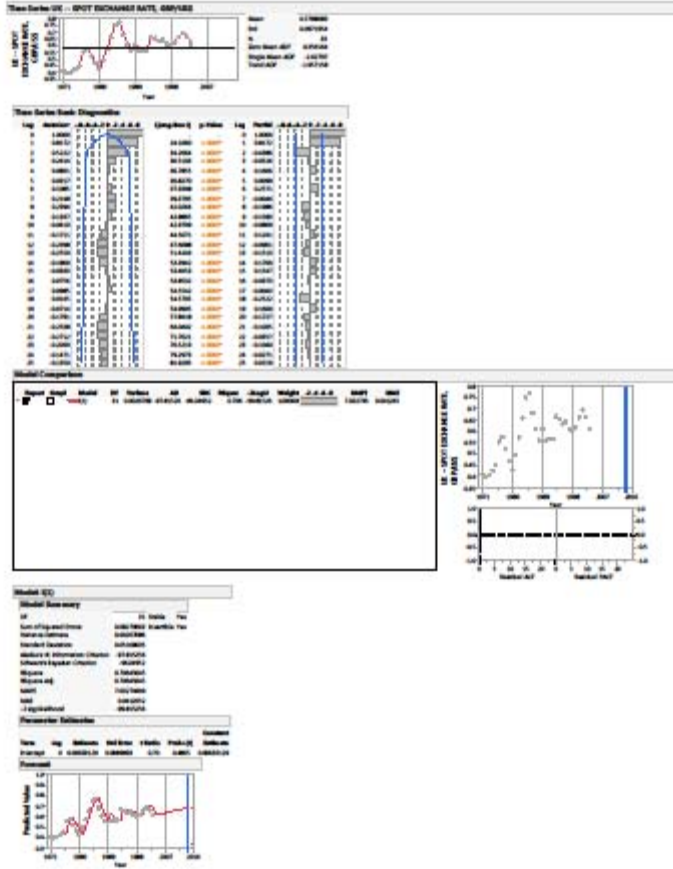


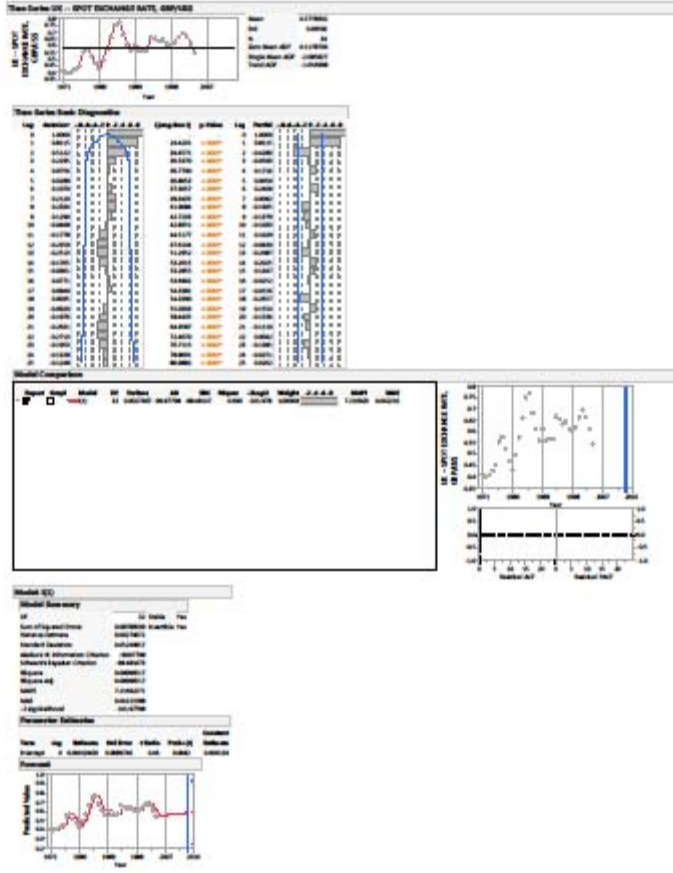


UK - Time Series of UK -- SPOT EXCHANGE RATE, GBP/US\$ 3

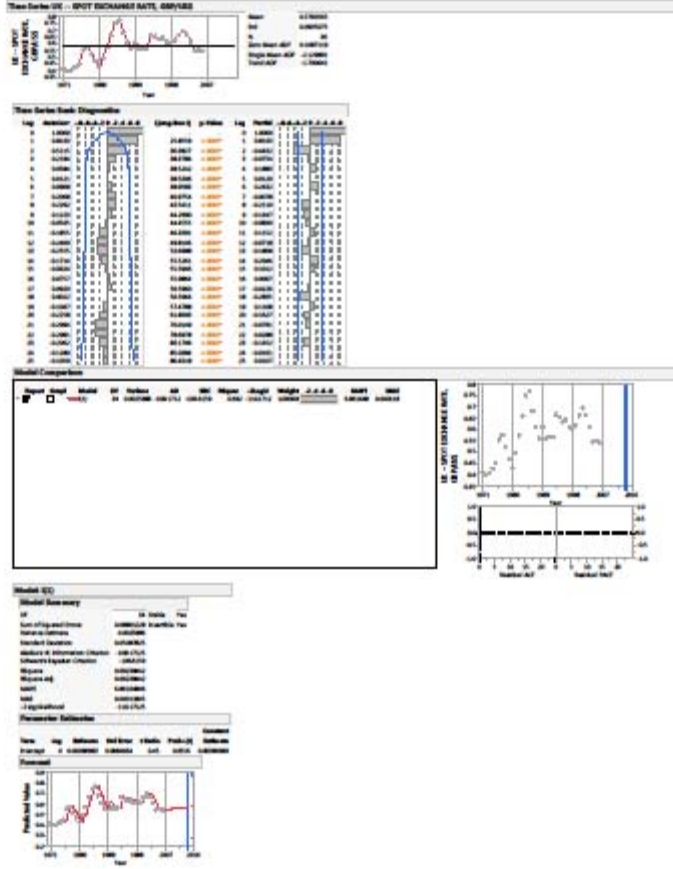




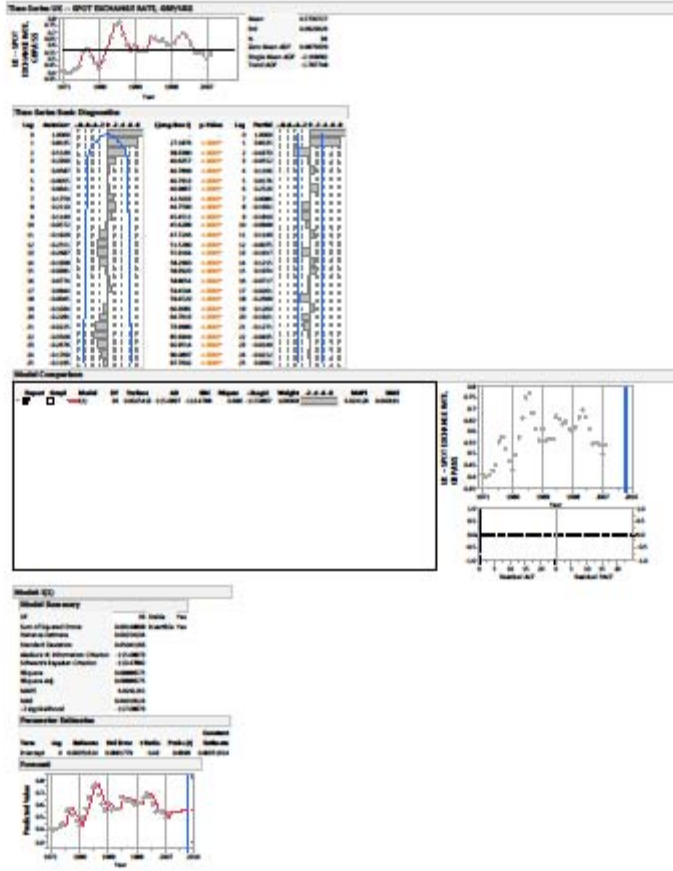


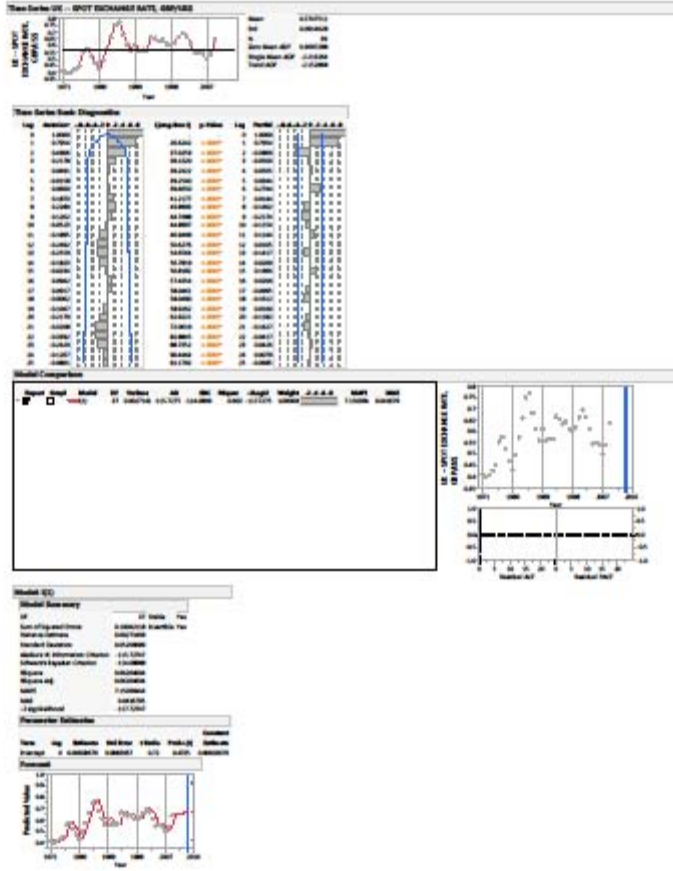


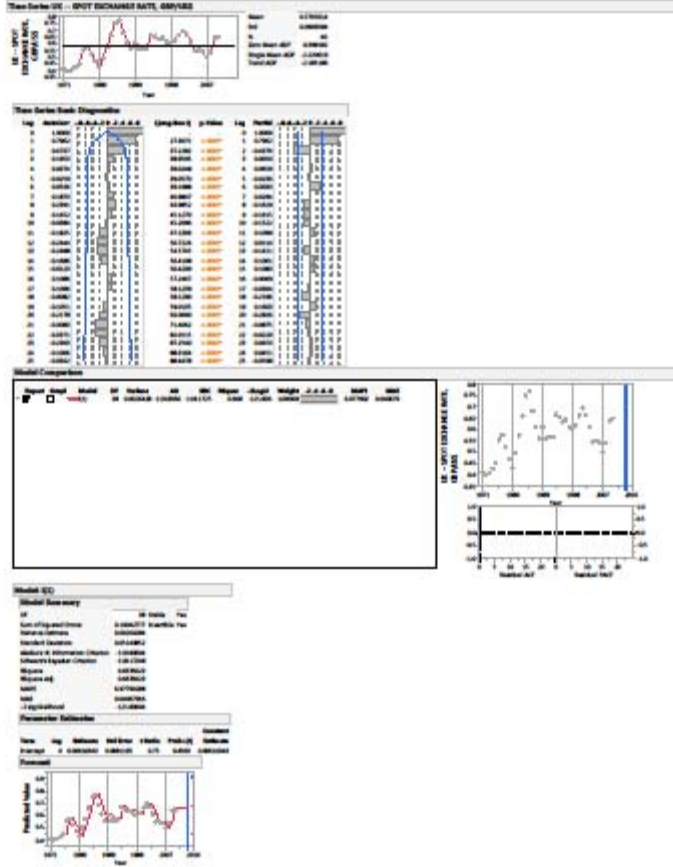












## Appendix E: OSD (Comptroller) Adjusting Rates

	Country	Monetary Unit	O&M Budget Rate		MILCON & FH Budget Rate		Adjusting Rate in Dollars	Adjusting Rate in Foreign Currency
			Dollars to Foreign Currency	Foreign Currency to Dollars	Dollars to Foreign Currency	Foreign Currency to Dollars		
For Month Ended 9/30/2014	DENMARK	KRONE	0.1751896	5.7081	0.1751896	5.7081	0.169262	5.908
	EUROPEAN UNION	EURO	1.3063357	0.7655	1.3063357	0.7655	1.261034	0.793
	ICELAND	KRONA	0.0081387	122.8694	0.0081387	122.8694	0.008259	121.08
	JAPAN	YEN	0.0096206	103.9439	0.0096206	103.9439	0.0091241	109.6
	NORWAY	KRONE	0.1741584	5.7419	0.1741584	5.7419	0.155159	6.445
	SINGAPORE	DOLLAR	0.8057368	1.2411	0.8057368	1.2411	0.7843137	1.275
	SOUTH KOREA	WON	0.0009045	1105.592	0.0009045	1105.592	0.0009483	1054.55
	TURKEY	LIRA	0.5563282	1.7975	0.5563282	1.7975	0.4389816	2.278
	UNITED KINGDOM	POUND	1.5281174	0.6544	1.5281174	0.6544	1.618123	0.618
For Month Ended 8/31/2014	DENMARK	KRONE	0.1751896	5.7081	0.1751896	5.7081	0.1768972	5.653
	EUROPEAN UNION	EURO	1.3063357	0.7655	1.3063357	0.7655	1.3192612	0.758
