

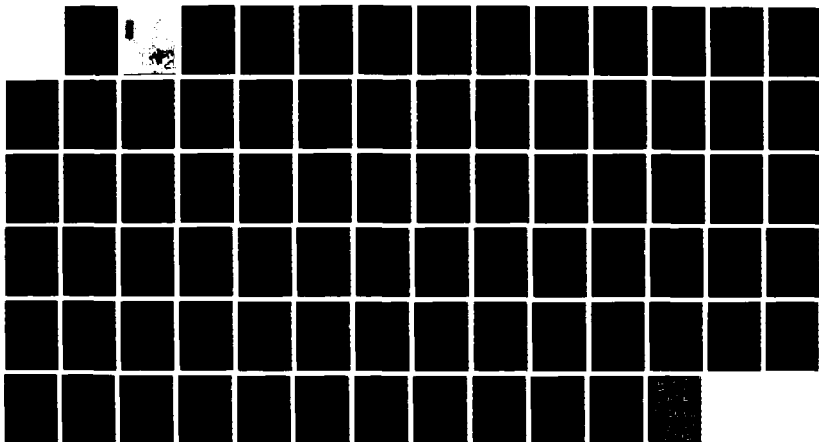
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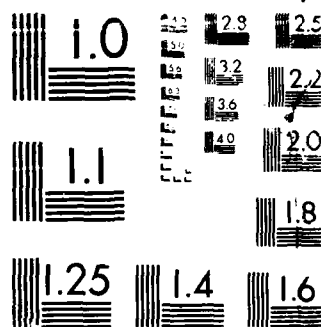
DEFENSE AND DEVELOPMENT IN SUB-SAHARAN AFRICA: CODEBOOK 1/1
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER N-2651/1-USDP	2. GOVT ACCESSION NO. 317	3. RECIPIENT'S CATALOG NUMBER	
4. TITLE and Subtitle Defense and Development in Sub-Saharan Africa: Codebook		5. TYPE OF REPORT & PERIOD COVERED Interim	
		6. PERFORMING ORG. REPORT NUMBER	
7. AUTHOR(s) Patrick J. Murphy		8. CONTRACT OR GRANT NUMBER(s) MDA903-85-C-0030	
9. PERFORMING ORGANIZATION NAME AND ADDRESS The RAND Corporation 1700 Main Street Santa Monica, CA 90406		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
11. CONTROLLING OFFICE NAME AND ADDRESS Assistant Secretary of Defense Office, Under Secretary of Defense for Policy Washington, DC 20301		12. REPORT DATE March 1988	
		13. NUMBER OF PAGES 68	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report) Unclassified	
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report) Approved for Public Release: Distribution Unlimited			
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) No Restrictions			
18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Subsaharan Africa Military Budgets National Defense Economics Developing Nations Data Bases			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) See reverse side			

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This Note documents the Defense and Development in Sub-Saharan Africa database, a collection of statistics from various sources, chiefly the International Monetary Fund and the World Bank. The purpose of the database is to clarify the methods and figures used to measure defense spending in various countries by presenting the different data sources and explaining how they were compiled. The statistics in the database cover 41 African countries for the years 1970-1985 and fall under ten main headings: debt; price indexes; income; military expenditures, foreign military presence, government expenditures; national accounts; development assistance; social/political indicators; and weather. (See also N-2650, N-2651/2, N-2652, N-2653, N-2655, N-2656, N-2657.)

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A RAND NOTE

N-2651/1-USDP

**Defense and Development in Sub-Saharan Africa:
Codebook**

Patrick J. Murphy

March 1988

**Prepared for
The Office of the Under Secretary of Defense
for Policy**

40 Years
1948-1988
RAND

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

PREFACE

This Note is one in a series reporting the findings of a RAND project on Defense and Development in Africa. This project is part of RAND's international economics program and is funded by the Office of the Assistant Secretary of Defense (International Security Policy). The technical client for this project is the Africa Region, Office of the Assistant Secretary of the Defense for International Security Affairs, Department of Defense.

The research output from this project should be of particular interest to policymakers concerned with economic development and security policy in that region. This particular Note should be useful to potential users of the Sub-Saharan Africa Database, specifically, to researchers conducting empirical research on Africa. This database could prove an invaluable resource, in that it combines data from a variety of sources in a consistent manner.

In order to provide a reference that is easy to use, this Note has been divided into two volumes. This volume, N-2651/1-USDP, contains the codebook for the database with all of the relevant documentation. The second volume, ^(N-2651/2-USDP) N-2651/2-USDP, presents the database in the form of several tables.

Other publications from the same project include:

- James Rosberg, Kwabena Gyimah-Brempong, Francois Goreux, *Defense and Development in Africa: Annotated Bibliography*, N-2657-USDP.
- Kwabena Gyimah-Brempong, *Defense and Development: A Review of the Statistical and Econometric Literature*, N-2650-USDP.

- Judith C. Fernandez, *Some Evidence on the Relation Between Military Rule and Economic Regime in Sub-Saharan Africa*, N-2652-USDP.
- Daniel F. Kohler, *The Effects of Defense and Security on Capital Formation in Africa: An Empirical Investigation*, N-2653-USDP.
- Elliot Berg and Alexander Berg, *Security Expenditures in Senegal: An Analysis of National Data*, N-2655-USDP.
- Elliot Berg with the assistance of Jeremy Foltz, *The Nonmilitary Uses of Military Forces*, N-2656-USDP.



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SUMMARY

The Defense and Development in Sub-Saharan Africa Database is a collection of statistics from various sources, reflecting the goals of the project. First, the two main sources for the compilation of international statistics, the International Monetary Fund and the World Bank, were used to produce a common set of basic economic indicators for these African countries. Second, an attempt was made to present the greatest number of possible sources offering estimates of national military expenditures. Controversy and confusion surround the methods and figures used to measure defense spending in all countries.¹ The purpose of this database is not to provide a "definitive" estimate of military spending, but rather to present the different sources, explain how they were compiled, and enable the user to decide how these data should be evaluated. In some cases, as many as six sources were cited for a single measure. Several graphs that plot some of the different military expenditure sources against one another appear as an appendix to this codebook.

Sources of military expenditure data include a series of tables compiled by Professor Robert West of the Fletcher School of Law and Diplomacy at Tufts University. Professor West combined data from the U.S. Arms Control and Disarmament Agency and the U.N. International Comparisons Project, a cooperative undertaking of the University of Pennsylvania, the United Nations, and the World Bank, under the direction of Robert Summers and Alan Heston. Professor West's variables include estimates of purchasing power parity coefficients and provide a starting point for individuals wanting to compare absolutes in international prices. Other statistics have been calculated and included in the database, which attempt to provide indexes of the threat faced by countries on their borders and the presence of foreign powers in Africa.

¹Nicole Ball, "Measuring Third World Security Expenditure: A Research Note," *World Development*, February 1984, pp. 157-164

Finally, in addition to the economic and military data, some statistics have been compiled that monitor social and political changes in these countries during the period under study. The majority of these indicators come from the Cross-National Time-Series Data Archive maintained by the Center for Social Analysis, State University of New York, Binghamton.

The Sub-Saharan Africa database exists in two types of "machine-readable" formats: a SAS database file and a series of Lotus 1-2-3 worksheets formatted for an IBM personal computer.

This codebook is intended to serve as a documentation source for both formats; however, the user should understand that the two databases are not identical. For example, many binary variables that appear on the SAS database are not included in the worksheets. The first appendix lists the variables and descriptions and should serve as a guide to the availability of particular variables.

Of particular note to the Lotus worksheet user is that all files follow a common format and correspond to the major subsections of this codebook (i.e., one worksheet will include all of the variables discussed in the National Accounts section). Variable names, which appear in all capital letters following each description, are SAS variable names as well as Lotus "rangenames." This information should prove useful for individuals who wish to combine a few variables from different files. Each Lotus file is also self-documenting with source notes appearing at the bottom of the spreadsheet.

Appendix B documents four worksheets, available only in Lotus form, which track changes in military equipment for the 41 countries. Each worksheet provides a "snapshot" of the available military equipment information for each of the following years: 1970, 1975, 1980, and 1985. Because of the descriptive nature of these worksheets, they are not compatible with the above mentioned Lotus files.

The statistics in the database cover 41 countries for the years 1970 to 1985 and fall into ten main subheadings: debt, indexes, income, military expenditures, foreign military presence, government expenditures, national accounts, aid and development assistance,

social/political, and weather. To provide a useful reference for those using the database, the information in this Note will be organized under these headings. The following countries are included in the study:

ANGOLA	MADAGASCAR
BENIN	MALAWI
BOTSWANA	MALI
BURKINA FASO	MAURITANIA
BURUNDI	MAURITIUS
CAMEROON	MOZAMBIQUE
CENTRAL AFRICAN REPUBLIC	NIGER
CHAD	NIGERIA
CONGO	RWANDA
DJIBOUTI	SENEGAL
EQUATORIAL GUINEA	SIERRA LEONE
ETHIOPIA	SOMALIA
GABON	SUDAN
GAMBIA	SWAZILAND
GHANA	TANZANIA
GUINEA	TOGO
GUINEA-BISSAU	UGANDA
IVORY COAST	ZAIRE
KENYA	ZAMBIA
LESOTHO	ZIMBABWE
LIBERIA	

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I. AFRICAN DEBT STATISTICS

SOURCES AND NOTES ON COLLECTION OF DATA

Twenty-one statistics exist in the database concerning the debt situations of these countries. The source for these statistics is the I.P. Sharp on-line service, which accesses the data files of the World Bank. These figures were the most recent ones available as of September 1986.

Each of these statistics is divided into two categories: Official and All Creditors. The World Bank defines debt from Official Creditors to be:¹ (a) loans from international organizations (multilateral loans), loans and credits from the World Bank, regional development banks, and other multilateral and intergovernmental agencies (excluded are loans from funds administered by an international organization on behalf of a single donor government--these are classified as loans from governments; and (b) loans from governments (bilateral loans) from governments and their agencies (including central banks), and from autonomous public bodies.

The category All Creditors encompasses transactions of Official Creditors and Private Creditors. The World Bank defines Private Creditors to be: (a) suppliers--credits from manufacturers, exporters, or other suppliers of goods; (b) financial markets--loans from private banks and other private financial institutions, and publicly issued and privately placed bonds; and (c) other--external liabilities on account of nationalized properties and unclassified debts to private creditors.

Debt data received by the World Bank from its members are expressed in the currencies in which the debts are repayable or in which the transactions took place. For aggregation, the World Bank converts those amounts to U.S. dollars using the International Monetary Fund (IMF) par values or central rates or, where appropriate, the current market rates.

¹Definitions and source information on debt statistics was extracted from The World Bank, *World Debt Tables*, 1984-85, The World Bank, Washington, D.C., 1985, pp. xxvii-xxx.

Service payments and disbursements (that is, flows) are converted to U.S. dollars at the average rate for the year. Debt outstanding at the end of a given year (that is, a stock) is converted at the rate in effect at the end of that year.

VARIABLES

Debt outstanding, including undisbursed. The sum of disbursed and undisbursed debt representing the total outstanding external obligations of the borrower at the end of the year in millions of U.S. dollars. ODUALL, ODUOFF.

Debt outstanding, disbursed only. The total outstanding debt drawn by the borrower at the end of the year in millions of U.S. dollars. DODALL, DODOFF.

Commitments. The total of loans for which contracts were signed in the year specified. COMALL, COMOFF.

Disbursements. Drawings on outstanding loan commitments during the year specified in millions of U.S. dollars. DISALL, DISOFF.

Principal repayments. Actual repayments of principal (amortization) made in foreign currencies, goods, or services in the year specified in millions of U.S. dollars. They include the repayment of outstanding arrears. PRIALL, PRIOFF.

Interest payments. Interest payments made in foreign currencies, goods, or services in the year specified in millions of U.S. dollars. INTALL, INTOFF.

Borrowing terms. The average terms of borrowing are given for all new loans contracted during the year and separately for loans from official and private creditors. To obtain averages, the interest rates, maturities, and grace periods of loans in each category have been weighted by the amounts of the loans. The grant equivalent of a loan is its commitment value, less the discounted present value of its contractual debt service; conventionally, future service payments are discounted at 10 percent. The grant element of a loan is the grant equivalent expressed as a percentage of the amount committed. It is used as a measure of the overall cost of borrowing. Loans with a grant

element of 25 percent and above are defined as concessional. The average grant element also has been weighted by the amounts of the loans. ATAGRP, ATAINT, ATAMAT, ATOGRP, ATOINT, ATOMAT, ATPGRP, ATPINT, ATPGRP.

II. GOVERNMENT EXPENDITURES

SOURCES AND NOTES ON COLLECTION OF DATA

Data on government expenditures is compiled from the International Monetary Fund's *Government Finance Statistics Yearbook, 1985*, in millions of domestic currency units. Information for the Yearbook has been provided by government finance statistics correspondents in each government or central bank. Sources for the data can be found in "Table 3" at the end of each country study in the Yearbook. The timing of entry does not always refer to calendar years; some countries report figures for years ending June 30 and others for years ending December 31, etc. The end of the fiscal year is noted in each country study in the Yearbook. Transactions are generally classified by their characteristics at the time of payment rather than by any subsequent use. Expenditure is classified by the function or purpose for which it is made and by its economic characteristics.

VARIABLES

Total expenditures. Total expenditures comprise current expenditures and capital expenditures. EXTOTIM.

Current expenditures. Current expenditures comprise expenditures for the current year excluding capital expenditures. EXCURIM.

Expenditure by Function:

Defense. Defense comprises expenditures intended mainly for military purposes by all departments for ordinary operations, construction works, and equipment. EXDEFIM.

Education. Education comprises expenditures for provision, management, inspection, and support of preprimary, primary, and secondary schools, universities and colleges, and technical, vocational, and other training institutions. Also included is expenditure on the general administration and regulation of the education system; on research into its objectives, organization, administration, and

methodology; and on subsidiary services such as transport of students, school means, and medical and dental services in schools. EXEDUIM.

Health. Health comprises expenditures on hospitals, medical and dental centers, and clinics (but not criminal asylums) with a major medical component; provision of national health and medical insurance schemes for individual health services outside hospitals; family planning; and preventive care such as immunization, inoculation, cancer tests, and other field programs. Also included is expenditure on the general administration and regulation of relevant government departments, hospitals and clinics, health and sanitation, and the national health and medical insurance schemes. EXHEAIM.

Social security and welfare. Social security and welfare comprises expenditures to compensate for temporary loss of income of the sick and temporarily disabled; to cover payments to the elderly, the permanently disabled, and the unemployed; payments of family, maternity, and child allowances; and so on. It includes the costs of welfare services such as care of the aged and the disabled and child care. Also included is expenditure on general administration, regulation, and research on social security and welfare services. EXSOCIM.

Housing. Housing and community amenities comprise expenditures on housing, such as income-related schemes; on provision, assistance, or support of housing and slum clearance activities; on community development; and on sanitary schemes. EXHOUIM.

Other. Other comprises expenditures not included elsewhere. EXOTHIM.

Deficit or surplus. The government deficit or surplus is calculated as the difference between revenue and grants received, on one hand, and expenditure and lending minus repayments, on the other. These values are compiled from the *1985 International Financial Statistics Yearbook*. DSURPIM.

Central government expenditures. The reporting source for Professor Robert West's estimates of central government expenditures is the U.S. Arms Control and Disarmament Agency (ACDA). The World Bank, however, is the primary source for this information and the ACDA

methodology of conversion is applied to obtain current year domestic currency and constant 1982 U.S. dollars (see Sec.IV, for an explanation of this methodology). Professor West, of the Fletcher School of Policy Studies, Tufts University, has then used the Purchasing Power Parity indexes to arrive at central government expenditures in current year international prices and constant 1975 international prices. CGEDCYWE, CGEU82WE, CGEPCYWE, CGEP75WE.

III. INDEXES

SOURCES AND NOTES ON COLLECTION OF DATA

Seven different indexes exist in the database for the purpose of converting figures in different currencies and time periods to a constant currency and time frame. Exchange rates and a terms of trade index also are present in the database.

Two sources were used for the indexes in the database: The World Bank and a series of tables supplied by Professor Robert West. His tables compiled figures from the U.N. International Comparison Project and the Penn World Table III (property of the ICP, available from Professor Robert Summers, University of Pennsylvania).

