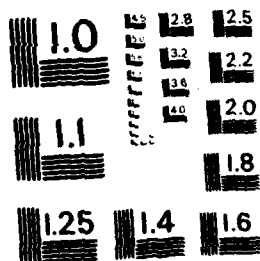


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ARE SUGGESTED TO OVERCOME THE LACK OF PLANS TO DEAL WITH A MAJOR AIR CARRIER FAILURE.

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THE NATIONAL WAR COLLEGE
INDUSTRIAL COLLEGE OF THE ARMED FORCES
NATIONAL DEFENSE UNIVERSITY

STRATEGIC STUDY

THE EFFECT OF A MAJOR AIR CARRIER'S FAILURE
ON THE CIVIL RESERVE AIR FLEET

By

Wayne DeLawter
Colonel, USAFR
John F. Phillips
Colonel, USAF
Richard Vogel
Lieutenant Colonel, USAFR

A RESEARCH REPORT SUBMITTED TO THE FACULTY

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FULFILLMENT OF THE RESEARCH

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THE NATIONAL WAR COLLEGE
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STRATEGIC STUDIES REPORT ABSTRACT

TITLE: The Effect of a Major Air Carrier's Failure on
the Civil Reserve Air Fleet

AUTHORS: Wayne E. DeLawter, Colonel, USAFR
John D. Phillips, Colonel, USAF
Richard K. Vogel, Lieutenant Colonel, USAFR

DATE: April 1983

The Department of Defense relies on commercial airlines to provide approximately fifty percent of the United States strategic airlift during a national emergency by mobilizing the Civil Reserve Air Fleet (CRAF). This study investigates the effect of a major civil airline bankruptcy on CRAF. This research also examined the adequacy of plans to deal with CRAF carrier corporate failures and found that while the loss of a major carrier would adversely affect strategic airlift capability, no plans exist to cope with the eventuality. Investigative conclusions are analyzed and feasible recommendations are suggested to overcome the lack of plans to deal with a major air carrier failure.

BIOGRAPHICAL SKETCHES

Colonel Wayne E. DeLawter, USAFR, (B.S., Purdue University), has 18 years of operational experience in strategic and tactical airlift. He served five years on active duty, flying a combat tour in Vietnam and in the Military Airlift Command (MAC) as an aircraft commander and flight examiner in the C-7A and C-141A/B, respectively. In 1969, he joined Trans World Airlines and flew as a line crewmember, then later as an FAA designee check airman in a management position. Since 1969, Colonel DeLawter actively participated in the C-141 Reserve Associate Program as a Squadron Training Officer, Standardization Officer, Chief Pilot, and Operations Officer. He holds a USAF Command Pilot rating and logged more than 7,500 flying hours in most theaters of operation, to include 205 combat missions in Vietnam. In commercial aviation, he holds several FAA ratings to include Airline Transport Pilot. With Trans World Airlines, he has flown over 4,000 flying hours on both domestic and international routes. Colonel DeLawter is a graduate of the Industrial College of the Armed Forces, (non-resident), and is a graduate of the Industrial College of the Armed Forces, Class of 1983.

Colonel John F. Phillips, USAF, (Pre-Med degree, Jarvis College, Texas; M.S., in Aeronautical Engineering, University of Southern California; M.S., in Logistics, Air Force Institute of Technology) is a PhD candidate in International Relations at Texas A&M University. Colonel Phillips is a rated pilot and navigator with over 3,000 flying hours. His assignments include: Instructor navigator in KC-135s; Instructor pilot in T-37 and T-38 aircraft; Propulsion engineer; logistics analyst; Director of Logistics for Airlift and Trainer Systems; and System Program Director for Tactical Reconnaissance Aircraft. Colonel Phillips is a graduate of Air Command and Staff College (non-resident), Industrial College of the Armed Forces (non-resident), and The National War College, Class of 1983.

Lieutenant Colonel Richard K. Vogel, USAFR, (B.S., Engineering Technology, Kent State University, Ohio) has more than 15 years of operational experience in strategic airlift in both military and civilian sectors. He has served in the Military Airlift Command (MAC) as an aircraft commander, flight instructor and flight examiner in the C-141A/B aircraft. In 1966, he joined a major international airline as a line crewmember and has extensive experience in civil international airline operations in Boeing 707 and Boeing 747 aircraft. Since 1969, he has actively participated in the C-141 Associate Reserve Program while serving as a Squadron Standardization

Officer, Squadron Flying Safety Officer, Air Operations Officer, Chief of Wing Flying Safety, and Squadron Commander. He holds the USAF aeronautical rating of Command Pilot, FAA ratings of Airline Transport Pilot and Turbojet Engineer, and has logged in excess of 15,000 flying hours in most areas of the world. He was active in both civil and military airlift operations in Southeast Asia with more than 100 missions into South Vietnam. Lieutenant Colonel Vogel is a graduate of Air Command and Staff College (non-resident), Industrial College of the Armed Forces (non-resident), and is a graduate of The National War College, Class of 1983.

EXECUTIVE SUMMARY

This study investigates the adequacy of existing plans to assure continued airlift support to the United States in the event of bankruptcy of a major U.S. airline. During a national emergency, approximately ninety percent of U.S. passenger airlift and thirty-eight percent of U.S. cargo airlift will be provided by the civil sector through the Civil Reserve Air Fleet (CRAF). More specifically, the DOD has tasked the civil aviation sector for nearly ninety percent of its inter-theater passenger capacity and one hundred percent of its cargo capability. Because these civilian contributions are essential to the successful execution of U.S. mobility plans, and several major carriers are dangerously close to insolvency, contingency plans are required to deal with a major air carrier failure, but none exist.

Cargo airlift, especially for outsize equipment such as self-propelled howitzers, fighting vehicles, attack helicopters and support vehicles, is less than adequate to meet early deployment and sustainability requirements. As documented in the Congressionally Mandated Mobility Study, even with CRAF fully generated, inter-theater airlift capability needs to be increased by twenty million ton-miles per day to provide an adequate capability for force projection. Because there are no plans to retain the assets of a failed airline in the CRAF, a bankruptcy would seriously compound the lift shortfall.

During 1982, the airline industry lost in excess of one billion dollars, furloughed more than twenty-two thousand

employees, and, more significantly, experienced the failure of Braniff Airways, a contributor to the CRAF. Several major CRAF contributors, furthermore, are currently in serious economic difficulty. Salient findings of the study are:

1. There are no contingency plans to ensure continued civil airlift support in the event of bankruptcy of a major U.S. airline.

2. Responsibility for emergency airlift is fragmented among several federal agencies, diluting the overall effectiveness of airlift management.

3. Analysis shows that Pan American World Airways, Flying Tigers Line and World Airways are experiencing financial problems. Pan Am is the largest single passenger carrier in CRAF and Flying Tigers the largest cargo carrier, while World also contributes significantly to the freighter fleet. Failure of any would represent a significant loss to CRAF.

4. Factors leading to airline bankruptcies are generic to the industry and can, over time, affect other major U.S. airlines.

5. Aircraft of bankrupt airlines may not be available to the Department of Defense until resolution of financial arrangements with lending institutions, both foreign and domestic, have been made.

6. Aircraft placed in dry storage by financial receivers require a minimum of two weeks to become operationally ready,

and other aircraft may demand much more. The requirements for the CRAF are aircraft availability in forty-eight hours. Aircraft sold by receivers to foreign carriers and to salvage are, obviously, totally lost to the CRAF.

7. Commercial pilots of bankrupt airlines will become noncurrent and not legal for flight operations after ninety days of flight inactivity.

8. The foreign infrastructure consisting of ground handling equipment, maintenance and terminal facilities and personnel will be lost.

9. There are one hundred forty-two U.S. wide-bodied aircraft unassigned to the CRAF. However, these aircraft are limited to domestic flight operations because of inadequate extended overwater navigation and communications equipment.

The Congress and the DOD need to assess the contribution the civil air carriers make to the U.S. Defense effort, and assume the responsibility of maintaining this vital resource with subsidy if necessary, to maintain essential inter-theater airlift. In conclusion, the loss of a major air carrier vis-a-vis a Chrysler or a Lockheed should be compared relative to its impact on U.S. defense posture. Can we afford the loss and at what cost?

CHAPTER I

INTRODUCTION

The CRAF accounts for nearly half of the strategic aircraft and crews available to this country for use in a national emergency. The role of CRAF is to augment the military airlift force in an emergency. Today, with all CRAF carriers flying and the Military Airlift Command (MAC) fully generated, there is an intertheater airlift capability shortfall of approximately thirty-three million ton miles per day. (See Appendix F) Tomorrow, that shortfall could be worse because civil flag air carrier operations are declining and carriers are selling many of their wide-body aircraft. The B-747 can carry approximately either 100 tons of cargo or 400 troops; DC-10, 55 tons or 250 to 270 troops; L-1011, 250 to 270 troops.¹ Loss of such systems could critically jeopardize our capability to rapidly move men and material to points of conflict.

Historically, CRAF has played an essential role in military planning. The partnership began with U.S. involvement in World War II. Commercial airlines, under contract with the Air Transport Command and the Naval Air Training Service, flew more than 1.4 million hours, resulting in more than four billion passenger miles and one billion cargo ton miles for the military to overseas locations.

U.S. airlines also helped make the Berlin Airlift a

success. They flew more than six hundred transatlantic flights in support of the airlift between June 1948 and May 1949.

During the Korean War, U.S. airlines augmented military air transport by carrying sixty-seven percent of the passengers, thirty-six percent of the military freight and seventy percent of the mail.

During the Vietnam conflict, U.S. airlines played an even larger role in augmenting military airlift. When this conflict was expanding in 1965 and 1966, U.S. airlines were transporting an estimated eighty-eight percent of the military passengers into the theater. Commercial carriers airlifted more than 2,500 passengers and 180 tons of cargo daily into Vietnam during these years.

Today, CRAF will provide approximately ninety percent of U.S. passenger airlift and thirty-eight percent of U.S. cargo airlift in an emergency using airline air terminal infrastructure for enroute support. The Joint Chiefs of Staff asserts that CRAF contribution is essential to the successful execution of U.S. operation plans. They believe that the health of the transportation industry, especially those which provide intertheater mobility assets, must be maintained.²

We ask the following question: if it is necessary to assure access to CRAF assets, what plans exist to assure continued airlift support in the event of airline insolvency? We find the question germane because there is convincing

evidence that several major U.S. airlines are on the brink of bankruptcy.

The Transportation Research Board has predicted fewer but financially stronger airlines for the 1980's.³ There is no assurance, however, that newly formed or expanding airlines will replace those that might be lost from the CRAF. Because of the state of the U.S. and international economies, airline bankruptcies can be realistically expected, and the affect on CRAF is apparent. Therefore, valid plans should exist to assure airlift capability is not further diminished by the failure of a key CRAF participant.

DISCLAIMER-ABSTAINER

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CHAPTER II

STUDY OBJECTIVE

The bankruptcy of one major and several small U.S. air carriers in 1982, coupled with major air carrier financial difficulties, properly causes apprehension among military leaders concerned with strategic airlift. Since the CRAF is committed to carry nearly all of the military personnel and about five percent of the cargo in an emergency, the loss of a major air carrier supporting the CRAF would adversely affect U.S. flexible response capability.

The impact on the CRAF of a failed carrier depends upon the contribution the company makes to the program through its aircraft and supporting infrastructure. For example, World Airways and Pan American World Airways contribute together thirty percent of the passenger and twelve percent of the cargo capacity to CRAF, while Flying Tigers alone provides more than thirty percent of the total cargo capability, and all are vulnerable to financial failure. The failure of any one would cause a disastrous effect upon strategic airlift capability.

The objective of this study is to examine the adequacy of military plans to deal with CRAF carrier corporate failures, and to demonstrate, through regression analysis, that some main CRAF contributors are vulnerable. Additionally, we examined the Braniff Airways insolvency. By using that company as a model, we made assumptions concerning the disposition of equipment from companies which may not survive.

CHAPTER III

CRAF CONTRIBUTION TO STRATEGIC AIRLIFT

The primary function of CRAF is to augment military airlift during a national emergency. While CRAF is divided into four segments (long-range international, short-range international, domestic, and Alaskan), the long-range segment is of prime importance. This portion would be most affected by a failure of a major international air carrier because of the loss of strategically critical airlift capacity. The long-range international segment provides support for MAC's world-wide mission requirements. Aircraft allocated to this segment are capable of extended overwater operations with a productive payload. Desired range is 3,500 nautical miles; however, cargo aircraft with 2300 NM capability are acceptable in the long-range fleet.

The composition of the CRAF fleet is shown in Appendix B. The 330 long-range international, 16 short-range international, 11 Alaskan, and 30 domestic CRAF aircraft comprise the force which is depended upon to provide airlift in a national emergency.

CRAF Operational Procedures

The current operational plans governing the CRAF are organized for coordination of commercial air carrier augmentation of military airlift; yet CRAF management is disturbingly

fractionated. In addition to the air carriers, the following government and military agencies are affected by CRAF planning: Department of Defense (DOD), Military Airlift Command (MAC), Department of Transportation (DOT), Federal Aviation Administration (FAA), Civil Aeronautics Board (CAB), and Federal Emergency Management Agency (FEMA).

MAC is the operational manager of the CRAF program. MAC and CRAF carriers meet annually to negotiate the terms of the MAC Annual Airlift Services Contract and the CRAF Call Contract. Throughout the year MAC coordinates with the various agents of CRAF carriers to ensure proper operation. If the CRAF is actuated in times of heightened military tensions, the MAC Crisis Action Team (CAT) will provide mission control.

DOD determines the number and types of civil air carrier aircraft needed in the CRAF program to meet the most demanding emergencies. DOD advises DOT of this requirement in terms of ton miles and passenger miles. DOD also advises DOT of the intention to activate any stage of the CRAF.

DOT establishes air transportation priorities and allocates civil air carrier aircraft to the CRAF program. Also, DOT notifies DOD whether the CRAF incremental stage will have a significant affect on the civil air carriers capability to provide essential airline service.

Because of the need to be selective in employing civil airlift, CRAF is activated in three stages, Stage I,

activated by CINCMAC, requires that long-range airlift aircraft be furnished to DOD to support expanded peacetime military airlift requirements. Stage I, designed to minimally disrupt civil commercial services, is expected to be available within twenty-four hours.

Stage II is activated by the Secretary of Defense to provide additional civil airlift augmentation during an emergency that does not require national mobilization. This stage provides a significant increase in augmentation without resorting to full mobilization or the declaration of a national emergency. This airlift capability is also to be available within twenty-four hours.

Under Stage III, airlift resources are activated by an order from the Secretary of Defense, but only after the President or the Congress has declared a national emergency. This airlift is to be available within forty-eight hours.

FAA is authorized to grant waiver and exemptions as emergency conditions warrant. Chapter 10 of MAC Regulation 55-8, lists blanket waivers and exemptions for use only upon Stage III activation. These waivers and exemptions are necessary when carriers operate off their certified routes.

Headquarters MAC initiates aircraft requests after examining the requirements and the aircraft suitability to the mission. This request is submitted to HQ, USAF for approval. The request is then forwarded to the Office of Emergency Transportation (OET) within DOT, for final allocation.

Allocation arbitration is reviewed and resolved by FEMA when other agencies of government (Department of State, Energy, etc.) also require aircraft which have strategic airlift capability.

When CRAF activation is necessary, HQ MAC will advise the CRAF carriers, DOT/OET, CAB, FEMA and the FAA. During CRAF activation, MAC maintains mission control and the carrier retains operational control using its own resources of personnel and equipment to ensure the mission is completed as directed.

Air carrier membership in CRAF is voluntary with pre-arranged commitment of airframes for each stage of activation. As a CRAF member, each carrier commits aircraft, personnel and infrastructure for use in a national defense emergency; in peacetime these air carriers are eligible for MAC airlift service contracts for military cargo or passenger revenue as an incentive for participation. This contract operation benefits both the government and the carrier. It has always been found more cost effective to satisfy some of MAC's oversize/bulk requirements and most of the passenger airlift by using CRAF aircraft rather than owning and operating a larger force of organic aircraft. The carriers, in turn, derive revenue from the contract business because they have committed corporate resources to support CRAF during emergency conditions.

Manpower, aircraft maintenance, and logistic support is the responsibility of the operating carrier. Civilian enroute airfields will be used whenever possible to reduce military base saturation.

The senior lodger is a designated air carrier that is committed to support CRAF aircraft and crews transiting a specific airdrome after CRAF activation. The overseas senior lodger stations and assigned senior lodger carriers are:

Atlantic Area

Amsterdam/Schiphol	- Pan Am	London/Gatwick	- Pan Am
Ankara/Esenboga	- Pan Am	London/Heathrow	- TWA
Athens Intl	- TWA	Madrid/Barajas	- TWA
Barcelona Intl	- TWA	Paris/DeGaulle	- TWA
Brussels Natl	- Pan Am	Prestwick	- Pan Am
Cairo Intl	- TWA	Rome/Fiumicino	- TWA
Copenhagen/Kastrup	- Northwest	Santa Maria	- Pan Am
Frankfurt Main Intl	- Pan Am	Shannon	- Pan Am
Keflavik/Meeks	- Pan Am		
Lisbon/Portela	- TWA		

Pacific Area

Anchorage Intl	- Northwest
Bangkok	- Pan Am
Cold Bay	- Flying Tiger
Guam/Agana	- Pan Am
Honolulu	- United
Manila	- Northwest
Naha	- Northwest
Seoul/Kimpo	- Northwest
Tokyo Intl	- Northwest
Wake Island	- Pan Am

CONUS senior lodger stations and carriers are:

Baltimore-Washington Intl	- Eastern
Bangor Intl	- Pan Am
Boston/Logan	- TWA
Miami Intl	- Pan Am
New York/Kennedy	- Pan Am
O'Hara Intl	- United
Wash DC/Dulles	- TWA
Los Angeles Intl	- United

Oakland Intl.	- World
San Francisco Intl	- United
Seattle/Tacoma	- Northwest

Northwest, Pan American, and Trans World must upon request, in addition to providing aircrews, aircraft, and senior lodger personnel, also provide communications supervisor personnel. Each of these carriers may also be asked to provide a supervisor to HQ MAC at Scott AFB and/or to the alternate command post (MACALT) at McGuire AFB.

History of Airline Problems and Characteristics

Many problems common to most U.S. air carriers threaten profits. The following characteristics have conditioned the development of the U.S. airline industry and will be later amplified: (1) it is a service industry; (2) until recent deregulation, it was closely regulated by the government; (3) it is highly competitive; (4) its demand is seasonal; (5) it has grown rapidly; (6) it is sensitive to fluctuations in the economy; (7) it is an industry with very high costs; (8) it is capital intensive and has high technological turnover; (9) it has a low rate of return on capital investment.

1. The airlines have only service to market. While the U.S. airlines carried more than 5.6 billion tons of air cargo in 1981, the industry's predominant product is the passenger who yields twice the revenue per ton mile of cargo.¹

Scheduled airlines furthermore on a given day may have its seats ten percent or ninety percent full, but whatever the case, the unused seats cannot be saved or inventoried for

sale at a later date.

2. Government regulation had a profound effect on the airlines. Although the airline industry grew rapidly under government regulation since the end of World War II, the airlines were not as profitable as corporations in the unregulated sector of the economy. Low rates of profitability came in spite of the CAB's attention to the financial health of the industry.²

The CAB was established in 1938 to regulate the control of entry, routes, and fares of the interstate air carriers. It determined what areas would be served, what cities in the areas would be provided air service, what minimum service must be maintained, and what prices may be charged for any passenger, air freight, express, or mail service. The regulation of these aspects, however, proved to be unwieldy for the CAB. Certain issues critical to the industry's health were commonly deliberated for several months, with one case lasting five years and four months. During times of sustained inflation, these delays adversely affected the airlines.³

By the early 1970's, stringent government controls had reached the point that the airlines managerial freedom had been severely eroded. Also, consumer groups believed that the inefficiency caused by over regulation resulted in higher fares. Therefore, spurred by politically active and powerful consumerists, the Ford administration proposed the

deregulation of what had by then become the country's most regulated industry.⁴ The airline deregulation concept gained popular political support during the Carter administration. With the passage of the Deregulation Act in October 1978, this highly regulated industry began to transition toward total deregulation by 1983.⁵ Deregulation brought about increased competition which has reduced profits.

3. The U.S. airline industry is highly competitive. In the late 1930's and 1940's more than ninety-five percent of a trunk airlines total route system was free of other air competition, while today some ninety percent has from two to nine carriers in direct competition.⁶

Recent deregulation gave impetus to the creation of low cost new airlines. These newly formed airlines, operating with much lower nonunion costs, have reduced the profit margins of the old, established, unionized trunk carriers.