	ICELAND	KRONA	0.0081387	122.8694	0.0081387	122.8694	0.0085756	116.61
	JAPAN	YEN	0.0096206	103.9439	0.0096206	103.9439	0.0096283	103.86
	NORWAY	KRONE	0.1741584	5.7419	0.1741584	5.7419	0.1617599	6.182
	SINGAPORE	DOLLAR	0.8057368	1.2411	0.8057368	1.2411	0.8019246	1.247
	SOUTH KOREA	WON	0.0009045	1105.592	0.0009045	1105.592	0.0009864	1013.75
	TURKEY	LIRA	0.5563282	1.7975	0.5563282	1.7975	0.4640371	2.155
	UNITED KINGDOM	POUND	1.5281174	0.6544	1.5281174	0.6544	1.6611296	0.602
For Month Ended 7/31/2014	DENMARK	KRONE	0.1751896	5.7081	0.1751896	5.7081	0.1795332	5.57
	EUROPEAN UNION	EURO	1.3063357	0.7655	1.3063357	0.7655	1.3386881	0.747
	ICELAND	KRONA	0.0081387	122.8694	0.0081387	122.8694	0.0086919	115.05
	JAPAN	YEN	0.0096206	103.9439	0.0096206	103.9439	0.0097229	102.85
	NORWAY	KRONE	0.1741584	5.7419	0.1741584	5.7419	0.1593118	6.277
	SINGAPORE	DOLLAR	0.8057368	1.2411	0.8057368	1.2411	0.8019246	1.247
	SOUTH KOREA	WON	0.0009045	1105.592	0.0009045	1105.592	0.000973	1027.75
	TURKEY	LIRA	0.5563282	1.7975	0.5563282	1.7975	0.4686036	2.134
	UNITED KINGDOM	POUND	1.5281174	0.6544	1.5281174	0.6544	1.6891892	0.592
For Month Ended 6/30/2014	DENMARK	KRONE	0.1751896	5.7081	0.1751896	5.7081	0.1831166	5.461
	EUROPEAN UNION	EURO	1.3063357	0.7655	1.3063357	0.7655	1.3661202	0.732
	ICELAND	KRONA	0.0081387	122.8694	0.0081387	122.8694	0.0088763	112.66
	JAPAN	YEN	0.0096206	103.9439	0.0096206	103.9439	0.0098629	101.39
	NORWAY	KRONE	0.1741584	5.7419	0.1741584	5.7419	0.1623377	6.16