VARIABLES

Consumer price index.¹ The consumer price index, or retail price index, is included as an indicator of changes in the cost of living. The index measures the change in the cost, relative to a specific base period, of a typical basket of goods and services purchased by a representative group of consumers. Where a retail price index is included, the typical basket of goods and services includes not only consumer goods and services but also a broader range at the retail stage of distribution. Both the coverage and method of constructing this index vary from country to country, and in developing countries this index frequently reflects price movements in principal cities or covers only a limited number of items. For all countries, 1975 is used as a base year. CPIWB.

Wholesale price index. The wholesale price index measures average changes in the level of commodity prices at a wholesale stage of distribution. In practice, the point at which prices are obtained may vary, and the wholesale price index may pertain to prices charged by

¹Information on the sources of the three World Bank indexes was extracted from The World Bank, *World Tables Third Edition*, Johns Hopkins University Press, Baltimore, 1983, p. xi.

producers to wholesalers, by wholesalers to retailers, or to a combination of both. The commodity coverage of the index also varies widely among countries. The index may refer only to goods consumed in the domestic market, which includes imports but excludes exports, or to domestically produced goods, thus including exports but no imports. It may also reflect all goods sold at the nonretail level, which would include both imports and exports. For all countries, 1975 is used as a base year. WPIWB.

Implicit gross domestic product (GDP) deflator. The implicit GDP deflator is the index of the annual ratios of GDP at current market prices to GDP at constant market prices. It provides a comprehensive measure of the aggregate price movements of all goods and services making up the GDP. For all countries, 1975 is used as a base year. DEFLAWB.

In an effort to obtain more recent GDP deflator estimates, IMF GDP deflator estimates were adjusted to a 1975 base year and spliced onto the World Bank series. DEFLATE.

Terms of trade. The terms of trade index measures the relative level of export prices compared with import prices. Calculated as the ratio of export price index (which measures changes in the aggregate price level of a country's merchandise exports over time) to the import price index, it shows changes over time in the level of export prices as a percentage of import prices. For the years 1970 to 1974, the second edition of *World Tables* was used. For the years 1975 to 1980, the third edition was used. For 1981 and 1983, the 1985 *World Development Report* was used. For 1982 and 1984, the 1986 *World Development Report* was used. All terms were converted to the common base year of 1975 as was used in the *World Tables*, third edition. TTERMSWB.

ICP price indexes. The International Comparison Project derived price indexes based on purchasing power parity (PPP) estimates relative to other countries in the world. Different price level indexes were calculated for all income, private consumption, government consumption, and domestic investment. The PPP conversion coefficients, which appear in the database, reflect the product of the relevant price level index and the appropriate annual exchange rate. When this coefficient is

applied, it produces common world units constant for the year 1975.
PNDXY, PNDXCON, PNDXGDI, PNDXGVT.

Exchange rates. The foreign exchange rate for both the World Bank and the IMF is the annual average value of national currency units per U.S. dollar and generally represents the "trade conversion factor" as calculated by the IMF (line "rf" of *International Financial Statistics*). The variable XRATE (without a source suffix) represents a combination of two sources. The IMF rate is used for all countries except Angola and Mozambique, where Robert West's exchange rates were used. Professor West's exchange rates were calculated at the U.N. Statistical Office and are intended to represent market rates for these two countries.
XRATE, XRATEIM, XRATEWB, XRATEWE.

IV. MILITARY EXPENDITURES, FORCES, AND EXTERNAL THREATS

A variety of measures of military expenditures exist in the database and these are derived from six different sources. Three different variables estimated the size of each country's military force. In an attempt to measure the external threat faced by the countries, five variables have been calculated to estimate the military strength of countries on a nation's borders.

SOURCES AND NOTES ON COLLECTION OF DATA

U.S. Arms Control and Disarmament Agency (ACDA)¹

ACDA figures are compiled from the 1985 publication of *World Military Expenditures and Arms Transfers*. The sources for this publication include: *Government Finance Statistics Yearbook*, issued by the International Monetary Fund, and the "publications and files of other U.S. government agencies." Generally, the data represent the expenditures of the Ministry of Defense. When these are known to include the costs of internal security, ACDA attempts to remove these expenditures.

The approach used in the ACDA series of reports for most countries consists essentially of three steps:

- a. Data expressed originally in the national currency and at current prices are "deflated" or put into constant-price terms, usually by means of an implicit deflator for national GNP as a whole. This GNP price index is used for other variables--military and central government expenditures--because more appropriate price indexes for those sectors are not generally available. National currency data for all years are expressed in prices of the base year (1982 in this issue).

¹Information on the sources and computation of ACDA figures comes from U.S. Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers*, 1985, ACDA Publication 123, Washington, D.C., 1985, pp. 139-140.

- b. These data are then converted by the exchange rate between the national currency and the U.S. dollar for the base year to obtain a measure of constant base-year dollar. The exchange rate used is the annual average par/market rate (line "rf" as designated in the IMF's *International Financial Statistics*).
- c. Data in constant dollars are then expressed in current dollars by applying the U.S. implicit GNP deflator, as supplied by the World Bank.

International Institute for Strategic Studies

Defense expenditure.² "The latest available defense expenditure or budget data are quoted (in some cases estimated).... Where possible capital equipment budgets/expenditures have been added to recurrent/administrative cost. Figures may therefore be radically different from previous issues.... In cases of great variance between sources (government data, central banks, IMF, etc.) central bank data has been preferred. In many cases, internal/border security force budgets have been included. Revised budget and expenditure figures are the result of changes by the governments themselves."

Strength of military formations. "Military organization is flexible, and the manning and structure of formations may vary.... Divisional strengths cover organic units only and exclude support units or services outside the divisional structure." (For an example of the varying manpower levels organized within a division or a brigade, see p. vii of *The Military Balance* 85-86).

Stockholm International Peace Research Institute³

Definitions. "For the purpose of showing the resources absorbed by military activities in each country, military expenditures are defined

²International Institute for Strategic Studies (IISS), *The Military Balance*, IISS, London, 1985, pp. v-vii.

³Information regarding SIPRI reporting comes from Stockholm International Peace Research Institute, *World Armaments and Disarmament, SIPRI Yearbook, 1979*, Crane, Russak, and Company, Inc., New York, 1979, pp. 58-62.

to include weapon research and development, to include military aid in the budget of the donor country and to exclude it from the budget of the recipient country, and to exclude war pensions and payment on war debts. However, a rather large proportion, especially of the developing nations, do not specify how their military outlays are spent, and thus the figures for these countries may not agree with this definition."

Countries and time period covered. "The military expenditure estimates refer to calendar years in all cases. For countries where the government fiscal year differs from the calendar year, conversion to a calendar-year basis is made on the assumption of an even rate of expenditure throughout the fiscal year. This may reduce fluctuations of the series, but does not affect the total amounts spent over the years."

Methods. "... the prime source is the series given in the United Nations' *Statistical Yearbook* (UNSY), where it is available. As a general rule no adjustments are made to these figures (which have been notified to the United Nations by governments), except to bring them up to date. The latest figures in the series have mainly been taken from journals and newspaper articles giving the most recent budget estimates. The few countries that are not included in the UNSY have presented difficulties, as most of these do not publish their defense budgets regularly. The estimates of their military spending have necessarily been derived from other sources and therefore must be taken to be highly approximate, and subject to revision when more information becomes available."

"... as the sources for the most recent years generally are not the same as those used for the earlier years in the series, the problem of interpreting and comparing different sources arises. Different sources often give widely different data, and the question of which source to use is a matter of judgement. When switching from one source to another, the percentage change from the up-to-date source has, when possible, been applied to the SIPRI series."

Sources. "The sources of the data ... are of five general types: official national documents; journals and periodicals; newspapers; books, monographs and annual reference works; and documents issued by international and intergovernmental organizations. The common criterion for all these sources is that they are open sources, available to the general public."

International Monetary Fund⁴

Defense expenditures as defined by the IMF in the *Manual on Government Finance Statistics (DRAFT)* "... covers all expenditure, whether by defense or other departments, for the maintenance of military forces, including the purchase of military supplies and equipment... Also included are capital expenditures for the provision of quarters. Military forces also include paramilitary organizations such as gendarmerie, constabulary, security forces, border and customs guards, and other trained, equipped and available for use as military personnel."

Tables Compiled by Robert West

Methods and figures used in calculating military expenditures by Robert West are essentially the same as those used by ACDA with only one exception. Where the ACDA figures do not report (i.e., missing data) West has interpolated estimates from the surrounding data to fill these gaps. For this reason, the West data provide the most consistent and comprehensive coverage for the years 1970 to 1983.

The World Bank

Defense expenditures are found in *World Tables*, "Economic Data Sheet 2," under the heading of "Total expenditure by function: defense," which comprises expenditure intended mainly for military purposes by all departments for ordinary operations, construction works,

⁴Nicole Ball, "Measuring Third World Security Expenditure: A Research Note," *World Development*, February 1984, pp. 157-164.

and equipment. For the years 1970 to 1974, the second edition (1980) of *World Tables* was used. For the years 1975 to 1981, the third edition was used.

Exchange Rates

In instances where figures were calculated from published measures in another currency, the International Monetary Fund's period average exchange rates were used in all calculations except for Angola and Mozambique, where the U.N. Statistical Office exchange rates were used.

VARIABLES

Domestic currency current year. For West, SIPRI, IISS, IMF, and the World Bank figures, military expenditures are in millions of domestic currency units for the current year as presented in the relevant publications. The ACDA figures for domestic currency, current year, are also in millions of domestic units, but these figures are calculated from the "current U.S. dollar" figure published by ACDA in *World Military Expenditures and Arms Transfers* (WMEAT)--a simple annual average exchange rate was used, as noted above. Since no attempt was made to reconstruct the conversion process originally used by ACDA, the ACDA domestic currency figures should be treated as calculated estimates only and can be used as a check on annual trends but not as a measure in absolute terms. MXDCYWE, MXDCYSP, MXDCYIS, MXDCYAC, MXDCYIM, MXDCYWB.

Current U.S. dollars. Estimates of military expenditures in current U.S. dollars for IISS and the World Bank were compiled directly from the annual publications. The ACDA and West figures were also directly entered from those sources; however, note the manner in which the conversions were made from domestic currencies to U.S. dollars, which is described above. The current U.S. dollar figure for SIPRI was calculated from the current local currency estimates and the relevant annual exchange rate. MXUCYIS, MXUCYSP, MXUCYAC, MXUCYWE.

Constant 1982 U.S. dollars. Three variables estimate military expenditures in constant 1982 U.S. dollars. The first two, Robert West's and ACDA's are simply figures that were extracted from these two

sources. As noted above, West essentially presents the same figures as ACDA, except that he has filled any gaps in the ACDA data through simple interpolation and that his estimates begin in 1970 as opposed to 1973. SIPRI constant 1982 dollars were calculated by transforming constant 1980 dollars (MXU80SP, published in the 1985 edition of *World Arms Transfers and Disarmament*) to 1982 prices and exchange rates. Price figures were interpolated from the 1980 constant figures for the years 1981 and/or 1982, for the following: Burundi, Central African Republic, Congo, Ghana, Madagascar, Malawi, Mauritania, Mauritius, Niger, Rwanda, Sierra Leone, and Tanzania. No price figures (CPI) were available for Chad, Benin, Sudan, and Mozambique, and the constant figures only reflect 1982 exchange rates. MXU82AC, MXU82WE, MXU82SP.

Purchasing power parities. Robert West combined the relevant purchasing power parity coefficients and military expenditure figures (current domestic currency units) to produce military expenditures at current international prices and constant 1975 international prices. MXPCYWE, MXP75WE.

Military forces. For all sources, the figures estimate the number of individuals enlisted as members of the standing military forces, including all branches, but excluding police and paramilitary forces (when it was possible to make such distinctions). Once again, Robert West essentially uses ACDA data but fills any gaps created by missing data through interpolation. All figures are in thousands of individuals. MFORCIS, MFORCAC, MFORCWE.

Conscription. A binary variable was created identifying which countries use conscription as a method of building their armed forces. This variable should be used with caution, however, since it is based solely on the 1985-86 edition of *The Military Balance*. In other words, if that edition stated that a country used conscripts, that country was coded a "1" for CONSCRPT. The following countries received a value of "1" for all years: Angola, Benin, Central African Republic, Chad, Ethiopia, Guinea, Guinea-Bissau, Ivory Coast, Mozambique, Niger, Senegal, Somalia, and Togo. All other countries were assigned a value of "0" for all years.

Border threat estimates. "Border threats" are calculated estimates of the surrounding military strength in neighboring countries. For each country, the percentage of shared land borders is estimated, and these percentages are used to weight five different measures of relative military strength for each year in each of the neighboring countries: the absolute size of the military force, annual military expenditures, and the ratio of military expenditures to gross domestic product, gross national product, and population. The military force figures used in these calculations were derived from a combination of the West and ACDA force numbers. The military expenditure figures used in these calculations were Robert West's military expenditures at constant 1975 international prices (purchasing power parity). For the military expenditure/GDP ratio, West's Milex figure in domestic units at current prices was used with GDP in domestic units, current prices. In an effort to maximize the number of observations, World Bank and IMF figures were combined (when appropriate) for gross domestic product and some SIPRI figures were used to supplement the West data. Only land borders were used, therefore, an island nation such as Madagascar would have a border threat of zero. BORFORC, BORMX, BORMXGDP, BORNXGNP, BORMXCAP.

<i>COUNTRY</i>	<i>PERCENTAGE SHARED/BORDER COUNTRY</i>		
Angola	35/South Africa	40/Zimbabwe	25/Zambia
Benin	40/Togo 10/Niger	40/Niger	10/Burkina Faso
Botswana	70/South Africa	30/Zimbabwe	
Burkina Faso	15/Ivory Coast 7/Benin	40/Mali 3/Togo	20/Niger 15/Ghana
Burundi	50/Tanzania	35/Rwanda	15/Zaire
Cameroon	35/Nigeria 10/Gabon	20/Chad 10/Congo	20/Cen. Afr. Rep 5/Equat. Guinea
Central African Republic	30/Chad 15/Cameroon	20/Zaire 5/Congo	20/Sudan

Chad	25/Libya 15/Cen.Afr.Rep.	25/Sudan 10/Cameroon	25/Niger
Congo	50/Zaire 10/Cen.Afr.Rep.	30/Gabon	10/Cameroon
Djibouti	80/Ethiopia	20/Somalia	
Equat.Guinea	50/Cameroon	30/Gabon	
Ethiopia	40/Sudan 20/Kenya	35/Somalia	5/Djibouti
Gabon	70/Congo	15/Equat.Guinea	15/Cameroon
Gambia	100/Senegal		
Ghana	40/Togo	35/Ivory Coast	25/Burkina Faso
Guinea	25/Mali 10/Guinea-Bis.	25/Ivory Coast 15/Sierra Leone	5/Senegal 10/Liberia
Guinea-Bis.	50/Senegal	50/Guinea	
Ivory Coast	15/Mali	15/Burkina Faso	35/Ghana
Kenya	30/Tanzania 20/Ethiopia	40/Uganda 5/Sudan	25/Somalia
Lesotho	100/South Africa		
Liberia	30/Sierra Leone	40/Ivory Coast	30/Guinea
Madagascar	0		
Malawi	35/Zambia	50/Mozambique	15/Tanzania
Mali	30/Mauritania 6/Ivory Coast 20/Algeria	6/Senegal 15/Burkina Faso	8/Guinea 15/Niger
Mauritania	40/Mali 30/Morocco	15/Senegal	15/Algeria
Mauritius	0		
Mozambique	20/Malawi 5/Swaziland	25/Zimbabwe 10/Zambia	20/South Africa 20/Tanzania
Niger	25/Nigeria 15/Mali	5/Benin 20/Algeria	10/Burkina Faso 10/Libya

Nigeria	40/Niger 5/Chad	20/Benin	35/Cameroon
Rwanda	30/Zaire 20/Uganda	25/Burundi	25/Tanzania
Senegal	20/Gambia 15/Guinea	30/Mauritania 20/Mali	15/Guinea-Bis.
Sierra Leone	65/Guinea	35/Liberia	
Somalia	5/Djibouti	65/Ethiopia	30/Kenya
Sudan	30/Ethiopia 15/Chad 3/Kenya	7/Zaire 5/Libya 5/Uganda	15/Cen. Afr. Rep. 20/Egypt
Swaziland	75/South Africa	25/Mozambique	
Tanzania	30/Mozambique 10/Burundi 30/Kenya	6/Malawi 7/Rwanda	10/Zambia 7/Uganda
Togo	45/Ghana	45/Benin	10/Burkina Faso
Uganda	25/Sudan 10/Tanzania	30/Zaire 25/Kenya	10/Rwanda
Zaire	25/Angola 2/Burundi 15/Cen. Afr. Rep.	20/Zambia 10/Uganda 15/Congo	5/Rwanda 8/Sudan
Zambia	25/Angola 10/Malawi	30/Zaire 10/Mozambique	5/Tanzania 20/Zimbabwe
Zimbabwe	25/Botswana 15/Zambia	15/South Africa	35/Mozambique

Threat. Three binary variables were created to represent countries that faced an external threat from a powerful neighbor. The THRTSA variable was coded "1" for countries that border South Africa. THRTLYB was coded "1" for countries bordering Libya. THRT was coded "1" for countries that bordered either Libya or South Africa. All other countries were coded "0" for these variables.