When the approach to domestic regulation reversed, our international aviation policymakers were likewise affected by this domestic deregulation philosophy. The U.S. espoused a goal of pure competition for its flag carriers, as well as for all foreign air carriers operating into the United States. If all international competitors operated by the same rules, open competition would be desirable. Each nation, however, controls its national carrier with preconceived national interests, operating under different rules, different interpretations of bilateral agreements,

different forms of financial support, and different policy objectives.⁷

Most foreign carriers are state owned and controlled. In addition to providing air transportation, they may be mandated by the state to earn specific amounts of convertible currency, maintain a level of employment in excess of real needs, support a domestic aircraft-manufacturing industry or a certain foreign aircraft industry for political or economic reasons, or operate commercially unsound routes consistent with a particular foreign policy. Protectionist, noncompetitive policies may also be adopted by authoritarian states as one means of enforcing restrictions on citizen travel. Many small or underdeveloped countries employ protectionist procedures to create a market unattainable by conventional nonpressure commercial practices.⁸

Many foreign competitors employ discriminatory and unfair practices that put U.S. international carriers at a disadvantage. Some control their internal traffic through control of travel agents, freight forwarders, and local reservations systems, they also control the flow of national-originating traffic to international services. Many foreign transatlantic carriers deny reservations on domestic connecting flights unless the transatlantic portion is booked on the national carrier.⁹

The validity of the U.S. government's pro-competitive international aviation policy must be questioned in light of

the disappointing financial results realized by U.S. flag airlines in recent years. In addition to losses, the decline in the North Atlantic market share of the United States carriers that has occurred since 1977 is further evidence that more competition in international aviation markets is undesirable.¹⁰

4. Demand for air passage varies during the day, the week, and the year. Therefore, airlines have peak periods of travel and slack ones. To illustrate, Trans World Airlines at the Washington National air terminal experiences three major flight pushes--times when a large number of flights depart a station in a short period of time--two occurring in the morning and one in the afternoon. The periods in-between are very slack and very costly for the airline.¹¹

The same situation occurs seasonally. For example, the peak traffic period for TWA's domestic east-west traffic has always been in the summer; conversely, the peak for Eastern Air Lines' north-south traffic has always been in the winter. This undesirable single-direction situation that was fostered in the part by the CAB has begun to change. The airlines, under deregulation, are now free to develop routes in any direction to alleviate the seasonal problem.

5. Almost uncontrolled growth in the airline industry has been a problem. In 1938, when the CAB was established, there were 36,259 miles of domestic routes. By the late

1970's, that mileage number had grown to more than 570,000.¹²

While the CAB increased the air routes by an average of three percent a year from 1938 to 1969, the overly optimistic air traffic forecasts of the mid-1960's, spurred by new technology aircraft, led the CAB to increase the 1969 route miles by 181 percent.¹³ This phenomenal expansion of competition in 1969 unfortunately coincided with an economic recession which sharply cut airline traffic growth and led to costly overexpansion.

Another significant development which recently affected the expansion of the airlines was deregulation. While it provided for freedom to expand and allowed entry of new airlines, it also proved to be a dominant factor in the demise of Braniff and several smaller carriers.

6. Air carriers are extremely sensitive to fluctuations in the economy. The depressing effect of recessions on passenger demand for air transportation is apparent from chart one.¹⁴ The international and domestic service by the major carriers declined by five percent in 1980 and six percent in 1981 compared to their respective previous year.¹⁵ This followed four years of growth.

The reduction in the total passenger traffic is reflected by the financial statistics. While the airline industry revenues in 1981 reached an all-time high of 36 billion dollars, the operating losses were \$421 million. The

previous record loss was \$220 million in 1980.¹⁶

7. The airline industry is plagued by high costs. Most airline operating costs remain about the same whether the airplane is empty or full. Air crew members pay and maintenance costs are the same regardless of the plane's load factor. Depreciation and interest charges, furthermore, do not vary with the number of passengers on board.

Labor costs in the airline industry are higher than in most other industries. It is, however, a high skill industry where higher wages are expected. Recently, though, the labor costs as a percentage of the total operating expenses have dropped markedly. In 1976, the labor costs accounted for about fifty percent of the total operating expenses--by 1982 these costs dropped to below thirty-five percent.¹⁷

The most significant cost for the airlines (after labor) is fuel. The airlines spent more than ten billion dollars for fuel in 1981, compared with \$1.3 billion in 1973. The average cost per gallon of jet fuel in the mid-1960's was 11.7 cents; domestic fuel today costs \$.95 per gallon, and international or foreign fuel costs \$1.07 per gallon.¹⁸ Fuel accounts for about thirty percent of the total operating costs.

Another increasing cost area is the price of capital. Because of inadequate earnings over the years, the airlines

have been forced to borrow large amounts. This has resulted in a reversal of debt/equity ratio. In the mid-1950's the average scheduled carrier had a sixty percent equity/forty percent debt ratio; today the average equity has dropped to approximately forty percent, while the debt has risen to sixty percent.¹⁹

8. Air carriers suffer a very high technological turnover. In the past fifty years, technological advances have forced airlines to undertake a re-equipment cycle every eight years on the average. Besides calling for huge capital spending, these cycles require heavy expenses for hiring and training personnel and in plant facilities to accommodate the new aircraft. In general, it takes two to three years before an airline can fully realize the cost benefits of this equipment changeover.²⁰

For the past two decades, the airlines have led other U.S. industries, including utilities, manufacturing, and communications in the rate of increase in capital spending.²¹

Eighty percent of an airline's capital investment is in aircraft. Each new generation of replacement aircraft costs six to seven times more per aircraft than its predecessor. For example, first generation jet transports, the DC-8 and B-707, originally cost about \$6.7 million each; their replacement aircraft, the B-757 and B-767 originally cost approximately \$39.6 and \$48.9 million each respectively--a factor of nearly seven times more.²²

To make future technological advances, the airlines need huge sums of capital. An ATA study of capital requirements estimates that for the ten-year period, 1980-1989, the airlines will need \$60 billion additional new capital to meet new equipment requirements.

9. Air carriers are plagued by a low rate of return on capital investment. In 1961, the CAB determined that 10.5 percent would be a fair and reasonable annual rate of return on investment. The "fair" annual return on investment was set by the CAB at 10.5 percent from 1961 to 1971 and twelve percent thereafter. From 1961 to 1971 the domestic trunk carriers earned the 10.5 percent only once.²³ Since 1971 the industry has exceeded the twelve percent operating profit criteria only once, that was in 1978 with \$1.4 billion earnings. At the other end of the spectrum, the most recent years, 1980 and 1981, represent the low years with record operating losses of \$222 million and \$421 million for 1980 and 1981, respectively.²⁴ Even with fuel price relief, the 1982 loss is estimated to be over \$600 million.

The airline industry's record of financial performance is far below the performance of other industries. Profits comparisons of airline, railroad, and the U.S. manufacturing industry since the mid-1960s demonstrate the financial difficulty confronting the airlines. While the railroads have been recognized as being under financial stress, on an annual basis since 1968, the railroads have attained a higher

return on sales than the airlines, except for the relatively good years of 1976, 1977, and 1978.²⁰

Economic Analysis of Selected Air Carriers

Five commercial carriers, Pan American, World, Continental, United, and Flying Tigers, were selected for detailed analysis because of their significant contribution to CRAF or possession of wide bodied aircraft which could be used during a national emergency.

The model used to analyze individual airlines was a variation of the model used in this study to analyze the aggregate financial performance of U.S. carriers (Reference Appendix J). We assumed the four key variables identified as affecting the financial performance of the U.S. airline industry in the aggregate would also affect individual airlines. The four variables used were: GNP, fuel cost, revenue passengers, and freight ton miles. The four variables were regressed against the profit margin of each company for the period from 1972 to 1981. All input data are included in Table 1.

From the historical data in Table 1, a prediction model was developed, and sensitivity analysis were performed to predict future airline performance given certain trends in GNP, fuel cost, revenue passengers, and freight ton miles. Data were analyzed at the ninety-five percent confidence level. For a detailed analysis of findings, refer to Appendix J.

INDIVIDUAL CARRIER MODEL

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
PAN AM	10.3%	9.3	1.9	6.4	7.6	13.0	14.6	10.2	3.6	3.6E
CONTINENTAL	8.1	8.5	8.0	3.4	8.9	10.8	13.6	11.6	7.6	.5
WORLD	1.0	1.3	2.2	2.6	2.8	3.0	1.7	1.2	.7	.1
UNITED	14.6	17.5	16.4	8.8	9.0	9.7	15.8	3.2	6.4	4.6
FLYING TIGERS	42.5	43.6	33.8	33.6	31.7	31.8	34.2	26.2	19.6	19.1

* operating margin **asset-equity ratio

(Source - Standard and Poors, October 8, 1982)

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INDEPENDENT VARIABLES

GNP	1171	1307	1413	1529	1702	1900	2128	2414	2626	28261
FUEL COST	200	20	20	25	30	32	37	39	75	96
REVENUE PAX (000)	191349	202208	207458	205062	228318	240326	274719	31636	296903	285726
FREIGHT TX (000)	4217452	4736729	4890026	4766118	5074193	5385129	5763249	5907731	5685622	5616750

Table 1

Pan American World Airways Economic Analysis

Pan American has committed sixty-two passenger aircraft and five cargo aircraft to the long-range international segment of CRAF. It is one of the largest U.S. flag carriers with a fleet consisting of: forty-five B-747, twelve L-1011-500s, fifty-six B-727s, sixteen DC-10s, and eight B-737s.

The analysis indicates that fuel cost is the dominant variable affecting Pan American's operating margin. GNP, passenger revenue, and freight ton miles in order were the next most significant variables. Any unfavorable trend in either variable would render Pan American's financial solvency (operating margin) questionable. Assuming the current trend continues, the model predicts that Pan Am will only have an operating margin of one percent by 1986. This results in a net operating loss because a ten to twelve percent return on investment is considered reasonable. Loss of Pan American would represent twenty-two percent of the CRAF's aircraft, and approximately twenty-nine percent of its passenger airlift capability.

Certain management actions which could affect operating margin were not considered in the model. These actions include: (1) Fleet reduction--Pan American is in the process of selling some of its B-747's. In addition, the L-1011 fleet is being grounded, and if sold, would cut the total debt in half. (2) Reduction in labor force--Pan American

plans to reduce its labor force by 5,000 through attrition and leaves of absence. (3) Debt restructuring--Pan American could negotiate more favorable agreements with lending institutions.

During December 1982, Pan American's management was able to obtain wage concessions and productivity improvements from its labor force which will amount to an aggregate savings in labor costs of approximately fifteen percent or about 200 million dollars per year until 1985.

Because its major share of flight operation is conducted in the international arena, it is still plagued by high fuel cost averaging \$1.0368 per gallon at the end of 1982. The major obstacle to operating profitability continues to be the high cost of jet fuel.

World Airways Economic Analysis

World is one of the largest charter air carriers in the U.S. Its fleet consist of eight DC-10s, four DC-8s, and four B-747s. The company has committed fourteen aircraft to the long-range international segment of CRAF.

Analysis shows that freight ton miles is the most significant variable affecting World's operating margin. In order, the next most significant factors are: GNP, fuel cost, and passenger revenue. Assuming the current trend continues, World will have a debt-to-equity ratio of .01 by 1984. This represents a .09 drop from its current ratio. By any accounting standard, World is in imminent

danger of bankruptcy. Loss of World would represent twelve percent of the CRAF's freight capability.

Factors not analyzed which could improve the financial picture are: (1) Increase in military charter service (twenty-five percent of World's income was generated from military charter in 1981, down from thirty-two percent in 1980). (2) Increased emphasis on scheduled air services (currently, only fifty percent of its revenue is generated from scheduled service). (3) Restructuring debt agreements with aircraft lenders and lessors.

Continental Airlines Economic Analysis

Texas Air Corporation is a holding company with a combined fleet of aircraft as follows: thirteen DC-10s, fifty-one DC-9s, and sixty B-727s. One of its subsidiaries, Continental, has committed thirteen aircraft to the long-range segment of CRAF. Continental was analyzed after its successful merger with Texas Air Corporation.

All data show the company to be a going concern. While 1981 showed only a .5% operating margin, it can be considered a spurious event driven by the acquisition of a new subsidiary. The relatively young fleet (five years) suggest that no new aircraft will be needed in the near term, further enhancing financial solvency.

United Airlines Economic Analysis

United Airlines is a minimum support member of CRAF; however, it has a substantial fleet of wide bodied aircraft

with the potential for airlift in a national emergency. The fleet consist of eighteen B-747s, forty-six DC-10s, forty-four DC-8s, 158 B-737s, two B-767s, and on order are one DC-10 and seventeen B-767s.

The analysis predicts that United will continue to be a going concern. There are two factors which were not included in the analysis which further support its economic vitality.

(1) United's major hub was most affected by the controller strike. It is anticipated that departures will increase by twelve percent when controllers return to full strength.

(2) It is a diversified company with twelve percent of its revenues generated from hotels and business services.

Flying Tigers Economic Analysis

Tiger International Incorporated, a holding company, owns Flying Tiger Line, the world's largest scheduled air cargo carrier. The carrier serves Asia, United States, and Europe. It operates twenty-four DC-8Fs, thirteen B-747Fs and the average fleet age is seven years.

Flying Tigers has committed its entire fleet to the CRAF. It has the single largest cargo capability providing more than 4.37 million ton miles per day and thirty-one percent of the CRAF cargo airlift.

The 1982 calendar year was the company's worst on record with an estimated deficit of \$4.00 per share and little prospect is held for improvement during 1983.

The company announced on February 21, 1983 that it was

unilaterally suspending payments on about half of its total debt of \$1.8 billion, which some analysts view as a technical default on loans.

A company spokesperson indicated their mounting problems result from significant MAC contract business reduction, recent acquisition of Seaboard World Airline, deregulation of air cargo operations, the recession, high fuel prices and interest rates.

Computer analysis of Tiger International (TI) shows fuel cost to be the single most significant variable affecting operating margin, followed by GNP, passenger revenue, and freight tons.

In view of the volatility of fuel cost, a credible prediction of bankruptcy as a function of operating margin was difficult. However, the model determined the following relationship between fuel cost and operating margin:

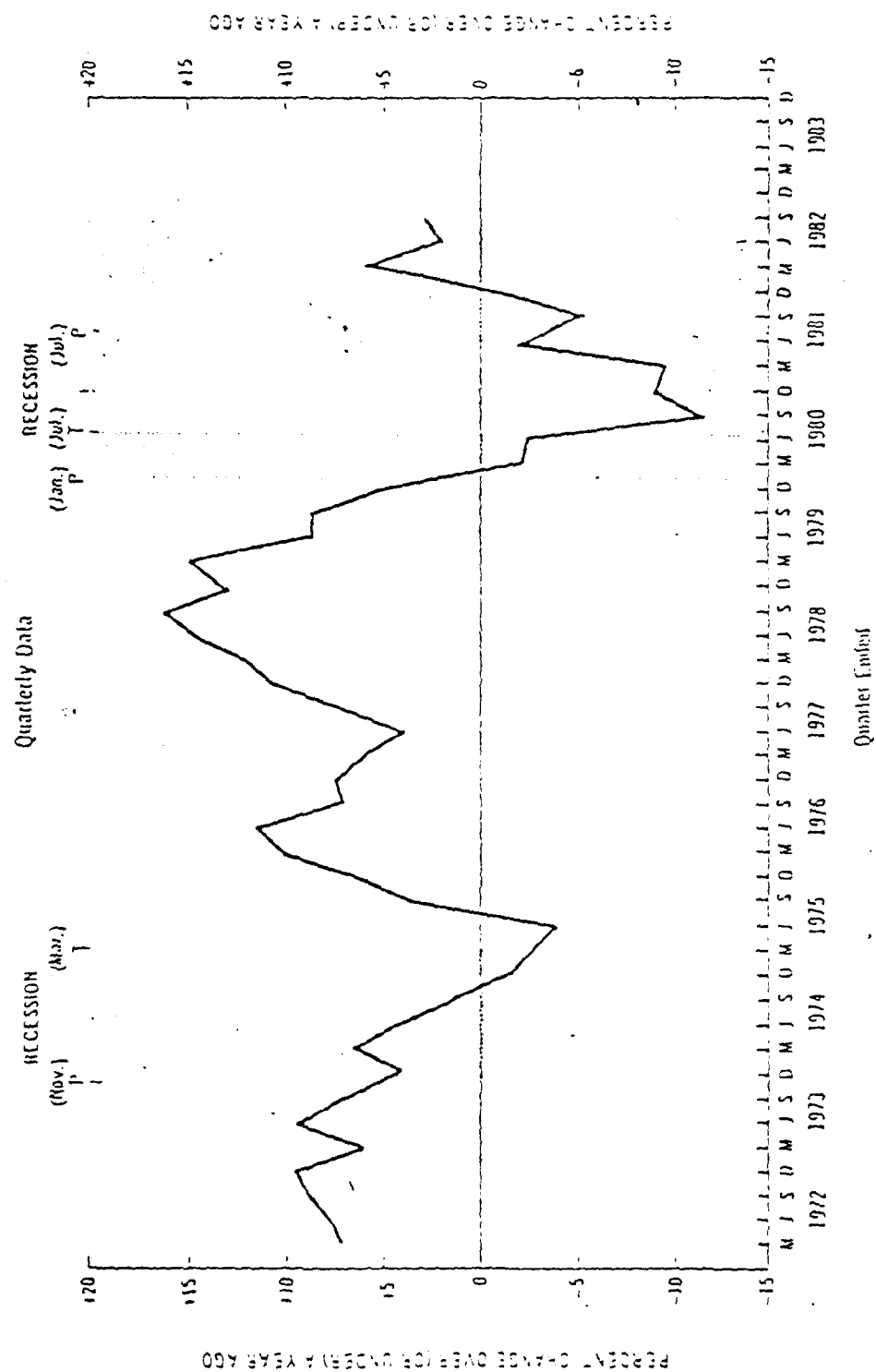
- Historical relationship (TI from 1972 to 1981) is hyperbolic with the function: $Y = 1/(A + B X)$. Where operating margin (Y) = $1/ [.01838 + .04037 (\text{Fuel Cost})]$.

- Example: A change of two cents per gallon in fuel cost will affect TI's operating margin by eight percentage points. (For detailed analysis, see Appendix I.)

Should the Flying Tiger Line be forced to suspend operation, it would create a void in CRAF cargo capability which could not be filled and would result in drastic shortfalls in cargo airlift.

Chart 1

MAJORS DOMESTIC OPERATIONS RPM's (Scheduled Service)
PERCENT CHANGE OVER COMPARABLE QUARTER A YEAR EARLIER



Summary of Individual Airline Analysis

Of the four variables analyzed to determine their affect on operating margin, GNP and fuel cost were clearly dominant. GNP is a complex variable in that many sub-elements determine its index (interest rate, unemployment, etc.). Therefore resolution of GNP as a causal factor is long term and multifaceted. Fuel cost, on the other hand, is amenable to near term solution. Fuel cost was one of the major determinents of operating margin even for the two companies determined to be financially stable. (Reference Table 1.) Recent predictions in Aviation Week and Space Technology suggest that,

failure of Organization of Petroleum Exporting Countries to fix production quotas will help reduce operating cost. A one percent decrease in the price of a gallon of aviation fuel saves U.S. airlines \$100 million a year. In the aggregate, fuel accounts for thirty percent of the operating cost of airlines. Demand for aviation fuel is expected to grow more slowly than air traffic through the 1990s because of conservation, improvements in technology and other measures.²⁴

The analysis suggest that if the Federal Government elects to support financial stability of U.S. airlines, the highest and most immediate return on investment would come from direct subsidies to airlines toward fuel costs.

Disposition of Aircarrier Assets

Disposition of a bankrupt airline's assets is achieved

by various means. The Braniff litigation is probably typical of asset disposition.

Litigation involving disputes between government agencies, potential purchaser of equipment, and competitors is delaying the sale of most of Braniff's equipment to more than twelve months. After about eight months of negotiating, Pacific Southwest Airline (PSA), the first lease candidate for most of the equipment, has dropped plans for acquiring the aircraft. Twelve months after Braniff's failure, People Express, a new airline, will begin taking delivery on the first of twenty aircraft to be delivered over the next eighteen months. Neither PSA nor People Express are CRAF participants.

Braniff did not own all of its airplanes. Eleven were owned by Braniff Realty Corporation, a subsidiary of Braniff International who leased them to the airline. These aircraft were repossessed following Braniff's declaration of bankruptcy. This group of airplanes is being remarketed.²⁵ All the wide-body aircraft that had been assigned to the CRAF except for one were sold to foreign sources--some to communist countries. These wide-body sales are lost to the CRAF.

The current recession has stymied the resale of many of the aircraft. As of 17 January 1983, there remained seventy aircraft for sale or lease.²⁶ Most of these aircraft are stored in an arid location at Marana, Arizona. In this environment, aircraft systems and hull deterioration are

kept to a minimum. Engines are started periodically to keep them in a minimum serviceable condition. These aircraft are not, however, maintained to manufacturers' or Federal Aviation Agency (FAA) specifications. It is estimated that these aircraft will require approximately two weeks preparation to meet flight standards.²⁷

Older aircraft, those that were inefficient or approaching the end of their usefulness, are parked on a Dallas-Fort Worth airport ramp. Here, aircraft are cannibalized, sold for scrap or put in storage without consideration for preservation or future use. These aircraft are lost assets.²⁸

While the disposition of aircraft and equipment has been a problem for Braniff, the opposite has been true regarding its divestment of its international infrastructure. Some of Braniff's international long-range aircraft and routes were sold even before bankruptcy was declared. This was done in an effort to remain solvent. Even during this recession there was strong competition for the South American routes. Four airlines, Air Florida, Eastern, Continental and Pan American, requested CAB permission to take over some of these routes.²⁹

It should be noted that in the past twelve months, both World and Pan American are likewise attempting to sell aircraft. Within the past year World sold one B-747-100F and a DC-10-30CF. Pan American is trying to divest itself of its six B-747 freighters and all twelve of its L-1011s.

The recession has made it difficult for Pan American to sell airplanes. But if Pan American is forced to withdraw from some of its markets, stronger U.S. carriers may assume them, as the carriers did prior to and after the Braniff failure. The new airlines' operation of the routes and stations would provide the international infrastructure which is important to a CRAF Phase III operation. The assumption of the infrastructure by the stronger airline, in turn, gives impetus to the purchase of some of the failed carrier aircraft.