	SINGAPORE	DOLLAR	0.8057368	1.2411	0.8057368	1.2411	0.8006405	1.249
	SOUTH KOREA	WON	0.0009045	1105.592	0.0009045	1105.592	0.0009886	1011.5
	TURKEY	LIRA	0.5563282	1.7975	0.5563282	1.7975	0.4708098	2.124
	UNITED KINGDOM	POUND	1.5281174	0.6544	1.5281174	0.6544	1.7006803	0.588
	DENMARK	KRONE	0.1751896	5.7081	0.1751896	5.7081	0.1823819	5.483
	EUROPEAN UNION	EURO	1.3063357	0.7655	1.3063357	0.7655	1.3605442	0.735
	ICELAND	KRONA	0.0081387	122.8694	0.0081387	122.8694	0.008859	112.88
For Month Ended 5/31/2014	JAPAN	YEN	0.0096206	103.9439	0.0096206	103.9439	0.0098377	101.65
	NORWAY	KRONE	0.1741584	5.7419	0.1741584	5.7419	0.1672241	5.98
	SINGAPORE	DOLLAR	0.8057368	1.2411	0.8057368	1.2411	0.7980846	1.253
	SOUTH KOREA	WON	0.0009045	1105.592	0.0009045	1105.592	0.0009804	1019.95
	TURKEY	LIRA	0.5563282	1.7975	0.5563282	1.7975	0.4782401	2.091
	UNITED KINGDOM	POUND	1.5281174	0.6544	1.5281174	0.6544	1.6722408	0.598
	DENMARK	KRONE	0.1751896	5.7081	0.1751896	5.7081	0.1852538	5.398
	EUROPEAN UNION	EURO	1.3063357	0.7655	1.3063357	0.7655	1.3831259	0.723
	ICELAND	KRONA	0.0081387	122.8694	0.0081387	122.8694	0.0089158	112.16
For Month Ended 4/30/2014	JAPAN	YEN	0.0096206	103.9439	0.0096206	103.9439	0.0097494	102.57
	NORWAY	KRONE	0.1741584	5.7419	0.1741584	5.7419	0.1675884	5.967
	SINGAPORE	DOLLAR	0.8057368	1.2411	0.8057368	1.2411	0.7961783	1.256
	SOUTH KOREA	WON	0.0009045	1105.592	0.0009045	1105.592	0.0009682	1032.85
	TURKEY	LIRA	0.5563282	1.7975	0.5563282	1.7975	0.4725898	2.116
	UNITED KINGDOM	POUND	1.5281174	0.6544	1.5281174	0.6544	1.6835017	0.594
	DENMARK	KRONE	0.1849318	5.4074	0.1849318	5.4074	0.1846722	5.415
	EUROPEAN UNION	EURO	1.3776002	0.7259	1.3776002	0.7259	1.3793103	0.725
	ICELAND	KRONA	0.0087276	114.5787	0.0087276	114.5787	0.008881	112.6
For Month Ended 3/31/2014	JAPAN	YEN	0.0122384	81.7098	0.0122384	81.7098	0.0096834	103.27
	NORWAY	KRONE	0.1704681	5.8662	0.1704681	5.8662	0.1669449	5.99
	SINGAPORE	DOLLAR	0.7601672	1.3155	0.7601672	1.3155	0.7936508	1.26
	SOUTH KOREA	WON	0.0008766	1140.786	0.0008766	1140.786	0.0009393	1064.65
	TURKEY	LIRA	0.6214654	1.6091	0.6214654	1.6091	0.464684	2.152
	UNITED KINGDOM	POUND	1.6189089	0.6177	1.6189089	0.6177	1.6638935	0.601
	DENMARK	KRONE	0.1849318	5.4074	0.1849318	5.4074	0.1848429	5.41
	EUROPEAN UNION	EURO	1.3776002	0.7259	1.3776002	0.7259	1.3793103	0.725
	ICELAND	KRONA	0.0087276	114.5787	0.0087276	114.5787	0.0088992	112.37
For Month Ended 2/28/2014	JAPAN	YEN	0.0122384	81.7098	0.0122384	81.7098	0.0098155	101.88
	NORWAY	KRONE	0.1704681	5.8662	0.1704681	5.8662	0.1666667	6
	SINGAPORE	DOLLAR	0.7601672	1.3155	0.7601672	1.3155	0.7898894	1.266
	SOUTH KOREA	WON	0.0008766	1140.786	0.0008766	1140.786	0.0009383	1065.71
	TURKEY	LIRA	0.6214654	1.6091	0.6214654	1.6091	0.4512635	2.216
	UNITED KINGDOM	POUND	1.6189089	0.6177	1.6189089	0.6177	1.6694491	0.599
For Month	DENMARK	KRONE	0.1849318	5.4074	0.1849318	5.4074	0.1815871	5.507

Ended 1/31/2014	EUROPEAN UNION	EURO	1.3776002	0.7259	1.3776002	0.7259	1.3550136	0.738
	ICELAND	KRONA	0.0087276	114.5787	0.0087276	114.5787	0.0086453	115.67
	JAPAN	YEN	0.0122384	81.7098	0.0122384	81.7098	0.0097847	102.2
	NORWAY	KRONE	0.1704681	5.8662	0.1704681	5.8662	0.1591596	6.283
	SINGAPORE	DOLLAR	0.7601672	1.3155	0.7601672	1.3155	0.7818608	1.279
	SOUTH KOREA	WON	0.0008766	1140.786	0.0008766	1140.786	0.0009256	1080.36
	TURKEY	LIRA	0.6214654	1.6091	0.6214654	1.6091	0.4378284	2.284
	UNITED KINGDOM	POUND	1.6189089	0.6177	1.6189089	0.6177	1.6447368	0.608
For Month Ended 12/31/2013	DENMARK	KRONE	0.1849318	5.4074	0.1849318	5.4074	0.1845359	5.419
	EUROPEAN UNION	EURO	1.3776002	0.7259	1.3776002	0.7259	1.3774105	0.726
	ICELAND	KRONA	0.0087276	114.5787	0.0087276	114.5787	0.0086934	115.03
	JAPAN	YEN	0.0122384	81.7098	0.0122384	81.7098	0.0095229	105.01
	NORWAY	KRONE	0.1704681	5.8662	0.1704681	5.8662	0.1643926	6.083
	SINGAPORE	DOLLAR	0.7601672	1.3155	0.7601672	1.3155	0.7917656	1.263
	SOUTH KOREA	WON	0.0008766	1140.786	0.0008766	1140.786	0.0009476	1055.25
	TURKEY	LIRA	0.6214654	1.6091	0.6214654	1.6091	0.4681648	2.136
For Month Ended 11/30/2013	UNITED KINGDOM	POUND	1.6189089	0.6177	1.6189089	0.6177	1.6528926	0.605
	DENMARK	KRONE	0.1849318	5.4074	0.1849318	5.4074	0.1824818	5.48
	EUROPEAN UNION	EURO	1.3776002	0.7259	1.3776002	0.7259	1.3605442	0.735
	ICELAND	KRONA	0.0087276	114.5787	0.0087276	114.5787	0.0083907	119.18
	JAPAN	YEN	0.0122384	81.7098	0.0122384	81.7098	0.0097742	102.31
	NORWAY	KRONE	0.1704681	5.8662	0.1704681	5.8662	0.1630523	6.133
	SINGAPORE	DOLLAR	0.7601672	1.3155	0.7601672	1.3155	0.7961783	1.256
	SOUTH KOREA	WON	0.0008766	1140.786	0.0008766	1140.786	0.0009454	1057.76
For Month Ended 10/31/2013	TURKEY	LIRA	0.6214654	1.6091	0.6214654	1.6091	0.4945598	2.022
	UNITED KINGDOM	POUND	1.6189089	0.6177	1.6189089	0.6177	1.6339869	0.612
	DENMARK	KRONE	0.1849318	5.4074	0.1849318	5.4074	0.1831166	5.461
	EUROPEAN UNION	EURO	1.3776002	0.7259	1.3776002	0.7259	1.3661202	0.732
	ICELAND	KRONA	0.0087276	114.5787	0.0087276	114.5787	0.0083181	120.22
	JAPAN	YEN	0.0122384	81.7098	0.0122384	81.7098	0.0101823	98.21
	NORWAY	KRONE	0.1704681	5.8662	0.1704681	5.8662	0.1685204	5.934
	SINGAPORE	DOLLAR	0.7601672	1.3155	0.7601672	1.3155	0.8071025	1.239
For Month Ended 9/30/2013	SOUTH KOREA	WON	0.0008766	1140.786	0.0008766	1140.786	0.0009439	1059.44
	TURKEY	LIRA	0.6214654	1.6091	0.6214654	1.6091	0.5027652	1.989
	UNITED KINGDOM	POUND	1.6189089	0.6177	1.6189089	0.6177	1.6025641	0.624
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1809955	5.525
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.3495277	0.741
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0082706	120.91
	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0102239	97.81
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1663894	6.01
SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.7961783	1.256	

	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0009314	1073.7
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.4906771	2.038
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.6155089	0.619
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1774623	5.635
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.3227513	0.756
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0083389	119.92
For Month Ended 8/31/2013	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0101926	98.11
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1636393	6.111
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.7849294	1.274
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0009011	1109.75
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.490918	2.037
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.5479876	0.646
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1778726	5.622
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.3262599	0.754
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0083977	119.08
For Month Ended 7/31/2013	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0102375	97.68
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1684069	5.938
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.7861635	1.272
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0008916	1121.62
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.5181347	1.93
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.5197568	0.658
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1778726	5.622
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.3262599	0.754
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0083977	119.08
For Month Ended 6/30/2013	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0102375	97.68
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1684069	5.938
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.7861635	1.272
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0008916	1121.62
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.5181347	1.93
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.5197568	0.658
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.174125	5.743
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.2987013	0.77
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0081486	122.72
For Month Ended 5/31/2013	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0099453	100.55
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1702128	5.875
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.7911392	1.264
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0008845	1130.55
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.5299417	1.887
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.5197568	0.658
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1752848	5.705
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.3071895	0.765
For Month Ended 4/30/2013	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1752848	5.705
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.3071895	0.765