V. FOREIGN MILITARY PRESENCE

Estimates of the role played by foreign powers in Africa during the years studied come from the annual publication noted above, *The Military Balance*. Information was collected from each issue beginning with 1970-71 to 1985-86 regarding deployment of foreign troops and cooperation between African nations and other states.

FOREIGN TROOPS

If an actual figure was published by IISS regarding the deployment of troops in Africa, then that is the figure used. This information appears either in the entry regarding a particular African country or in the entry for the relevant outside power. If foreign troops or advisors are known to be in a certain country but IISS did not quote an exact number (i.e., "advisors are known to exist in..."), then that value is recorded as 0.5. For countries and years where no mention was made of the presence of foreign troops, an entry of 0 was made. This variable should be examined with caution, however, since the reporting of this statistic in IISS was not always consistent. A value of 0, therefore, could be coded when in fact foreign troops or advisors were assigned to that country. The 0 value simply indicates that IISS did not report their presence. Regarding the deployment of French troops in the Francophone nations for specific years, the following estimates were made on the basis of limited IISS data: Central African Republic, estimated at 400 troops for 1976 to 1979; Djibouti, interpolated from 1976 to 1977; Gabon, estimated at 300 for 1973 to 1978; Ivory Coast, estimated at 500 for 1973 to 1977; Senegal, estimated at 1500 for 1973 to 1975 and estimated at 1000 for 1976 to 1977.

These estimates were based on cited numbers of French troops that were deployed in all of Africa "as necessitated by the local situation." FTRPFRIS, FTRPRUIS, FTRPCUIS, FTRPGDIS, FTRPOTIS.

A variable that attempts to provide a relative indicator of the presence of foreign troops in African countries is FTROOPIS, the coded foreign troop measure. From the above figures, the ratio of the sum of foreign troops was calculated relative to the total number of troops in the country. This indicator, converted to a percentage, was coded as follows:

- 0 If the sum of foreign troops equaled zero.
- 1 If less than 1 percent or if an unquantified number of foreign troops were present.
- 2 If less than 5 percent and greater than 1 percent of foreign troops were present.
- 3 If less than 10 percent and greater than 5 percent of foreign troops were present.
- 4 If greater than 10 percent of foreign troops were present.

AGREEMENTS AND/OR COOPERATION

Variables regarding agreements, either formal or simple cooperation, are divided into two categories: those with external powers and regional arrangements.

External Cooperation

Six variables track the status of cooperation between African nations and the United States, France, USSR, China, Cuba, and "Other" countries. These are coded as follows:

- 0 If no cooperation is noted between the two countries.
- 1 If a "friendship" agreement was signed, military assistance was being provided, or some unspecified cooperation existed.
- 2 If the cooperation entailed the presence of foreign troops or advisors, or military access to facilities.
- 3 If the country was a colony or territory of the external nation.

One should note that an entry of 0 does not necessarily indicate that no cooperation existed but that IISS did not specifically note it. This information was compiled solely on the basis of IISS publications. In some instances, countries may no longer recognize these arrangements; however, the agreement is still on the books. AGREUSIS, AGREFRIS, AGRERUIS, AGRECHIS, AGRECUIS, AGREOTIS.

Eastern Bloc Associations

The binary variable SOVSOC was used to identify those countries with Eastern Bloc Associations. Benin, Congo, and Guinea-Bissau were assigned values of 1 for SOVSOC for all years. Angola and Mozambique were assigned a 1 for years after 1975; Somalia before 1978; Ethiopia after 1977; and Guinea before 1979. All other countries were assigned a 0 for all years.

Regional Multilateral Arrangements

Multilateral agreements within Africa was coded as follows (REGMULIS):

- 0 If no multilateral agreements were signed.
- 1 Member of the Economic Community of Western African States (ECOWAS)
- 2 Member of the Defence Council of Equatorial Africa
- 3 Member of Conseil de Defense de l'Afrique Equatoriale
- 4 Member of the League of Arab States.

Regional Bilateral Agreements

This variable simply records the number of formal regional bilateral agreements in effect during a given year. REGBILIS.

VI. NATIONAL INCOME

SOURCES AND NOTES ON COLLECTION OF DATA

Data on the size and composition of gross national product and gross domestic product are supplied by the World Bank. Some figures are available from Robert West; however, these numbers represent certain calculations of World Bank data. *World Tables* third edition supplied the figures for 1970 to 1981 and annual editions of *World Development Report* were used for information after 1981.

VARIABLES¹

Gross domestic product. GDP measures the total final output of a country's economy--all goods produced and services rendered within its territory by residents and nonresidents--without regard to its allocation among domestic and foreign claims. Its value is calculated before deductions are made for depreciation and other capital consumption allowances. GDPWB.

Gross national product. GNP is the measure of total domestic and foreign output claimed by residents of a country. The difference between GDP and GNP is the net factor income from abroad. GNPWB.

Gross domestic product by industrial origin. GDP by industrial origin shows the value added in each of the following sectors of the economy:

Agriculture: ISIC division 1, including agriculture, forestry, hunting, and fishing. GDAGRWB.

Mining: ISIC division 2, including coal and metal mining, petroleum and natural gas production, and quarrying. GDMINWB.

Manufacturing: ISIC division 3. GDMANWB.

¹Information on the World Bank national income figures was extracted from the World Bank, *World Tables* third edition, p. x.

Construction: ISIC division 5. GDCONWB.

Electricity, gas, and water: ISIC division 4. GDELEWB.

Transportation and communications: ISIC division 7.
GDTRNWB.

Trade and finance: ISIC divisions 6 and 8. GDTRDWB.

Public administration and defense: ISIC division 91.
GDPUBWB.

Other branches: ISIC division 9 less division 91,
including ownership of dwellings and private services,
together with any statistical discrepancy that may
arise from the use of alternative methods of
calculating GNP. GDOTHWB.

SPECIFIC NOTES

- a. Lesotho 1980 "other" figure includes transportation, trade, and public administration.
- b. For Mauritania, 1970-72, transportation, trade and finance, and public administration figures are included in "other". For 1973-81, electricity, gas, and water are included in "manufacturing"; "other" is included in trade and finance.
- c. Senegal, 1970-76, figures for mining and electricity are included in manufacturing. For 1977-81, electricity is included in manufacturing.
- d. Uganda 1977-81, electricity is included in other.

Robert West's tables provided the data for real per capita GDP; however, this information was originally presented in a paper by Professors Summers and Heston, University of Pennsylvania.² GDP per

²Robert Summers, and Alan Heston, "Improved International Comparisons of Real Product and Its Composition: 1950-1980," *Review of Income and Wealth*, Vol. 30, No. 2, June 1984, pp. 207-262.

capita is expressed in 1975 international prices as calculated with the U.N. purchasing power parity conversions. A second variable, RGCAPXWE, presents GDP per capita is expressed in 1975 international prices after adjusting for changes in the terms of trade (domestic absorption in 1975 international prices; net foreign balance in current prices). A third variable that provides a relative comparison of GDP per capita is USCOMPWE, which expresses the ratio of the African nations real GDP per capita in 1975 international prices to the U.S. real GDP per capita in 1975 international prices. RGCAPWE, RGCAPXWE, USCOMPWE.

VII. NATIONAL ACCOUNTS STATISTICS

SOURCES AND NOTES ON COLLECTION OF DATA

Essentially two sources provide national accounts statistics, the International Monetary Fund and the World Bank. Some figures are available from Robert West; however, these numbers represent certain calculations of World Bank data. IMF data come from *International Financial Statistics Yearbook, 1985*, supplemented by on-line services and monthly IMF publications. *World Tables* third edition supplied the World Bank figures for 1970 to 1981 and annual editions of *World Development Report* were used for information after 1981.

VARIABLES

IMF National Accounts Statistics and Transfers¹

(All IMF figures are in millions of current domestic currency.)

Gross domestic product. Gross output of goods and services covers both the value of goods and services produced for sale and the value of goods and services produced for own use. It includes (a) the domestic production of goods and services that are either for sale or for transfer to others; (b) net additions to work in progress valued at cost and to stocks of finished goods valued in producers' prices; (c) products made on own account for government or private consumption or for gross fixed capital formation; and (d) rents received on structures, machinery, and equipment (but not on land) and imputed rent for owner-occupied dwellings. GDPIM.

Net factor payments. Net factor payments constitute the net of payments abroad for factor services rendered by nonresidents and income received from abroad by residents as compensation. FACPMTIM.

¹National Accounts Statistics reported in the IMF's *International Financial Statistics* (pp. xi-xiv) in general come from the United Nations. Information regarding the collection of these figures, therefore, was extracted from U.N. Statistical Office of the Department of International Economic and Publications, New York, 1985.

Gross national product. Gross national product is defined as the net of GDP and net factor payments. GNPIM.

Imports of goods and services. Imports of goods and services include broadly the equivalent of general imports of merchandise plus imports of services and direct purchases abroad made by resident households and by the government on current account. Transfer of migrants' household and personal effects and gifts between households are also included. Additions and deductions are performed to move from the general trade concept to the national accounting concept. The valuation of imports is c.i.f. In principle, transactions should be recorded at the moment the transfer of ownership takes place and not when goods physically enter the domestic territory, but in practice the time of recording used in the national accounts usually must follow that used in the external trade statistics. MGSIM.

Government consumption. Government final consumption expenditure is equal to the service produced by the general government for its own use. Since these services are not sold, they are valued in the gross domestic product at their cost to the government. This cost is defined as the sum of (1) intermediate consumption, (2) compensation of employees, (3) consumption of fixed capital, and (4) payments of indirect taxes, less (5) the value of own-account production of fixed assets, and less (6) sales of goods and services. GVTCONIM.

Private consumption. Private consumption expenditure measures the final consumption expenditure of all resident nongovernmental units. It is the sum of final consumption expenditure of households and that of private nonprofit institutions serving households. PVTCONIM.

Increase in stocks. This flow includes the value of the physical change in (a) stocks of raw materials, work in progress, and finished goods held by private producers, and (b) stocks of strategic materials held by the government. Work put in place on buildings and other structures, roads, and other construction projects is treated as gross fixed capital formation. INSTKSIM.

Gross capital formation. This flow is defined to include purchases and own-account production of new producers' durable goods, reduced by net sales to the rest of the world of similar second-hand or scrapped goods. Outlays of producers of government services for military purposes (except on land and certain civilian-type items, such as schools, hospitals, family-type housing and, in some cases, roads when for civilian use) are, however, considered to be current expenditures. "Military purposes" are here construed in terms of final expenditures: They include the military airport but not the bulldozer used in constructing the airport. Outlays on alteration or extension of fixed productivity are included, but outlays on repair and maintenance to keep fixed assets in good working order are not. All costs are included that are directly connected with the acquisition and installation of the fixed assets, such as customs duties and other indirect taxes, transport, delivery and installation charges, site clearing, planning and designing costs, legal fees, and other transfer costs with respect to transactions in land, mineral deposits, timber tracts, etc. However, the costs of financing are excluded. GFXDKIM.

Real capital stock. Three series of real capital stock accumulation were estimated based on the IMF gross fixed capital figures. The gross fixed capital figures were compiled back to 1968 and then calculated in real terms with the use of the GDP deflator. The initial value was assumed to be one-half of the 1968 figure and the annual gross fixed capital figure was added to it for each of the following years. Finally, the stock series were discounted at 8, 10, and 12 percent to produce real capital stock. RKAP08, RKAP10, RKAP12.

Exports of goods and services. Exports of goods and services are defined the same way as imports, above. Exports are, however, valued f.o.b., whereas imports are valued c.i.f. XGSIM.

Imports and exports--foreign trade. Foreign trade values cover merchandise transactions usually recorded by customs authorities. All countries report export values f.o.b. and most countries report import values c.i.f. EXPIM, IMPIM.

Private unrequited transfers. Private unrequited transfers appear in *International Financial Statistics* in millions of U.S. dollars. These figures are converted to millions of domestic currency with the appropriate annual average exchange rate. PUTRANIM.

Official unrequited transfers. Official unrequited transfers appear in *International Financial Statistics* in millions of U.S. dollars. These figures are converted to millions of units of domestic currency with the appropriate annual average exchange rate. OUTRANIM.

World Bank National Accounts Statistics and Transfers²

(All World Bank figures are in millions of units of current domestic currency.)

Gross national product. GNP is the measure of total domestic and foreign output claimed by residents of a country. The difference between GDP and GNP is the net factor income from abroad. GNPWB.

Net factor income from abroad. Net factor income from abroad comprises the income received from abroad by residents as compensation for factor services rendered, less payments abroad for factor services rendered by nonresidents. NETFACWB.

Gross domestic product. GDP measures the total final output of a country's economy--all goods produced and services rendered within its territory by residents and nonresidents--without regard to its allocation among domestic and foreign claims. Its value is calculated before deductions are made for depreciation and other capital consumption allowances. GDPWB.

Imports of goods and nonfactor services. Imports consists of the value of goods and nonfactor services purchased from the rest of the world. Included are merchandise, transport, travel, insurance, and other nonfactor services. Gifts in kind and imports by means of international transfers are included, but the value of military equipment transferred between governments is generally excluded. MGSWB.

²World Tables third edition, pp. x-xi.

Exports of goods and nonfactor services. Exports consists of the value of goods and nonfactor services sold to the rest of the world. XGSWB.

Net balance of goods and services. Net balance of goods and services constitutes the net income from exports of goods and services (factor and nonfactor). NBALWB.

Private consumption. Private consumption comprises the market value of all goods and services purchased or received as income in kind by households and private nonprofit institutions, including the imputed rent for owner-occupied houses. PVTCONWB.

General government consumption. General government consumption comprises all current expenditure for purchases of goods and services by government bodies: that is, central, regional, and local governments; separately operated social security funds; and international authorities that exercise tax or governmental expenditure functions within the national territory. It excludes outlays of public nonfinancial enterprises and public financial institutions. The current expenditure of general government covers outlays for compensation of employees, purchases of goods (excluding the acquisition of land and depreciable assets), and services from other sectors of the economy, military equipment, and other purchases from abroad. Capital expenditure on national defense (except for civil defense) is treated as consumption, whereas all expenditure on capital formation (including civil defense) is included in gross domestic investment. GVTCONWB.

Gross domestic investment. Gross domestic investment or gross domestic capital formation measures the outlays for the addition of reproducible capital goods to the fixed assets of private and public enterprises, private nonprofit institutions, and general government (reduced by their net sales of used or scrapped capital goods) and the value of the net increase or decrease in inventories. This category includes all new items produced domestically or purchased from abroad, as well as all imported second-hand goods. It also covers all new dwellings (including those acquired by owner-occupants), expenditures on the improvement of durable goods and nonreproducible tangible assets

(such as land, mineral deposits, plantations, orchards, and vineyards), and additions to livestock herds. Dealers' margins and other transfer costs arising from sales or purchases of land and other nonreproducible tangible assets and of used equipment are included. Government outlays for construction and durable goods for military purposes are excluded. GDIWB.

Gross national saving (excluding net current transfers from abroad). Gross national saving (excluding net current transfers from abroad) shows the amount of gross domestic capital formation financed from national output. It is gross domestic investment plus the net exports of goods and services (factor and nonfactor). GNSXWB.

Gross national saving (including net current transfers from abroad). Gross national saving (including net current transfers from abroad) shows the total resources available for investment from 1967 onward. It is gross national saving (excluding net current transfers from abroad), with net current transfers from abroad added. The data source does not distinguish between current and capital transfers, so all transfers are included. Net current transfers from abroad are named net unrequited transfers in the balance of payments section. GNSIWB.