Most of the many airlines have experienced difficulty in obtaining capital to acquire new aircraft because of the world-wide recession, high interest rates, and poor airline profit potential. This situation has caused the U.S. air carrier industry to seek capital from foreign sources which removes ownership and control of assets from the United States. Foreign financing and ownership has created a need to review what stipulations may be imposed on the carrier and the government's use of these assets for the implementation of foreign policy or use for national defense purposes. Some of the present financial agreements preclude using aircraft in a war zone, thus removing a potential resource for the CRAF. Consequently, all CRAF commitments require a trilateral agreement between MAC, the air carrier, and the financial institution before assignment can be made to the CRAF fleet.³⁰ If the lender's consent to allow the aircraft

SUMMARY OF AIRLINE SOLVENCY VARIABLES				
INDEPENDENT VARIABLE	DEPENDENT VARIABLE:		TOTAL OPERATING REVENUE	
	R	R ²	SE	
REVENUE PASSENGER LOAD FACTOR	.78	.61	.60	
TON MILES (FREIGHT)	.83	.68	.53	
REVENUE PASSENGERS	.91	.82	.39	
NUMBER OF AIRCRAFT	.79	.62	.58	
FUEL COST	.95	.89	.31	
GROSS NATIONAL PRODUCT	.99	.98	.13	
INTEREST RATE	.85	.72	.50	
FEDERAL SUBSIDY	.80	.65	.57	

GROSS PROFITS		
R	R ²	SE
.83	.69	.55
.90	.80	.44
.91	.83	.41
.69	.47	.72
.88	.78	.47
.97	.94	.24
.82	.68	.56
.78	.61	.62

NOTE: See explanation of process used in analysis in Appendix K.

R² = prediction accuracy and strength of linear association.

R = the degree of correlation between two variables.

SE = (standard error) accuracy of the prediction equation.

Table 2

in war zones is not specified in the lien, a consent agreement must be secured prior to CRAF membership authorization.³¹

The Department of Defense is investigating the possibility of acquiring aircraft from the large supply of surplus wide-body civil aircraft.³² If this concept is accepted and incorporated, future bankrupt assets would be prime consideration for this fleet.

Plans to Sustain CRAF in the Event of
Airline Failures

Currently, there are no contingency plans for dealing with the bankruptcy of a major CRAF carrier. Information obtained from Military Airlift Command and Pentagon agencies responsible for monitoring civil carrier airlift capability committed to the CRAF confirm that no plan exists to cover the shortfall created by a participater's bankruptcy. The financial collapse of any major carrier with the magnitude of resources of Pan Am, World, or Flying Tigers, would have an adverse effect upon the CRAF utility. Beyond loss of aircraft, crew currency would expire within a short period (completely within ninety days) and there would be the loss of the airlines infrastructure critical to supporting international operations.³³

One solution with severe shortcomings is the use of civil aircraft not designated to the CRAF which can be obtained during a declared emergency or nuclear attack under the provision of the Defense Production Act of 1950. These airlift assets are allocated to the War Airlift Services Program

(WASP) (Reference Appendix H). Available aircraft assets can provide substantial passenger airlift capability but little additional cargo capacity for bulk or oversize cargo suitable for international long range operations. Additionally, the WASP resources would have limited usefulness for extended overwater operation without Federal Aviation Agency waiver or aircraft modification.

The limitations which preclude the usefulness of the WASP resources for strategic airlift for DOD requirements are:

1. Aircraft not configured with required navigation and communication equipment.
2. Aircrew not qualified for overwater operations.
3. FAA restrictions prohibiting use of certain two and three engine aircraft more than ninety minutes off-shore.
4. Limited availability of cargo capable aircraft or cargo convertible capability to carry bulk or oversize cargo.
5. Aircraft not equipped with required emergency survival equipment for extended overwater operation.
6. Use of aircraft resource use must be coordinated in consonance with other government agencies.

Others are:

1. NATO civil airlift augmentation.
2. Korean airlift agreement.
3. Japanese airlift agreement.

The WASP is the only plan in addition to the CRAF which provides emergency airlift. It was neither intended to

function in lieu of the CRAF nor to sustain operations should the CRAF lose substantial airlift resources. The WASP is time consuming to implement and too inflexible to DOD mission control to be a valid alternative for the airlift shortfall created by an air carrier failure. It can, however, become a potential source of emergency airlift.

Another source of airlift may be the employment of foreign carriers. The JCS report on military posture for FY 83 states, "NATO countries have committed long-range cargo aircraft to transport U.S. reinforcements to Europe in the event of war. Similar commitments by other countries are being pursued." The European response for airlift into areas of low European interest or concern is questionable, however.

In summary, if a major airline in the CRAF fails, plans do not exist to sustain the CRAF airlift capability to enable the flexibility of operation and mission control. Military airlift is therefore vulnerable to increased shortfalls in view of the economic state of several major carriers.

Summary

Several major contributors to the Civil Reserve Air Fleet (CRAF) are clearly nearing bankruptcy, but no plans exist to assure the current airlift shortfall is not further exacerbated by airline failures.

There is no guarantee that assets would remain in the CRAF after bankruptcy is declared; we found that the Braniff aircraft were not. Also, assets would remain in the control of the Federal Bankruptcy Court until litigation could be resolved. Long litigation delays would present a problem if bankruptcy was declared shortly before the CRAF was activated for war.

The United States could lose twenty-nine percent of CRAF passenger capability if Pan Am failed, twelve percent of CRAF cargo capability if World failed, and thirty-one percent of CRAF cargo capacity if Flying Tigers failed.

Some aircraft owned by U.S. carriers not in CRAF are capable of filling the passenger requirement, but these would only provide for twenty-five percent of Pan Am's loss. Beyond Western and Delta's long-range international fleet, there are 142 other U.S. wide-body passenger aircraft which are not in the CRAF because they are not configured with communication/navigation equipment required for extended overwater routes. (Appendix C; page 12) There is no available wide-body cargo aircraft to fill a void created by the failure of World Airways or Flying Tigers.

The WASP, Foreign Carriers, and Leasing options could potentially minimize the effect of airline failures on airlift in a national emergency. However, none offer the needed flexibility and controllability required to assure timely response of men and their equipment.

We conclude that there is no substitute for contingency plans to assure continued airlift support given an airline bankruptcy.

SECRET

Summary

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CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

Based upon the lack of plans to assure continuity of airlift in the event of airline bankruptcy and the negative financial trends in the industry which may result in a major air carrier failure, we propose the following:

1. Conclusion: Contingency plans do not exist to assure airlift capability in the event of a major airline bankruptcy.

Recommendation: A single federal agency should be appointed to lead development of contingency plans for this possibility. We believe this should be the Department of Defense with MAC as its agent. A CRAF emergency action group should be established within MAC to immediately draw assets into CRAF once a CRAF carrier fails.

2. Conclusion: Authority for control of airlift assets is fragmented among many agencies, with little apparent coordinated structure.

Recommendation: A federal agency should be designated as the single manager for coordination and allocation of airlift resources in a national emergency.

3. Conclusion: Consideration has not been given to preserving a major carrier's CRAF assets when a bankruptcy occurs. This would be most important if the bankruptcy coincides with heightened U.S. military action which required or potentially required significant CRAF airlift.

by the failure of World Airways or Flying Tigers.

The WASP, Foreign Carriers, and Leasing options could potentially minimize the effect of airline failures on airlift in a national emergency. However, none offer the needed flexibility and controlability required to assure timely response of men and their equipment.

We conclude that there is no substitute for contingency plans to assure continued airlift support given an airline bankruptcy.

required navigation equipment installed and which are not included in the CRAF.

Recommendation: We recommend the Congress appropriate funds so these aircraft can be installed with the required equipment for extended overwater routes thus providing for shortfalls created by a possible CRAF air carrier failure.

5. Conclusion: Many B-767s will enter the U.S. air carrier inventory as the fleet of jumbo size aircraft decreases. Two engine aircraft are not currently certified for extended overwater flights. Provisions could be made for Stage III operations waiver from the FAA. FAA rule making personnel indicate that in a declared war scenario, the two engine overwater waiver could be quickly approved.

Recommendation: FAA should review its restrictions pertaining to two engine extended overwater operation and formulate plans to provide immediate waivers during emergency airlift operations.

6. Conclusion: The Department of Defense (DOD) has gained support from allies to augment the airlift of U.S. supplies and personnel with their civil air fleets. The U.S. Government could reduce its vulnerability to shortages of airlift capability by obtaining additional commitments from other friendly foreign governments to provide this vital service as part of their national defense contribution.

Recommendation: Additional civil aircraft assets from allied nations be negotiated to formulate a plan supplementing U.S. emergency airlift needs.

7. Conclusion: The DOD required airlift in a CMMS scenario is short thirty-three million ton-miles per day.

Recommendation: To reduce the additional effect of a failed carrier's lost assets to CRAF, consideration should be given to the purchase and modification of available wide-body aircraft to the organic fleet of the Military Airlift Command (MAC). These aircraft are available because of the industry's surplus capacity, deteriorating financial conditions, and inability to dispose of assets during a period of negative economic growth. We recommend DOD consider acquiring these readily available assets at comparatively advantageous costs to provide an additional airlift capacity.

8. Conclusion: Our analysis shows fuel cost to be the single most significant variable affecting financial solvency of some airlines. The federal government currently subsidizes the domestic airline industry via the Civil Aeronautics Board; however, only a small percentage is paid directly to air carriers. For example, in 1981, \$114.5 million of \$3.8 billion allocated to the Civil Aeronautics Board was paid to air carriers.¹

Recommendation: To ensure financial stability of an industry critically important to national defense, airline survivability would be greatly enhanced if more funds were

allocated to both domestic and international carriers to offset fuel costs.

9. Conclusion: All civil aircraft not assigned to the CRAF are placed in the War Air Service Program (WASP). (See Appendix II) Our investigation revealed this airlift capacity is neither identified nor tracked as promulgated by the most current WASP Manual (April 1971).

Recommendation: We recommend the update, revision, and reaffirmation of the National Airlift Policy at the national level between the Department of Defense and the Department of Transportation. The objective should be to formulate a plan which assigns specific available civil resources for designating military use and control of WASP assets to sustain the CRAF in the event of a major air carrier failure. A constructive and effective program which allocates resources to various government agencies prior to the event of a national emergency would provide an efficient, timely, and smooth transition to those government agencies if required. Current public law and Presidential executive order authorize the requisition and allocation of airline assets but current plans are outdated, cumbersome, and unrealistic for efficient implementation.

APPENDIX A EXPLANATION OF TERMS

1. Correlation coefficient (R). A high correlation between two variables tells us an association exists. Causation may or may not be involved. It measures the degree to which the relationship can be represented by a straight line. The value of R ranges from +1.00 to -1.00, where +1 represents a perfect linear relationship. The value of R is computed in the following manner:

$$R_{x\ y} = \frac{\sum xy - (x\ y)}{\sqrt{[\sum x^2 - n(\bar{x})^2][\sum y^2 - n(\bar{y})^2]}}$$

R = correlation coefficient

x & y = individual variable values

$\sum$ = summation sign

n = number of cases

$\bar{x}$ & $\bar{y}$ = mean values

When R equals .60 or above, R is considered to be a significant correlations.

2. Coefficient of determination (R) indicates the percentage of variance in one variable accounted for explained by variance in the other.

3. Standard error (SE) of the estimate tells how much the correlation deviates from a straight line relationship: It measures the overall accuracy of the prediction equation where:

$$SE = \sqrt{\frac{(y - \hat{y})^2}{n - 2}}$$

$\hat{y}$ = predicted value

4. The F test (goodness of fit test) indicates whether the (assumed random) sample of observations being analyzed has been drawn from a population in which the multiple correlation is equal to zero, and that any observed correlation is due to sampling fluctuation or measurement error.

$$\text{where } F = \frac{SS \text{ reg}/K}{SS \text{ res}/(n - K - 1)}$$

SS reg = sum of square explained by regression equation

K = degrees of freedom (number of independent variables)

SS res = residuals (unexplained) sum of squares

5. Operating margin - within the air transport industry, defined as operating income (after all operating expense, but before depreciation), as a percentage of gross revenues.

6. Debt / equity ratio - this is the measurement of a company's long term debt, including long term leases, relative to its equity (net worth). The ratio measures the degree to which a firm is leveraged to indicate the extent which it is financing operations and new investment through external sources.

[illegible]

Rev. Date 1 Jan 82 SUMMARY OF JET AIRCRAFT IN SERVICE

AIRCRAFT TYPE & MODEL IN SVC AIRLINE, OWNER OR OPERATOR

AIRBUS IND A300B2-200 2 EASTERN AIRLINES -EAL
 AIRBUS IND A300B4-100 17 EASTERN AIRLINES -EAL
 AIRBUS IND A300B4-200 6 EASTERN AIRLINES -EAL

TYPE TOTALS

BAC(BAE) 111-200 1 PACIFIC EXPRESS
 28 US AIR

TOTALS

BAC(BAE) 111-200 1 MPR: CAO-GULFSTREAM AM.

TOTALS

TYPE TOTALS

BOEING 707-120B 4 AMERICAN TRANS AIR
 1 GUY-AMERICAN AIRWAYS
 30 TRANS WORLD AIRLINES-TWA
 35

MODEL TOTALS

BOEING 707-320 1 INTERCONTINENTAL AIRWAYS
 BOEING 707-320B 1 ARROW AIRWAYS
 2 GLOBAL INTERNATIONAL AIRLINES
 1 GUY-AMERICA AIRWAYS
 1 SOUTH PACIFIC ISLAND AIRWAYS
 22 TRANS WORLD AIRLINES-TWA

TOTALS

BOEING 707-320C 4 ARROW

TOTALS

PAGE TOTAL

Number Allocated to CRAF	Number Retained in WASP	WASP Acft Capable of Domestic Operations Only	Domestic WASP Acft Potentially Capable of Over Water Operations}	
			Short Range	Long Range?
	2			
	17			
	6			
0	25	0	25	0
	1	1		
	28	28		
	1	1		
0	30	30	0	0
	4			4
	1			1
	30			30
0	35	0	0	35
	1			1
	1			1
	2			2
	1			1
	1			1
	22			22
0	28	0	0	28
4				
4	0	0	0	0
4	118	30	25	65

Rev. Date SUMMARY OF JET AIRCRAFT IN SERVICE

1 Jan 82

AIRCRAFT TYPE & MODEL IN SVC AIRLINE, OWNER OR OPERATOR

BOEING 727-200 ADV

5 AIR FLORIDA
6 ALASKA AIRLINES
83 AMERICAN AIRLINES-AAL
23 CONTINENTAL AIRLINES-CAL
116 DELTA AIRLINES - DAL
58 EASTERN AIRLINES - EAL
29 NORTHWEST ORIENT AIRLINES
NWA
9 PACIFIC SOUTHWEST AIRLINE
PSA
4 PAN AMERICAN WORLD
AIRWAYS - PAA
16 REPUBLIC AIRLINES
20 TRAVEL WORLD AIRLINES-TWA
76 UNITED AIRLINES - UAL
5 US AIR
41 WESTERN AIRLINES -WAL
491

TOTALS

BOEING 727-100

MODEL TOTALS

BOEING 727-200

14 AIRCAL
10 AIR FLORIDA
2 ALOHA AIRLINES
3 E. G. & G.
21 FRONTIER AIRLINES
22 PEI MONT AIRLINES
46 UNITED AIRLINES-UAL
12 WESTERN AIRLINES -WAL
3 WREN AIR ALASKA
133
12 AIR FLORIDA
6 ALOHA AIRLINES
24 FRONTIER AIRLINES
21 PEI MONT AIRLINES
27 SOUTHWEST AIRLINES
0 US AIR
90

TOTALS

BOEING 727-200 ADV

TOTALS

PAGE TOTAL

Number Allocated to CIAF	Number Retained in WASP	WASP Acft Capable of Domestic Operations Only	Domestic WASP Acft Potentially Capable of Over Water Operations ³	
			Short Range ¹	Long Range ²
0	5		5	
	6		6	
	83		83	
	23		23	
	116		116	
	58		58	
	29		29	
	9		9	
	4		4	
	16		16	
	20		20	
	76		76	
	5		5	
	41		41	
0	491	0	491	0
0	2	2		
	3	3		
	14	14		
0	19	19	0	0
	14	14		
	10	10		
	2	2		
	3	3		
	21	21		
	22	22		
	46	46		
	12	12		
	3	3		
0	133	133	0	0
	12	12		
	6	6		
	24	24		
	21	21		
	27	27		
0	90	90	0	0
0	733	242	491	0

Rev. Date 1 Jan 82

SUMMARY OF JET AIRCRAFT IN SERVICE

IN

AIRCRAFT TYPE & MODEL - SVC AIRLINE OWNER OR OPERATOR

BOEING 707-320C/ALL-CCO

4 ARROW AIRWAYS

2 GLOBAL INTERNATIONAL

1 JET CHARTER SERVICES

1 PAN AVIATION

1 TRANS WORLD AIRLINES-TWA

9

1 AEROMERICA

1

2 AEROSTAR

2 ALASKA AIRLINES

53 AMERICAN AIRLINES-AAL

13 CONTINENTAL AIRLINES-CAL

31 EASTERN AIRLINES-EAL

4 NORTHWEST ORIENT

3 PACIFIC SOUTHWEST

25 AIRLINES-TSA

25 PAN AMERICAN WORLD

2 AIRWAYS-PAA

2 PAN AVIATION

6 PIEDMONT AIRLINES

1 T-BIRD AIR-THUNDERBIRD

26 AIRWAYS

26 TRANS WORLD AIRLINES-TWA

26 UNITED AIRLINES - UAL

10 US AIR

8 BFR: BCAC -BOEING COML

212 AIRPLANE

TOTALS 212

BOEING 720- TOTALS

BOEING 727-100- TOTALS

TOTALS

PAGE TOTAL

Number Allocated to CRAF	Number Retained in WASP	WASP Acft Capable of Domestic Operations Only	Domestic WASP Acft Potentially Capable of Over Water Operations ³	
			Short Range ¹	Long Range ²
4				
2	1			1
	1			1
6	3	0	0	3
0	1	0	1	0
	2	2		
	53	53		
	13	13		
	31	31		
	4	4		
	3	3		
	25	25		
	2	2		
	6	6		
	1	1		
	26	26		
	26	26		
	10	10		
	8	8		
0	212	212	0	0
6	216	212	1	3

Rev. Date 1 Jan 82

SUMMARY OF JET AIRCRAFT IN SERVICE

AIRCRAFT TYPE & MODEL IN SVC AIRLINE, OWNER OR OPERATOR

DOEING 737-200C	4	WIEN AIR ALASKA
TOTALS	4	
BOEING 737-200C ADV	2	ALASKA AIRLINES
	5	WIEN AIR ALASKA
TOTALS	7	
BOEING 747SP	10	PAN AMERICAN WORLD
	3	AIRWAYS - PAA
	3	TRANS WORLD AIRLINES-TWA
	1	NEH: BOAC-BOEING COML
		AIRPLANE
MODEL TOTALS	14	
BOEING 747-100	8	AMERICAN AIRLINES-AAL
	12	NORTHWEST ORIENT AIRLINES
		PWA
	29	PAN AMERICAN WORLD
		AIRWAYS-PAA
	15	TRANS WORLD AIRLINES-TWA
	18	UNITED AIRLINES -UAL
	3	FLYING TIGER LINE -FTL
TOTALS	85	
BOEING 747-100 (+)	6	AMERICAN AIRLINES -AAL
	3	FLYING TIGER LINE -FTL
	4	PAN AMERICAN WORLD
		AIRWAYS-PAA
TOTALS	13	
PAGE TOTAL		

Number Allocated to CRAP	Number Retained in WASP	WASP Acft Capable of Domestic Operations Only	Domestic WASP Acft Potentially Capable of Over Water Operations ³	
			Short Range ¹	Long Range ²
0	4	4	0	0
5	2	2		
5	2	2	0	0
10				
3				
14	1	0	0	1
6	1			1
12				
29				
15				
18				
3				
85	0	0	0	0
6				
3				
4				
13	0	0	0	0
116	7	6	0	1

1 Jan 82

AIRCRAFT TYPE & MODEL	SVC	IN	AIRLINE, OWNER OR OPERATOR
BOEING 747-200B	3		METRO INTERNATIONAL AIRWAYS
	12		NORTHWEST ORIENT AIRLINES NWA
	7		MFR: BOAC - BOEING COML AIRPLANE
MODEL TOTALS	22		
BOEING 747-200C	2		WORLD AIRWAYS
TOTALS	2		
BOEING 747-200C-SCD	3		TRANSAMERICA AIRLINES
TOTALS	3		
BOEING 747-200F	1		MFR: BOAC-BOEING COML AIRPLANE
TOTALS	1		
BOEING 747-200-SCD	10		FLYING TIGER LINE-FTL
	5		NORTHWEST ORIENT AIRLINES NWA
	1		PAN AMERICAN WORLD AIRWAYS - PAA
TOTALS	16		
LOCKHEED 1-1011-1	33		DELTA AIR LINES - DAL
	31		EASTERN AIR LINES - EAL
	24		TRANS WORLD AIRLINES-TWA
	1		MFR: LAC-LOCKHEED(AIRCRAFT)
TOTALS	89		
LOCKHEED 1-1011-100	8		TRANS WORLD AIRLINES-TWA
TOTALS	8		
LOCKHEED 1-1011-200	1		DELTA AIRLINES-DAL
MODEL TOTALS	94		
LOCKHEED 1-1011-500	3		DELTA AIRLINES -DAL
	12		PAN AMERICAN WORLD AIRWAYS-PAA
MODEL TOTALS	15		
TYPE TOTALS	113		
PAGE TOTALS			

Number Allocated to CRAF	Number Retained in WASP	Capable of Domestic Operations Only	Potentially Capable of Over water Operations	
			Short Range ¹	Long Range ²
12	3			3
12	7			7
2	10	0	0	10
2	0	0	0	0
3	0	0	0	0
3	0	0	0	0
0	1			1
1	1	0	0	1
10				
5				
1				
16	0	0	0	0
3	33			33
	31			31
	21			21
	1			1
8	1			1
	3			3
12				
23	90	0	0	90
56	101	0	0	101