	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0085587	116.84
	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0102501	97.56
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1716444	5.826
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.811103	1.233
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0009078	1101.52
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.5561735	1.798
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.5479876	0.646
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1752848	5.705
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.3071895	0.765
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0085587	116.84
For Month Ended 3/31/2013	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0102501	97.56
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1716444	5.826
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.811103	1.233
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0009078	1101.52
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.5561735	1.798
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.5479876	0.646
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1759324	5.684
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.312336	0.762
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0079605	125.62
For Month Ended 2/28/2013	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0108578	92.1
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1751313	5.71
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.8084074	1.237
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0009228	1083.7
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.5574136	1.794
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.5197568	0.658
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1759324	5.684
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.312336	0.762
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0079605	125.62
For Month Ended 1/31/2013	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0108578	92.1
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1751313	5.71
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.8084074	1.237
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0009228	1083.7
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.5574136	1.794
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.5197568	0.658
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1766784	5.66
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.3175231	0.759
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0078119	128.01
For Month Ended 12/31/2012	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0116063	86.16
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1790831	5.584
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.8183306	1.222
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0009405	1063.24

	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.5599104	1.786
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.618123	0.618
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1766784	5.66
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.3175231	0.759
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0078119	128.01
For Month Ended 11/30/2012	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0116063	86.16
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1790831	5.584
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.8183306	1.222
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0009405	1063.24
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.5599104	1.786
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.618123	0.618
	DENMARK	KRONE	0.1853362	5.3956	0.1853362	5.3956	0.1766784	5.66
	EUROPEAN UNION	EURO	1.3810247	0.7241	1.3810247	0.7241	1.3175231	0.759
	ICELAND	KRONA	0.0093553	106.8909	0.0093553	106.8909	0.0078119	128.01
For Month Ended 10/31/2012	JAPAN	YEN	0.0121354	82.4035	0.0121354	82.4035	0.0116063	86.16
	NORWAY	KRONE	0.1684579	5.9362	0.1684579	5.9362	0.1790831	5.584
	SINGAPORE	DOLLAR	0.7511455	1.3313	0.7511455	1.3313	0.8183306	1.222
	SOUTH KOREA	WON	0.0009131	1095.164	0.0009131	1095.164	0.0009405	1063.24
	TURKEY	LIRA	0.6892749	1.4508	0.6892749	1.4508	0.5599104	1.786
	UNITED KINGDOM	POUND	1.6826519	0.5943	1.6826519	0.5943	1.618123	0.618
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.1736413	5.759
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.2936611	0.773
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0081024	123.42
For Month Ended 9/30/2012	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.0128766	77.66
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.1757778	5.689
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.8163265	1.225
	SOUTH KOREA	WON	0.0009095	1099.518	0.0009095	1099.518	0.0008992	1112.04
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5574136	1.794
	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.6207455	0.617
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.1686625	5.929
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.2562814	0.796
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0081974	121.99
For Month Ended 8/31/2012	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.0127356	78.52
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.1723544	5.802
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.8006405	1.249
	SOUTH KOREA	WON	0.0009095	1,099.52	0.0009095	1099.518	0.0008822	1133.59
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.550055	1.818
	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.5822785	0.632
For Month Ended 7/31/2012	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.16518	6.054
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.2285012	0.814
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0082795	120.78

	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.012791	78.18
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.1656452	6.037
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.8045052	1.243
	SOUTH KOREA	WON	0.0009095	1099.518	0.0009095	1099.518	0.0008847	1130.27
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5571031	1.795
	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.5698587	0.637
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.1691475	5.912
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.2578616	0.795
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0079567	125.68
For Month Ended 6/30/2012	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.0125834	79.47
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.1669449	5.99
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.7880221	1.269
	SOUTH KOREA	WON	0.0009095	1099.518	0.0009095	1099.518	0.000873	1145.51
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5503577	1.817
	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.5600624	0.641
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.1691475	5.912
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.2578616	0.795
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0079567	125.68
For Month Ended 5/31/2012	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.0125834	79.47
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.1669449	5.99
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.7880221	1.269
	SOUTH KOREA	WON	0.0009095	1099.518	0.0009095	1099.518	0.000873	1145.51
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5503577	1.817
	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.5600624	0.641
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.1776514	5.629
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.321004	0.757
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0079491	125.8
For Month Ended 4/30/2012	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.0124735	80.17
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.174216	5.74
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.8090615	1.236
	SOUTH KOREA	WON	0.0009095	1099.518	0.0009095	1099.518	0.0008862	1128.36
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5694761	1.756
	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.6260163	0.615
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.1794366	5.573
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.3351135	0.749
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0079177	126.3
For Month Ended 3/31/2012	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.0121862	82.06
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.175716	5.691
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.7955449	1.257
	SOUTH KOREA	WON	0.0009095	1099.518	0.0009095	1099.518	0.0008827	1132.9
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5614823	1.781

For Month Ended 2/29/2012	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.6	0.625
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.1807011	5.534
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.344086	0.744
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0080354	124.45
	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.0124285	80.46
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.1804403	5.542
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.8038585	1.244
	SOUTH KOREA	WON	0.0009095	1,099.52	0.0009095	1099.518	0.0008961	1115.95
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5737235	1.743
For Month Ended 1/31/2012	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.5923567	0.628
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.1773679	5.638
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.3192612	0.758
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0081473	122.74
	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.0130941	76.37
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.172206	5.807
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.798722	1.252
	SOUTH KOREA	WON	0.0009095	1,099.52	0.0009095	1099.518	0.0008925	1120.5
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5656109	1.768
For Month Ended 12/31/2011	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.5772871	0.634
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.174125	5.743
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.2936611	0.773
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0081633	122.5
	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.0129316	77.33
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.1665556	6.004
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.7698229	1.299
	SOUTH KOREA	WON	0.0009095	1099.518	0.0009095	1099.518	0.0008631	1158.65
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5302227	1.886
For Month Ended 11/30/2011	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.5479876	0.646
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.1790831	5.584
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.3315579	0.751
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0083493	119.77
	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.0128156	78.03
	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.171409	5.834
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.7739938	1.292
	SOUTH KOREA	WON	0.0009095	1099.518	0.0009095	1099.518	0.0008768	1140.55
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5411255	1.848
For Month Ended 10/31/2011	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.5625	0.64
	DENMARK	KRONE	0.1791505	5.5819	0.1791505	5.5819	0.1882176	5.313
	EUROPEAN UNION	EURO	1.3349353	0.7491	1.3349353	0.7491	1.4005602	0.714
	ICELAND	KRONA	0.0094995	105.2688	0.0094995	105.2688	0.0088013	113.62
	JAPAN	YEN	0.0109586	91.2524	0.0109586	91.2524	0.012837	77.9

	NORWAY	KRONE	0.1641901	6.0905	0.1641901	6.0905	0.1816201	5.506
	SINGAPORE	DOLLAR	0.7019514	1.4246	0.7019514	1.4246	0.8012821	1.248
	SOUTH KOREA	WON	0.0009095	1,099.52	0.0009095	1099.518	0.0009009	1110.05
	TURKEY	LIRA	0.7072636	1.4139	0.7072636	1.4139	0.5707763	1.752
	UNITED KINGDOM	POUND	1.6900456	0.5917	1.6900456	0.5917	1.6025641	0.624
	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1816201	5.506
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.3513514	0.74
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.0084854	117.85
For Month Ended 9/30/2011	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0130141	76.84
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.171409	5.834
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.770416	1.298
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.0008468	1180.9
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.5387931	1.856
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.5600624	0.641
	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1937609	5.161
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.4430014	0.693
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.008837	113.16
For Month Ended 8/31/2011	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0130565	76.59
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.186846	5.352
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.8319468	1.202
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.0009387	1065.35
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.5803831	1.723
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.6286645	0.614
	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1914242	5.224
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.4265335	0.701
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.0086498	115.61
For Month Ended 7/30/2011	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0128949	77.55
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.1842978	5.426
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.8298755	1.205
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.0009488	1054
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.5941771	1.683
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.6286645	0.614
	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1939864	5.155
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.447178	0.691
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.008739	114.43
For Month Ended 6/30/2011	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0124378	80.4
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.1861504	5.372
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.8136697	1.229
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.0009368	1067.5
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.6169031	1.621
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.6025641	0.624