Net unrequited transfers. Net unrequited transfers, which is net of workers' remittances (net), comprise net transfer payments--between private persons, nonofficial organizations, and governments of the compiling country and the rest of the world--that carry no provision for repayment. Included are transfers by migrants; gifts, dowries, and inheritances; alimony and other support remittances; and government grants of real resources and financial items, such as subsidies to current budgets (including defense budgets), grants of technical assistance, and government contributions to international organizations for administrative expenses, other than those items already included in workers' remittances. Net unrequited transfers appear in "Data Sheet 2" of *World Tables* in millions of U.S. dollars. These figures have been converted to millions of units of domestic currency using the appropriate annual average exchange rate. Because of limited coverage in "Data Sheet 2," information for years 1970 to 1974 comes from *World Tables* second edition and information for years 1975 to 1981 comes from *World Tables* third edition. NUTRANWB.

Robert West's Gross National Product Figures

Robert West's figures for gross national product are derived from World Bank estimates and then converted domestic currency into constant 1982 dollars, purchasing power parity international prices for the current year, and PPP constant 1975 prices. GNPDCYWE, GNPU82WE, GNPPCYWE, GNPP75WE.

1975 Constant Prices Filled Series

For three variables, gross national product, gross domestic product, and gross domestic investment, series of values were generated by deflating to constant 1975 prices and "filling in" any gaps in the data. Values from the World Bank were the starting point and were supplemented with data from the International Monetary Fund (where appropriate). Gaps in the data of one to two years were spanned by simple interpolation. The result is three variables in constant 1975 domestic currency units for GNP, GDP, and GDI with maximum coverage over the period. GNP75FD, GDP75FD, GDID75FD.

VIII. AID AND DEVELOPMENT ASSISTANCE

SOURCES AND NOTES ON COLLECTION OF DATA

Official development assistance and Food Aid statistics are compiled from two World Bank publications: *Accelerated Development in Sub-Saharan Africa* for the years 1970 to 1975 and *Toward Sustained Development in Sub-Saharan Africa* for years after 1975.

The composition of official development assistance is compiled from four volumes of *Geographical Distribution of Financial Flows to Developing Countries*, published by the Organization for Economic Co-operation and Development. Issues from 1977 (for years 1970 to 1975), 1980 (for years 1976 to 1979), 1984 (for years 1980 to 1982), and 1986 (for years 1983 and 1984) were used.

VARIABLES

The World Bank Development Aid Statistics

Official development assistance.¹ ODA consists of loans and grants made at concessional financial terms by official agencies of the members of the Development Assistance Committee (DAC) of the Organization for Economic Co-operation and Development (OECD), and members of the Organization of Petroleum Exporting Countries (OPEC) with the objective of promoting economic development and welfare. These figures appear in millions of U.S. dollars and have been converted to millions of units of domestic currencies with the appropriate annual average exchange rate. ODAWB.

Food aid imports. Food Aid includes cereals only and is expressed in metric tons grain equivalent. The data are for the fiscal year extending from July 1 of the preceding calendar year and ending on June 30 of the current calendar year. FOODWB.

¹Information on the method of compiling figures for ODA and Food Aid is extracted from The World Bank, *Toward Sustained Development in Sub-Saharan Africa*, The World Bank, Washington, D.C., 1984, p. 95.

Organization for Economic Co-operation and Development (OECD)²

All figures are reported in millions of current U.S. dollars.

Total ODA. Total official development assistance is the net ODA provided by OECD/DAC members (either individually or as a group), multilateral agencies (individually or as a group), and the Organization of Petroleum Exporting Countries (OPEC). ODAOECD.

U.S. ODA. Net official development assistance provided by the United States as reported to the OECD. ODAUSOE.

Multilateral organizations' ODA. Net official development assistance from the following multilateral organizations: the World Bank, the International Development Association, the Inter-American Development Bank, the African Development Bank, the African Development Fund, the Asian Development Bank, the Caribbean Development Bank, the International Fund for Agricultural Development, all U.N. Programs, and flows from the European Economic Community as an institution. ODAMUOE.

European Economic Community ODA. Net official development assistance from the EEC is calculated as the sum of the ODA from the individual countries and the flows from the EEC as an institution. ODAECOE.

Organization of Petroleum Exporting Countries' ODA. Net official development assistance from OPEC is the sum of the flows from the following countries: Algeria, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela. ODAOPOE.

²Information regarding the compilation of OECD statistics was extracted from Organization for Economic Co-operation and Development, *Geographical Distribution of Financial Flows to Developing Countries*, OECD, Paris, 1986.

IX. SOCIAL/POLITICAL STATISTICS

SOURCES AND NOTES ON COLLECTION OF DATA

Several sources contributed to the collection of variables that estimate changes in societies: World Bank, IMF, United Nations, and the Center for Social Analysis (SUNY, Binghamton). The Center for Social Analysis produces the Cross-National Time-Series Data Archive, which compiles and updates several variables on governments, education, and conflict event data for countries around the world. The Center draws on several sources for its information, but for the variables presented in this database, most figures come from the U.N.s' Statistical Office and the *New York Times*.

VARIABLES

World Tables, Third Edition, Volume II, Social Data¹

Population. Population figures exist from two sources, the World Bank and the International Monetary Fund. Both variables are in millions and represent mid-year estimates. POPWB, POPIM.

Urban population. Urban population indicates the percentage of the total population living in urban areas. Urban population is usually defined as inhabitants of cities and towns, but because of differing definitions of urban areas among countries, data comparability problems could arise. URBANWB.

Primary school enrollment. This figure expresses enrollment of all ages in primary schools as a percentage of the population of primary school age, which normally covers all children from ages 6 to 11. For countries with universal education, the enrollment ratio may exceed 100 percent (especially at the primary level) because some pupils are below or above the official school age. The school-age population on which the ratio is based may thus be smaller than the enrollment. PRISCHWB.

¹Information on the collection of these social statistics comes from *World Tables* third edition, Volume II, Social Data, pp. ix-xi.

Secondary school enrollment. This figure expresses enrollment of all ages in secondary schools as a percentage of the population of secondary school age. Secondary education requires at least four years of approved primary instruction, and typically it provides general or vocational instruction for those in the 12 to 17 age group. SECSCHWB.

Literacy. Adult literacy rate is the number of adults with the ability to both read and write expressed as a percentage of the adult population age 15 years and over. LITERWB.

Labor force participation. This figure expresses the activity rate of the labor force as a percentage of the population of all ages. These are based on the International Labor Office's *Yearbook of Labor Statistics*. LABFORWB.

Labor force in industry. This figure expresses the number in the labor force for industry as a percentage of the number in the labor force. Industrial activities include mining and quarrying, manufacturing, construction, and public utilities. LABINDWB.

Unemployment. The unemployment figure is taken from the U.N. *Statistical Yearbook* and is based on International Labor Office data. The percentage represents the total number of unemployed compared to the total members of that group of the labor force on which the unemployment data are based. UNEMPUN.

**CROSS-NATIONAL TIME-SERIES DATA ARCHIVE, CENTER FOR
SOCIAL ANALYSIS, STATE UNIVERSITY OF NEW YORK AT BINGHAMTON²
Education**

The Center for Social Analysis attempted to standardize the reporting of educational statistics according to the relevant UNESCO criteria:

- a. *First level:* Education whose main function is to provide basic instruction in the tools of learn (e.g., at elementary school,

²Arthur S. Banks, *Cross-National Time-Series Data Archive User's Manual*, Revised Edition, Center for Social Analysis, State University of New York at Binghamton, September 1979.

primary school). Its length may vary from 4 to 9 years, depending on the organization of the school system in each country.

- b. *Second level*: Education based upon at least four years of previous instruction, or both (e.g., at middle school, secondary school, or high school).
- c. *Third level*: Education that requires, as a minimum condition of admission, the successful completion of education at the second level, or evidence of the attainment of an equivalent level of knowledge. (U.N. *Statistical Yearbook*: 1971, p. 774).

Elementary school enrollment. ELESCHCN

Secondary school enrollment. SECSCHCN

University enrollment. UNIVERCN

Conflict Event Data

The eight conflict event variables were derived from the daily files of the *New York Times*.

Assassinations. Any politically motivated murder or attempted murder of a high government official or politician. ASCN.

General strikes. Any strike of 1,000 or more industrial or service workers that involves more than one employer and that is aimed at national government policies or authority. GSCN.

Guerrilla warfare. Any armed activity, sabotage, or bombings carried on by independent bands of citizens or irregular forces and aimed at the overthrow of the present regime. GWCN. A binary variable, GWDUMMY, is defined as 1 when GWCN is greater than 0, and 0 in all other cases.

Major government crises. Any rapidly developing situation that threatens to bring the downfall of the present regime--excluding situations of revolt aimed at such overthrow. GCCN.

Purges. Any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition. PGCN.

Riots. Any violent demonstration or clash of more than 100 citizens involving the use of physical force. RICN.

Revolutions. Any illegal or forced change in the top governmental elite, any attempt at such a change, or any successful or unsuccessful armed rebellion whose aim is independence from the central government. RVCN.

Antigovernment demonstrations. Any peaceful public gathering of at least 100 people for the primary purpose of displaying or voicing their opposition to government policies of authority, excluding demonstrations of a distinctly antiforeign nature. DMCN.

Political Variables

Type of Regime. RGCN

- 1 Civilian. Any government controlled by a nonmilitary component of the nation's population.
- 2 Military-civilian. Outwardly civilian government effectively controlled by a military elite. Civilians hold only those posts (up to and including that of Chief of state) for which their services are deemed necessary for successful conduct of government operations. An example would be retention of the Emperor and selected civilian cabinet members during the period of Japanese military hegemony between 1932 and 1945.
- 3 Military. Direct rule by the military, usually (but not necessarily) following a military coup d'etat. The governing structure may vary from use of the military chain of command under conditions of martial law to the institution of an ad hoc administrative hierarchy with at least an upper echelon staffed by military personnel.
- 4 Other. All regimes not falling into one or another of the foregoing categories, including instances in which a country, save for reasons of exogenous influence, lacks an effective national government. An example of the latter would be Switzerland between 1815 and 1848.

Military governments. A variable created directly from information in the Cross-National database is MIL. MIL is assigned a value of 1 if RGCN equals 3 and .5 if RGCN equals 2. In all other cases, MIL is assigned a value of 0.

Coups d'etat. The number of extraconstitutional or forced changes in the top government elite and/or its effective control of the nation's power structure in a given year. The term "coup" includes, but is not exhausted by the term "successful revolution." Unsuccessful coups are not counted. CECN.

Major constitutional changes. The number of basic alterations in a state's constitutional structure, the extreme case being the adoption of a new constitution that significantly alters the prerogatives of the various branches of government. Examples of the latter might be the substitution of presidential for parliamentary government or the replacement of monarchical by republican rule. Constitutional amendments that do not have significant impact on the political system are not counted. CCCN.

Head of state. HSCN.

- 1 Monarch. Chief of state is a monarch (either hereditary or elective) or a regent functioning on a monarch's behalf.
- 2 President. Chief of state is a president who may function as chief executive or merely as titular head of state, in which case that individual will possess little effective power. The presiding officer of a legislative assembly or state council may qualify for the coding, even though the formal title may be that of "chairman."
- 3 Military. A situation in which a member of the nation's armed forces is recognized as the formal head of government. In case of conflict between (2) and (3), coding is determined on the basis of whether the incumbent's role is intrinsically military or civilian in character.

- 4 Other. In practice, this category is used when no distinct head of state can be identified. It includes any distinct head of state not included in (1) - (3), such as a theocratic ruler, as well as nonmilitary bodies serving in a collegial capacity.

Premier. PMCN.

- 1 Formal executive is premierial.
- 2 Formal executive is nonpremierial.

Effective executive (type). ETCN. Refers to the individual who exercises primary influence in the shaping of most major decisions affecting the nation's internal and external affairs. The "other" category may refer to a situation in which the individual in question (such as the party first secretary in a Communist regime) holds no formal governmental post, or to one in which no truly effective national executive can be said to exist.

- 1 Monarch
- 2 President
- 3 Premier
- 4 Military
- 5 Other

Effective executive (selection). EXCN.

- 1 Direct election. Election of the effective executive by popular vote or the election of committed delegates for the purpose of executive selection.
- 2 Indirect election. Selection by an elected assembly or by an elected but uncommitted electoral college.

- 3 Nonelective. Any means of selection not involving a direct or indirect mandate from an electorate.

Parliamentary responsibility. PRCN. Refers to the degree to which a premier must depend on the support of a majority in the lower house of a legislature in order to remain in office.

- 0 Irrelevant. Office of premier does not exist.
- 1 Absent. Office exists, but there is no parliamentary responsibility.
- 2 Incomplete. The premier is, at least to some extent, constitutionally responsible to the legislature. Effective responsibility is, however, limited.
- 3 Complete. The premier is constitutionally and effectively dependent upon a legislative majority for continuance in office.

Size of cabinet. CSCN. Refers to the number of ministers of "cabinet rank," excluding undersecretaries, parliamentary secretaries, ministerial alternates, etc. Includes president and vice-president under a presidential system, but not under a parliamentary system. Chiefs of state excluded, except under presidential system.

Major cabinet changes. CGCN. The number of times in a year that a new premier is named and/or 50 percent of the cabinet posts are occupied by new ministers.

Changes in effective executive. ECCN. The number of times in a year that effective control of the executive power changes hands. Such a change requires that the new executive be independent of his predecessor.

Legislative effectiveness. LFCN.

- 0 None. No legislature exists.

- 1 Ineffective. There are three possible bases for this coding: First, legislative activity may be essentially of a "rubber stamp" character; second, domestic turmoil may make the implementation of legislation impossible; third, the effective executive may prevent the legislature from meeting, or otherwise substantially impede the exercise of its functions.
- 2 Partially effective. A situation in which the effective executive's power substantially outweighs, but does not completely dominate, that of the legislature.
- 3 Effective. The possession of significant governmental autonomy by the legislature, including, typically, substantial authority in regard to taxation and disbursement, and the power to override executive vetoes of legislation.

Legislative selection LSCN.

- 0 None. No legislature exists.
- 1 Nonelective. Examples would be the selection of legislators by the effective executive, or by means of heredity or ascription.
- 2 Elective. Legislators (or members of the lower house in a bicameral system) are selected by means of either direct or indirect popular election.

Legislative election. LECN. The number of elections held for the lower house of a national legislature in a given year.

X. WEATHER DATA

Two variables attempt to quantify the effect of weather on the economies of the 41 African countries.

Certain stations were extracted from this dataset in an effort to provide representative reporting for the individual countries. In some cases, as many as seven stations were used (Zaire) and in others, only one. For some countries it was not possible to find a station with adequate coverage within their borders, therefore stations in other countries were used as proxies. A list of the stations used is available.

From the raw monthly data, a "normal" figure was determined for each station for each month. The "normal" figure was the simple mean of the variable for each month from 1968 to 1985 (ignoring any missing data). The difference between each monthly observation and the mean was then calculated and standardized by dividing by the standard deviation for the period from 1968 to 1985.

These standardized figures were then averaged across months for each year and station. Finally, each country's annual rainfall and rainday figures were calculated across stations as weighted means of the annual standardized data--weighted by the number of months of reporting for that particular year.

The result is an index of rainfall deviation from "normal" (as defined above) ranging from minus 2 to plus 2 with a value of 0 indicating no deviation from normal. RAINFALL, RAINDAYS.¹

¹ From Wilbur M. L. Spangler, Roy L. Jenne, "World Monthly Surface Station Climatology" dataset, National Center for Atmospheric Research, Scientific Computing Division, Boulder, CO.