Rev. Date 1 Jan 82 SUMMARY OF JET AIRCRAFT IN SERVICE

AIRCRAFT TYPE & MODEL IN SVC AIRLINE OWNER OR OPERATOR

MCD DOUGLAS DC-8-50(F)

2 AIR TRANSPORT INTERNATIONAL
1 OVERSEAS NATIONAL AIRLINES
1 ZANTOP INTERNATIONAL AIRLINES

TOTALS
MCD DOUGLAS DC-8-61

4 CAPITOL AIR
6 DELTA AIRLINES - DAL
13 UNITED AIRLINES - UAL
29

TOTALS
MCD DOUGLAS DC-8-61CF

1 EVERGREEN INTERNATIONAL AIRLINES
5 TRANSAMERICA - TRA
2 FLYING TIGER LINE - FTL
8

TOTALS
MCD DOUGLAS DC-8-62CF
TOTALS

1 ARROW
1 CAPITOL AIR
6 FLYING TIGER LINE - FTL
6

TOTALS
MCD DOUGLAS DC-8-62AF

2 ARROW AIRWAYS
5 CAPITOL AIR
1 EVERGREEN INTERNATIONAL AIRLINES
13

1 FLYING TIGER LINE - FTL
1 METRO INTERNATIONAL AIRWAYS
1 OVERSEAS NATIONAL AIR -
ONA '79

7 TRANSAMERICA AIRLINES
4 UNITED PARCEL SERVICES - UPS
4 WORLD AIRWAYS
38

TOTALS
PAGE TOTAL
MODEL TOTALS
TYPE TOTALS

Number Allocated to CRAF	Number Retained in WASP	WASP Acft Capable of Domestic Operations Only	Domestic WASP Acft Potentially Capable of Over Water Operations	
			Short Range ¹	Long Range ²
2				
1				
1				
4	0	0	0	0
1	5			5
5	13			13
6	24			24
	42	0	0	42
1				
5				
2				
8	0	0	0	0
1	0	0	0	0
	1	0	0	1
6	0	0	0	0
6	0	0	0	0
2	2			2
3				
1				
13	1			1
1				
1				
7				
4	4			4
4		0	0	0
31	7			7
56	50			50

Rev. Date 1 Jan 82

SUMMARY OF JET AIRCRAFT IN SERVICE

AIRCRAFT TYPE & MODEL IN SVC AIRLINE OWNER OR OPERATOR

MD DOUGLAS DC-9-10 1 GREAT AMERICAN AIRWAYS
 9 MIDWAY AIRLINES
 7 OZARK AIRLINES
 28 REPUBLIC AIRLINES
 16 TEXAS INTERNATIONAL AIRLINES - TXI

TOTALS

MD DOUGLAS DC-9-10 61
 0 AIR FLORIDA
 5 EMERALD AIRLINES
 1 FURLOTTOR COURIER
 9 REPUBLIC AIRLINES
 2 ROSS AVIATION
 2 TEXAS INTERNATIONAL AIRLINES - TXI

TOTALS

MD DOUGLAS DC-9-10 80
 4 AIRBORNE EXPRESS
 36 DELTA AIRLINES - DAL
 58 EASTERN AIRLINES - EAL
 4 MIDWAY AIRLINES
 13 NEW YORK AIR
 34 OZARK AIR LINES
 60 REPUBLIC AIRLINES
 20 TEXAS INTERNATIONAL AIRLINES - TXI
 63 US AIR
 292

MD DOUGLAS DC-9-10 373

EVERGREEN INTERNATIONAL AIRLINES

TOTALS

1 SUMMIT AIRLINES

PAGE TOTALS

Number Allocated to CRAF	Number Retained in WASP	WASP Acft Capable of Domestic Operations Only	Domestic WASP Acft Potentially Capable of Over water Operations	
			Short Range	Long Range
0	1 9 7 28 16 61	1 9 7 28 16 61	0	0
0	5 1 9 2 2 19	5 1 9 2 2 19	0	0
0	4 36 58 4 13 34 60 20 63 292	4 36 58 4 13 34 60 20 63 292	0	0
3	1 1 373	1 1 373	0	0

Rev. Date 1 Jan 82

SUMMARY OF JET AIRCRAFT IN SERVICE

AIRCRAFT TYPE & MODEL IN SVC AIRLINE, OWNER OR OPERATOR

MCD DOUGLAS DC-9-30CF 2 AIRBORNE EXPRESS
3 AMERICAN INTERNATIONAL AIRWAYS
1 OZARK AIRLINES
1 REPUBLIC AIRLINES
1 MFR: MCDD - MCDONNELL DOUGLAS
8
TOTALS 21
MCD DOUGLAS DC-9-50 2
28
TOTALS 51
MODEL TOTALS 354
MCD DOUGLAS DC-9 SUPER 5
6
TOTALS 11
MCD DOUGLAS DC-10-10 32
34
TOTALS 66
MCD DOUGLAS DC-10-10 4
7
TOTALS 11
46
10
TOTALS 112

Number Allocated to CRAF	Number Retained in WASP	WASP Acft Capable of Domestic Operations Only	Domestic WASP Acft Potentially Capable of Over water Operations	
			Short Range ¹	Long Range ²
	2	2		
	3	3		
	1	1		
	1	1		
	1	1		
0	8	8	0	0
	21	21		
	2	2		
0	28	28	0	0
	51	51		
	5	5		
	6	6		
	2	2		
	2	2		
	13	13		
	3	3		
	1	1		
0	32	32	0	0
20	14			14
4				
7				
11				
10	36			36
0	10			10
52	60	0	0	60
52	151	91	0	60

Rev. Date	SUMMARY OF JET AIRCRAFT IN SERVICE		
1 Jan 82			
AIRCRAFT TYPE & MODEL	IN SVC	AIRLINE, OTHER OR OPERATOR	
MCD DOUGLAS DC-10-10CF	4	CONTINENTAL AIRLINES-CAL	
	4	FEDERAL EXPRESS	
	1	UNITED AIRLINES -UAL	
TOTALS	9		
MCD DOUGLAS DC-10-20	2	CONTINENTAL AIRLINES-CAL	
	4	PAN AMERICAN WORLD AIRWAYS -PAA	
	1	WESTERN AIR LINES -WAL	
TOTALS	7		
MCD DOUGLAS DC-10-20CF	2	AIR FLORIDA	
	3	TRANSAMERICA AIRLINES	
	8	WORLD AIRWAYS	
	1	FLYING TIGER LINE -FTL	
TOTALS	14		
MCD DOUGLAS DC-10-40	22	NORTHWEST ORIENT AIRLINES - NWA	
TOTALS	22		
TYPE TOTALS	161		
PAGE TOTALS			

Number Allocated to CRAP	Number Retained in WASP	WASP Acft Capable of Domestic Operations Only	Domestic WASP Potentially C of Overwater
4	4		Short Range
1	4		
5			
2			
	4		
	1		
2	5		
3	2		
8			
1			
12	2		
22			
22			
41	11		

Rev. Date 1 Jan 82 SUMMARY OF JET AIRCRAFT IN SERVICE

AIRCRAFT TYPE & MODEL	IN	AIRLINE, OWNER OR OPERATOR
Lockheed L-188C	4	EVERGREEN AIRLINES (EIA)
	5	TRANSAMERICA AIRLINES (TIA)
	6	ZANTOP (ZIA)
	2	REEVE ALBUTIA (RAA)
TYPE TOTAL	17	
LOCKHEED L-100-30	12	TRANSAMERICA (TIA)
	4	ALASKA INTERNATIONAL(AIA)
TYPE TOTAL	16	
ACCUMULATIVE TOTALS	2498	
TOTAL U.S. AIR CARRIER FLEET		

Number Allocated to CRAF	Number Retained in WASP	WASP Aoft Capable of Domestic Operation Only	Domestic WASP Aoft Potentially Capable of Over water Operations ³
			Short Range ¹ Long Range ²
4			
5			
6			
2			
17			
12			
4			
16			

387 2111 954 863 294

Inventory Data extracted from Lockheed Research and Engineering using CAF Base made on 15 October 1982.

POTENTIAL INTERNATIONAL CARGO CAPABILITY

Long Range Aircraft	Number Allocated to CRAF	Number Retained in WASP
136	115	21
Short Range ¹ Aircraft	Number Allocated to CRAF	Number Retained in WASP
129	54	72
AIRCRAFT TOTALS		

POTENTIAL INTERNATIONAL PAX CAPABILITY

Long Range ²	Number Allocated to CRAF	Number Retained in WASP
349	215	134
Short Range ¹	Number Allocated to CRAF	Number Retained in WASP
760	0	760
AIRPLANE TOTALS		

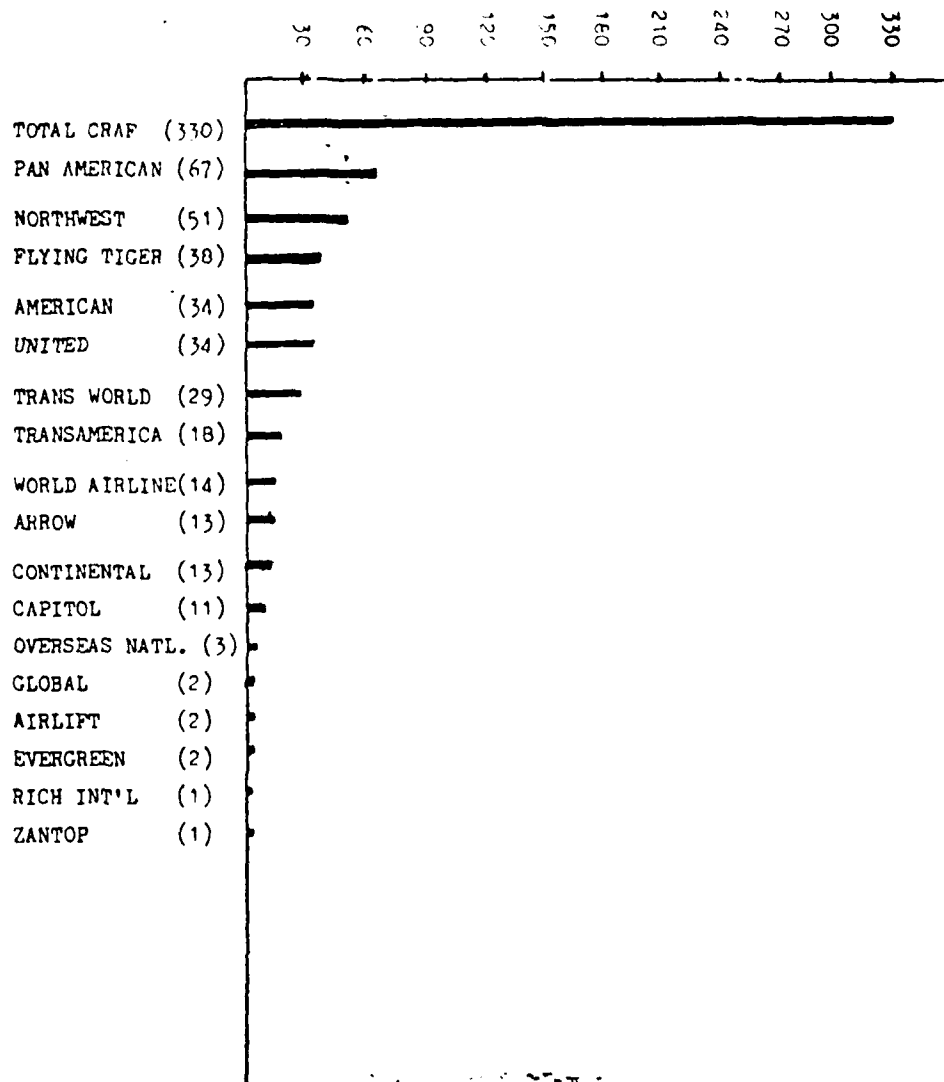
1. Less than 1500 nautical miles
2. Greater than 2500 nautical miles
3. Aircraft retained in WASP Fleet have potential use for overwater capability with installation of required communication/navigation and survival equipment and/or FMA wavier for 2/3 engine operation

APPENDIX D

LONG RANGE INTERNATIONAL AIRCRAFT CARRIERS

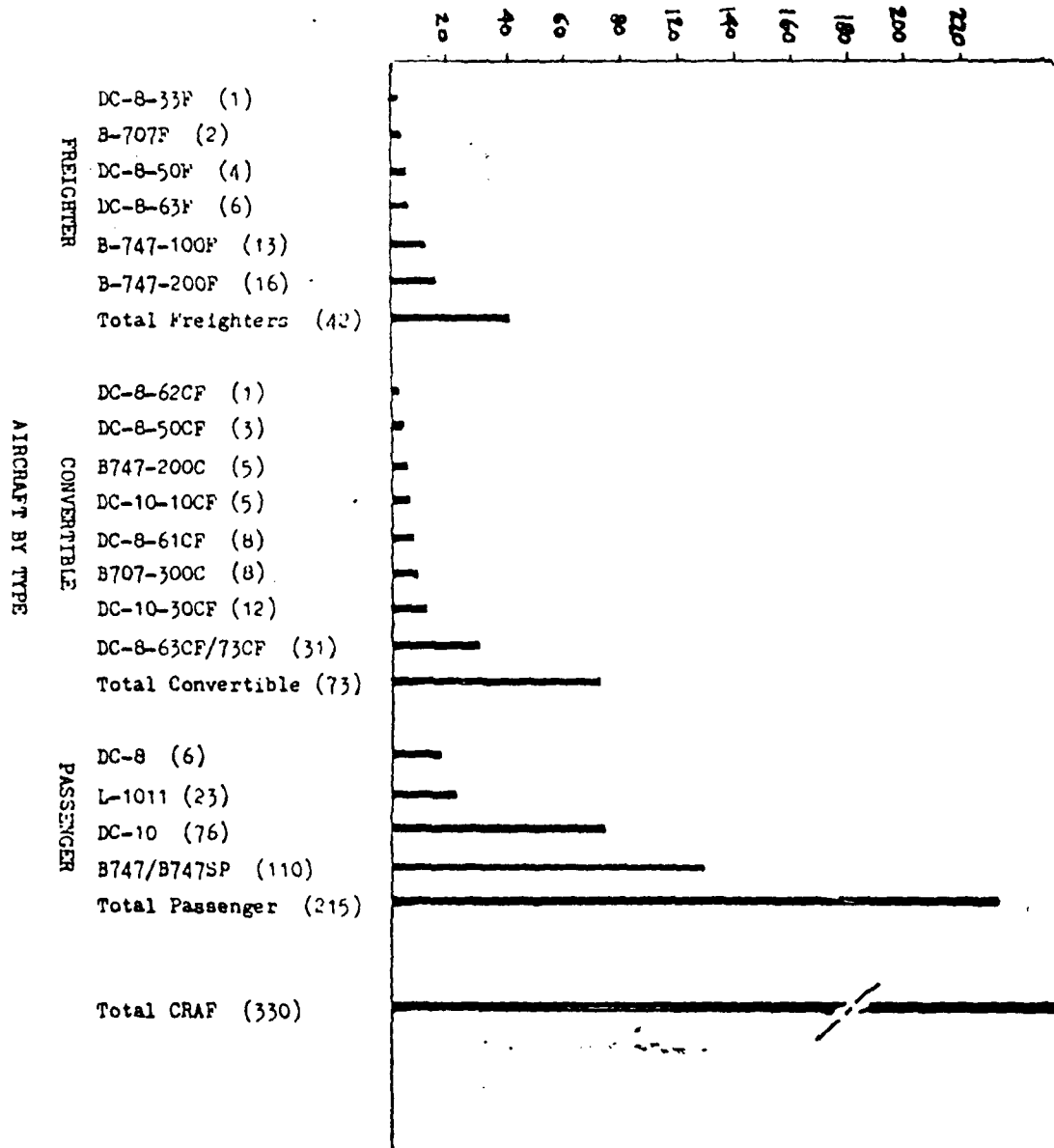
LONG RANGE INTERNATIONAL AIRCRAFT
(CRAF FLEET)

STAGE III Commitment by designated U.S. Aircarrier



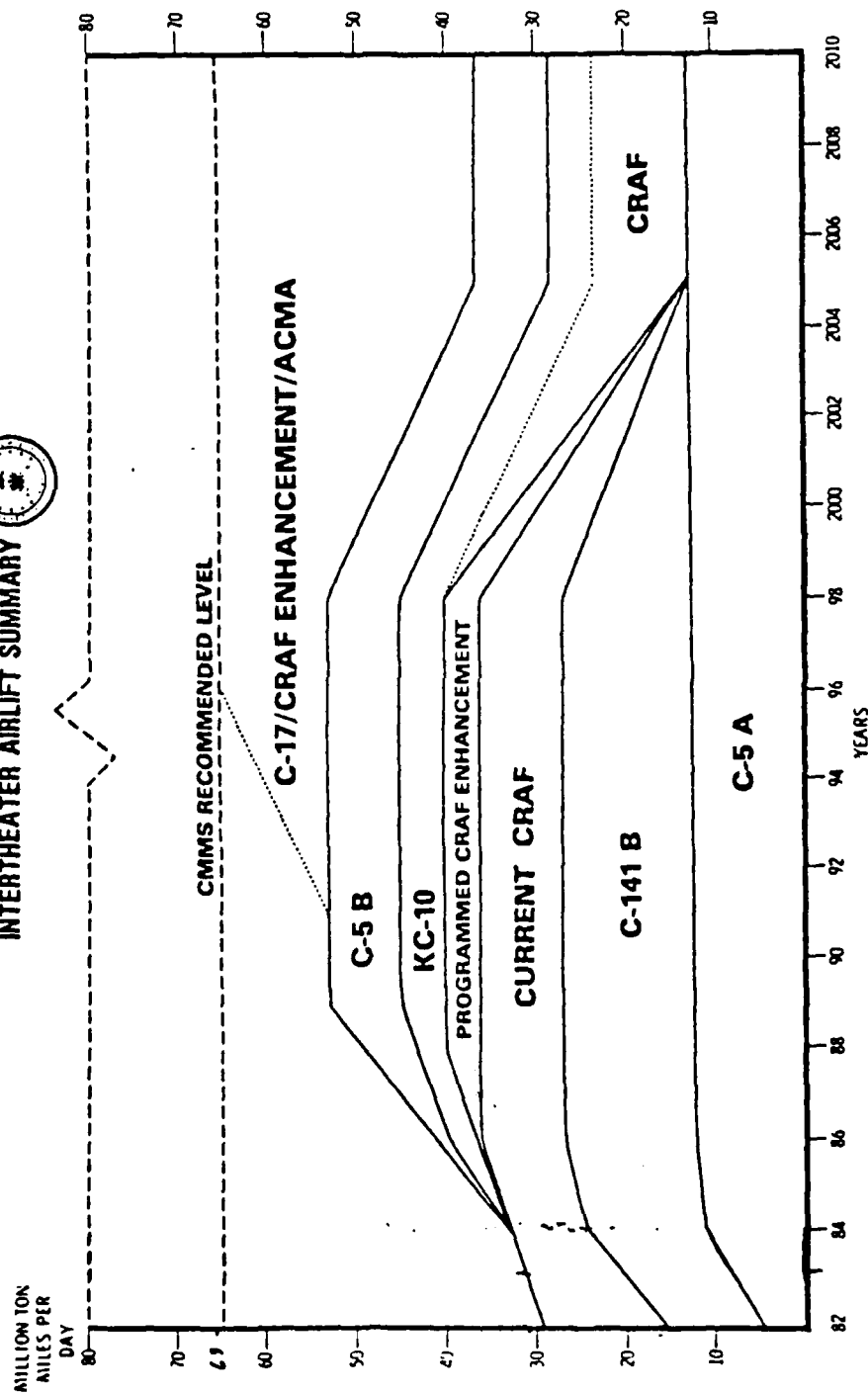
LONG RANGE INTERNATIONAL AIRCRAFT

COMMITTED TO CRAF





INTERTHEATER AIRLIFT SUMMARY



CIVIL AIRCRAFT WITH INTERTHEATER RANGE
(BUT NO COMM-NAV)
NOT IN CRAF

<u>CARRIER</u>	<u>TYPE</u>	<u>NUMBER</u>
AMERICAN AIRLINES	DC-10-10	14
DELTA	L-1011-1	33
EASTERN	L-100-1	31
PAN AMERICAN	DC-10-10	4
TRANS WORLD	L-1011-1	24
UNITED	DC-10-10	36
TOTAL		142

Source: LETX/LT COL MURPHY/77332/18 OCT 82

APPENDIX H

EMERGENCY PROCEDURES FOR THE CONTROL
OF CIVIL AIR ASSETS

The Department of Transportation (DOT) is responsible for administering civilian and commercial emergency transportation during wars or other emergency conditions involving the United States. During an emergency, the Secretary of Transportation would determine priorities of transportation requests by federal claimants using DOT standby order 1940.4 as the guideline.

Under the provisions of DOT 1940.4, the DOT, in conjunction with the DOD, annually reviews the pre-emergency program. Other federal departments, State, Commerce, Energy, etc., requests for emergency air transportation are reviewed, in addition to the DOD request for CRAF assets from the total U.S. possessed commercial and corporate aircraft. The emergency program to which all civil aircraft are assigned, that are not placed in the CRAF program, is the War Air Service Program (WASP). The WASP is administered and directed by the Civil Aeronautics Board (CAB).

The WASP Manual (April 1971) establishes the policies, procedures, and standards to provide methods for and guidance to accomplish the WASP air priorities functions. Additionally, a WASP Resource Report, issued by the CAB is used as an Emergency Planning Document for implementation of available airlift resources. The last report

published was for 1978.