For Month Ended 5/31/2011	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1930129	5.181
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.4388489	0.695
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.0087131	114.77
	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0122714	81.49
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.1855288	5.39
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.8103728	1.234
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.0009269	1078.9
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.6281407	1.592
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.650165	0.606
For Month Ended 4/30/2011	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1993223	5.017
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.4858841	0.673
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.0090367	110.66
	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0123153	81.2
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.1910585	5.234
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.8163265	1.225
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.000936	1068.4
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.6583278	1.519
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.6666667	0.6
For Month Ended 3/31/2011	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1905488	5.248
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.4204545	0.704
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.0087781	113.92
	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0120729	82.83
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.1812579	5.517
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.7936508	1.26
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.0009142	1093.8
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.6480881	1.543
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.610306	0.621
For Month Ended 2/28/2011	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1854943	5.391
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.3831259	0.723
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.0086311	115.86
	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0122145	81.87
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.1788589	5.591
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.7867821	1.271
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.0008881	1126
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.6257822	1.598
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.6233766	0.616
For Month Ended 1/31/2011	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1836547	5.445
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.3679891	0.731
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.0086415	115.72
	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0121743	82.14
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.1726817	5.791

	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.78125	1.28
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.0008932	1119.6
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.622665	1.606
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.5898251	0.629
	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1779043	5.621
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.3262599	0.754
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.0086558	115.53
For Month Ended 12/31/2010	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0122294	81.77
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.1695778	5.897
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.7757952	1.289
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.0008845	1130.6
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.643915	1.553
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.5384615	0.65
	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1748557	5.719
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.303781	0.767
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.0085419	117.07
For Month Ended 11/30/2010	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0119289	83.83
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.1613163	6.199
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.7564297	1.322
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.000862	1160.15
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.6640106	1.506
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.552795	0.644
	DENMARK	KRONE	0.1860984	5.3735	0.1860984	5.3735	0.1871608	5.343
	EUROPEAN UNION	EURO	1.3865779	0.7212	1.3865779	0.7212	1.3947	0.717
	ICELAND	KRONA	0.0117322	85.2358	0.0117322	85.2358	0.0090285	110.76
For Month Ended 10/31/2010	JAPAN	YEN	0.0098086	101.9517	0.0098086	101.9517	0.0124425	80.37
	NORWAY	KRONE	0.1631641	6.1288	0.1631641	6.1288	0.1713209	5.837
	SINGAPORE	DOLLAR	0.6821748	1.4659	0.6821748	1.4659	0.7745933	1.291
	SOUTH KOREA	WON	0.0008699	1149.506	0.0008699	1149.506	0.0008953	1116.98
	TURKEY	LIRA	0.7205649	1.3878	0.7205649	1.3878	0.7012623	1.426
	UNITED KINGDOM	POUND	1.7340038	0.5767	1.7340038	0.5767	1.6051364	0.623
	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1834189	5.452
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.3661202	0.732
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0088394	113.13
For Month Ended 9/30/2010	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0120019	83.32
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1710864	5.845
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.761035	1.314
	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.0008771	1140.1
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6915629	1.446
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.5898251	0.629
For Month	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1703287	5.871

Ended 8/31/2010	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.2674271	0.789
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0082843	120.71
	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0118497	84.39
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1580778	6.326
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7374631	1.356
	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.000834	1199.05
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6540222	1.529
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.5384615	0.65
For Month Ended 7/31/2010	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1743071	5.737
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.2987013	0.77
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0083167	120.24
	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0115714	86.42
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1630258	6.134
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7342144	1.362
	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.0008449	1183.55
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6609385	1.513
For Month Ended 6/30/2010	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.55521	0.643
	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1649893	6.061
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.2285012	0.814
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0078567	127.28
	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.011279	88.66
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1547748	6.461
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7173601	1.394
	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.0008186	1221.6
For Month Ended 5/31/2010	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6337136	1.578
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.5037594	0.665
	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1636393	6.111
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.216545	0.822
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0077274	129.41
	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0109842	91.04
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1532097	6.527
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7077141	1.413
For Month Ended 4/30/2010	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.0008224	1215.9
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6309148	1.585
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.459854	0.685
	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1789229	5.589
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.3315579	0.751
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0078333	127.66
	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0105775	94.54
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1696641	5.894
SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7309942	1.368	

	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.0009024	1108.2
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6747638	1.482
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.5337423	0.652
	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1813894	5.513
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.3513514	0.74
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0078284	127.74
For Month Ended 3/31/2010	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0107654	92.89
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1684069	5.938
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7153076	1.398
	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.000884	1131.2
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6574622	1.521
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.5128593	0.661
	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1826818	5.474
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.3586957	0.736
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0077961	128.27
For Month Ended 2/28/2010	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0112095	89.21
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1688049	5.924
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7112376	1.406
	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.0008622	1159.8
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6485084	1.542
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.52207	0.657
	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1947238	5.1355
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.39078	0.719
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0078339	127.65
For Month Ended 1/31/2010	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0110209	90.7364
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1701242	5.8781
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7084612	1.4115
	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.0008578	1165.8
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6729158	1.4861
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.5938211	0.6274
	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1938612	5.1583
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.4424062	0.6933
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.008017	124.735
For Month Ended 12/31/2009	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0107891	92.6859
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1757197	5.6909
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7151746	1.3983
	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.0008652	1155.8
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6745909	1.4824
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.6164072	0.6187
For Month Ended 11/30/2009	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.2014705	4.9635
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.4993482	0.667

	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0081553	122.619
	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0116098	86.1343
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1756189	5.6941
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7221304	1.3848
	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.0008592	1163.8187
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6521497	1.5334
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.6405992	0.6095
	DENMARK	KRONE	0.1715178	5.8303	0.1715178	5.8303	0.1988429	5.0291
	EUROPEAN UNION	EURO	1.2924906	0.7737	1.2924906	0.7737	1.48	0.6757
	ICELAND	KRONA	0.0113496	88.1091	0.0113496	88.1091	0.0080444	124.3099
For Month Ended 10/31/2009	JAPAN	YEN	0.0091746	108.9969	0.0091746	108.9969	0.0111012	90.08
	NORWAY	KRONE	0.1577063	6.3409	0.1577063	6.3409	0.1743922	5.7342
	SINGAPORE	DOLLAR	0.6593696	1.5166	0.6593696	1.5166	0.7159216	1.3968
	SOUTH KOREA	WON	0.0008392	1191.571	0.0008392	1191.571	0.000843	1186.2
	TURKEY	LIRA	0.7203054	1.3883	0.7203054	1.3883	0.6638784	1.5063
	UNITED KINGDOM	POUND	1.6934801	0.5905	1.6934801	0.5905	1.6520071	0.6053
	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1965184	5.0886
	EUROPEAN UNION	EURO	1.2650221	0.7905	1.2650221	0.7905	1.4631565	0.6835
	ICELAND	KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0080785	123.7852
For Month Ended 9/30/2009	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.0111728	89.5033
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.1730268	5.7795
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.7098234	1.4088
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.00085	1176.4226
	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.673456	1.4849
	UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.6004	0.6248
	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1928979	5.1841
	EUROPEAN UNION	EURO	1.2650221	0.7905	1.2650221	0.7905	1.4350007	0.6969
	ICELAND	KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0079956	125.0686
For Month Ended 8/31/2009	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.0107286	93.2089
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.1664899	6.0064
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.6937731	1.4414
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.0008004	1249.3541
	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.6670591	1.4991
	UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.6301144	0.6135
	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1915754	5.2199
	EUROPEAN UNION	EURO	1.2650221	0.7905	1.2650221	0.7905	1.4264836	0.701
For Month Ended 7/31/2009	ICELAND	KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0079031	126.5329
	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.0105755	94.5585
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.1632883	6.1241
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.6947548	1.4394
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.0008178	1222.75

For Month Ended 6/30/2009	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.6786848	1.4734
	UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.6706114	0.5986
	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1882691	5.3115
	EUROPEAN UNION	EURO	1.2650221	0.7905	1.2650221	0.7905	1.4019222	0.7133
	ICELAND	KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0078333	127.66
	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.0103711	96.4222
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.1553087	6.4388
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.6907132	1.4478
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.000784	1275.5068
	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.6491444	1.5405
UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.6449409	0.6079	
For Month Ended 5/31/2009	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1897065	5.2713
	EUROPEAN UNION	EURO	1.2650221	0.7905	1.2650221	0.7905	1.4136573	0.7074
	ICELAND	KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0082173	121.695
	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.010475	95.4653
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.1583005	6.3171
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.69266	1.4437
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.0007982	1252.85
	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.6488451	1.5412
	UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.6157699	0.6189
	For Month Ended 4/30/2009	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1778821
EUROPEAN UNION		EURO	1.2650221	0.7905	1.2650221	0.7905	1.3249403	0.7548
ICELAND		KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0078371	127.5978
JAPAN		YEN	0.0087489	114.3007	0.0087489	114.3007	0.0101249	98.7665
NORWAY		KRONE	0.1552096	6.4429	0.1552096	6.4429	0.1522425	6.5685
SINGAPORE		DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.676917	1.4773
SOUTH KOREA		WON	0.0010193	981.0592	0.0010193	981.0592	0.0007824	1278.146
TURKEY		LIRA	0.6979828	1.4327	0.6979828	1.4327	0.6263576	1.5965
UNITED KINGDOM		POUND	1.8031013	0.5546	1.8031013	0.5546	1.4808979	0.6753
For Month Ended 3/31/2009		DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1780628
	EUROPEAN UNION	EURO	1.2650221	0.7905	1.2650221	0.7905	1.3259838	0.7542
	ICELAND	KRONA	0.0143772	69.5546	0.0143772	69.5546	0.008112	123.2743
	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.0100871	99.1362
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.148319	6.7422
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.6575707	1.5207
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.0007286	1372.5743
	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.5994244	1.6683
	UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.4296416	0.6995
	For Month Ended 2/28/2009	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1701462
EUROPEAN UNION		EURO	1.2650221	0.7905	1.2650221	0.7905	1.2677485	0.7888
ICELAND		KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0087951	113.7