Appendix A

INDEX OF VARIABLES

SASNAME	DESCRIPTION	CATEGORY	PAGE	LOTUS
AGRECHIS	AGREE. OR COOP, CHINA, CODE, (IISS)	FORMIL	21	X
AGRECUIS	AGREE. OR COOP, CUBA, CODE, (IISS)	FORMIL	21	X
AGREFRIS	AGREE. OR COOP, FRANCE, CODE, (IISS)	FORMIL	21	X
AGREOTIS	AGREE. OR COOP, OTHER, CODE, (IISS)	FORMIL	21	X
AGRERUIS	AGREE. OR COOP, USSR, CODE, (IISS)	FORMIL	21	X
AGREUSIS	AGREE. OR COOP, US, CODE, (IISS)	FORMIL	21	X
ASCN	ASSASSINATIONS, NUMBER	SOCPOL	36	X
ATAGRP	AVG TERMS ALL, GRACE PERIOD IN YEARS	DEBT	3	X
ATAINT	AVG TERMS ALL, INTEREST RATE	DEBT	3	X
ATAMAT	AVG TERMS ALL, MATURITY IN YEARS	DEBT	3	X
ATOGRP	AVG TERMS OFF, GRACE PERIOD IN YEARS	DEBT	3	X
ATOINT	AVG TERMS OFF, INTEREST RATE	DEBT	3	X
ATOMAT	AVG TERMS OFF, MATURITY IN YEARS	DEBT	3	X
ATPGRP	AVG TERMS PVT, GRACE PERIOD IN YEARS	DEBT	3	X
ATPINT	AVG TERMS PVT, INTEREST RATE	DEBT	3	X
ATPMAT	AVG TERMS PVT, MATURITY IN YEARS	DEBT	3	X
BORFORC	WEIGHTED SUMS, BORDER FORCES	MILEXP	16	
BORMX	WEIGHTED SUMS, BORDER MILEX	MILEXP	16	
BORMXCAP	WEIGHTED SUMS, BORDER MILEX/CAP	MILEXP	16	
BORMXGDP	WEIGHTED SUMS, BORDER MILEX/GDP	MILEXP	16	
BORMXGNP	WEIGHTED SUMS, BORDER MILEX/GNP	MILEXP	16	
CCCN	CONSTITUTIONAL CHANGES, NUMBER	SOCPOL	38	X
CECN	COUPS D' ETAT	SOCPOL	38	X
CGCN	CABINET CHANGES	SOCPOL	40	X
CGEDCYWE	CENTRAL GVT EXP, DOM CURR CUR YR (WE)	GVTEXP	6	X
CGEP75WE	CENTRAL GVT EXP, PPP 1975 (WE)	GVTEXP	6	X
CGEPCYWE	CENTRAL GVT EXP, PPP CURRENT YR (WE)	GVTEXP	6	X
CGEU82WE	CENTRAL GVT EXP, US DOL 1982 (WE)	GVTEXP	6	X

COMALL	COMMITMENTS, ALL, MIL US DOL	DEBT	2	X
COMOFF	COMMITMENTS, OFF, MIL US DOL	DEBT	2	X
CONSCRPT	DUMMY EQ 1 IF COUNTRY USES CONSCRIPTION	MILEXP	15	
CPIWB	CONSUMER PRICE INDEX, 1975 BASE (WB)	INDEX	7	X
CSCN	CABINET SIZE, NUMBER	SOCPOL	40	X
D1	ANGOLA DUMMY	*		
D2	BENIN DUMMY	*		
D3	BOTSWANA DUMMY	*		
D4	BURKINA FASO DUMMY	*		
D5	BURUNDI DUMMY	*		
D6	CAMEROON DUMMY	*		
D7	CEN AFR REP DUMMY	*		
D8	CHAD DUMMY	*		
D9	CONGO DUMMY	*		
D10	DJIBOUTI DUMMY	*		
D11	EQUATORIAL GUINEA DUMMY	*		
D12	ETHIOPIA DUMMY	*		
D13	GABON DUMMY	*		
D14	GAMBIA DUMMY	*		
D15	GHANA DUMMY	*		
D17	GUINEA BISSAU DUMMY	*		
D16	GUINEA DUMMY	*		
D18	IVORY COAST DUMMY	*		
D19	KENYA DUMMY	*		
D20	LESOTHO DUMMY	*		
D21	LIBERIA DUMMY	*		
D22	MADAGASCAR DUMMY	*		
D23	MALAWI DUMMY	*		
D24	MALI DUMMY	*		
D25	MAURITANIA DUMMY	*		
D26	MAURITIUS DUMMY	*		
D27	MOZAMBIQUE DUMMY	*		
D28	NIGER DUMMY	*		
D29	NIGERIA DUMMY	*		

D30	RWANDA DUMMY	*		
D31	SENEGAL DUMMY	*		
D32	SIERRA LEONE DUMMY	*		
D33	SOMALIA DUMMY	*		
D34	SUDAN DUMMY	*		
D35	SWAZILAND DUMMY	*		
D36	TANZANIA DUMMY	*		
D37	TOGO DUMMY	*		
D38	UGANDA DUMMY	*		
D39	ZAIRE DUMMY	*		
D40	ZAMBIA DUMMY	*		
D41	ZIMBABWE DUMMY	*		
DEFLAWB	GNP DEFLATOR, 1975 BASE (WB)	INDEX	8	X
DISALL	DISBURSEMENTS, ALL, MIL US DOL	DEBT	2	X
DISOFF	DISBURSEMENTS, OFF, MIL US DOL	DEBT	2	X
DMCN	ANTI GOVT DEMONSTRATIONS, NUMBER	SOCPOL	37	X
DODALL	DEBT OUTSTAN DISBUR, ALL, MIL US DOL	DEBT	2	X
DODOFF	DEBT OUTSTAN DISBUR, OFF, MIL US DOL	DEBT	2	X
DSURPIM	GVT DEFCIT / SURPLUS, MIL DOM CUR (IMF)	GVTEXP	5	X
ECCN	EFFECTIVE EXECUTIVE, CHANGES	SOCPOL	40	X
ELESCHCN	ELEMENTARY SCH ENROLLMENT, NUMBER	SOCPOL	36	X
ETCN	EFFECTIVE EXECUTIVE, TYPE	SOCPOL	39	X
EXCN	EFFECTIVE EXECUTIVE, SELECTION	SOCPOL	39	X
EXCURIM	GVT EXP, CURRENT , MIL DOM CUR (IMF)	GVTEXP	4	X
EXDEFIM	GVT EXP, DEFENSE , MIL DOM CUR (IMF)	GVTEXP	4	X
EXEDUM	GVT EXP, EDUCATION , MIL DOM CUR (IMF)	GVTEXP	4	X
EXHEAIM	GVT EXP, HEALTH , MIL DOM CUR (IMF)	GVTEXP	5	X
EXHOUM	GVT EXP, HOUSING , MIL DOM CUR (IMF)	GVTEXP	5	X
EXOTHIM	GVT EXP, OTHER , MIL DOM CUR (IMF)	GVTEXP	5	X
EXPIM	EXPORTS FOB, MIL DOM CUR, (IMF)	NATACCT	27	X
ENSOCIM	GVT EXP, SOCIAL SEC, MIL DOM CUR (IMF)	GVTEXP	5	X
EXTOTIM	GVT EXP, TOTAL , MIL DOM CUR (IMF)	GVTEXP	4	X
FACPMTIM	FACTOR PYMTS ABROAD, MIL DOM CUR (IMF)	NATACCT	25	X
FOODWB	FOOD AID IMPORTS, THOUS OF TONS (WB)	AID	32	X

FTROOPIS	FOR. TROOP MEASURE, CODE, (IISS)	FORMIL	19	X
FTRPCUIS	CUBAN TROOPS/ADVIS PRESENT (IISS)	FORMIL	19	X
FTRPFRIS	FRENCH TROOPS/ADVIS PRESENT (IISS)	FORMIL	19	X
FTRPGDIS	GDR TROOPS/ADVIS PRESENT (IISS)	FORMIL	19	X
FTRPOTIS	OTHER TROOPS/ADVIS PRESENT (IISS)	FORMIL	19	X
FTRPRUIS	RUSSIAN TROOPS/ADVIS PRESENT (IISS)	FORMIL	19	X
GCCN	GOVERNMENT CRISIS, NUMBER	SOCPOL	36	X
GDAGRWB	VAL ADDED, AGRICULT, MIL DOM CUR (WB)	INCOME	22	X
GDCONWB	VAL ADDED, CONSTRUCT, MIL DOM CUR (WB)	INCOME	23	X
GDELEWB	VAL ADDED, ELECTRIC, MIL DOM CUR (WB)	INCOME	23	X
GDIID75FD	GRS DOM INVEST, 1975 DOM CUR (FD)	NATACCT	31	
GDIWB	GRS DOM INVEST, MIL DOM CUR (WB)	NATACCT	30	X
GDMANWB	VAL ADDED, MANUFACT, MIL DOM CUR (WB)	INCOME	22	X
GDMINWB	VAL ADDED, MINING, MIL DOM CUR (WB)	INCOME	22	X
GDOTHWE	VAL ADDED, OTHER, MIL DOM CUR (WB)	INCOME	23	X
GDPD75FD	GRS DOM PRODUCT, 1975 DOM CUR (FD)	INCOME	31	
GDPIM	GRS DOM PRODUCT, MIL DOM CUR (IMF)	NATACCT	25	X
GDPUBWB	VAL ADDED, PUB ADMIN, MIL DOM CUR (WB)	INCOME	23	X
GDPWB	GRS DOM PRODUCT, MIL DOM CUR (WB)	NATACCT	28	X
GDTRDWB	VAL ADDED, TRADE, MIL DOM CUR (WB)	INCOME	23	X
GDTRNWB	VAL ADDED, TRANSPORT, MIL DOM CUR (WB)	INCOME	23	X
GFYDKIM	GRS FIXED CAPITAL, MIL DOM CUR (IMF)	NATACCT	27	X
GNPD75FD	GRS NAT PRODUCT, 1975 DOM CUR (FD)	NATACCT	31	
GNIDCYWE	GRS NAT PRODUCT, DOM CUR, CUR YR (WE)	NATACCT	31	X
GNPIM	GRS NAT PRODUCT, MIL DOM CUR (IMF)	NATACCT	26	X
GNPP75WE	GRS NAT PRODUCT, 1975 PPP (WE)	NATACCT	31	X
GNPPCYWE	GRS NAT PRODUCT, PPP CUR YR (WE)	NATACCT	31	X
GNPU82WE	GRS NAT PRODUCT, 1982 US DOL, (WE)	NATACCT	31	X
GNPWB	GRS NAT PRODUCT, MIL DOM CUR (WB)	NATACCT	28	X
GNSIWB	GRS NAT SAVINGS INC TRANS, MDC (WB)	NATACCT	30	X
GNSXWB	GRS NAT SAVINGS EXCL TRANS, MDC (WB)	NATACCT	30	X
GSCN	GENERAL STRIKES, NUMBER	SOCPOL	36	X
GVTCONIM	GOVT CONSUMPTION, MIL DOM CUR (IMF)	NATACCT	26	X
GVTCONWB	GOVT CONSUMPTION, MIL DOM CUR (WB)	NATACCT	29	X

GWCN	GUERRILLA WARFARE	SOCPOL	36	X
GWDUMMY	DUMMY FOR GUERRILLA WARFARE PRESENT	SOCPOL	36	
HSCN	HEAD OF STATE, TYPE	SOCPOL	38	X
IMPIM	IMPORTS, CIF, MIL DOM CUR (IMF)	NATACCT	27	X
INSTKIM	INC IN STOCKS, MIL DOM CUR (IMF)	NATACCT	26	X
INTALL	INTEREST PAYMENTS, ALL, MIL US DOL	DEBT	2	X
INTOFF	INTEREST PAYMENTS, OFF, MIL US DOL	DEBT	2	X
LABFORWB	LABOR FORCE PARTICIPATION (WB)	SOCPOL	35	X
LABINDWB	LABOR FORCE IN INDUSTRY (WB)	SOCPOL	35	X
LECN	LEGISLATURE ELECTIONS	SOCPOL	41	X
LFCN	LEGISLATIVE EFFECTIVENESS	SOCPOL	40	X
LITERWB	LITERACY RATE (WB)	SOCPOL	35	X
LSCN	LEGISLATURE SELECTION	SOCPOL	41	X
MFORCAC	MILITARY FORCE IN THOU (ACDA)	MILEXP	15	X
MFORCIS	MILITARY FORCE IN THOU (IISS)	MILEXP	15	X
MFORCWE	MILITARY FORCE IN THOU (WEST)	MILEXP	15	X
MGSIM	IMPORTS OF G & S, MIL DOM CUR (IMF)	NATACCT	26	X
MGSWB	IMPORTS OF G & S, MIL DOM CUR (WB)	NATACCT	28	X
MIL	INDEX OF MILITARY PARTIC. IN GOVT	SOCPOL	38	
MXDCYAC	MILEX DOM CUR, CUR YR (ACDA)	MILEXP	14	X
MXDCYIM	MILEX DOM CUR, CUR YR (IMF)	MILEXP	14	X
MXDCYIS	MILEX DOM CUR, CUR YR (IISS)	MILEXP	14	X
MXDCYSP	MILEX DOM CUR, CUR YR (SIPRI)	MILEXP	14	X
MXDCYWB	MILEX DOM CUR, CUR YR (WB)	MILEXP	14	X
MXDCYWE	MILEX DOM CUR, CUR YR (WEST)	MILEXP	14	X
MXP75WE	MILEX 1975 PPP (WEST)	MILEXP	15	X
MXPCYWE	MILEX PPP CURRENT YR (WEST)	MILEXP	15	X
MXU80SP	MILEX 1980 US DOL (SIPRI)	MILEXP	15	X
MXU82AC	MILEX 1982 US DOL (ACDA)	MILEXP	15	X
MXU82SP	MILEX 1982 US DOL (SIPRI)	MILEXP	15	X
MXU82WE	MILEX 1982 US DOL (WEST)	MILEXP	15	X
MXUCYAC	MILEX CURRENT US DOL (ACDA)	MILEXP	14	X
MXUCYIS	MILEX CURRENT US DOL (IISS)	MILEXP	14	X
MXUCYSP	MILEX CURRENT US DOL (SIPRI)	MILEXP	14	X

MXUCIWE	MILEX CURRENT US DOL (WEST)	MILEXP	14	X
NETFACWB	NET FACTOR PAYMENTS ABROAD (WB)	NATACCT	28	X
NBALWB	NET BAL OF G & S, MIL DOM CUR (WB)	NATACCT	29	X
NUTRANWB	NET UNREQ TRANS, MIL DOM CUR (WB)	NATACCT	30	X
ODAECOE	OFF DEVELOP AID FROM EEC, MIL DOL	AID	33	X
ODAMUOE	OFF DEVELOP AID FROM MULTILAT, MIL DOL	AID	33	X
ODAOECD	OFF DEVELOP AID FROM ALL, MIL DOL	AID	33	X
ODAOPOE	OFF DEVELOP AID FROM OPEC, MIL DOL	AID	33	X
ODAU'OE	OFF DEVELOP AID FROM US, MIL DOL	AID	33	X
ODAWB	OFFIC DEVELOP ASST, MIL DOM CUR (WB)	AID	32	X
ODUCALL	OUTSTAN DEBT UNDISB, ALL, MIL US DOL	DEBT	2	X
ODUOFF	OUTSTAN DEBT UNDISB, OFF, MIL US DOL	DEBT	2	X
OUTRANIM	OFF UNREQ TRAN, MIL DOM CUR (IMF)	NATACCT	28	X
PGCN	PURGES, NUMBER	SOCPOL	36	X
PMCN	PREMIER, TYPE	SOCPOL	39	X
PNDXCON	1975 PPP PRICE INDEX, CONSUMPTION	INDEX	9	X
PNDXGDI	1975 PPP PRICE INDEX, INVESTMENT	INDEX	9	X
PNDXGVT	1975 PPP PRICE INDEX, GVT EXPEND	INDEX	9	X
PNDXY	1975 PPP PRICE INDEX, INCOME	INDEX	9	X
POPIM	POPULATION IN MILLIONS (IMF)	SOCPOL	34	X
POPWB	POPULATION IN MILLIONS (WB)	SOCPOL	34	X
PRCN	PARLIAMENTARY RESPONSIBILITY	SOCPOL	40	X
PRIALL	PRINCIPAL REPAYMENTS, ALL, MIL US DOL	DEBT	2	X
PRIOFF	PRINCIPAL REPAYMENTS, OFF, MIL US DOL	DEBT	2	X
PRISCHWB	PRIMARY SCH ENROLL, PERCENT (WB)	SOCPOL	34	X
PUTRANIM	PVT UNREQ TRAN, MIL DOM CUR (IMF)	NATACCT	28	X
PVTCONIM	PVT CONSUMPTION, MIL DOM CUR (IMF)	NATACCT	26	X
PVTCONWB	PVT CONSUMPTION, MIL DOM CUR (WB)	NATACCT	29	X
RAINDAYS	WEIGHTED STD. MEASURE OF DAYS OF RAIN	WEATHER	42	X
RAINFALL	WEIGHTED STD. MEASURE OF RAINFALL	WEATHER	42	X
REGBILIS	REGION BILATERAL AGREE., NUMBER, (IISS)	FORMIL	21	X
REGMULIS	REGION MULTILATERAL AGREE., CODE, (IISS)	FORMIL	21	X
RGCAPWE	REAL GNP/CAP, 1975 PPP (WEST)	INCOME	24	X
RGCAPXWE	REAL GNP/CAP ADJ., 1975 PPP (WEST)	INCOME	24	X

RGCN	TYPE OF REGIME	SOCPOL	37	X
RICN	RIOTS, NUMBER	SOCPOL	37	X
RKAP08	REAL CAPITAL STK AT 8% DISC RATE	GFIXED	27	X
RKAP10	REAL CAPITAL STK AT 10% DISC RATE	GFIXED	27	X
RKAP12	REAL CAPITAL STK AT 12% DISC RATE	GFIXED	27	X
RVCN	REVOLUTIONS	SOCPOL	37	X
SECSCHCN	SECOND SCH ENROLL, NUMBER (CN)	SOCPOL	36	X
SECSCHWB	SECOND SCH ENROLL, PERCENT (WB)	SOCPOL	35	X
SOVSOC	DUMMY FOR E.BLOC ASSOCIATIONS	FORMIL	21	
THRT	DUMMY FOR THRT FROM LIBYA, S.AFRICA	MILEXP	18	
THRTLYB	DUMMY IF BORDER LIBYA	MILEXP	18	
THRTSA	DUMMY IF BORDER SOUTH AFRICA	MILEXP	18	
TTERMSWB	TERMS OF TRADE (WBANK)	INDEX	8	X
UNEMPUN	PERCENT UNEMPLOYED (UN)	SOCPOL	35	X
UNIVERCN	UNIVERSITY ENROLL, NUMBER (CN)	SOCPOL	36	X
URBANWB	PERCENT POP IN URBAN AREAS (WB)	SOCPOL	34	X
USCOMPWE	RGNP PER CAP / US RGNP PER CAP (WEST)	INCOME	24	X
WPIWB	WHOLESALE PRICE INDEX, 1975 BASE (WB)	INDEX	8	X
XGSIM	EXPORT OF G & S, NAT ACCTS, MDC (IMF)	NATACCT	27	X
XGSWB	EXPORT OF G & S, NAT ACCTS, MDC (WB)	NATACCT	29	X
XRATE	EXCHANGE RATE, DOM CUR TO US DOL	INDEX	9	X
XRATEIM	EXCHANGE RATE, DOM CUR TO US DOL (IMF)	INDEX	9	X
XRATEWB	EXCHANGE RATE, DOM CUR TO US DOL (WB)	INDEX	9	X
XRATEWE	EXCHANGE RATE, DOM CUR TO US DOL (WEST)	INDEX	9	X

An "X" in the Lotus column indicates that a variable appears in worksheet, as well as SAS form.