The assignment of air priorities begins upon the activation of the WASP for both domestic and international routes maintained as part of the WASP. The authority for execution for the WASP is provided by Executive Order 11490, Part 1, Sec. 105, assigning specific emergency preparedness functions to the CAB under the coordination authority of the Secretary of Transportation.

A system for priority control of WASP traffic is required in time of emergency because of limited available civil airlift capacity and to assure such traffic moves in accordance with its degree of urgency. Priority of traffic is based strictly on urgency, as related to the national emergency, regardless of Government agency (Department of Defense, Department of State, or Department of Energy) sponsoring the traffic.

The WASP Air Priorities System is world wide in scope. During a national emergency under which it would be implemented, most if not all priority passenger travel and cargo shipments would be directly or indirectly related to government activities in support of the war effort. Priority of movement is not limited to military personnel and equipment, but also includes the movement of civilian and government personnel and equipment which support programs relating to manpower, agriculture, power, health, transportation, etc. Further, the Secretary of Transportation's Standby Order 1940.4 provides the guidance and

procedures governing the establishment of priorities and allocations of civil air carrier capacity.

The WASP Air Priorities System is based on four classes of priority precedences ranging from Class I (highest) to Class 4 (lowest) with determination made as follows.¹

a. Class I Priority. Traffic which is required of utmost urgency and importance that precedence is given over all other traffic and which under no circumstances should be delayed enroute. The authority to issue Class I priorities is reserved exclusively to the CAB Administrator of Air Priorities.

b. Class 2 Priority. Traffic to meet a destination arrival time for the accomplishment of an urgent objective.

c. Class 3 Priority. Traffic of a less urgent nature to meet a destination arrival time for the accomplishment of an essential objective.

d. Class 4 Priority. Traffic which is eligible for air movement but which does not meet the requirements for movement specified in Classes 1, 2, and 3 above.

An Administrator of Air Priorities is appointed by the WASP Air Priorities Board to implement the policies and procedures they have formulated, and acts as the coordinator for all agencies concerned with civil air priority matters.

¹CAB, WASP Air Priorities Manual, April 1971, Section 2015.

APPENDIX I

DATA ON U.S. SCHEDULED AIRLINES

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
1. REVENUE PER LOAD FACTOR (2)	49.7	18.5	53.0	52.1	54.9	53.7	55.4	55.9	61.5	63.0	59.0	58.6
2. FREIGHT TON MILES (000)		371228	421745	4736729	4890026	4766118	5074193	5385129	5763249	5907731	5685622	5616750
3. REVENUE TAX (000)		173669	191319	202208	207458	205062	223318	240326	274719	316863	296903	285720
4. TOTAL OPERATING REVENUE (000)		10015577	12418777	14699125	15355921	17501215	19924800	22883955	27226665	33127906	3649317	3649317
5. TOTAL OPERATING EXPENSE (000)		9717102	11163271	11833511	13973385	15228012	16779282	19016760	21519092	27027610	33949421	3691391
6. OPERATING PROFIT (000)		328475	584471	585266	725740	127879	721933	908040	1364863	199055	(221615)	(420741)
7. NET INCOME (000)		28006	214850	226693	321641	(84204)	563354	752536	1196537	346845	17414	(236812)
8. RATE PER HOUR OF INV. (¢)		3.5	4.9	5.1	6.4	2.5	8.0	10.9	13.0	7.0	5.8	5.3
9. FUEL COST PER HOUR OF SERVICE		2380	2361	2361	2241	2267	2264	2229	2266	2542	2712	2808
10. FUEL COST (¢)		20¢ F	20¢ E	20¢ F	20¢	25¢	30¢	32¢	37¢	39¢	75¢	90¢
11. CAPITAL (000)	082	1664	1771	1307	1413	1529	1702	1900	2128	2414	2626	2926 E
12. OPERATING RATES	1.9	4.9	4.9	4.9	5.6	8.59	7.7	7.0	6.0	5.8	7.1	8.3*
13. INTEREST RATES		1.66	4.66	8.20	10.05	6.26	5.24	5.54	7.91	10.97	12.66	16.35
14. FEDERAL SUBSIDY (000000)		3.2	2.2	2.2	2.2	2.4	2.6	0.6	2.8	3.3	3.4	3.8

* Missing - Continued (7)
 1982 - 9.47 (12)

APPENDIX J

ECONOMIC ANALYSIS OF THE U.S. AIRLINE INDUSTRY

An analysis of the economic status of U.S. airlines was made to document the vulnerability of CRAF airlines. The data used represents the major contributing variables to determine a forecast in airline corporate health.

The variables used were:

1. revenue passenger miles load factor
2. freight ton miles
3. revenue passengers
4. total operating revenue
5. total operating expense
6. operating profit
7. net income
8. rate of return on investment
9. number of aircraft in service
10. fuel cost
11. gross national product
12. unemployment rate (national)
13. interest rates
14. federal subsidy

Some elements of operating expense were not included in this regression analysis. They were: labor, travel agent commissions, passenger meals; aircraft maintenance materials, landing fees and advertising.

Various analysis were made using data to determine the most significant contributors to airline solvency. Statistical techniques employed were: stepwise linear regression; cross tabulation, scattergrams, and other tests to determine significance of data. The detail data of each test are included in Appendix K, exhibits 1, 2, and 3.

This research was designed to first examine the financial status of all U.S. air carriers and then examine specific airlines, based on their contribution to the Civil Reserve Air Fleet or their potential for enhancing airlift. All data were analyzed at the ninety-five percent confidence level, using operating revenue as the first dependent variable and net profit as the second dependent variable. They were chosen as representing the ultimate determinant of airline solvency. All variables were separately regressed against the two dependent variables to determine their contribution/ impact on each dependent variable. A summary of the most significant variables is shown in table 2.

From table 2, summary of airline solvency variables, it is clear that GNP, fuel cost, and revenue passengers are the most dominant variables in determining total operating revenue. However, when using gross profits as the dependent variable, the three dominant variables, in order, are GNP, revenue passengers, and freight ton ~~miles~~. While only the most significant variables are summarized in table 2, financial solvency of U.S. air carriers appears clearly

determined by four variables: GNP, fuel cost, revenue passengers, and freight ton miles. That is, any attempt to improve the financial status of U.S. air carriers could best be done by implementing policies or actions which favorably affect the four variables mentioned above. The analysis also suggests that federal subsidies must increase significantly to affect airline solvency in that federal subsidies had little or no impact on gross profits or operating revenue. If federal subsidies continue at the same nominal level as for the past 11 years (2.8B \$/year), a higher payoff, in terms of airline solvency, would be realized if subsidies were applied directly to fuel cost. Fuel cost ranks second among major variables affecting both operating revenue and gross profits.

Gross national product is the single most significant factor affecting total airline solvency. Any favorable change in GNP must of course, result from government actions. The analysis showed unemployment and interest rates to have a minor affect on airline solvency relative to other variables, however; both significantly affect GNP. An improvement in GNP we indicate would result in a multiplicative improvement in airline solvency.

APPENDIX K

EXPLANATION OF REGRESSION PROCESS AND TERMS

Regression is a general statistical technique through which one can analyze the relationship between a dependent or criterion variable (e.g., operating revenue) and a set of independent or predictor variables (e.g., fuel cost, GNP). Regression may be viewed either as a descriptive tool by which the linear dependence of one variable on others is summarized and decomposed, or as an inferential tool by which the relationship in the population are evaluated from the examination of sample data. For purposes of this study, the inferential aspects of regression were used to predict the impact of selected variables on airline operating revenue.

Terms used in the analysis are as follows:

1. regression formula $Y = A + B X$

where: Y = predicted value (i.e. operating revenue)

$$A = \bar{Y} - B \bar{x}$$

$$B = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2} = \frac{SP_{xy}}{SS_x}$$

or sum of cross
product of x & y
or sum of squares of x

2. R^2 or coefficient of determination: a measure of the prediction accuracy, and the strength of linear association, that is, the ratio of explained variation in the dependent variable Y to the total variation in Y .

$$R^2 = \frac{SS_{reg}}{SS_y}$$

3. S E or Standard Error of the estimate measures the accuracy of the prediction equation. It is the standard deviation of actual Y values from the predicted Y' values.

$$S E = \sqrt{\frac{\sum (y - y')^2}{N - 2}} \quad \text{or} \quad \sqrt{\frac{SS_{res}}{N - 2}}$$

where: N = sample size

Y' = predicted value

Y = observed value

4. R or correlation coefficient represents the degree of correlation between two variables. Causation may or may not be involved. It measures the degree to which the relationship can be represented by a straight line. The value of R ranges from +1 to -1, where +1 represents a perfect linear relationship. R is the square root of R^2 (coefficient of determination).

5. The F test (goodness of fit test) indicates whether the (assumed random) sample of observations being analyzed has been drawn from a population in which the multiple correlation is equal to zero, and that any observed correlation is due to sampling fluctuation or measurement error.

$$\text{where } F = \frac{SS_{reg}/K}{SS_{res}/(n - K - 1)}$$

SS reg = sum of square explained by regression equation

K = degrees of freedom (number of independent variables)

SS res = residuals (unexplained) sum of squares

6. Operating margin - within the air transport industry, defined as operating income (after all operating expense, but before depreciation), as a percentage of gross revenues.

7. Debt / equity ratio - this is the measurement of a company's long term debt, including long term leases, relative to its equity (net worth). The ratio measures the degree to which a firm is leveraged to indicate the extent which it is financing operations and new investment through external sources.

EXHIBIT - 1

U.S. AIRLINE ANALYSIS VS TOTAL OPERATING REVENUE

1
2
3
4
5
6
7
8

1
2
3
4
5
6
7
8

14 (GROSS) TOTAL OPERATING EXPENSE
\$2,104,463.74. 307552200.508018219.700294180.00

[illegible]

4

(ACROSS) TONMILES FREIGHT TON MILES
01.655139325.959358070.855576416.55579793A,05

[illegible]

ALIGNMENT FAILURE

FILE NUMBER (CONTINUED) # 12/20/62)

SCATTERING OF
(1100) REFLECTION
(1100) REFLECTION
(1100) REFLECTION

OFFICE NUMBER	SCATTERGRAM OF TURNS IN LAMP- HOUSING UNIT, B {272079}	(ALMOS) LOADFAIR REVENUE PER LOAD FACTOR
	89.23	51.51
	56.67	55.02
	53.15	56.47
		59.37
		60.02
		62.27

[illegible]

EXHIBIT - 2

U.S. ATELLINE ANALYSIS VS PROFIT

FILE NOHAME (CREATION DATE = 12/20/82)

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 2, LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 2.

DEPENDENT VARIABLE.. TOTOPRV TOT OPERATING REVENUE

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. TOTMILES FREIGHT TON MILES

MULTIPLE R	0.82707	ANALYSIS OF VARIANCE	OF	SUM OF SQUARES	MEAN SQUARE
R SQUARE	0.68405	REGRESSION	1	0.555040 15	0.555040 15
ADJUSTED R SQUARE	0.64894	RESIDUAL	9	0.256360 15	0.284850 14
STANDARD ERROR	0.533710 07				

F = 19.48554 SIGNIF F = 0.0017

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
TOTMILES	10.79197	2.44481	0.82707	4.414	0.0017
(CONSTANT)	-0.305700 08	0.12500 08		-2.766	0.0219

FOR BLOCK NUMBER 1 PCUJ = 0.100 LIMITS REACHED.

AIRLINE FAILURES

PAGE

12/20/82

FILE NAME (CREATION DATE = 12/20/82)

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 3. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 3.

DEPENDENT VARIABLE.. TOTOPKPV TOT OPERATING REVENUE

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. PAXREV REVENUE PAX

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
R SQUARE	0.82935	CF	1	0.672940	15	0.672940	15
ADJUSTED R SQUARE	0.81030	REGRESSION	9	0.138460	15	0.153850	14
STANDARD ERROR	0.392230 07	RESIDUAL					

F = 43.74070 SIGNIF F = 0.0001

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
----------	---	------	------	---	-------

PAXREV	170.49490	25.77975	0.91069	6.614	0.0001
(CONSTANT)	-0.204420 08	0.62440 07		-3.272	0.0097

FOR BLOCK NUMBER 1. POUT = 0.100 LIMITS REACHED.

AIRLINE FAILURES

FILE NAME (CREATION DATE = 12/20/82)

PAGE

*** MULTIPLE REGRESSION ***

VARIABLE LIST NUMBER 8. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 8.

DEPENDENT VARIABLE.. TOTOPRRV TOT OPERATING REVENUE

REGRESSING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. ROACFT NUMBER AIRCRAFT

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
R	R SQUARE	DF	SS	DF	SS	DF	SS
0.79313	0.62906	1	0.510420	1	0.510420	1	0.510420
0.56785	0.32135	9	0.300980	9	0.300980	9	0.334420
0.578290	0.33275						

F = 15.26273 SIGNIF F = 0.0036

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	DELTA	T	SIG T
ROACFT	35961.55482	9204.96801	0.79313	3.907	0.0036
(CONSTANT)	-0.663170	0.802220		-2.988	0.0153

FOR BLOCK NUMBER 1 POWI = 0.100 LIMITS REACHED.

AIRLINE FAILURES

FILE NUNAME (CREATION DATE = 12/20/R2)

*** MULTIPLE REGRESSION ***

VARIABLE LIST NUMBER 9. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 9.

DEPENDENT VARIABLE.. TOTOPHRV TOT OPERATING REVENUE

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FUELCOST FUEL COST

ANALYSIS OF VARIANCE			
	DF	SUM OF SQUARES	MEAN SQUARE
MULTIPLE R	1	0.726190 15	0.726190 15
R SQUARE	9	0.852070 14	0.946750 13
ADJUSTED R SQUARE			
STANDARD ERROR			

F = 76.70395 SIGNIF F = 0.0000

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
FUELCOST	0.359120 06	0.41000 07	0.94604	8.758	0.0000
(CONSTANT)	0.641090 07	0.17020 07		3.723	0.0001

FOR BLOCK NUMBER 1 POUT = 0.100 LIMITS REACHED.

AIRLINE FAILURES

FILE NAME (CREATION DATE = 12/20/82)

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 10, LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 10.

DEPENDENT VARIABLE.. TOTOPRRV TOT OPERATING REVENUE

REGRESSING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GNP GROSS NATIONAL PRODUCT

MULTIPLE R	0.99011	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE
R SQUARE	0.98032	REGRESSION	1	0.795430 15	0.795430 15
ADJUSTED R SQUARE	0.97815	RESIDUAL	9	0.159710 14	0.177460 13
STANDARD ERROR	0.133210 07				

F = 448.25169 SIGNIF F = 0.0000

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
GNP	14744.40269	694.50104	0.99011	21.172	0.0000
(CONSTANT)	-0.006330 07	0.15510 07		-5.134	0.0004

FOR BLOCK NUMBER 1 POUT = 0.100 LIMITS REACHED.

AD-A131 009

THE EFFECT OF A MAJOR AIR CARRIER'S FAILURE ON THE
CIVIL RESERVE AIR FLEET(U) NATIONAL WAR COLL WASHINGTON
DC W DELAFTER APR 83 NDU/NWC-83-037

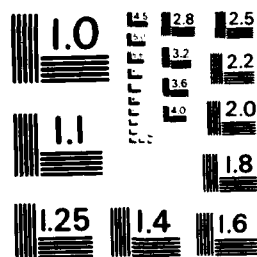
2/2

UNCLASSIFIED

F/G 15/5

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END
DATE
9 83
DTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS - 1963-A

FILE NAME (CREATION DATE = 12/20/82)

*** MULTIPLE REGRESSION ***

VARIABLE LIST NUMBER 12. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 12.

DEPENDENT VARIABLE.. TOTOPKRV TOT OPERATING REVENUE

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. INTRATE INTEREST RATE

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
R SQUARE	0.72131	REGRESSION	1	0.585270	15	0.585270	15
ADJUSTED R SQUARE	0.69035	RESIDUAL	4	0.226130	15	0.251250	14
STANDARD ERROR	0.501250						
F =		23.29007		SIGNIF F = 0.0009			

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
INTRATE	0.203270	0.042120	0.6	4.826	0.0009
(CONSTANT)	0.505210	0.38520	0.7	0.747	0.4514

OR BLOCK NUMBER 1 POUT = 0.100 LIMITS REACHED.

FILE NAME (CREATION DATE = 12/20/42)

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 13. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 13.

DEPENDENT VARIABLE.. TUTOPRRV TOT OPERATING REVENUE

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FEDFUNDS FEDERAL SUBSIDY

ANALYSIS OF VARIANCE			
	SS	DF	MEAN SQUARE
MULTIPLE R	0.40318		
R SQUARE	0.64509		
ADJUSTED R SQUARE	0.60566	1	0.523430 15
STANDARD ERROR	0.565660 07	9	0.287970 15
			0.319970 14

F = 16.35444 SIG:IF F = 0.0029

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
FEDFUNDS	0.505440 07	0.12500 07	0.40318	4.045	0.0029
(CONSTANT)	0.119980 04	0.26370 07		4.550	0.0014

FOR BLOCK NUMBER 1 POUT = 0.100 LIMITS REACHED.

ORDER FROM MCCORMACK MILL SPSS, 2ND ED. (PUBLICATION 1141) ORDER FROM SPSS INC.: SPSS STATISTICAL ALGORITHMS;
SPSS UPDATE 7-9 (USE 4/SPSS/2ND EDITION REL. 7, 8, 9) ACCORDING TO SPSS INC. INSTRUCTION
SPSS PUCKER BULLET RELEASE 1
SPSS PAPER TOWEL TOWEL TO SPSS)

5 JUL 1950

AIRLINE FAILURES	
1. RUN NAME	2. DATA LIST
1	FIXED/2/1
2	LORBATN 3-8 TON-ILES 0-12 PAMEY 10-19
3	INORPMV 21-2A 101UPM 30-30 0PMKROFT 30-43
4	MELINGUP 42-21 MELLIMU 52-24/2 WADACE 1-4
5	FUELCST 0-8 GAP 10-15 0PMKPL 13-17
6	INMATE 19-23 FEAPRUS 25-27
7	

THE DATA LIST PROVIDES FOR 14 VARIABLES AND 2 RECORDS (CARDS) PER CASE. A MAXIMUM OF 50 CALLINGS ARE USED IN A WELL

LIST OF THE CONSTRUCTED FORMAT STATEMENT..

LIST OF THE CONSTRUCTED FORMAT STATEMENT.

(P,Q,R,S,T,U,V,W,X,Y,Z,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z,F,G,H,I,J,K,L,M,N,O)

--(X,Y,Z,F,G,H,I,J,K,L,M,N,O)-----

S TAPIT MEDIUM

8	INPUT MEDIUM	DISK	
9	N OF CASH	UNKNOWN	
10	VAM LABELS	LOADFAM	REVENUE PAR CURV FACTUM/
11		TOTPRNV	REVENUE PAR CURV FACTUM/
12		TOTPRNV	REVENUE PAR CURV FACTUM/
13		TOTPRNV	REVENUE PAR CURV FACTUM/
14		TOTPRNV	REVENUE PAR CURV FACTUM/
15		TOTPRNV	REVENUE PAR CURV FACTUM/
16		TOTPRNV	REVENUE PAR CURV FACTUM/
17		TOTPRNV	REVENUE PAR CURV FACTUM/
18		TOTPRNV	REVENUE PAR CURV FACTUM/
19		TOTPRNV	REVENUE PAR CURV FACTUM/
20		TOTPRNV	REVENUE PAR CURV FACTUM/
21		TOTPRNV	REVENUE PAR CURV FACTUM/
22		TOTPRNV	REVENUE PAR CURV FACTUM/
23		TOTPRNV	REVENUE PAR CURV FACTUM/
24		TOTPRNV	REVENUE PAR CURV FACTUM/
25		TOTPRNV	REVENUE PAR CURV FACTUM/
26		TOTPRNV	REVENUE PAR CURV FACTUM/
27		TOTPRNV	REVENUE PAR CURV FACTUM/
28		TOTPRNV	REVENUE PAR CURV FACTUM/
29		TOTPRNV	REVENUE PAR CURV FACTUM/
30		TOTPRNV	REVENUE PAR CURV FACTUM/
31		TOTPRNV	REVENUE PAR CURV FACTUM/

ONLINE FAILURES

32 VARIABLE=HATEROT TOTOPRRV/DEPENDENT=TOTOPRRV/STEPWISE/
33 VARIABLE=HATEROT TOTOPRRV/DEPENDENT=TOTOPRRV/STEPWISE/
34 VARIABLE=HATEROT TOTOPRRV/DEPENDENT=TOTOPRRV/STEPWISE/
35 VARIABLE=HATEROT TOTOPRRV/DEPENDENT=TOTOPRRV/STEPWISE/
36 VARIABLE=HATEROT TOTOPRRV/DEPENDENT=TOTOPRRV/STEPWISE/
37 VARIABLE=HATEROT TOTOPRRV/DEPENDENT=TOTOPRRV/STEPWISE/
38

REGRESSION PROCEDURE RESULTS 20100 BYTES OF WORKSPACE

FILE READING 11 CASES FROM SURFILE NAME , END OF DATA WAS ENCOUNTERED ON LOGICAL UNIT # 6

ALL INFORMATION CONTAINED
HEREIN IS UNCLASSIFIED

FILE NUMBER (CUBELI: 19) = 12/20/03)

FLIGHT INFORMATION
SCATTERED
(...)
(...)
=

SCOTT & BOWEN CO.
1000 E. 10th St.
SALT LAKE CITY, UTAH 84103
Tel. 531-5555

[illegible]

S WITH GRAPHICS OPTION FOR VM/CMS, VERSION M, RELEASE 9.0, OCTOBER 1, 1981

CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
 ER FROM MCGRAW-HILL: SPSS, 2ND ED. (PRINCIPAL TEXT) ORDER FROM SPSS, INC. 1 SPSS STATISTICAL ALG
 SPSS UPDATE 7-9 (USE W/SPSS, 2ND FOR REL. 7, 8, 9) KEYWORDS: THE SPSS I
 SPSS POCKET GUIDE, RELEASE 9
 SPSS PRIMER (BRIEF INTRO TO SPSS)

BUILT SPACE ALLOCATION.. ALLOWS FOR.. 102 TRANSFORMATIONS
 CSPACE 71680 BYTES 409 RECORD VALUES + LAG VARIABLES
 ASpace 10240 BYTES 1641 IF/COMPUTE OPERATIONS

1 RUN NAME	AIRLINE FAILURES
2 DATA LIST	FIXED(2)/1
3	LOADPATH 1-4 TUNNILES 6-12 PAXREV 10-19
4	TOTOPRRV 21-29 TOTOPRFX 30-36 OPRPROFT 30-43
5	RELINCUM 45-51 RATEROI 52-54/2 NOACFT 1-4
6	FUELCOST 6-8 GWP 10-13 UNEMPL 15-17
7	INTRATE 19-23 FEDFUNDS 25-27

DATA LIST PROVIDES FOR 14 VARIABLES AND 2 RECORDS ('CARDS') PER CASE. A MAXIMUM OF 54 COLUMNS ARE
 IING - A NUMERIC VARIABLE HAS A WIDTH GREATER THAN 7, SMALL ROUNDING/TRUNCATION ERROR MAY RESULT.