	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.0102449	97.61
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.1422718	7.0288
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.645682	1.5487
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.000653	1531.45
	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.5878553	1.7011
	UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.4275008	0.7005
	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1718951	5.8175
	EUROPEAN UNION	EURO	1.2650221	0.7905	1.2650221	0.7905	1.2803032	0.7811
	ICELAND	KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0087819	113.87
For Month Ended 1/31/2009	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.0111219	89.913
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.1448499	6.9037
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.6620324	1.5105
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.000724	1381.2
	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.6081616	1.6443
	UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.4597475	0.6851
	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.186929	5.3496
	EUROPEAN UNION	EURO	1.2650221	0.7905	1.2650221	0.7905	1.3920444	0.7184
	ICELAND	KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0082333	121.4586
For Month Ended 12/31/2008	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.0110152	90.7838
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.1433378	6.9765
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.6957334	1.4373
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.0007905	1264.9771
	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.6493535	1.54
	UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.4615274	0.6842
	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1703723	5.8695
	EUROPEAN UNION	EURO	1.2650221	0.7905	1.2650221	0.7905	1.268448	0.7884
	ICELAND	KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0069979	142.9
For Month Ended 11/30/2008	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.0104685	95.525
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.1427144	7.007
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.660701	1.5135
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.0006801	1470.3
	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.6384881	1.5662
	UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.5342012	0.6518
	DENMARK	KRONE	0.1682227	5.9445	0.1682227	5.9445	0.1702645	5.8732
	EUROPEAN UNION	EURO	1.2650221	0.7905	1.2650221	0.7905	1.2679542	0.7887
	ICELAND	KRONA	0.0143772	69.5546	0.0143772	69.5546	0.0082815	120.7507
For Month Ended 10/31/2008	JAPAN	YEN	0.0087489	114.3007	0.0087489	114.3007	0.01016	98.4251
	NORWAY	KRONE	0.1552096	6.4429	0.1552096	6.4429	0.148375	6.7397
	SINGAPORE	DOLLAR	0.6349609	1.5749	0.6349609	1.5749	0.6739662	1.4838
	SOUTH KOREA	WON	0.0010193	981.0592	0.0010193	981.0592	0.0007768	1287.3906
	TURKEY	LIRA	0.6979828	1.4327	0.6979828	1.4327	0.652621	1.5323

	UNITED KINGDOM	POUND	1.8031013	0.5546	1.8031013	0.5546	1.6152532	0.6191
	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.1887631	5.2976
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.408156	0.7101
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0094338	106.0017
For Month	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.0094398	105.9349
Ended	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1697755	5.8901
9/30/2008	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.6975453	1.4336
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.0008284	1207.1237
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.7845599	1.2746
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	1.7801563	0.5617
	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.1966955	5.084
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.4667058	0.6818
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0120041	83.305
For Month	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.00919	108.814
Ended	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1843318	5.425
8/31/2008	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.7060152	1.4164
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.0009148	1093.15
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.8435615	1.1855
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	1.8189094	0.5498
	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.2089698	4.7854
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.5586285	0.6416
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0126281	79.1884
For Month	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.009251	108.0965
Ended	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1948475	5.1322
7/31/2008	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.7312892	1.3674
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.00099	1010.1004
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.8599913	1.1628
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	1.9800808	0.505
	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.2111397	4.7362
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.5748031	0.635
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0126569	79.0086
For Month	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.009417	106.191
Ended	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1963776	5.0922
6/30/2008	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.7348186	1.3609
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.0009551	1046.99
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.8179966	1.2225
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	1.9904459	0.5024
	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.2085223	4.7957
For Month	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.5540016	0.6435
Ended	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0134523	74.3365
5/31/2008	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.0094769	105.52

	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1963942	5.0918
	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.734484	1.3615
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.0009708	1030.05
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.8202773	1.2191
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	1.9791986	0.5053
	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.2086436	4.7929
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.556424	0.6425
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0133709	74.7895
For Month Ended 4/30/2008	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.0095666	104.5302
	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1953369	5.1194
	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.7365964	1.3576
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.0009941	1005.9541
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.7842184	1.2752
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	1.984282	0.504
	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.2119421	4.7183
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.580403	0.6328
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0132258	75.6096
For Month Ended 3/31/2008	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.0100141	99.8595
	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1966344	5.0856
	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.7251106	1.3791
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.0010098	990.3072
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.7514164	1.3308
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	1.9858843	0.5036
	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.2038512	4.9055
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.5187528	0.6584
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0151332	66.0799
For Month Ended 2/29/2008	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.0095963	104.2066
	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1919861	5.2087
	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.7175248	1.3937
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.001065	938.9405
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.8281916	1.2075
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	1.9862196	0.5035
	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.1990967	5.0227
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.483816	0.6739
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0154064	64.9081
For Month Ended 1/31/2008	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.0093683	106.7433
	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1846422	5.4159
	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.7059156	1.4166
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.0010596	943.7966
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.855037	1.1695
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	1.9894203	0.5027

For Month Ended 12/31/2007	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.1958472	5.106
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.4600458	0.6849
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.015917	62.826
	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.008951	111.7188
	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1840236	5.4341
	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.6958942	1.437
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.0010601	943.2651
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.8554759	1.1689
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	1.9856241	0.5036
For Month Ended 11/30/2007	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.1962424	5.0957
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.462908	0.6836
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0163239	61.26
	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.0089888	111.25
	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1799775	5.5563
	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.6916543	1.4458
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.0010813	924.8263
	TURKEY	LIRA	0.6899883	1.4493	0.6899883	1.4493	0.8474576	1.18
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	2.0563438	0.4863
For Month Ended 10/31/2007	DENMARK	KRONE	0.1599411	6.2523	0.1599411	6.2523	0.1940881	5.1523
	EUROPEAN UNION	EURO	1.2108003	0.8259	12.1080034	0.0826	1.4461316	0.6915
	ICELAND	KRONA	0.0134384	74.4138	0.0134384	74.4138	0.0167221	59.8011
	JAPAN	YEN	0.0087125	114.7781	0.0087125	114.7781	0.0086733	115.2966
	NORWAY	KRONE	0.1519133	6.5827	0.1519133	6.5827	0.1854943	5.391
	SINGAPORE	DOLLAR	0.6172078	1.6202	0.6172078	1.6202	0.6903693	1.4485
	SOUTH KOREA	WON	0.0009749	1025.697	0.0009749	1025.697	0.0011101	900.8274
	TURKEY	LIRA	0.6899935	1.4493	0.6899935	1.4493	0.8545548	1.1702
	UNITED KINGDOM	POUND	1.8089725	0.5528	1.8089725	0.5528	2.0759809	0.4817
For Month Ended 9/30/2007	DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.1914352	5.2237
	EUROPEAN UNION	EURO	1.1723329	0.853	1.1723329	0.853	1.4234875	0.7025
	ICELAND	KRONA	0.0135002	74.073	0.0135002	74.073	0.0162008	61.7255
	JAPAN	YEN	0.0088261	113.3	0.0088261	113.3	0.0087108	114.8
	NORWAY	KRONE	0.1477541	6.768	0.1477541	6.768	0.1855184	5.3903
	SINGAPORE	DOLLAR	0.5868545	1.704	0.5868545	1.704	0.673174	1.4855
	SOUTH KOREA	WON	0.0008688	1151	0.0008688	1151	0.0010965	911.965
	TURKEY	LIRA	0.6703235	1.4918	0.6703235	1.4918	0.8268563	1.2094
	UNITED KINGDOM	POUND	1.7391304	0.575	1.7391304	0.575	2.038736	0.4905
For Month Ended 8/31/2007	DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.1830999	5.4615
	EUROPEAN UNION	EURO	1.1723329	0.853	1.1723329	0.853	1.3642006	0.733
	ICELAND	KRONA	0.0135002	74.073	0.0135002	74.073	0.015748	63.5003
	JAPAN	YEN	0.0088261	113.3	0.0088261	113.3	0.0086326	115.8402
	NORWAY	KRONE	0.1477541	6.768	0.1477541	6.768	0.17178	5.8214