Appendix B

MILITARY EQUIPMENT WORKSHEETS

Four Lotus files exist on floppy disk, which track changes in the military equipment of the 41 African countries. These worksheets provide a "snapshot" of the equipment available to each country at a particular time, namely: 1970, 1975, 1980, and 1985. The source for these estimates is *The Military Balance*, published by the International Institute for Strategic Studies (IISS) in London.

The columns in each worksheet read (from left to right):

- Country
- Tanks
- Arm. Cars and Carriers
- Artillery
- AA Guns
- Mortars
- Rocket Launchers
- Anti-tank Weapons
- Missiles
- Naval Craft
- Aircraft
- Helicopters
- Personnel Summary
- Army Force Structure
- Comments

If IISS listed a quantity for a particular type of equipment, then that quantity appears in the spreadsheet. One should be aware of the fact that IISS did not always provide a quantity estimate, and in some cases where quantities do appear, that equipment may actually be unserviceable. In some instances, unfortunately, IISS did not provide an entry for some of the smaller countries. These cases are noted in

the first column and occur in the 1970 and 1975 worksheets for the most part.

A Lotus "Rangename" has been created for each country to enable the user to combine entries across time for a single country in a separate spreadsheet. In other words, the user could view all four entries for Angola across the 15 year period at one time. Before attempting this, one should note the spelling of a particular name, since Lotus does not allow spaces between words for one rangename i.e. Guinea-Bissau becomes GUINEABIS. The military equipment worksheets are *not* intended to be used with the other statistical files since the formats are not compatible.

Abbreviations that appear in the files are as follows:

AA	anti-aircraft
AB	airborne
AD	air defense
APC	armored personnel carrier
ATGW	anti-tank guided weapons
ATK	anti-tank
bde	brigade
bn	battalion
bty	battery
cdo	commando
Ch	Chinese
Chin	Chinese
COIN	council insurgency
coy	company
div	division
enr	engineer
FAC	fast attack craft
GDR	German Democratic Republic
gp	group
hel	helicopter
how	howitzer
para	parachute
pdr	pounder
Portug	Portuguese
RCL	recoilless launchers
recce	reconnaissance

regt regiment

SAR search and rescue

sigs signals

Sov Soviet

sp self-propelled

spt support

sqn squadron

tk tank

Yug Yugoslav

[BRACKETS] Indicate items
 "on order"

* Indicates that all services
 form part of the army

Appendix C

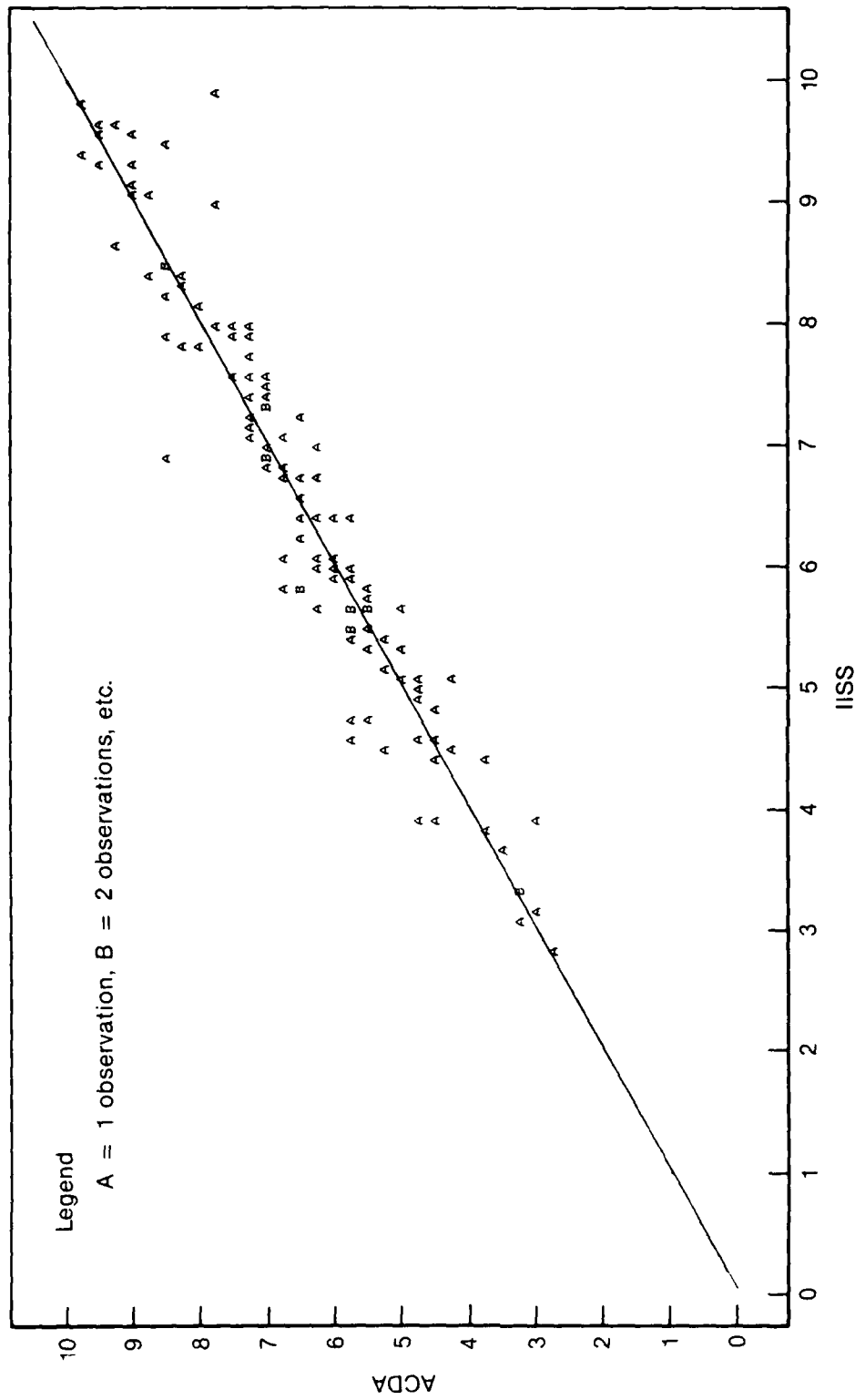
PLOTS OF MILITARY EXPENDITURES FROM DIFFERENT SOURCES

The following nine figures provide plots of military expenditure estimates from the six different sources. The goal of this exercise was to give the user some idea of how, say, SIPRI figures compare with IMF figures at a glance. It is extremely important to note the methodology employed in the creation of these plots before one attempts to interpret them. First, six variables were used, all in domestic currency: MXDCYAC, MXDCYIS, MXDCYWE, MXDCYSP, MXDCYIM, and MXDCYWB. These are derived from the following sources, respectively: ACDA, IISS, Robert West, SIPRI, IMF, and the World Bank. Because no attempt was made to recreate the process used by ACDA to "work back" to domestic currency units from the current U.S. dollars that it publishes, our domestic currency figures are inherently biased (see Sec. IV. Military Expenditures). One, therefore, should not assume that these estimates are an accurate representation of ACDA's starting point, current domestic currency. Since Robert West's figures are compiled from the ACDA tapes, those estimates may better represent where ACDA begins its calculations.

For the sake of consistency and ease of viewing, the Log of each of the six variables was taken, and then plotted as follows:

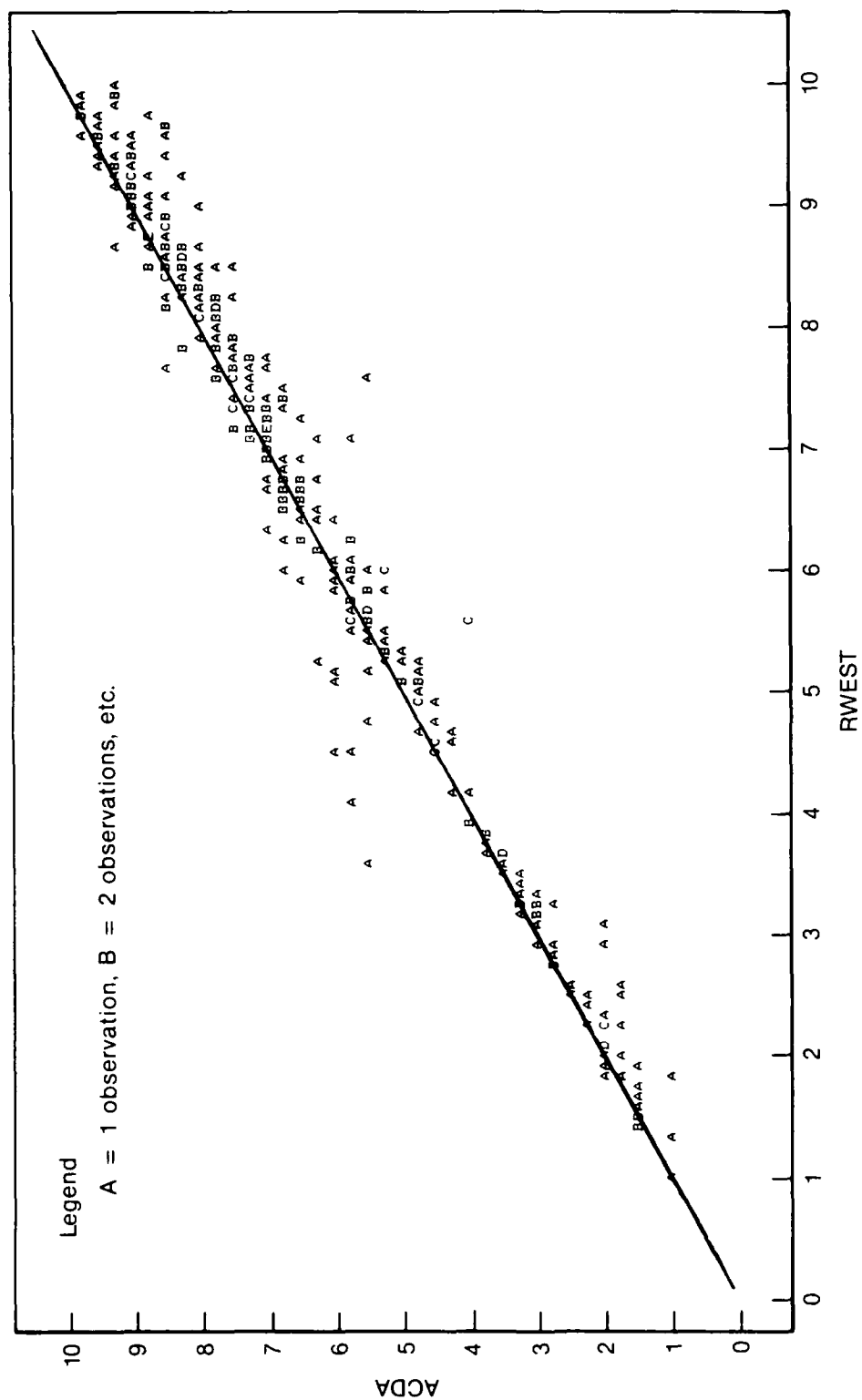
- Figure C.1: ACDA by IISS
- Figure C.2: ACDA by WEST
- Figure C.3: ACDA by SIPRI
- Figure C.4: WEST by SIPRI
- Figure C.5: WEST by IISS
- Figure C.6: WEST by IMF
- Figure C.7: IMF by WORLD BANK
- Figure C.8: SIPRI by IISS
- figure C.9: ACDA by IMF

A "x equals y" line was drawn in each plot to provide a point of reference. Plots that appear closely grouped around the line or actually on the line indicate that the two sources report very similar values. (The seventh plot, IMF by the World Bank, provides an excellent example of an almost identical set of figures.) Depending on the distribution of observations around the "x equals y" line, one can develop some conclusions as to how one source compares to another.