OF THE CONSTRUCTED FORMAT STATEMENT..
 (E4.0,1X,F7.0,1X,F6.0,1X,F7.0,1X,F6.0,1X,F7.0,1X,F3.0,1X,F4.0,1X,F3.0,1X,F5.0,
 1X,F3.0)

8 INPUT MEDIUM	DISK
9 N OF CASES	UNKNOWN
10 VAR LABELS	LOADPATH REVENUE PAX LOAD FACTOR/ TUNNILES FREIGHT TON MILES/
11	PAXREV REVENUE PAX/
12	TOTOPRRV TOT OPERATING REVENUE/
13	TOTOPRFX TOTAL OPERATING EXPENSE/
14	OPPRPROFT OPERATING PROFIT/
15	RELINCUM NET INCOME/
16	RATEROI RATE RETURN ON INV/
17	NOACFT NUMBER AIRCRAFT/
18	FUELCOST FUEL COST/
19	GWP GROSS NATIONAL PRODUCT/
20	UNEMPL UNEMPLOYMENT/
21	INTRATE INTEREST RATE/
22	FEDFUNDS FEDERAL SUBSIDY/
23	DELTA PRU=TOTOPRRV-TOTOPRFX
24 COMPUTE	
25 SCATTERGRAM	

EXHIBIT - 3

U.S. AIRLINE ANALYSIS, DESCRIPTIVE STATISTIC

FILE NOVAPE (CREATION DATE = 12/20/82)

*** MULTIPLE REGRESSION ***

VARIABLE LIST NUMBER 8, LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 8.

DEPENDENT VARIABLE.. DELTAPO

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. NOACFT NUMBER AIRCRAFT

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
R SQUARE	0.47245	DF	1	0.416400	15	0.415400	15
ADJUSTED R SQUARE	0.41384	REGRESSION	1	0.416400 <td>15</td> <td>0.415400<td>15</td></td>	15	0.415400 <td>15</td>	15
STANDARD ERROR	0.718760 07	RESIDUAL	9	0.464960 <td>15</td> <td>0.516620<td>14</td></td>	15	0.516620 <td>14</td>	14

F = 8.06008 SIGNIF F = 0.0194

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
NOACFT	32481.02122	11400.89427	0.68735	2.839	0.0194
(CONSTANT)	-0.607100	0.27590	OR	-2.201	0.0553

FOR BLOCK NUMBER 1 POUT = 0.100 LIMITS REACHED.

A RLINE FAILURES

FILE NO. 000000 (CREATION DATE = 12/20/82)

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 9. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 9.

DEPENDENT VARIABLE.. DELTA PRU

REGRESSION BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FUELCOST FUEL COST

MULTIPLE R	R SQUARE	ADJUSTED R SQUARE	STANDARD ERROR	ANALYSIS OF VARIANCE		SUM OF SQUARES	MEAN SQUARE
				REGRESSION	RESIDUAL		
0.88046	0.77521	0.75023	0.460180 07	1	9	0.683240 15	0.683240 15
						0.198120 15	0.220130 14
				F =	31.03735	SIGNIF F = 0.0003	

----- VARIABLES IN THE EQUATION -----

VARIABLE	H	SE B	DELTA	T	SIG.
FUELCOST	0.340330 08	0.62530 07	0.88046	5.571	0.0003
(CONSTANT)	0.444730 07	0.21170 07		1.637	0.1360

FOR BLOCK NUMBER 1 POUT = 0.100 LIMITS REACHED.

Y = 0.88046 X
0.31 + 0.01 (s)

AIRLINE FAILURES

PAGE

12/20/82

FILE NAME (CREATION DATE = 12/20/82)

*** MULTIPLE REGRESSION ***

VARIABLE LIST NUMBER 10. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 10.

DEPENDENT VARIABLE.. DELTAPOD

REGIMING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GNP GROSS NATIONAL PRODUCT

MULTIPLE R	R SQUARE	ADJUSTED R SQUARE	STANDARD ERROR	ANALYSIS OF VARIANCE	OF REGRESSION	RESIDUAL	SUM OF SQUARES	MEAN SQUARE
0.97035	0.94158	0.93509	0.239180 07		4		0.829870 15	0.829870 15
							0.514860 14	0.572070 13

F = 145.06393 SIGNIF F = 0.0000

VARIABLES IN THE EQUATION

VARIABLE	B	SE B	WETA	T	SIG T
GNP	15105.17236	1254.13985	0.97035	12.044	0.0000
(CONSTANT)	-0.102050 08	0.24000 07		-4.252	0.0021

FOR BLOCK NUMBER 1 POUT = 0.100 LIMITS REACHED.

AIRLINE FAILURES

FILE NAME (CREATION DATE = 12/20/82)

*** MULTIPLE REGRESSION ***

VARIABLE LIST NUMBER 5. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 5.

DEPENDENT VARIABLE.. DELTAPO

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. OPRPROFIT OPERATING PROFIT

MULTIPLE R	R SQUARE	ADJUSTED R SQUARE	STANDARD ERROR	ANALYSIS OF VARIANCE		MEAN SQUARE
				FF	SUM OF SQUARES	
0.76267	0.58167	0.55519	0.640050 07	1	0.512660 15	0.512660 15
				9	0.368700 15	0.409670 14

F = 12.51401 SIGNIF F = 0.0063

----- VARIABLES IN THE EQUATION -----

VARIABLE	R	SE B	DELTA	T	SIG T
OPRPROFIT	-76.77211	21.70227	-0.76267	-3.538	0.0063
(CONSTANT)	0.223900 08	0.23970 07		9.343	0.0000

FOR BLOCK NUMBER 1. POINT = 0.100 LIMITS REACHED.

IRLINE FAILURES

FILE NO: 000000 (CREATION DATE = 12/20/82)

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 3. LISTWISE DELETION OF MISSING DATA.

QUANTIFY NUMBER 3.

DEPENDENT VARIABLE.. DELTA PRO

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FAXREV REVENUE PAX

MULTIPLE R	SQUARE	ADJUSTED R SQUARE	STANDARD ERROR	ANALYSIS OF VARIANCE		SUM OF SQUARES	MEAN SQUARE
				REGRESSION	RESIDUAL		
0.90932	0.82687	0.80763	0.411760 07	1	9	0.728760 15	0.728760 15
						0.152590 15	0.169550 14

F = 42.98307 SIGNIF F = 0.0001

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	DELTA	T	SIG T
FAXREV	177.03029	27.06319	0.90932	6.556	0.0001
CONSTANT	-0.208550 07	0.655590 07		-3.740	0.0043

FOR BLOCK NUMBER 1 POUT = 0.100 LIMITS REACHED.

AIRLINE FAILURES

FILE NAME (CREATION DATE = 12/20/82)

*** MULTIPLE REGRESSION ***

VARIABLE LIST NUMBER 12, LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 12.

DEPENDENT VARIABLE... DELTAPOD

REGRESSION BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. INTRATE INTEREST RATE

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
R SQUARE	0.67715	REGRESSION	1	0.596810	15	0.596810	15
ADJUSTED R SQUARE	0.66128	RESIDUAL	9	0.284550	15	0.316166	14
STANDARD ERROR	0.562260						

F = 18.87656 SIGNIF F = 0.0019

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
INTRATE	0.205260	0.07	0.47240	06	0.0019
(CONSTANT)	100924.14021	0.03210	0.7	0.023	0.9419

FOR BLOCK NUMBER 1. POUT = 0.100 LIMITS REACHED.

12/20/62

IRLINE FAILURES

FILE NAME (CREATION DATE = 12/20/62)

***** MULTIPLE REGRESSION *****

ARIABLE LIST NUMBER 13. LISTWISE DELETION OF MISSING DATA.

QUATION NUMBER 13.

DEPENDENT VARIABLE.. DELTAPRO

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

ARIABLE(S) ENTERED ON STEP NUMBER 1.. FEDFUNDS FEDERAL SUBSIDY

MULTIPLE R ANALYSIS OF VARIANCE			
SOURCE	SS	DF	MEAN SQUARE
ADJUSTED R SQUARE	0.512450	1	0.512450
TOTAL ERROR	0.637620	15	0.425080
RESIDUAL	0.333310	15	0.222207

F = 14.10496 SIGNIF F = 0.0045

----- VARIABLES IN THE EQUATION -----

ARIABLE	B	SE B	BETA	T	SIG T
FEDFUNDS	0.512450	0.136007	0.74133	5.756	0.0005
CONGRAT	0.912170	0.207907		5.168	0.0114

OK BLOCK NUMBER 1. POUT = 0.100 LIMITS REACHED.

U. S. AIRLINE ANALYSIS, SCATTERGRAM

EXHIBIT - A

EXAMINE PHILURES

FILE NAME (CREATION DATE = 12/26/82)

DELTAPHU

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE		ADJUSTED FREQ (FCT)	CUM	
			FREQ (FCT)	FREQ (FCT)		FREQ (PCT)	FREQ (PCT)
	320475.	1	9.1	9.1	9.1	9.1	9.1
	10105591.	1	9.1	9.1	9.1	18.2	18.2
	11235426.	1	9.1	9.1	9.1	27.3	27.3
	13301787.	1	9.1	9.1	9.1	36.4	36.4
	13433117.	1	9.1	9.1	9.1	45.5	45.5
	15423272.	1	9.1	9.1	9.1	54.5	54.5
	14023120.	1	9.1	9.1	9.1	63.6	63.6
	20732032.	1	9.1	9.1	9.1	72.7	72.7
	24523448.	1	9.1	9.1	9.1	81.8	81.8
	50332044.	1	9.1	9.1	9.1	90.9	90.9
	32401776.	1	9.1	9.1	9.1	100.0	100.0
	TOTAL	11	100.0	100.0	100.0		

MEAN	*****	STD LMR	2030603.000	MEDIAN	*****
MODE	320475.000	STD DEV	9340049.000	VARIANCE	*****
KURTOSIS	0.003	SKEWNESS	0.097	KURTOSIS	*****
MINIMUM	320475.000	MAXIMUM	*****		

VALID CASES 11 MISSING CASES 0

FILE

NAME (CREATION DATE = 12/20/82)

FEDFUND FEDERAL SUBSIDY

CATEGORY LABEL	COUNT	ABSOLUTE		RELATIVE		ADJUSTED		CUM	
		FREQ	(PCT)	FREQ	(PCT)	FREQ	(PCT)	FREQ	(PCT)
0.	3	3	27.3	27.3	27.3	27.3	27.3	27.3	27.3
1.	2	2	14.2	14.2	14.2	41.5	41.5	41.5	41.5
1.	1	1	9.1	9.1	9.1	50.6	50.6	50.6	50.6
2.	1	1	9.1	9.1	9.1	59.7	59.7	59.7	59.7
2.	1	1	9.1	9.1	9.1	68.8	68.8	68.8	68.8
3.	1	1	9.1	9.1	9.1	77.9	77.9	77.9	77.9
3.	1	1	9.1	9.1	9.1	87.0	87.0	87.0	87.0
4.	1	1	9.1	9.1	9.1	96.1	96.1	96.1	96.1
TOTAL	11	11	100.0	100.0	100.0	100.0	100.0	100.0	100.0

MEAN	1.609	STD ERR	0.432	MEDIAN	0.800
MODE	0.200	STD DEV	1.931	VARIANCE	2.049
KURTOSIS	-1.206	SKEWNESS	0.451	RANGE	5.600
MINIMUM	0.200	MAXIMUM	3.900		

VALID CASES	11	MISSING CASES	0
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FILE NO:NAME (CREATION DATE = 12/20/82)

INTRATE INTEREST RATE

CATEGORY LABEL	CODE	ABSOLUTE		RELATIVE		ADJUSTED		CUM	
		FREQ	(PCT)	FREQ	(PCT)	FREQ	(PCT)	FREQ	(PCT)
5.	2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2
5.	1	9.1	9.1	9.1	9.1	9.1	9.1	27.3	27.3
5.	1	9.1	9.1	9.1	9.1	9.1	9.1	36.4	36.4
6.	1	9.1	9.1	9.1	9.1	9.1	9.1	45.5	45.5
8.	1	9.1	9.1	9.1	9.1	9.1	9.1	54.5	54.5
8.	1	9.1	9.1	9.1	9.1	9.1	9.1	63.6	63.6
10.	1	9.1	9.1	9.1	9.1	9.1	9.1	72.7	72.7
11.	1	9.1	9.1	9.1	9.1	9.1	9.1	81.8	81.8
13.	1	9.1	9.1	9.1	9.1	9.1	9.1	90.9	90.9
16.	1	9.1	9.1	9.1	9.1	9.1	9.1	100.0	100.0
TOTAL	11	100.0	100.0	100.0	100.0	100.0	100.0		

MEAN	8.412	STD DEV	1.135	MEDIAN	7.940
MODE	4.660	STD DEV	3.764	VARIANCE	14.165
KURTOSIS	0.341	SKEWNESS	0.978	RANGE	11.690
MINIMUM	4.660	MAXIMUM	16.356		

VALID CASES 11 MISSING CASES 0

FILE NAME (CREATION DATE = 12/20/82)

UNEMPL UNEMPLOYMENT

CATEGORY LABEL	COUNT	ABSOLUTE FREQ.	RELATIVE FREQ.		ADJUSTED FREQ.		CUM FREQ.	
			(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)
5.	3	27.3	27.3	27.3	27.3	27.3	27.3	27.3
6.	1	9.1	9.1	9.1	9.1	36.4	36.4	36.4
9.	1	9.1	9.1	9.1	9.1	45.5	45.5	45.5
6.	1	9.1	9.1	9.1	9.1	54.5	54.5	54.5
7.	1	9.1	9.1	9.1	9.1	63.6	63.6	63.6
7.	1	9.1	9.1	9.1	9.1	72.7	72.7	72.7
8.	1	9.1	9.1	9.1	9.1	81.8	81.8	81.8
8.	1	9.1	9.1	9.1	9.1	90.9	90.9	90.9
9.	1	9.1	9.1	9.1	9.1	100.0	100.0	100.0
TOTAL	11	100.0	100.0	100.0	100.0			

MEAN 6.427 STD DEV 0.410 MEDIAN 6.000
 MODE 9.000 STD DEV 1.359 VARIANCE 1.846
 KURTOSIS -1.441 SKWNESS 0.314 RANGE 3.600
 MINIMUM 4.900 MAXIMUM 8.500

VALID CASES 11 MISSING CASES 0

AIRLINE FAILURES

FILE NAME (CREATION DATE = 12/20/82)

GNP GROSS NATIONAL PRODUCT					
CATEGORY LABEL	CODL	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	1063.	1	9.1	9.1	9.1
	1171.	1	9.1	9.1	18.2
	1307.	1	9.1	9.1	27.3
	1413.	1	9.1	9.1	36.4
	1529.	1	9.1	9.1	45.5
	1702.	1	9.1	9.1	54.5
	1900.	1	9.1	9.1	63.6
	2124.	1	9.1	9.1	72.7
	2414.	1	9.1	9.1	81.8
	2626.	1	9.1	9.1	90.9
	2826.	1	9.1	9.1	100.0
	TOTAL	11	100.0	100.0	
MEAN	1025.364	STD DEV	141.637	MEDIAN	1702.000
MODE	1063.000	STD DEV	603.085	VARIANCE	363712.250
KURTOSIS	-1.156	SKWNESS	0.438	RANGE	1763.000
MINIMUM	1063.000	MAXIMUM	2826.000		
VALID CASES	11	MISSING CASES	0		

PLINE FAILURES

12/20/02

FILE NAME (CREATION DATE = 12/20/02)

JELCOST FUEL COST

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE		ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
			FREQ (PCT)	FREQ (PCT)		
	0.	3	36.4	36.4	36.4	36.4
	0.	1	9.1	9.1	45.5	45.5
	0.	1	9.1	9.1	54.5	54.5
	0.	1	9.1	9.1	63.6	63.6
	0.	1	9.1	9.1	72.7	72.7
	0.	1	9.1	9.1	81.8	81.8
	1.	1	9.1	9.1	90.9	90.9
	1.	1	9.1	9.1	100.0	100.0
	TOTAL	11	100.0	100.0		

MEAN	0.371	STD DEV	0.072	MEDIAN	0.300
MODE	0.200	STD DEV	0.237	VARIANCE	0.054
UNIFORM	1.770	SKEWNESS	1.650	RANGE	0.700
MINIMUM	0.200	MAXIMUM	0.900		

VALID CASES	11	MISSING CASES	0
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FAIRLINE FAILURES

FILE PROJAME (CREATION DATE = 12/20/82)

12/20/82 PAGE

NOACFT GUNNER AIRCRAFT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE		ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
			FREQ (PCT)	FREQ (PCT)		
	2220.	1	9.1	9.1	9.1	9.1
	2244.	1	9.1	9.1	18.2	18.2
	2264.	1	9.1	9.1	27.3	27.3
	2266.	1	9.1	9.1	36.4	36.4
	2267.	1	9.1	9.1	45.5	45.5
	2361.	2	18.2	18.2	63.6	63.6
	2389.	1	9.1	9.1	72.7	72.7
	2542.	1	9.1	9.1	81.8	81.8
	2712.	1	9.1	9.1	90.9	90.9
	2808.	1	9.1	9.1	100.0	100.0
	TOTAL	11	100.0	100.0		

MEAN	2403.409	STD ERR	50.900	MEDIAN	2360.750
MODE	2361.000	STD DEV	194.667	VARIANCE	39468.461
CURTOSIS	0.391	SKEWNESS	1.252	RANGE	579.000
KURTOSIS	2224.000	MAXIMUM	2808.000		
VALU CASES	11	MISSING CASES	0		

AIRLINE FAILURES

PAGE

12/20/82

FILE PROGRAM (CREATION DATE = 12/20/82)

WACFT NUMBER AIRCRAFT

CATEGORY	ANAL	CODE	ABSOLUTE		RELATIVE		ADJUSTED		CUM	
			FREQ	PCT	FREQ	PCT	FREQ	PCT	FREQ	PCT
		2220.	1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
		2244.	1	9.1	9.1	9.1	9.1	18.2	18.2	18.2
		2264.	1	9.1	9.1	9.1	9.1	27.3	27.3	27.3
		2266.	1	9.1	9.1	9.1	9.1	36.4	36.4	36.4
		2267.	1	9.1	9.1	9.1	9.1	45.5	45.5	45.5
		2361.	2	18.2	18.2	18.2	18.2	63.6	63.6	63.6
		2389.	1	9.1	9.1	9.1	9.1	72.7	72.7	72.7
		2542.	1	9.1	9.1	9.1	9.1	81.8	81.8	81.8
		2712.	1	9.1	9.1	9.1	9.1	90.9	90.9	90.9
		2808.	1	9.1	9.1	9.1	9.1	100.0	100.0	100.0
		TOTAL	11	100.0	100.0	100.0	100.0			

MEAN	2403.909	STD ERR	59.900	PENJAN	2360.750
MODE	2361.000	STD DEV	194.067	VARIANCE	39468.461
URTOSIS	0.591	SKEWNESS	1.252	KURTOSIS	579.000
MINIMUM	2220.000	MAXIMUM	2808.000		

ALLO CASES 11 MISSING CASES 0

AIRLINE FAILURES

FILE NONAME (CREATION DATE = 12/20/82)

HATCHOI RATE RETURN ON INV

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE		CUM FREQ (PCT)
			FREQ (PCT)	ADJUSTED FREQ (PCT)	
1.	1	1	9.1	9.1	9.1
2.	1	1	9.1	9.1	18.2
3.	1	1	9.1	9.1	27.3
4.	1	1	9.1	9.1	36.4
5.	2	2	18.2	18.2	54.5
6.	1	1	9.1	9.1	63.6
7.	1	1	9.1	9.1	72.7
8.	1	1	9.1	9.1	81.8
370.	1	1	9.1	9.1	90.9
420.	1	1	9.1	9.1	100.0
TOTAL	11	100.0	100.0		

MEAN	75.545	STD ERR	47.745	MEDIAN	5.250
MODE	5.000	STD DEV	158.351	VARIABLE	25075.031
KURTOSIS	2.147	SKEWNESS	1.944	RANGE	419.000
MINIMUM	1.000	MAXIMUM	420.000		