	SINGAPORE	DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6559958	1.5244
	SOUTH KOREA	WON	0.0008688	1151	0.0008688	1151	0.0010657	938.3097
	TURKEY	LIRA	0.6703235	1.4918	0.6703235	1.4918	0.7694675	1.2996
	UNITED KINGDOM	POUND	1.7391304	0.575	1.7391304	0.575	2.0165356	0.4959
For Month Ended 7/31/2007	DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.1842265	5.4281
	EUROPEAN UNION	EURO	1.1723329	0.853	1.1723329	0.853	1.3708019	0.7295
	ICELAND	KRONA	0.0135002	74.073	0.0135002	74.073	0.0163697	61.0884
	JAPAN	YEN	0.0088261	113.3	0.0088261	113.3	0.0083925	119.1535
	NORWAY	KRONE	0.1477541	6.768	0.1477541	6.768	0.1720697	5.8116
	SINGAPORE	DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6597176	1.5158
	SOUTH KOREA	WON	0.0008688	1151	0.0008688	1151	0.0010879	919.1949
	TURKEY	LIRA	0.6703235	1.4918	0.6703235	1.4918	0.7857311	1.2727
	UNITED KINGDOM	POUND	1.7391304	0.575	1.7391304	0.575	2.0358306	0.4912
	For Month Ended 6/30/2007	DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.1819902
EUROPEAN UNION		EURO	1.1723329	0.853	1.1723329	0.853	1.3540961	0.7385
ICELAND		KRONA	0.0135002	74.073	0.0135002	74.073	0.0160669	62.2399
JAPAN		YEN	0.0088261	113.3	0.0088261	113.3	0.0081189	123.17
NORWAY		KRONE	0.1477541	6.768	0.1477541	6.768	0.1697937	5.8895
SINGAPORE		DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6527628	1.532
SOUTH KOREA		WON	0.0008688	1151	0.0008688	1151	0.0010844	922.195
TURKEY		LIRA	0.6703235	1.4918	0.6703235	1.4918	0.7641755	1.3086
UNITED KINGDOM		POUND	1.7391304	0.575	1.7391304	0.575	2.0081128	0.498
For Month Ended 5/31/2007		DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.1806228
	EUROPEAN UNION	EURO	1.1723329	0.853	1.1723329	0.853	1.3449899	0.7435
	ICELAND	KRONA	0.0135002	74.073	0.0135002	74.073	0.0162605	61.4989
	JAPAN	YEN	0.0088261	113.3	0.0088261	113.3	0.0082149	121.7307
	NORWAY	KRONE	0.1477541	6.768	0.1477541	6.768	0.1655766	6.0395
	SINGAPORE	DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6532105	1.5309
	SOUTH KOREA	WON	0.0008688	1151	0.0008688	1151	0.0010777	927.87
	TURKEY	LIRA	0.6703235	1.4918	0.6703235	1.4918	0.7590709	1.3174
	UNITED KINGDOM	POUND	1.7391304	0.575	1.7391304	0.575	1.979806	0.5051
	For Month Ended 4/30/2007	DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.1828856
EUROPEAN UNION		EURO	1.1723329	0.853	1.1723329	0.853	1.3635124	0.7334
ICELAND		KRONA	0.0135002	74.073	0.0135002	74.073	0.0155788	64.19
JAPAN		YEN	0.0088261	113.3	0.0088261	113.3	0.0083612	119.5998
NORWAY		KRONE	0.1477541	6.768	0.1477541	6.768	0.1675435	5.9686
SINGAPORE		DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6585446	1.5185
SOUTH KOREA		WON	0.0008688	1151	0.0008688	1151	0.0010762	929.1641
TURKEY		LIRA	0.6703235	1.4918	0.6703235	1.4918	0.749232	1.3347
UNITED KINGDOM		POUND	1.7391304	0.575	1.7391304	0.575	1.9984013	0.5004
For Month		DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.1792179

Ended 3/31/2007	EUROPEAN UNION	EURO	1.1723329	0.853	1.1723329	0.853	1.3354701	0.7488
	ICELAND	KRONA	0.0135002	74.073	0.0135002	74.073	0.015186	65.8501
	JAPAN	YEN	0.0088261	113.3	0.0088261	113.3	0.0084897	117.79
	NORWAY	KRONE	0.1477541	6.768	0.1477541	6.768	0.1641147	6.0933
	SINGAPORE	DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6592392	1.5169
	SOUTH KOREA	WON	0.0008688	1151	0.0008688	1151	0.0010269	973.8
	TURKEY	LIRA	0.6703235	1.4918	0.6703235	1.4918	0.7182876	1.3922
	UNITED KINGDOM	POUND	1.7391304	0.575	1.7391304	0.575	1.9681165	0.5081
For Month Ended 2/28/2007	DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.177535	5.6327
	EUROPEAN UNION	EURO	1.1723329	0.853	1.1723329	0.853	1.3227569	0.756
	ICELAND	KRONA	0.0135002	74.073	0.0135002	74.073	0.0151194	66.14
	JAPAN	YEN	0.0088261	113.3	0.0088261	113.3	0.0084515	118.3224
	NORWAY	KRONE	0.1477541	6.768	0.1477541	6.768	0.1630425	6.1334
	SINGAPORE	DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6543044	1.5283
	SOUTH KOREA	WON	0.0008688	1151	0.0008688	1151	0.0010619	941.7103
	TURKEY	LIRA	0.6703235	1.4918	0.6703235	1.4918	0.7067091	1.415
For Month Ended 1/31/2007	UNITED KINGDOM	POUND	1.7391304	0.575	1.7391304	0.575	1.960875	0.51
	DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.1748007	5.7208
	EUROPEAN UNION	EURO	1.1723329	0.853	1.1723329	0.853	1.3034411	0.7672
	ICELAND	KRONA	0.0135002	74.073	0.0135002	74.073	0.0146285	68.3599
	JAPAN	YEN	0.0088261	113.3	0.0088261	113.3	0.0082871	120.67
	NORWAY	KRONE	0.1477541	6.768	0.1477541	6.768	0.1607149	6.2222
	SINGAPORE	DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6512113	1.5356
	SOUTH KOREA	WON	0.0008688	1151	0.0008688	1151	0.0010621	941.53
For Month Ended 12/31/2006	TURKEY	LIRA	0.6703235	1.4918	0.6703235	1.4918	0.7109847	1.4065
	UNITED KINGDOM	POUND	1.7391304	0.575	1.7391304	0.575	1.9646365	0.509
	DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.177057	5.6479
	EUROPEAN UNION	EURO	1.1723329	0.853	1.1723329	0.853	1.3197	0.7577
	ICELAND	KRONA	0.0135002	74.073	0.0135002	74.073	0.0140905	70.97
	JAPAN	YEN	0.0088261	113.3	0.0088261	113.3	0.0084019	119.02
	NORWAY	KRONE	0.1477541	6.768	0.1477541	6.768	0.1605471	6.2287
	SINGAPORE	DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6519755	1.5338
For Month Ended 11/30/2006	SOUTH KOREA	WON	0.0008688	1151	0.0008688	1151	0.0010753	930
	TURKEY	LIRA	0.6703235	1.4918	0.6703235	1.4918	0.7055591	1.4173
	UNITED KINGDOM	POUND	1.7391304	0.575	1.7391304	0.575	1.9585991	0.5106
	DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.1766972	5.6594
	EUROPEAN UNION	EURO	1.1723329	0.853	1.1723329	0.853	1.3199996	0.7576
	ICELAND	KRONA	0.0135002	74.073	0.0135002	74.073	0.014497	68.9799
	JAPAN	YEN	0.0088261	113.3	0.0088261	113.3	0.0085911	116.4002
	NORWAY	KRONE	0.1477541	6.768	0.1477541	6.768	0.1596263	6.2646
SINGAPORE	DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6475392	1.5443	