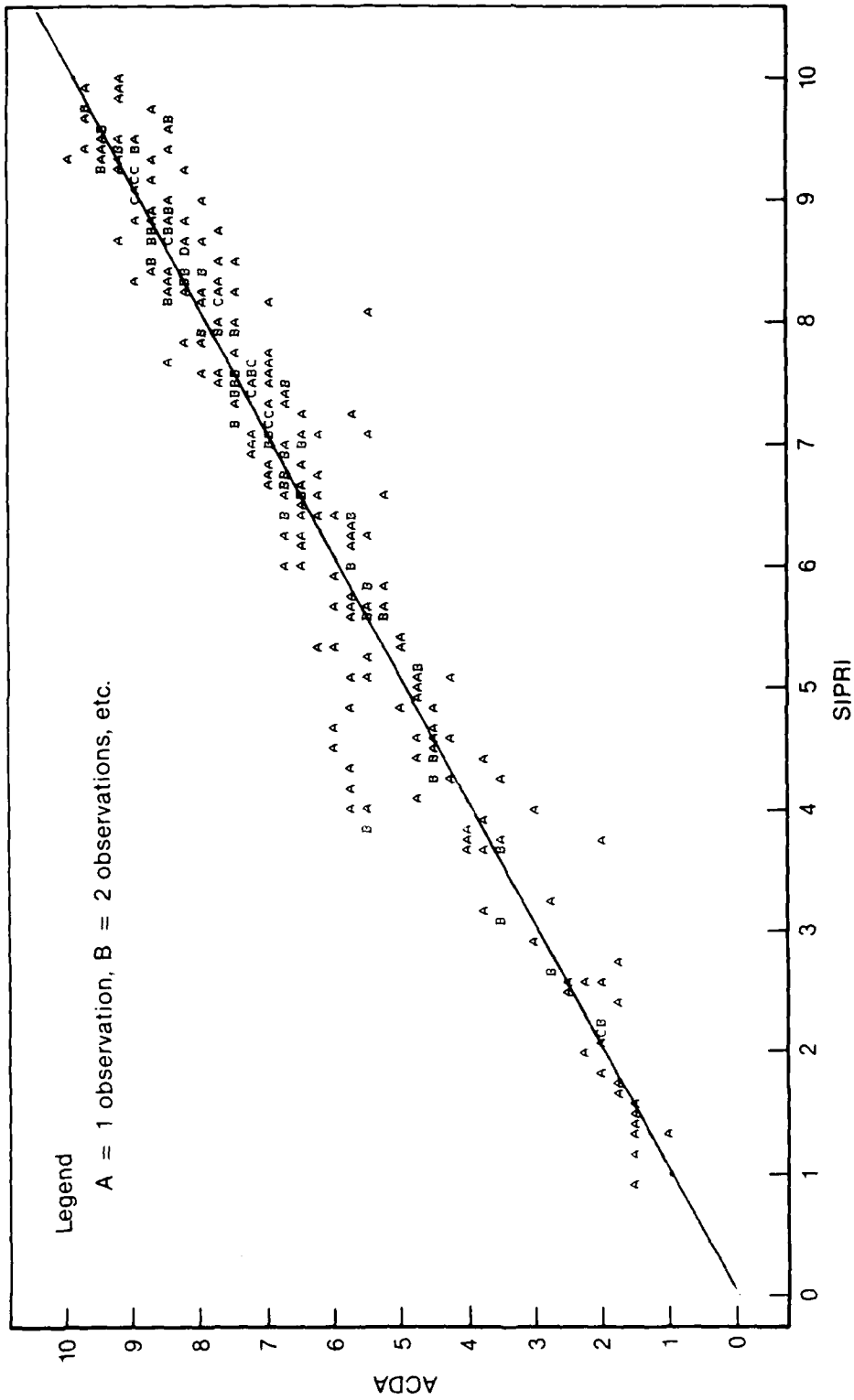
NOTE: 626 observations had missing values or were out of range

Fig. C.1—ACDA by IISS



NOTE: 390 observations had missing values or were out of range

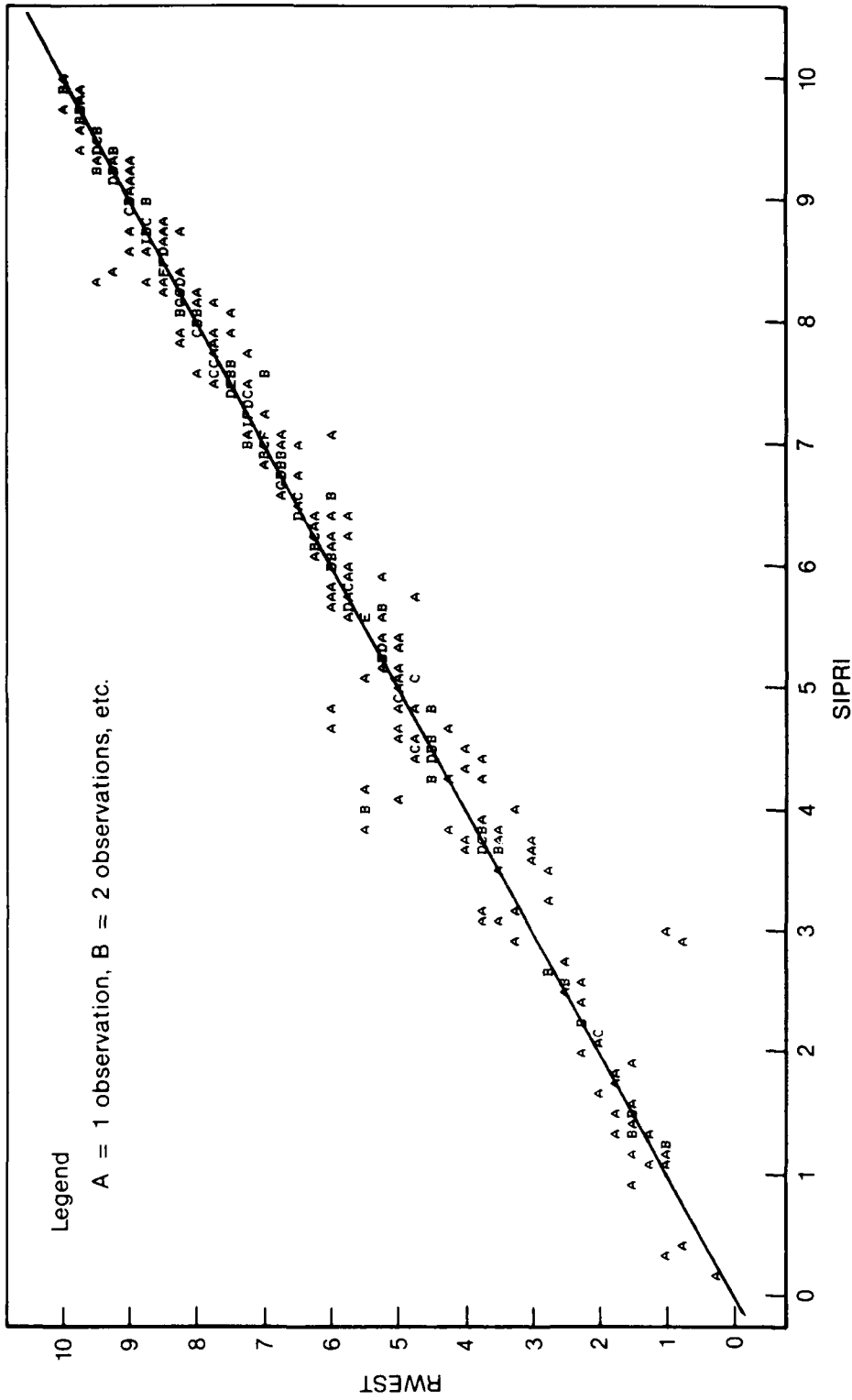
Fig. C.2—ACDA by RWEST



Legend
A = 1 observation, B = 2 observations, etc.

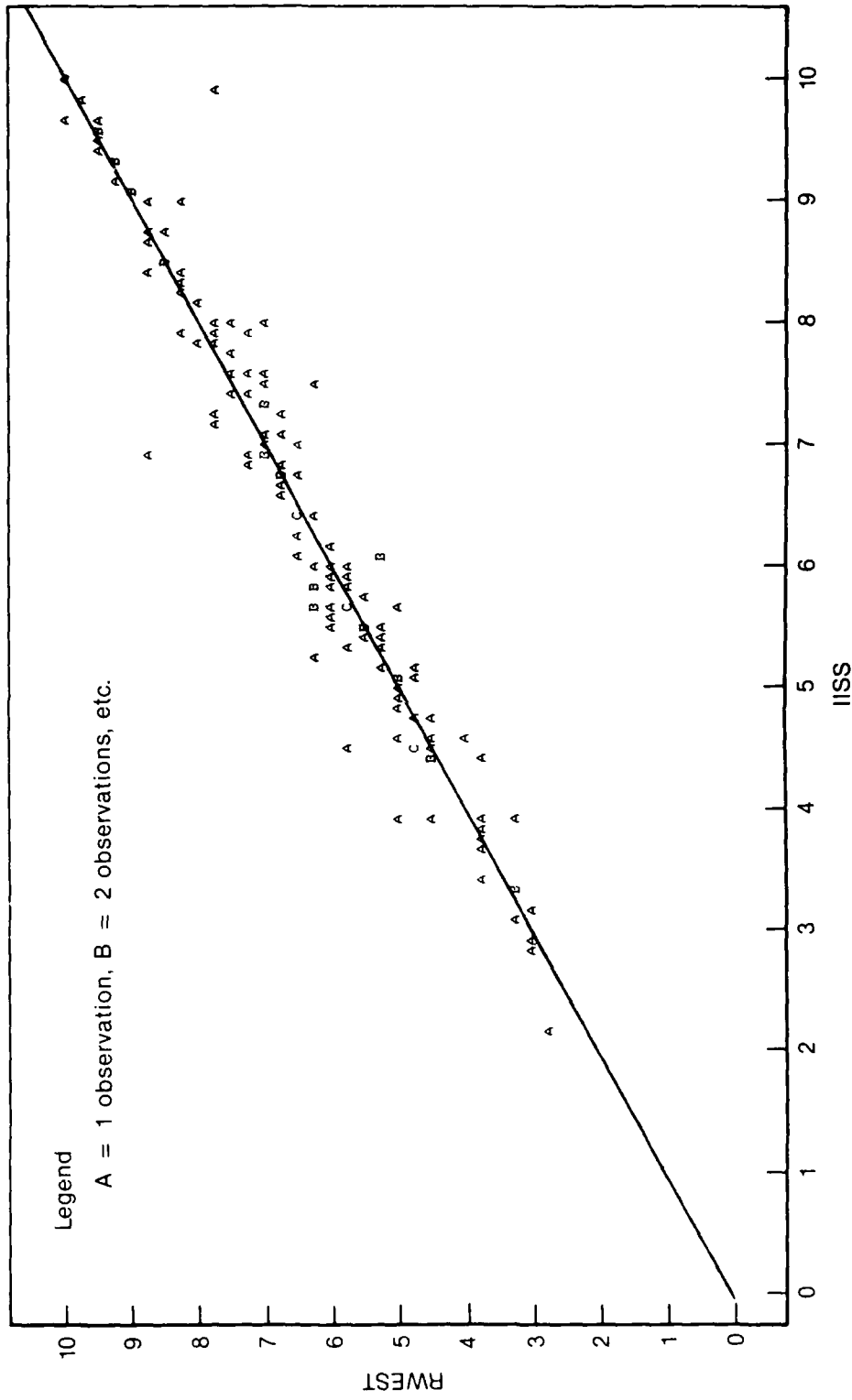
NOTE: 451 observations had missing values or were out of range

Fig. C.3—ACDA by SIPRI



NOTE: 348 observations had missing values or were out of range

Fig. C.4—RWEST by SIPRI

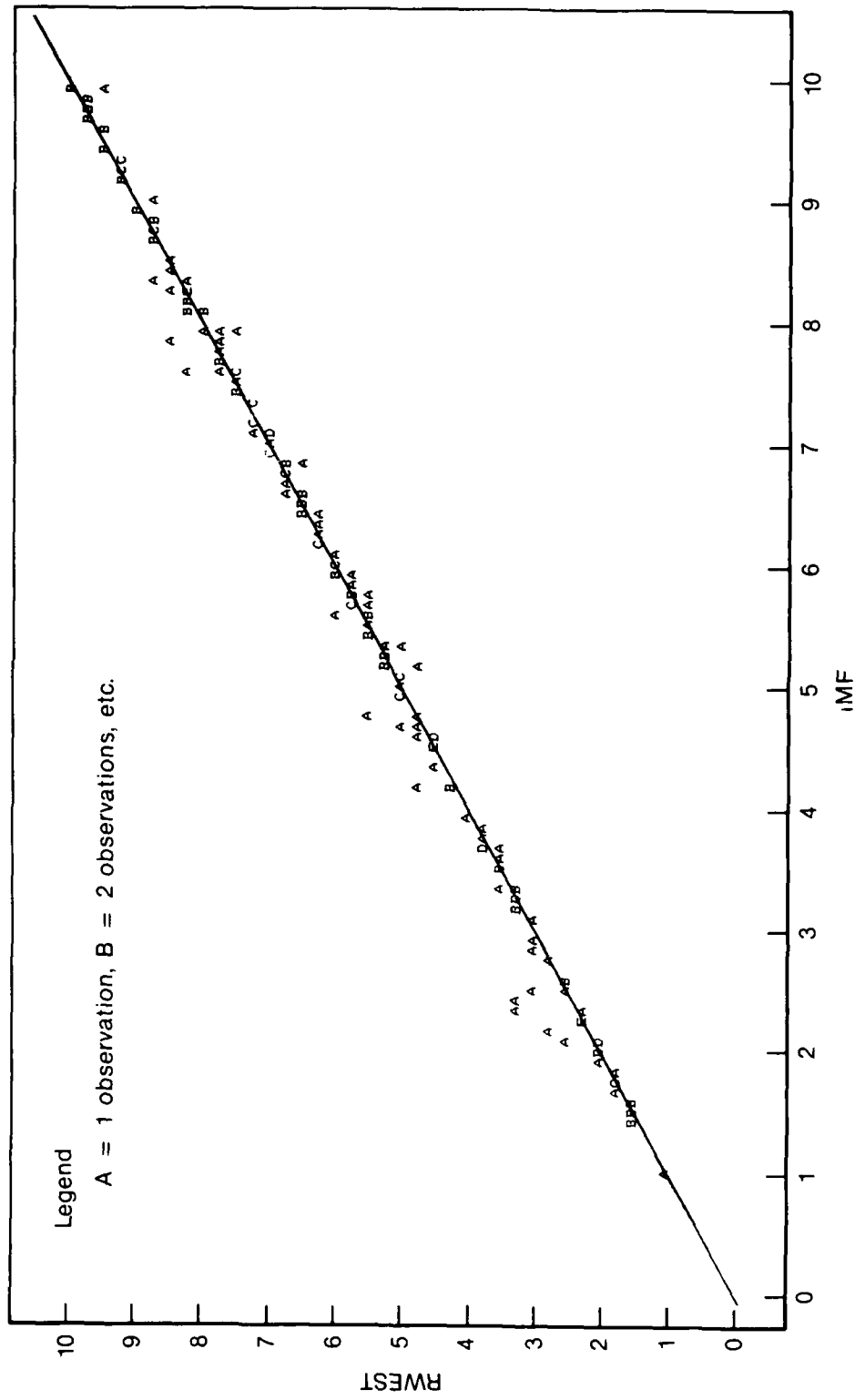


Legend

A = 1 observation, B = 2 observations, etc.

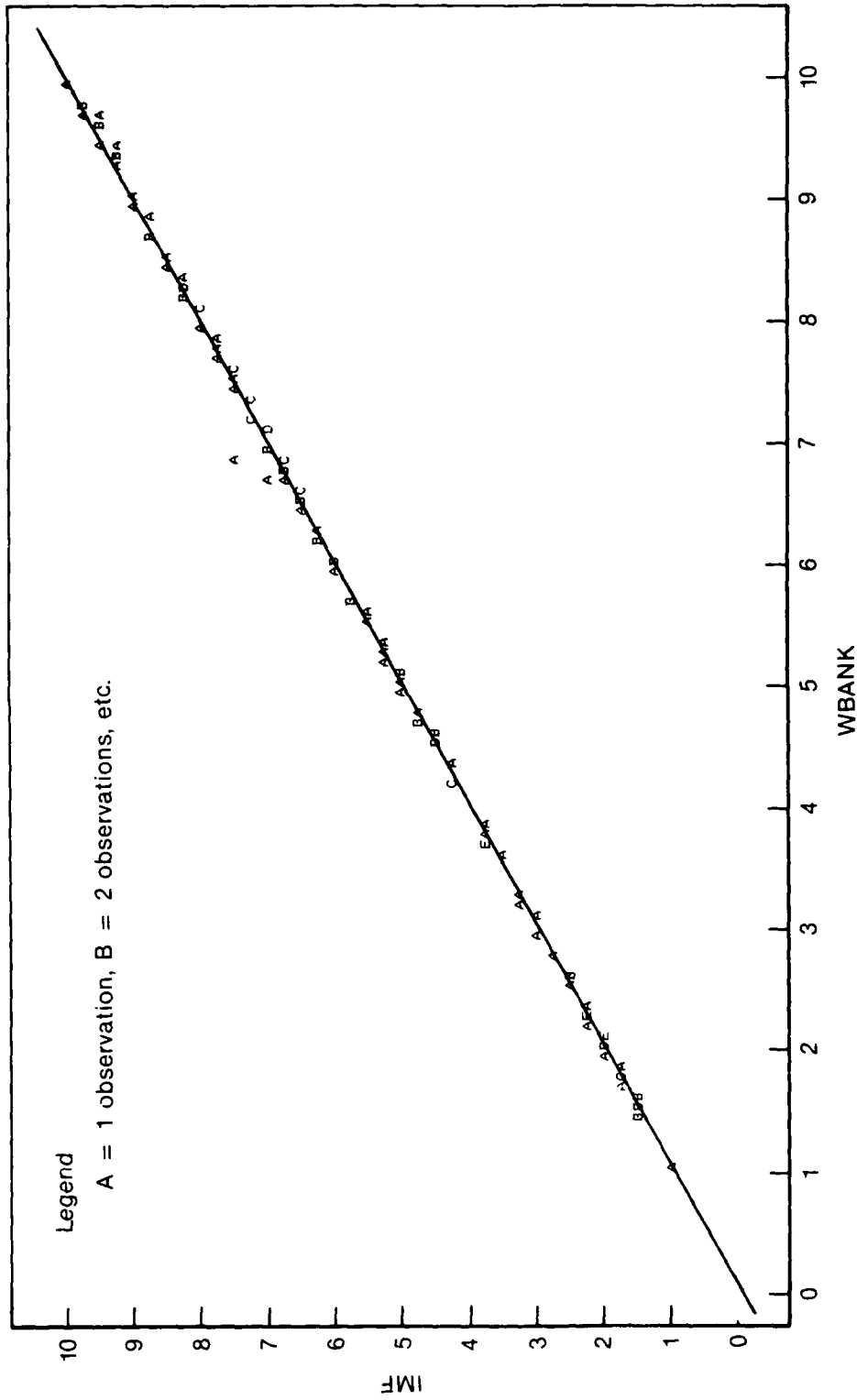
NOTE: 604 observations had missing values or were out of range