VALID CASES 11 MISSING CASES 0

INLINE FACTURES

FILE NO: 00000000 CREATION DATE: 12/22/2011

ITEM CODES LIST INCOME

CATEGORY LABEL	CODE	ADJUSTED		RELATIVE		ADJUSTED		CUM	
		PERCENT	PERCENT	PERCENT	PERCENT	PERCENT	PERCENT	PERCENT	PERCENT
	210050.	1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
	521041.	1	9.1	9.1	9.1	9.1	9.1	18.2	18.2
	306005.	1	9.1	9.1	9.1	9.1	9.1	27.3	27.3
	752536.	1	9.1	9.1	9.1	9.1	9.1	36.4	36.4
	3011965.	1	9.1	9.1	9.1	9.1	9.1	45.5	45.5
	0.	1	9.1	9.1	9.1	9.1	9.1	54.6	54.6
	-80201.	1	9.1	9.1	9.1	9.1	9.1	63.7	63.7
	20006.	1	9.1	9.1	9.1	9.1	9.1	72.8	72.8
	226093.	1	9.1	9.1	9.1	9.1	9.1	81.9	81.9
	563550.	1	9.1	9.1	9.1	9.1	9.1	90.9	90.9
	5017414.	1	9.1	9.1	9.1	9.1	9.1	100.0	100.0
	TOTAL	11	100.0	100.0	100.0	100.0	100.0	100.0	100.0

ITEM	905372.600	STO FOR	470192.500	SECTION	0.0
ONE	210050.000	STO OF	157719.000	SECTION	0.0
THIRDS	4.700	SKETCHES	2.500	SECTION	0.0
THIRDS	-80200.000	MAXIMUM	5017019.000	SECTION	0.0
ALLO CASES	11	MISSING CASES	0		

AIRLINE FAILURES

FILE NUMBER (CORRELATION DATE = 12/20/82)

12/20/82

OPRPROFIT OPERATING PROFIT

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE		ADJUSTED		CUM	
			FREQ (PCT)	FREQ (PCT)	FREQ (PCT)	FREQ (PCT)	FREQ (PCT)	FREQ (PCT)
	-4207.	1	9.1	9.1	9.1	9.1	9.1	9.1
	-2216.	1	9.1	9.1	9.1	18.2	18.2	18.2
	12787.	1	9.1	9.1	9.1	27.3	27.3	27.3
	13644.	1	9.1	9.1	9.1	36.4	36.4	36.4
	14405.	1	9.1	9.1	9.1	45.5	45.5	45.5
	58047.	1	9.1	9.1	9.1	54.5	54.5	54.5
	58526.	1	9.1	9.1	9.1	63.6	63.6	63.6
	72193.	1	9.1	9.1	9.1	72.7	72.7	72.7
	72574.	1	9.1	9.1	9.1	81.8	81.8	81.8
	90804.	1	9.1	9.1	9.1	90.9	90.9	90.9
	328475.	1	9.1	9.1	9.1	100.0	100.0	100.0
	TOTAL	11	100.0	100.0	100.0			

MEAN 65539.625 STD EMV 28119.052 CEMV 58947.000
MODE -4207.000 STD DEV 93263.000 CEMV 332682.000
KURTOSIS 7.572 SKENWISS 2.506
MINIMUM -4207.000 MAXIMUM 328475.000

VALID CASES 11 MISSING CASES 0

TOTOPREX TOTAL OPERATING EXPENSE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE		ADJUSTED FREQ (PCT)	CUM	
			FREQ (PCT)	FREQ (PCT)		FREQ (PCT)	FREQ (PCT)
	1057A80.	1	9.1	9.1	9.1	9.1	9.1
	11A3351.	1	9.1	9.1	9.1	18.2	18.2
	139733A.	1	9.1	9.1	9.1	27.3	27.3
	1522A94.	1	9.1	9.1	9.1	36.4	36.4
	167742A.	1	9.1	9.1	9.1	45.5	45.5
	190107A.	1	9.1	9.1	9.1	54.5	54.5
	2151909.	1	9.1	9.1	9.1	63.6	63.6
	2702761.	1	9.1	9.1	9.1	72.7	72.7
	3394442.	1	9.1	9.1	9.1	81.8	81.8
	3691391.	1	9.1	9.1	9.1	90.9	90.9
	9717102.	1	9.1	9.1	9.1	100.0	100.0
	TOTAL	11	100.0	100.0	100.0		

MEAN 2765549.000 STD DEV 7429493.813 MEDIAN 1901676.000
MODE 1057A80.000 STD DEV 20646202.000 VARIANCE 426266666666
KURTOSIS 7.575 SKEWNESS 2.628
MINIMUM 1057A80.000 MAXIMUM 9717102.000 RANGE 8659222.000

VALID CASES 11 MISSING CASES 0

FILE RUNNAME (CALCULATING DATE = 12/20/82)

PAXREV REVENUE PAX

CATEGORY LABEL	COUNT	ABSOLUTE		RELATIVE		ADJUSTED		COUNT	
		FREQ	(PCT)	FREQ	(PCT)	FREQ	(PCT)	FREQ	(PCT)
	173669.	1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
	191349.	1	9.1	9.1	9.1	9.1	18.2		
	202209.	1	9.1	9.1	9.1	27.3			
	205062.	1	9.1	9.1	9.1	36.4			
	207459.	1	9.1	9.1	9.1	45.5			
	223319.	1	9.1	9.1	9.1	54.5			
	240326.	1	9.1	9.1	9.1	63.6			
	274719.	1	9.1	9.1	9.1	72.7			
	285720.	1	9.1	9.1	9.1	81.8			
	296903.	1	9.1	9.1	9.1	90.9			
	316863.	1	9.1	9.1	9.1	100.0			
	TOTAL	11	100.0	100.0	100.0				

AN	257903.125	STD ERR	14506.719	MEDIAN	223319.000
DE	173669.000	STD DEV	46113.348	VARIANCE	*****
RTINGS	-1.314	SKEWNESS	0.411	RANGE	143194.000
MINUM	173669.000	MAXIMUM	316863.000		

LID CASES 11 MISSING CASES 0

12/20/82

IRLINE FAILURES

FILE NAME (CREATION DATE = 12/20/82)

STOPRV TOL OPERATING REVENUE

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE		ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
			FREQ (PCT)			
	10045577.	1	9.1	9.1	9.1	9.1
	11163271.	1	9.1	9.1	18.2	
	12418777.	1	9.1	9.1	27.3	
	14699125.	1	9.1	9.1	36.4	
	15355921.	1	9.1	9.1	45.5	
	17501200.	1	9.1	9.1	54.5	
	19924800.	1	9.1	9.1	63.6	
	22883952.	1	9.1	9.1	72.7	
	27226650.	1	9.1	9.1	81.8	
	33727792.	1	9.1	9.1	90.9	
	36493168.	1	9.1	9.1	100.0	
	TOTAL	11	100.0	100.0		

EAN ***** STD FOR 2715943.000 MEDIAN *****
 ODE ***** STD DEF 0007766.000 VARIANCE *****
 ORTOSIS -0.540 SKETCHES 0.799 RANGE *****
 THIMON ***** MAXIMUM *****

ALID CASES 11 MISSING CASES 0

AIRLINE FAILURES

FILE RUNAME (CREATION DATE = 12/20/82)

LOADFAIR REVENUE PAX LOAD FACTOR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE		CUM FREQ (PCT)
			FREQ (PCT)	ADJUSTED FREQ (PCT)	
	44.	1	9.1	9.1	9.1
	52.	1	9.1	9.1	18.2
	53.	1	9.1	9.1	27.3
	54.	1	9.1	9.1	36.4
	55.	1	9.1	9.1	45.5
	55.	1	9.1	9.1	54.5
	56.	1	9.1	9.1	63.6
	59.	1	9.1	9.1	72.7
	59.	1	9.1	9.1	81.8
	62.	1	9.1	9.1	90.9
	63.	1	9.1	9.1	100.0
	TOTAL	11	100.0	100.0	

MEAN	55.964	STD ERR	1.287	MEDIAN	55.400
MODE	48.500	STD DEV	0.270	VARIANCE	10.233
KURTOSIS	-0.331	SKEWNESS	0.042	RANGE	14.500
MINIMUM	48.500	MAXIMUM	63.000		

VALID CASES 11 MISSING CASES 0

AIRLINE FAILURES

PAGE

12/20/82

FILE NO/NAME (CREATION DATE = 12/20/82)

LOADFAIR REVENUE PAX LOAD FACTOR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	49.	1	9.1	9.1	9.1
	52.	1	9.1	9.1	18.2
	53.	1	9.1	9.1	27.3
	54.	1	9.1	9.1	36.4
	55.	1	9.1	9.1	45.5
	55.	1	9.1	9.1	54.5
	56.	1	9.1	9.1	63.6
	59.	1	9.1	9.1	72.7
	59.	1	9.1	9.1	81.8
	62.	1	9.1	9.1	90.9
	63.	1	9.1	9.1	100.0
	TOTAL	11	100.0	100.0	

MEAN	55.964	STD ERR	1.287	MEDIAN	55.400
MODE	48.500	STD DEV	0.270	VARIANCE	10.233
KURTOSIS	-0.331	SKEWNESS	0.002	RANGE	14.500
MINIMUM	48.500	MAXIMUM	63.000		

VALID CASES 11 MISSING CASES 0

FILE NAME (CREATION DATE = 12/20/82)

TONMILES AIRPORT TON MILES

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE		ADJUSTED		CUM FREQ (PCT)
			FREQ (PCT)	FREQ (PCT)	FREQ (PCT)	FREQ (PCT)	
	37122RB.	1	9.1	9.1	9.1	9.1	
	4217452.	1	9.1	9.1	9.1	18.2	
	4736729.	1	9.1	9.1	9.1	27.3	
	4766114.	1	9.1	9.1	9.1	36.4	
	4890026.	1	9.1	9.1	9.1	45.5	
	5074193.	1	9.1	9.1	9.1	54.5	
	5385329.	1	9.1	9.1	9.1	63.6	
	5616750.	1	9.1	9.1	9.1	72.7	
	5865622.	1	9.1	9.1	9.1	81.8	
	5763249.	1	9.1	9.1	9.1	90.9	
	5907731.	1	9.1	9.1	9.1	100.0	
	TOTAL	11	100.0	100.0	100.0		

MEAN 5088657.000 STD ERR 208144.000 MEDIAN 5074193.000
 MODE 37122RB.000 STD DEV 690355.750 VARIANCE *****
 KURTOSIS -0.207 SKEWNESS -0.678 RANGE 2195443.000
 MINIMUM 37122RB.000 MAXIMUM 5907731.000

VALID CASES 11 MISSING CASES 0

FILE RUNAME (CREATION DATE = 12/20/82)

LOADFAIR REVENUE PAX LOAD FACTOR

CATEGORY LABEL	CODE	ABSOLUTE FREQ	RELATIVE		CUM FREQ
			FREQ (PCT)	ADJUSTED FREQ (PCT)	
	49.	1	9.1	9.1	9.1
	52.	1	9.1	9.1	18.2
	53.	1	9.1	9.1	27.3
	54.	1	9.1	9.1	36.4
	55.	1	9.1	9.1	45.5
	55.	1	9.1	9.1	54.5
	56.	1	9.1	9.1	63.6
	59.	1	9.1	9.1	72.7
	59.	1	9.1	9.1	81.8
	62.	1	9.1	9.1	90.9
	65.	1	9.1	9.1	100.0
	TOTAL	11	100.0	100.0	
MEAN	55.964	STD ERR	1.287	MEDIAN	55.400
MODE	49.500	STD DEV	0.270	VARIANCE	10.233
KURTOSIS	-0.331	SKEWNESS	0.092	RANGE	14.500
MINIMUM	49.500	MAXIMUM	63.000		
VALID CASES	11	MISSING CASES	0		

AIRLINE FAILURES

12/20/82

PAGE

FILE RUNAME (CREATION DATE = 12/20/82)

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 1. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 1.

DEPENDENT VARIABLE.. DELTAPRO

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. LUADFATH REVENUE PAX LOAD FACTOR

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
F	SQUARE	df	df	1	15	0.613980	15
ADJUSTED R SQUARE	0.66293	REGRESSION	1	0.613980	15	0.613980	15
STANDARD ERROR	0.545050	RESIDUAL	9	0.267370	15	0.297080	14

F = 20.66702 SIGNIF F = 0.0014

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
LUADFATH	0.143510	0.040370	0.83465	4.586	0.0014
(CONSTANT)	-0.853300	0.226500		-3.767	0.0044

ON BLOCK NUMBER 1 POUT = 0.100 LIMITS REACHED.

AIRLINE FREIGHTS

FILE NAME (CREATION DATE = 12/20/82)

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 2. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 2.

DEPENDENT VARIABLE.. DELTAPRO

BEGINNING BLOCK NUMBER 1. METHOD: STEPWISE

VARIABLE(S) ENTERED ON STEP NUMBER 1.. TONMILES FREIGHT 10N MILES

MULTIPLE R	0.896M3	ANALYSIS OF VARIANCE	OF	SUM OF SQUARES	MEAN SQUARE
R SQUARE	0.80431	REGRESSION	1	0.708470	0.708470
ADJUSTED R SQUARE	0.78256	RESIDUAL	9	0.172470	0.191640
STANDARD ERROR	0.437770				

F = 36.99057 SIGNIF F = 0.0002

----- VARIABLES IN THE EQUATION: -----

VARIABLE	B	SE B	BETA	T	SIG. T
TONMILES	12.19625	2.00531	0.896M3	6.082	0.0002
(CONSTANT)	-0.444510	0.10250		-4.337	0.0019

FOR BLOCK NUMBER 1. POINT = 0.100 LIMITS REACHED.

RAMSPACE REQUIRED.. 100 BYTES

1 TIME/STATIONATIONS

0 RECORD VALUES + LAG VARIABLES

3 IF/COMPUTE OPERATIONS

NO TIME REQUIRED.. 0.24 SECONDS

39 NEW REGRESSION VARIABLES=LOADFATH DELTAPRO/DEPENDENT=DELTAPRO/

40 STEPWISE/

41 VARIABLES=TOTALLES DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

42 VARIABLES=PAKREV DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

43 VARIABLES=TOTALPREX DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

44 VARIABLES=OPRPROFT DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

45 VARIABLES=NETINCOR DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

46 VARIABLES=RATERDI DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

47 VARIABLES=ENDACFT DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

48 VARIABLES=FUELCCST DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

49 VARIABLES=SEGNP DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

50 VARIABLES=SUMGPL DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

51 VARIABLES=TRATE DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

52 VARIABLES=FEEDFUNDS DELTAPRO/DEPENDENT=DELTAPRO/STEPWISE/

REGRESSION PROCEDURE REQUIRES 20104 BYTES OF WORKSPACE.

CONFIDENTIAL

EXHIBIT - 5

SUMMARY OF FACTORS AFFECTING OPERATING COST

	PASSENGER REVENUE	FREIGHT TONS	FUEL COST	GNP
PAN AM	.00062	.00913	*.1513	.0248
WORLD	.2053	.05021	*.42604	.2504
UNITED	.48497	.34106	.42982	*.56155
TEXAS AIR CORP.	.02070	.05514	*.21094	.02222
FLYING TIGERS	.8245	.7668	*.9577	.9221

* Most significant contribution to airline operating cost.

NOTE: 1. Numbers represent the correlation between each variable and operating cost.

2. See Appendix I for detailed analysis.

01/14/83

MULTIPLE REGRESSION RUN

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 11. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 11.

DEPENDENT VARIABLE.. UNITED

REGRESSION BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED OR STEP NUMBER 1.. FUELCON

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE
R	SQUARE	REGRESSION	RESIDUAL	T	R	
0.65560	0.42982			1	102.85537	102.85537
ADJUSTED R SQUARE	0.35855				136.40456	17.05557
STANDARD ERROR	0.12984					

F = 6.03060 SIGNIF F = 0.0396

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
FUELCON	-13.9181	5.66764	-0.65560	-2.456	0.0396
(CONSTANT)	16.00025	2.55761		6.256	0.0002

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

01/14/83

MULTIPLE REGRESSION RUN

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

*** MULTIPLE REGRESSION ***

VARIABLE LIST NUMBER 12. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 12.

DEPENDENT VARIABLE.. UNITED

REGRESSING BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. GMP

MULTIPLE R	0.74937	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE
R SQUARE	0.56155	REGRESSION	1	134.37839	134.37839
ADJUSTED R SQUARE	0.50674	RESIDUAL	4	104.92155	13.11519
STANDARD ERROR	3.62149				

F = 10.24601 SIGNIF F = 0.0126

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
GMP	-0.00676	0.00209	-0.74937	-3.201	0.0126
(CONSTANT)	23.33154	4.13903		5.637	0.0005

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

01/14/83

MULTIPLE REGRESSION RUN

FILE SOLVECY (CREATION DATE = 01/10/83) DATA FOR PREDICTING AIRLINE FAILURES

*** MULTIPLE REGRESSION ***

VARIABLE LIST NUMBER 14. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 14.

DEPENDENT VARIABLE... TEXAS

REGRESSING BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FUELCOST

MULTIPLE R	0.45928	ANALYSIS OF VARIANCE	SUM OF SQUARES	MEAN SQUARE
R SQUARE	0.21094	REGRESSION	27.56945	27.56945
ADJUSTED R SQUARE	0.11230	RESIDUAL	103.13053	12.89132
STANDARD ERROR	3.59045			

F = 2.13961 SIGNIF F = 0.1418

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
FUELCOST	-7.20542	4.92746	-0.45928	-1.462	0.1418
(CONSTANT)	10.89546	2.22556		4.900	0.0012

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

MULTIPLE REGRESSION RUN

01/14/83

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 13. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 13.

DEPENDENT VARIABLE.. TEXAS

REGRESSION BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FRETTONS

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
R	R SQUARE	REGRESSION	RESIDUAL	OF	1	2	3
0.23083	0.05514				7.20734		7.20734
	ADJUSTED R SQUARE				123.49265		15.43658
	STANDARD ERROR						

F = 0.46090 SIGNIF F = 0.5137

----- VARIABLES IN THE EQUATION -----

VARIABLE	R	SF	R	DELTA	T	SIG	T
FRETTONS	0.00162	0.00237	0.23083		0.683	0.5137	
(CONSTANT)	-0.33547	12.80754			-0.027	0.9791	

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

MULTIPLE REGRESSION RUN

01/14/83

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 14. LISTWISE SELECTION OF MISSING DATA.

EQUATION NUMBER 14.

DEPENDENT VARIABLE.. TEXAS

DELETING BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FUELCOST

MULTIPLE R	0.45928	ANALYSIS OF VARIANCE	OF	SUM OF SQUARES	MEAN SQUARE
R SQUARE	0.21094	REGRESSION	1	27.56945	27.56945
ADJUSTED R SQUARE	0.11230	RESIDUAL	8	103.13053	12.89132
STANDARD ERROR	3.59045				

F = 2.13861 SIGNIF F = 0.1818

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	WETA	T	SIG T
FUELCOST	-7.20542	4.92740	-0.45928	-1.462	0.1818
(CONSTANT)	10.89586	2.22354		4.900	0.0012

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

01/14/83

MULTIPLE REGRESSION RUN

FILE SOLVENCY (CREATION DATE = 01/10/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 15. LISTWISE DELETION OF MISSING DATA.

ANALYSIS NUMBER 15.

DEPENDENT VARIABLE... TEXAS

GLS METHOD BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1... GNP

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
ADJUSTED R SQUARE	STANDARD ERROR	REGRESSION	RESIDUAL	1	R	2.90453	15.97443
0.984320-03	9.97178	0.00231	4.50794	127.74546			

F = 0.14182 SIGNIF F = 0.6811

----- VARIABLES IN THE EQUATION -----

ANALYSIS	B	SE B	BETA	T	SIG T
CONSTANT	-0.984320-03	0.00231	-0.14907	-0.426	0.6811
GNP	9.97178	4.50794		2.183	0.0606

DR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

MULTIPLE REGRESSION RUN 01/14/83

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 16. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 16.

DEPENDENT VARIABLE.. TEXAS

REGULATING BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. PAXREV

MULTIPLE R	0.14387	ANALYSIS OF VARIANCE	df	SUM OF SQUARES	MEAN SQUARE
R SQUARE	0.02070		1	2.70529	2.70529
ADJUSTED R SQUARE	-0.10171	REGRESSION	8	127.99469	15.99934
STANDARD ERROR	3.99992	RESIDUAL			
		F =	0.16909	SIGNIF F =	0.6917

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE, B	HEIA	T	SIG T
PAXREV	0.01211	0.02005	0.14387	0.411	0.6917
(CONSTANT)	5.13677	7.51601		0.702	0.5025

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

SPSS BATCH SYSTEM

01/14/83

SPSS WITH GRAPHICS OPTION FOR VM/CMS, VERSION 9.0, OCTOBER 1, 1981

ORDER FROM MCGRAW-HILL: SPSS, 2ND ED. (PRINCIPAL TEXT) ORDER FROM SPSS INC., SPSS STATISTICAL
SPSS UPDATE 7-9 (USE W/SPSS, 2ND FOR REL. 7, 8, 9)
SPSS PACKET GUIDE, RELEASE 9
SPSS PRIMER (BRIEF INTRO TO SPSS)

DEFAULT SPACE ALLOCATION: ALLOWS FOR: 102 TRANSFORMATIONS
WORKSPACE 71680 BYTES 409 REC'DE VALUES + LAG VARIABLES
TRANSPACE 10240 BYTES 1647 IF/COMPUTE OPERATIONS

1 RUN NAME MULTIPLE REGRESSION RUN
2 FILE NAME SOLVERCY DATA FOR PREDICTING AIRLINE FAILURES
3 DATA LIST FUEL(1)/1 PANAM 1-4 TEXAS 6-9 WORLD 13-15
4 UNITED 19-22 GNP 26-29 PAXREV 33-35
5 FREIGHTS 39-42 FUELCOST 46-48

THE DATA LIST PROVIDES FOR 8 VARIABLES AND 1 RECORDS ('CARDS') PER CASE. A MAXIMUM OF 48 COLUMNS

LIST OF THE CONSTRUCTED FORMAT STATEMENT..