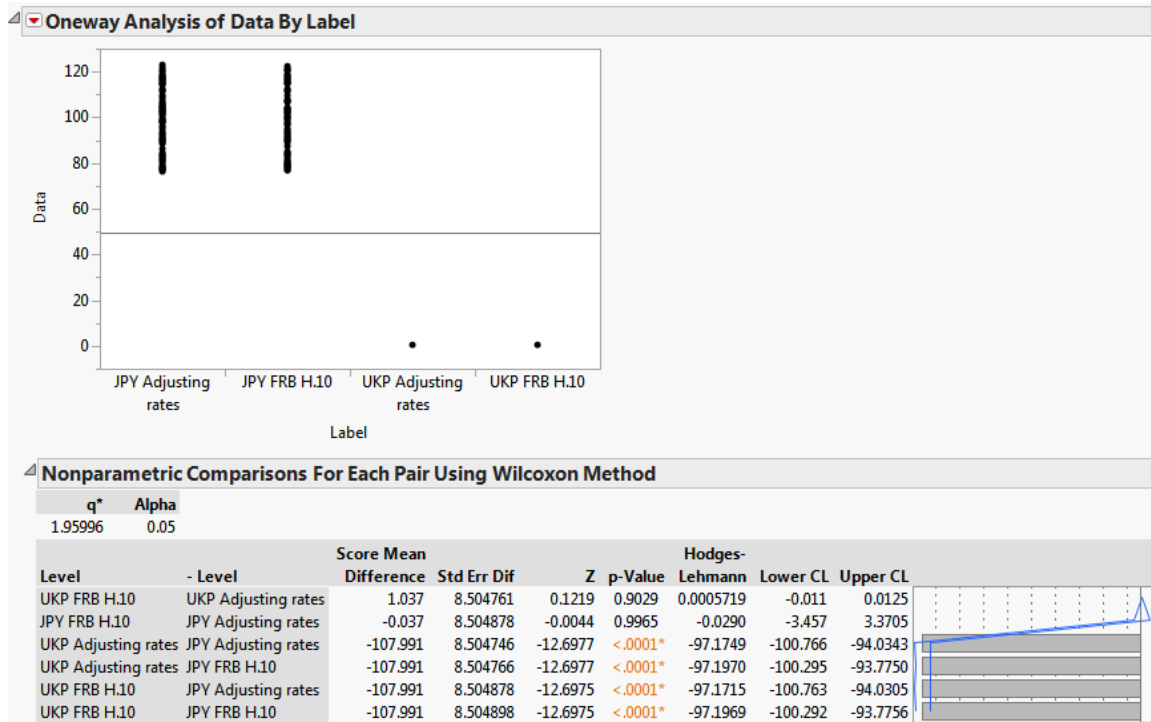
	SOUTH KOREA	WON	0.0008688	1151	0.0008688	1151	0.0010752	930.0206
	TURKEY	LIRA	0.6703235	1.4918	0.6703235	1.4918	0.6882787	1.4529
	UNITED KINGDOM	POUND	1.7391304	0.575	1.7391304	0.575	1.9562045	0.5112
	DENMARK	KRONE	0.1545356	6.471	0.1545356	6.471	0.1712739	5.8386
	EUROPEAN UNION	EURO	1.1723329	0.853	1.1723329	0.853	1.2764871	0.7834
	ICELAND	KRONA	0.0135002	74.073	0.0135002	74.073	0.0148017	67.56
For Month Ended 10/31/2006	JAPAN	YEN	0.0088261	113.3	0.0088261	113.3	0.0085551	116.8899
	NORWAY	KRONE	0.1477541	6.768	0.1477541	6.768	0.152952	6.538
	SINGAPORE	DOLLAR	0.5868545	1.704	0.5868545	1.704	0.6424671	1.5565
	SOUTH KOREA	WON	0.0008688	1151	0.0008688	1151	0.0010674	936.8301
	TURKEY	LIRA	0.6703235	1.4918	0.6703235	1.4918	0.6877579	1.454
	UNITED KINGDOM	POUND	1.7391304	0.575	1.7391304	0.575	1.907305	0.5243
	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1701838	5.876
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.2687135	0.7882
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0142796	70.0299
For Month Ended 9/30/2006	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0084758	117.983
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.1537043	6.506
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.6307556	1.5854
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0010568	946.2907
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.663482	1.5072
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.8716077	0.5343
	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1722801	5.8045
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.2851819	0.7781
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0144927	69.0001
For Month Ended 8/31/2006	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0085237	117.3205
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.1590558	6.2871
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.6357683	1.5729
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0010421	959.6041
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.6824541	1.4653
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.9076688	0.5242
	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1712006	5.8411
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.2774655	0.7828
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0139919	71.4701
For Month Ended 7/31/2006	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0087222	114.65
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.1625012	6.1538
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.6333924	1.5788
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0010469	955.2
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.667735	1.4976
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.8681113	0.5353
	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1704332	5.8674
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.2712942	0.7866
For Month Ended 6/30/2006	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1704332	5.8674
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.2712942	0.7866

	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0131627	75.9722
	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0086994	114.9503
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.1601948	6.2424
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.6291682	1.5894
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0010413	960.3007
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.6355259	1.5735
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.8345258	0.5451
	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1718006	5.8207
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.2815584	0.7803
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0139471	71.6996
For Month Ended 5/31/2006	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0088857	112.54
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.1645007	6.079
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.6333924	1.5788
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0010574	945.72
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.6355259	1.5735
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.8702076	0.5347
	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.168039	5.951
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.2537613	0.7976
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0133832	74.7203
For Month Ended 4/30/2006	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0087489	114.2999
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.1616214	6.1873
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.631672	1.5831
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0010574	945.699
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.7532957	1.3275
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.8086453	0.5529
	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1623008	6.1614
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.211387	0.8255
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0139782	71.5398
For Month Ended 3/31/2006	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0084913	117.768
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.1525902	6.5535
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.6187736	1.6161
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0010241	976.4376
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.7448235	1.3426
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.7367141	0.5758
	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1598006	6.2578
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.1924636	0.8386
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0153539	65.1301
For Month Ended 2/28/2006	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0086341	115.82
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.1482008	6.7476
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.6162948	1.6226
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0010299	970.97

	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.761035	1.314
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.7540782	0.5701
For Month Ended 1/31/2006	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1623561	6.1593
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.2118274	0.8252
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0160179	62.43
	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0084955	117.71
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.149158	6.7043
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.6033547	1.6574
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0010299	970.9977
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.7527853	1.3284
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.7711654	0.5646
For Month Ended 12/31/2005	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1589926	6.2896
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.1875074	0.8421
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0159261	62.7899
	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0084964	117.6967
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.149158	6.7043
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.6033547	1.6574
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0009912	1008.9
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.7446016	1.343
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.7295054	0.5782
For Month Ended 11/30/2005	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1582003	6.3211
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.1791062	0.8481
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0157084	63.6603
	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0083459	119.82
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.148401	6.7385
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.5912961	1.6912
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0009639	1037.45
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.7371913	1.3565
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.7295054	0.5782
For Month Ended 10/31/2005	DENMARK	KRONE	0.1661958	6.017	0.1661958	6.017	0.1605987	6.2267
	EUROPEAN UNION	EURO	1.1383039	0.8785	1.1383039	0.8785	1.198466	0.8344
	ICELAND	KRONA	0.0121656	82.199	0.0121656	82.199	0.0163801	61.0499
	JAPAN	YEN	0.0086957	115	0.0086957	115	0.0085911	116.4
	NORWAY	KRONE	0.1481262	6.751	0.1481262	6.751	0.1536995	6.5062
	SINGAPORE	DOLLAR	0.5743825	1.741	0.5743825	1.741	0.5903885	1.6938
	SOUTH KOREA	WON	0.0008297	1205.2	0.0008297	1205.2	0.0009579	1043.95
	TURKEY	LIRA	0.6603157	1.5144	0.6603157	1.5144	0.7399186	1.3515
	UNITED KINGDOM	POUND	1.6863406	0.593	1.6863406	0.593	1.7702248	0.5649

## Appendix F: Comparison of FRB H.10 and DoD Adjusting Rates

The FRB H.10 average monthly Pound and Yen exchange rates are not statistically different as their respective DoD adjusting rates. The exchange rates from both sources do not exhibit a normal distribution; therefore a nonparametric comparison was completed using the Wilcoxon method. The p-value of both pairs of currencies is extremely higher than 0.05, indicating the samples come from the same population (as shown by the top two pair comparisons below). This allows the use of the FRB H.10 data for method comparison in the long term analysis.



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14. ABSTRACT This thesis examines the current method of forecasting foreign currency exchange rates for the annual US Air Force budget. Using 5 methods against the status quo of a center-weighted average, the paper evaluates the absolute percent error (APE) over three time periods extending from Fiscal Year (FY) 1979 to FY 2014. The results strongly indicate that four of the alternative methods outperform over the short term, and one method for all three time periods. Furthermore, a non-parametric comparison of the median APE demonstrates statistical similarities between the four methods over the short term, and allows for the Air Force to choose which method to exercise for future forecasting. Overall, the paper recommends using a private firm's forecasts to decrease the median APE by 3.36% and avoiding \$36.1 million opportunity cost.					
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