Fig. C.5—RWEST by IISS



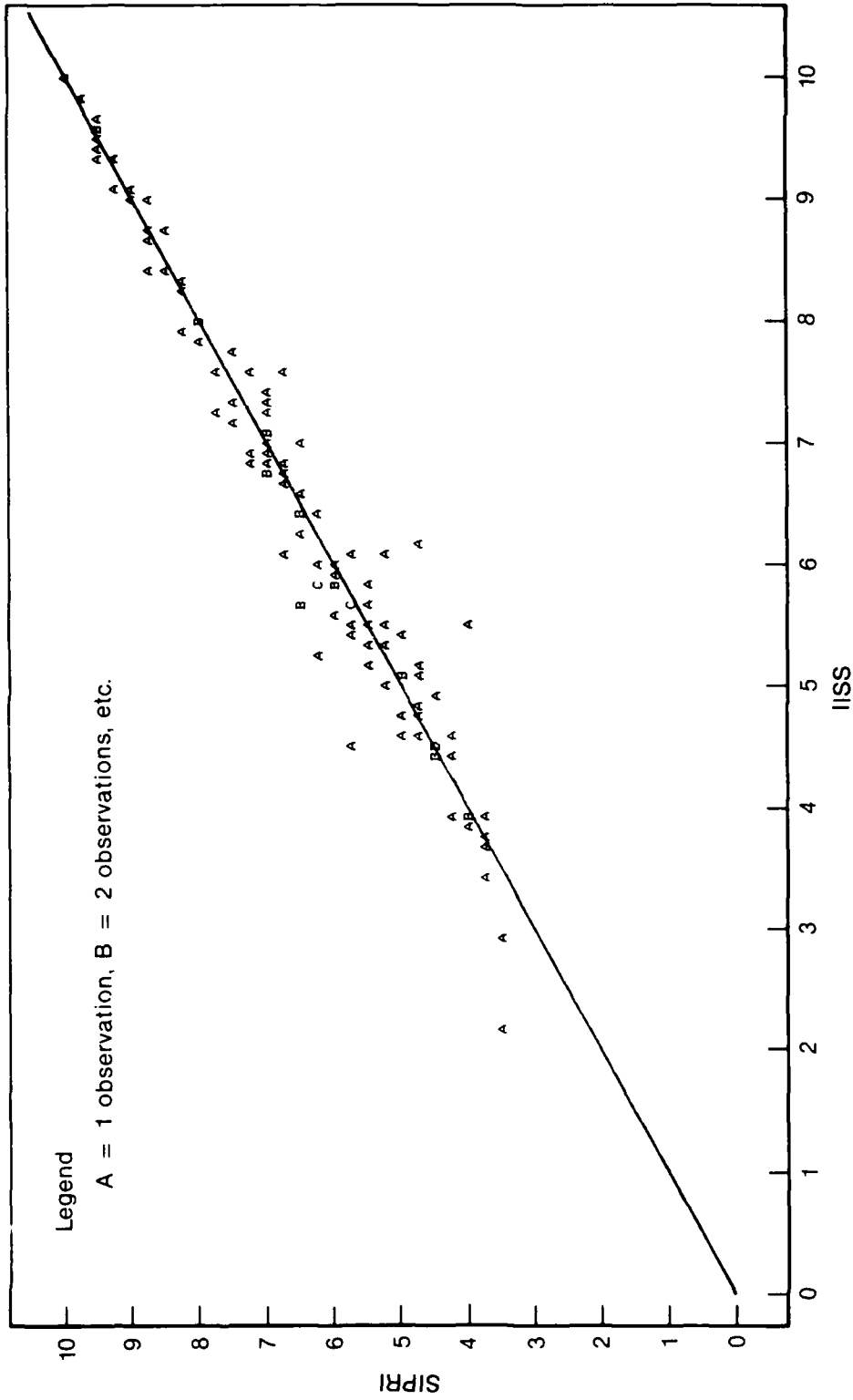
NOTE: 530 observations had missing values or were out of range

Fig. C.6—RWEST by IMF



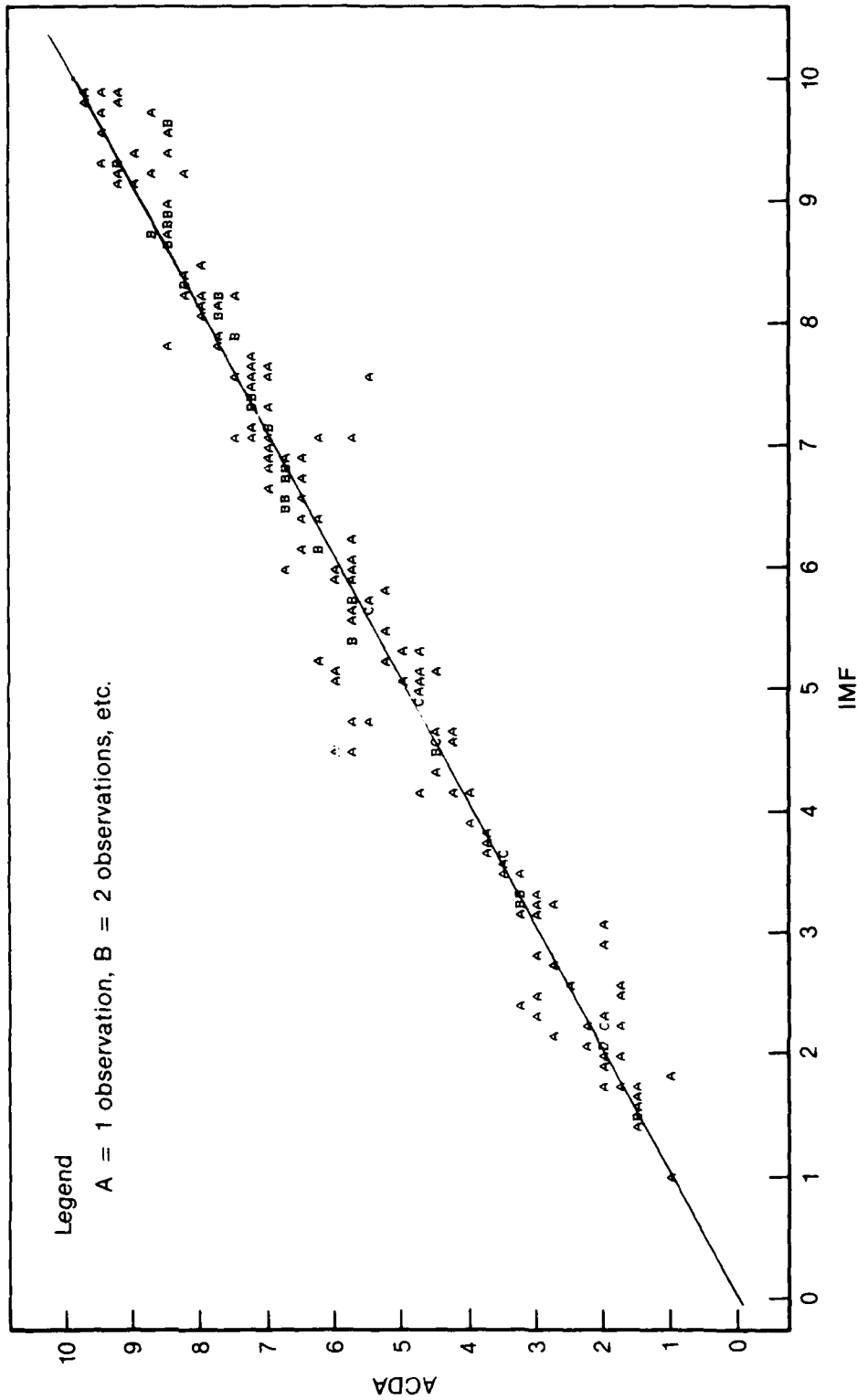
NOTE: 601 observations had missing values or were out of range

Fig. C.7—IMF by WBANK



NOTE: 626 observations had missing values or were out of range

Fig. C.8—SIPRI by IISS



NOTE: 543 observations had missing values or were out of range

Fig. C.9—ACDA by IMF

Appendix D

LIST OF WEATHER STATIONS USED

The following weather stations were used in the calculation of the RAINFALL and RAINDAYS indexes. The station name given is within the borders of the country for which it is used, except where noted. Negative latitudinal and longitudinal values correspond with south and east, respectively. The "WMO #" is the unique identification number assigned to each station by the National Center for Atmospheric Research (NCAR), Boulder, Colorado.

COUNTRY	STATION	LAT.	LON.	WMO #
ANGOLA	Mocamdes	-152	-122	664220
ANGOLA	Nova Lisboa	-128	-158	663180
ANGOLA	Malange	-96	-164	662150
ANGOLA	Luanda	-89	-132	661600
BENIN	Bohicon	72	-21	653380
BENIN	Kandi	111	-29	653060
BENIN	Cotonou	64	-24	653440
BOTSWANA	Mahalapye	-231	-268	681480
BOTSWANA	Maun	-200	-234	680320
BURKINAFAS	Bobo/Dioulasso	112	43	655100
BURKINAFAS	Odagadougou	124	15	655030
BURKINAFAS	Gaoua	103	32	655220
BURUNDI	Bujumbura	-33	-293	643900
BURUNDI	Nairobi (Kenya)	-13	-369	637400
CAMEROON	Yaounde	39	-115	649500
CAMEROON	Yoko	56	-124	649000
CAMEROON	Kribi	30	-99	649710
CENAFRREP	N Dele	84	-207	646540
CENAFRREP	Bangui	44	-186	646500
CENAFRREP	Bossemebele	53	-176	646050
CENAFRREP	Yalinga	65	-233	646610
CHAD	N'djamena	121	-150	647000
CHAD	Bilma, Niger	187	-129	610170
CHAD	Faya	180	-192	647530

CHAD	El Fasher, Sudan	136	-253	627600
CONGO	Ouessou	16	-161	644580
CONGO	Brazzaville	-43	-153	644500
CONGO	Gamboma	-19	-159	644540
CONGO	Dolisie	-42	-127	644010
DJIBOUTI	Djibouti	116	-432	631250
EQUATGUIN	Mitzié, Gabon	8	-115	645520
EQUATGUIN	Kribi, Cameroon	30	-99	649710
ETHIOPIA	Dessis/Combolche	111	-397	633330
ETHIOPIA	Addis Ababa	90	-387	634500
ETHIOPIA	Juba	49	-316	629410
ETHIOPIA	Asmara	153	-389	630210
GABON	Mitzié	8	-115	645520
GABON	Lastoursville	-8	-127	645600
GABON	Liberville	5	-94	645000
GAMBIA	Tambacounda, Sen	138	137	616870
GAMBIA	Dakar, Seng.	147	175	616410
GAMBIA	Kolda, Seng.	129	150	616980
GHANA	Kumasi	67	16	654420
GUINEA	Nzerekore	77	88	618490
GUINEA	Conkay	96	136	618320
GUINEA	Kankan	104	93	618290
GUINEABIS	Bissau	119	157	617660
IVORYCOAST	Sassandri	50	61	655990
IVORYCOAST	Adiake	53	33	655850
IVORYCOAST	Abijan	53	39	655780
IVORYCOAST	Bouake	77	51	655550
KENYA	Nairobi	-13	-369	637400
KENYA	Moyale	35	-391	636190
KENYA	Malindi	-32	-401	637990
LESOTHO	Bloemfontein RSA	-291	-263	684420
LIBERIA	Roberts Field	63	104	656600
MADAGASCAR	Tananarive	-188	-475	670830
MADAGASCAR	Tulear	-234	-437	671610
MADAGASCAR	Diego Suarez	-124	-493	670090
MALAWI	Chileka	-157	-350	676930

MALAWI	Zomba	-154	-353	676970
MALAWI	Lilongwe	-140	-337	675870
MALI	Bamako	125	80	612910
MALI	Bougouni	114	75	612960
MALI	Tombouctou	167	30	612230
MALI	Kenieba	129	112	612850
MAURITANIA	Rosso	165	158	614890
MAURITANIA	Nouakchott	181	160	614420
MAURITANIA	Kiffa	166	114	614980
MAURITIUS	Rodrigues	-197	-634	619880
MOZAMBIQUE	Lourenco Marque	-259	-326	673410
MOZAMBIQUE	Nampula	-151	-393	672370
MOZAMBIQUE	Beira	-198	-349	672970
MOZAMBIQUE	Vila Cabral	-133	-353	672170
MOZAMBIQUE	Inhambane	-239	-354	673230
MOZAMBIQUE	Tete	-162	-336	672610
NIGER	Niamey	135	-22	610520
NIGER	Maine	132	-120	610960
NIGER	Tahoua	149	-53	610430
NIGER	Bilma	187	-129	610170
NIGERIA	Cotonou, Benin	64	-24	653440
NIGERIA	Yaounde, Camer.	39	-115	649500
NIGERIA	Yoko, Camer.	56	-124	649000
NIGERIA	Maine, Niger	132	-120	610960
RWANDA	Kigali	-20	-301	643870
RWANDA	Nairobi, Kenya	-13	-369	637400
SENEGAL	Tambacounda	138	137	616870
SENEGAL	Kolda	129	150	616980
SENEGAL	Dakar	147	175	616410
SIERRALEON	Bonthe	75	125	618660
SIERRALEON	Daru	80	109	618910
SIERRALEON	Freetown	86	132	618560
SOMALIA	Djibouti, DJI.	116	-432	631250
SOMALIA	Mogadisciu	20	-454	632600
SOMALIA	Garissa, Kenya	-5	-396	637230
SUDAN	Port Sudan	196	-372	626410
SUDAN	Khartoum	156	-326	627210
SUDAN	Malakal	96	-317	628400
SUDAN	El Fasher	136	-253	627600
SUDAN	Wau	77	-280	628800

SWAZILAND	Pietersburg, RSA	-239	-295	681740
TANZANIA	Dar Es Salaam	-69	-392	638940
TANZANIA	Sungea	-107	-356	639620
TANZANIA	Dodama	-62	-358	638620
TOGO	Lome	62	-13	653870
TOGO	Sokode	90	-11	653610
UGANDA	Kigali, Rwanda	-20	-301	643870
UGANDA	Mwanza, Tan.	-25	-329	637560
UGANDA	Nairobi, Kenya	-13	-369	637400
ZAIRE	Manono	-73	-274	642820
ZAIRE	Kisangani	5	-252	640400
ZAIRE	Luluabourg	-58	-224	642350
ZAIRE	Inongo	-20	-183	641150
ZAIRE	Kasama, Zambia	-102	-311	674750
ZAIRE	Gamboma	-19	-159	644540
ZAIRE	Yalinga	65	-233	646610
ZAMBIA	Broken Hill	-144	-285	676630
ZAMBIA	Kasama	-102	-311	674750
ZAMBIA	Lusaka	-154	-282	676510
ZIMBABWE	Bulawayo	-202	-286	679640
ZIMBABWE	Chipinga	-202	-326	679830
ZIMBABWE	Salisbury/Harare	-179	-311	677750

Appendix E
LISTING OF SOURCES

For specific questions regarding the collection of this data not covered in this codebook, please contact the relevant source directly.

International Monetary Fund
Washington, D.C. 20431

Tel. (202) 473-7430

Time-Series Data Project
Center for Social Analysis
State University of New York
Binghamton, New York
13901

Tel. (607) 777-2116

International Institute for
Strategic Studies
23 Tavistock Street
London WC2 7NQ
England

Tel. (01) 379-7676

U.S. Arms Control and
Disarmament Agency
Washington, D.C.
20451

Tel. (202) 647-1300

Organisation for Economic
Co-operation and Development
Suite 1207
1750 Pennsylvania Avenue
Washington, D.C.
20006

Tel. (202) 724-1857

The World Bank
1818 H Street, N.W.
Washington, D.C.
20433

Tel. (202) 477-1234

Stockholm International
Peace Research Institute
Pipers vag 28
S-171 73 Solna
Sweden

Tel. (08) 55 97 00

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