(F4.0,1X,F4.0,3X,F3.0,F3.0,F3.0,F4.0,3X,F4.0,3X,F3.0,F3.0,F3.0)

6 INPUT METHOD	7 NEW REGRESSION	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
VARIABLES=PAXREV	PANAM/DEPENDENT=PANAM/ENTER/	VARIABLES=FUELCOST	PANAM/DEPENDENT=PANAM/ENTER/	VARIABLES=FUELCOST	PANAM/DEPENDENT=PANAM/ENTER/	VARIABLES=GNP	PANAM/DEPENDENT=PANAM/ENTER/	VARIABLES=PAXREV	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=FUELCOST	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=GNP	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=PAXREV	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=FUELCOST	UNITED/DEPENDENT=UNITED/ENTER/
VARIABLES=PAXREV	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=FUELCOST	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=GNP	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=PAXREV	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=FUELCOST	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=GNP	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=PAXREV	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=FUELCOST	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=GNP	TEXAS/DEPENDENT=TEXAS/ENTER/
VARIABLES=PAXREV	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=FUELCOST	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=GNP	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=PAXREV	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=FUELCOST	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=GNP	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=PAXREV	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=FUELCOST	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=GNP	UNITED/DEPENDENT=UNITED/ENTER/
VARIABLES=PAXREV	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=FUELCOST	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=GNP	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=PAXREV	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=FUELCOST	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=GNP	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=PAXREV	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=FUELCOST	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=GNP	TEXAS/DEPENDENT=TEXAS/ENTER/
VARIABLES=PAXREV	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=FUELCOST	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=GNP	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=PAXREV	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=FUELCOST	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=GNP	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=PAXREV	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=FUELCOST	WORLD/DEPENDENT=WORLD/ENTER/	VARIABLES=GNP	WORLD/DEPENDENT=WORLD/ENTER/
VARIABLES=PAXREV	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=FUELCOST	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=GNP	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=PAXREV	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=FUELCOST	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=GNP	UNITED/DEPENDENT=UNITED/ENTER/	VARIABLES=PAXREV	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=FUELCOST	TEXAS/DEPENDENT=TEXAS/ENTER/	VARIABLES=GNP	TEXAS/DEPENDENT=TEXAS/ENTER/

REGRESSION PROCEDURE REQUIRES 20480 BYTES OF WORKSPACE.

SPSS WITH GRAPHICS OPTION FOR VM/CMS, VERSION 9.0, OCTOBER 1, 1981

MULTIPLE REGRESSION RUN

01/14/83

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 1. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 1.

DEPENDENT VARIABLE.. PANAM

REGRESSING BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. PANAM

MULTIPLE R 0.92090 ANALYSIS OF VARIANCE
R SQUARE 0.00062
ADJUSTED R SQUARE -0.12030
STATISTICAL ERROR 4.45643
SUM OF SQUARES
REGRESSION 0.09860
RESIDUAL 158.90640
MEAN SQUARE
REGRESSION 0.09860
RESIDUAL 19.86330
F = 0.0000A SIGNIF F = 0.9456

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
PANAM	0.00231	0.03201	0.02090	0.070	0.9456
(CONSTANT)	7.48424	0.15217		0.914	0.3854

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

MULTIPLE REGRESSION RUN

01/14/83

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 2. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 2.

DEPENDENT VARIABLE.. PARAM

REGRESSION BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FRETIHDS

MULTIPLE R	0.09557	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE
R SQUARE	0.00913	REGRESSION	1	1.45232	1.45232
ADJUSTED R SQUARE	-0.11472	RESIDUAL	8	157.55268	19.69409
STANDARD ERROR	4.43780				

F = 0.07374 SIGNIF F = 0.7928

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
FRETIHDS	0.727600-03	0.00268	0.09557	0.272	0.7928
(CONSTANT)	4.26337	14.01452		0.304	0.7687

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

MULTIPLE REGRESSION RUN

01/14/83

FILL SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 3. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 3.

DEPENDENT VARIABLE... PARAM

REGRESSION BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FUELCOST

MULTIPLE R	0.38897	ANALYSIS OF VARIANCE	SUM OF SQUARES	MEAN SQUARE
R SQUARE	0.15130	REGRESSION	24.05733	24.05733
ADJUSTED R SQUARE	0.04521	RESIDUAL	134.94768	16.86846
STANDARD ERROR	4.10712			

F = 1.42617 SIGNIF F = 0.2666

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
FUELCOST	-6.73120	5.63606	-0.38897	-1.194	0.2666
(CONSTANT)	10.66171	2.50354		4.192	0.0030

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

MULTIPLE REGRESSION RUN

01/14/83

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 4. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 4.

DEPENDENT VARIABLE.. PARAM

REGRESSING BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. STEP

MULTIPLE R	0.15747	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE
R SQUARE	0.02480	REGRESSION	1	3.94305	3.94305
ADJUSTED R SQUARE	-0.09710	RESIDUAL	8	155.06195	19.38274
STANDARD ERROR	4.40254				

F = 0.20343 SIGNIF F = 0.6639

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
STEP	-0.00115	0.00254	-0.15747	-0.451	0.6639
(CONSTANT)	10.23609	5.03175		2.033	0.0765

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

01/14/83

MULTIPLE REGRESSION RUN

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES
 * * * * * M U L T I P L E R E G R E S S I O N * * * * *

VARIABLE LIST NUMBER 5. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 5.

DEPENDENT VARIABLE.. WORLD

REGRESSOR BLOCK NUMBER 1. METHOD: STEP

VARIABLE(S) ENTERED ON STEP NUMBER 1.. PAXREV

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
R SQUARE		REGRESSION		1		1.72558	
ADJUSTED R SQUARE		RESIDUAL		4		6.67842	
STANDARD ERROR						0.83480	

F = 2.06705 SIGNIF F = 0.1885

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
PAXREV	-0.00967	0.00673	-0.45313	-1.438	0.1885
(CONSTANT)	4.02660	1.67124		2.409	0.0426

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

01/14/85

MULTIPLE REGRESSION RUN

FILE SOLVEDCY (CREATING DATE = 01/14/85) DATA FOR PREDICTING AIRLINE FAILURES

*** MULTIPLE REGRESSION ***

VARIABLE LIST NUMBER 6. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 6.

DEPENDENT VARIABLE.. WORLD

REGRESSION BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. PRETIONS

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
	0.22407						
ADJUSTED R SQUARE	0.05021				0.42194		0.42194
STANDARD ERROR	-0.06857				7.98206		0.99776
	0.99844						

F = 0.42244 SIGNIF F = 0.5337

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
FAILURES	-0.392180-03	0.60311-03	-0.22407	-0.650	0.5337
(CONSTANT)	3.70101	3.15400		1.173	0.2744

FOR NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

MULTIPLE REGRESSION RUN

01/14/83

FILE SOLVENCY SCHEDULE DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 7. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 1.

DEPENDENT VARIABLE... WORLD

PREDICTING BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED IN STEP NUMBER 1... FUELCOST

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
R	SQUARE	REGRESSION	RESIDUAL	1	R	3.58047	3.58047
0.65272	0.42604					4.82352	0.60294
ADJUSTED R SQUARE	0.35430						
STANDARD ERROR	0.77649						

F = 5.93435 SIGNIF F = 0.0408

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
FUELCOST	-2.59481	1.06563	-0.65272	-2.437	0.0408
(CONSTANT)	2.66756	0.48048		5.547	0.0005

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

01/14/83

MULTIPLE REGRESSION RUN

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 8. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 8.

DEPENDENT VARIABLE... WORLD

REGRESSING BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1... GDP

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
R SQUARE		REGRESSION		1		2.10435	
ADJUSTED R SQUARE		RESIDUAL		8		6.29965	
STANDARD ERROR						0.78746	

F = 2.67233 SIGNIF F = 0.1407

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG T
GDP	-0.437830-03	0.51250-03	-0.50040	-1.635	0.1407
(CONSTANT)	5.25322	1.01420		5.208	0.0125

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

MULTIPLE REGRESSION RUN

01/14/83

FILE SOLVENCY (CREATION DATE = 01/14/83) DATA FOR PREDICTING AIRLINE FAILURES

***** MULTIPLE REGRESSION *****

VARIABLE LIST NUMBER 9. LISTWISE DELETION OF MISSING DATA.

EQUATION NUMBER 9.

DEPENDENT VARIABLE.. UNITED

REGRESSION BLOCK NUMBER 1. METHOD: ENTER

VARIABLE(S) ENTERED ON STEP NUMBER 1.. PARSIV

MULTIPLE R		ANALYSIS OF VARIANCE		SUM OF SQUARES		MEAN SQUARE	
R	SQUARE	REGRESSION	RESIDUAL	DF			
0.48497	0.48497			1	116.05280		116.05280
0.42059	0.42059			8	123.24713		15.40589
3.92503	3.92503						

F = 7.53301 SIGNIF F = 0.0253

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	SE B	BETA	T	SIG. T
PARSIV	-0.07931	0.02490	-0.69640	-2.745	0.0253
(CONSTANT)	30.00825	7.17900		4.180	0.0031

FOR BLOCK NUMBER 1 ALL REQUESTED VARIABLES FURNISHED.

VAR NAME	MEAN	UNBIASED VARIANCE	UNBIASED STD DEV
CNF	1901.6	333059.045	577.1335
FLITOP	31.51	67.541	8.2183

MODEL	UNADJUSTED R ²
1. LINEAR	.85072145
2. POWER	.815269124
3. EXPONENTIAL	.859691957
4. LOGRITHMIC	.842290355
5. HYPERBOLIC 1	.818130275
6. HYPERBOLIC 2	.837245281
7. HYPERBOLIC 3	.716768972

$$1 = 56.55055 + -.01313 \cdot X$$

$$\text{UNADJUSTED R}^2 = .95023$$

$$\text{CORRELATION COEFFICIENT} = .97218$$

$$\text{STD ERROR OF ESTIMATE} = 2.57177$$

$$\text{VARIANCE OF ESTIMATE} = 11.26631$$

$$\text{DEGREES OF FREEDOM} = 9$$

WITH $X = \text{GDP}$ AND $Y = \text{FLITOP}$

	ACTUAL	ACTUAL	PREDICTED	RESIDUAL
	1	2	1	2
1	1171	42.5	41.2033	1.2862
2	1307	43.6	39.4179	4.1821
3	1413	23.8	32.026	-4.225
4	1525	32.6	36.5027	-2.9027
5	1722	31.7	34.231	-2.531
6	1300	31.3	31.631	.169
7	2123	34.2	29.5371	5.5629
8	2414	26.3	24.6315	1.5185
9	2626	19.6	22.0977	-2.4977
10	2826	19.1	19.4714	-.3714

VAR NAME	MEAN	UNBIASED VARIANCE	UNBIASED STD. DEV
FCOST	.386	.0593	.2436
FLITCP	31.61	67.541	8.2183

MODEL	UNADJUSTED R ²
1. LINEAR	.771208701
2. POWER	.891473135
3. EXPONENTIAL	.858844402
4. LOGRITHMIC	.837473991
5. HYPERBOLIC	.835333544

6. HYPERBOLIC 2	.917212486
7. HYPERBOLIC 3	.895555555

POWER $Y = A + YB$

$t = 17.7337 \cdot X - .4971$

UNADJUSTED $R^2 = .93147$
CORRELATION COEFFICIENT = .965419

STD ERROR OF ESTIMATE = .05228
VARIANCE OF ESTIMATE = 5.65503

DEGREES OF FREEDOM = 8

WITH $X = \text{FOOT}$ AND $Y = \text{FLUTTER}$

	ACTUAL	ACTUAL	PREDICTED	RESIDUAL
	X	Y	$\hat{Y}$	e
1	42.8	39.4239	39.4239	0.0000
2	43.6	39.4239	39.4239	0.0000
3	43.8	39.4239	39.4239	0.0000
4	43.6	39.4239	39.4239	0.0000
5	43.6	39.4239	39.4239	0.0000
6	43.6	39.4239	39.4239	0.0000
7	43.6	39.4239	39.4239	0.0000
8	43.6	39.4239	39.4239	0.0000
9	43.6	39.4239	39.4239	0.0000
10	43.6	39.4239	39.4239	0.0000

HYPERTOLIC 2 $y = 1.04 + 3.2x$

$$y = 1 / (0.01833 + 0.04037 \cdot x)$$

UNADJUSTED R² = .51701
CORRELATION COEFFICIENT = .55771

STD ERROR OF ESTIMATE = 3.138-03
VARIANCE OF ESTIMATE = .0098

DEGREES OF FREEDOM = 3

WITH X = FCOST AND Y = FLTOP

	ACTUAL	ACTUAL	PREDICTED	RESIDUAL
	X	Y		
1	.2	42.5	37.8059	4.6942
2	.2	43.6	37.8059	5.7942
3	.2	33.8	37.8059	-4.0059
4	.25	33.6	35.1257	-1.5257
5	.3	31.7	32.9003	-1.1003
6	.3	31.8	32.8003	-1.0003
7	.37	34.2	30.0182	4.1813
8	.39	26.2	29.308	-3.108
9	.75	19.6	20.5541	-1.9541
10	.9	19.1	18.2793	.8207

VAR NAME	MEAN	UNBIASED VARIANCE	UNBIASED STD DEV
PEVPAX	244.4	2022.4995	44.9721
FLUTOP	31.61	67.541	8.2183

MODEL	UNADJUSTED R ²
1. LINEAR	.654390682
2. POWER	.644636665
3. EXPONENTIAL	.624370855
4. LOGRITHMIC	.663431546
5. HIPEBOIC 1	.67995095
6. HIPEBOIC 2	.590336497
7. HIPEBOIC 3	.597729657

$$\text{HYPERBOLIC } 1 \quad 1 = A + 100X$$

$$1 = -5.50319 + 5042.46157 (X)$$

$$\text{ADJUSTED } R^2 = .67295$$

$$\text{CORRELATION COEFFICIENT} = .82495$$

$$\text{STD ERROR OF ESTIMATE} = 4.92139$$

$$\text{VARIANCE OF ESTIMATE} = 24.31846$$

$$\text{DEGREES OF FREEDOM} = 3$$

$$\text{WITH } X = \text{FEVMAX} \quad \text{AND } 1 = \text{FLUTTER}$$

ACTUAL X	ACTUAL Y	PREDICTED Y	RESIDUAL
191	42.5	40.8296	1.6604
202	43.6	39.2616	5.2394
207	33.8	37.1809	-3.3802
205	33.6	37.6065	-4.0065
229	31.7	33.1562	-1.4562
240	31.8	31.1739	.6262
274	34.2	26.4986	7.7014
316	26.2	22.1122	4.0877
296	19.6	24.0457	-4.4457
0 295	19.1	25.2249	-6.1249

1 = 67.73917 * -1.1475

UNADJUSTED R² = .61430
 CORRELATION COEFFICIENT = .78384
 STD ERROR OF ESTIMATE = 5.12451
 VARIANCE OF ESTIMATE = 26.25085
 DEGREES OF FREEDOM = 8

WITH X = REVPAX AND Y = FLITCF

	ACTUAL	PREDICTED	RESIDUAL
	X	Y	
1	191	42.5	39.5041
2	202	45.6	37.8779

3	267	33.8	37.1399
4	205	32.6	37.4345
5	223	31.7	34.0344
6	240	31.8	32.2604
7	274	34.2	37.2343
8	316	28.2	31.0235
9	298	19.6	23.982
0	295	19.1	25.6021

-3.3388
 -3.8245
 -2.5344
 -1.4604
 6.9657
 5.1745
 -4.432
 -5.5031

VAR	MEAN	UNBIASED VARIANCE	UNBIASED STD DEV
FPTON 5203.9		304565.434	551.8745
FLITCP 31.61		67.541	8.2193

MODEL	UNADJUSTED R ²
1. LINEAR	.593571475
2. POWER	.52919591
3. EXPONENTIAL	.528338902
4. LOGRITHMIC	.597694907
5. HIPERBOLIC 1	.597997482
6. HIPERBOLIC 2	.461172749
7. HIPERBOLIC 3	.454968583

$$Y = 90.83969 + -.01138 \cdot X$$

$$\text{UNADJUSTED } R^2 = .53357$$

$$\text{CORRELATION COEFFICIENT} = .76392$$

$$\text{STD ERPOP OF ESTIMATE} = 5.6251$$

$$\text{VARIANCE OF ESTIMATE} = 31.64175$$

$$\text{DEGREES OF FREEDOM} = 5$$

WITH X = FPTON AND : = FLITOP

	ACTUAL	ACTUAL	PREDICTED	RESIDUAL
	X	X	X	
1	4217	42.5	42.837	-1.337
2	4736	43.6	36.9328	6.6672
3	4890	33.8	35.1809	-1.3309
4	4766	23.6	36.5916	-12.9916
5	5074	31.7	33.0877	-1.3877
6	5385	31.3	29.5498	2.7302
7	5763	34.2	25.2497	3.9503
8	5907	26.2	23.6115	2.5895
9	5695	19.6	26.137	-6.537
10	5616	19.1	26.9219	-7.8219

$$i = -25.01572 + 291560.13 / X$$

UNADJUSTED P² = .593

CORRELATION COEFFICIENT = .76691

STD ERROR OF ESTIMATE = 5.59513

STANDARD ERROR OF ESTIMATE
VARIANCE OF ESTIMATE
= 31.30541

DEGREES OF FREEDOM = 9

WITH X = ERTTON AND Y = FLITCR

ACTUAL 'X'	ACTUAL 'Y'	PREDICTED 'Y'	RESIDUAL
4217	42.5	44.1235	-1.6235
4736	43.6	36.5468	7.0532
4890	33.8	34.1609	-.809
4766	33.6	36.1593	-2.5593
5074	31.7	32.4459	-.7459
5395	31.9	29.1273	2.6727
5763	24.2	25.576	9.624
5907	26.2	24.3427	1.8573
5685	19.6	26.2702	-6.6702
5516	19.1	25.2222	-6.1222

NOTES

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COL Lowell Jones, Chief, Airlift Mobility, Pentagon, Washington,
D.C.: 20 September, 20 October, 16 December 1982, 14 January,
8 February 1983.

Mr. Joe Lauffer, Emergency Coordinator, Civil Aeronautics Board,
Washington, D.C.: 28 October 1982.

LTC David Meuh, OSD/PA&E, Pentagon, Washington, D.C.:
15 December 1982.

Mr. Frank Motola, Mobilization Representative, Pan American
Airways, Jamaica, NY: 28 September, 20 December 1982,
14 January 1983.

LTC Jim Murphy, AF/LET, Pentagon, Washington, D.C.: 20 September,
24 October 1982, 27 January 1983.

Ms. Karen Richardson, OSD/Legal Council, Pentagon, Washington, D.C.:
22 December 1982.

Mr. J. Ruys, Aircraft Forecasts, Lockheed Aircraft Corporation,
Marietta, GA: 15 October 1982.

Mr. O.C. Simpson, Field Manager, Airport Services, Washington
National Airport: 9 March 1983

Mr. Tom Snider, Chief, Plans Branch, Resource Management for Strategic Mobility, Department of Transportation, Washington, D.C.: 22 October 1982.

Mr. Mike Sparrow, Economist, Airline Pilots Association, Washington, D.C.: 22 September 1982.

INTERVIEWS

Mr. Lawrence P. Bedord, Aviation Safety Inspector, Operations and Project Development Branch, Federal Aviation Agency, Washington, D.C.: 21 October 1982.

Mr. Morten Boyer, President, AVMARK, Inc., Arlington, VA: 19 October 1982.

COL Shirley Carpenter, Air Force Reserve Advisor to CINCMAC, Scott AFB, IL: 24 September 1982.

MAJ Dave Catey, Aviation Traffic Control, Federal Aviation Agency, Washington, D.C.: 19 October 1982.

Mr. Rip Collins, Department of Transportation, Washington, D.C.: 21 October 1982.

LTC Charles der Baghossian, AF/LETT, Pentagon, Washington, D.C.: 19 October 1982.

MAJ Jon Hawley, AF/XOXFL, Pentagon, Washington, D.C.: 19 October 1982.

Mr. William Hern and Mr. Aden Riggan, Analyst, Air Transportation Association, Washington, D.C.: 18 October 1982.

COL Lowell Jones, Chief, Airlift Mobility, Pentagon, Washington, D.C.: 19, 24 September, 19 October 1982, 8 February 1983.

COL Phil Loudon, LTC Mick Herden, Mr. Bill Beverage, HQMAC/XPW, Scott AFB, IL: 24 September 1982.

MAJ John Macrotte, AF/LET, Pentagon, Washington, D.C.: 17 December 1982.

LTC Fred McGuire, Director Engineering, Civil Reserve Air Fleet, Wright Patterson AFB, OH: 25 September 1982.

Mr. Gene Mercer, Director Forecasts, Federal Aviation Agency, Washington, D.C.: 20 October 1982.

LTC Dave Meuh, OSD/PA&E and LTC Dave Morley, OSD/MR&L, Pentagon, Washington, D.C.: 19 October 1982.

MAJ Tom Mikalojack, CSAF/CVAX, Pentagon, Washington, D.C.: 19 October 1982.

Ms. Alexandvia Molohoski, Research Analyst, Harbridge House, Inc.,
New York, NY: 17 January 1983.

LTC Jim Murphy, AF/LET, Pentagon, Washington, D.C.: 24 September,
19 October 1982, 15 December 1982.

COL Wayne Oberg, Director, Logistics, Airline Training and Systems,
Wright-Patterson AFB, OH: 24 September 1982.

Mr. Mike Sparrow, Economist, Airline Pilots Association,
Washington, D.C.: 20 October 1982.

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