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To: Members of the Executive Board

From: The Secretary

Subject: Evolution of the Statistical Activities of the Fund

The attached paper provides background information to the report on the statistical policy of the Fund, which was circulated as (SM/95/115, 5/18/95), and is tentatively scheduled for discussion on Wednesday, June 7, 1995.

Mr. Joyce (ext. 37984) is available to answer technical or factual questions relating to this paper prior to the Board discussion.

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INTERNATIONAL MONETARY FUND

Evolution of the Statistical Activities of the Fund

Prepared by the Statistics Department

(In Consultation with Other Departments)

Approved by John B. McLenaghan

May 25, 1995

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Evolution of the Statistical Activities of the Fund

I. Introduction

Statistical work performed by the Fund fulfills a number of important functions. It underpins much of the Fund's global, regional, and country-specific surveillance activity, its policy discussions with members and regional organizations, its activities in support of member countries' economic programs, and its research, all of which is undertaken within an integrated macroeconomic framework. It supports national and supranational authorities in their efforts to develop and maintain macroeconomic databases that will be useful for economic analysis and the formulation, implementation, and monitoring of economic and financial policy. It also provides a means to disseminate macroeconomic data to users throughout the world. The statistical expertise that resides in the Fund and the body of Fund statistics are, therefore, an important strategic corporate asset of the Fund. In the context of the budget, a significant proportion of total Fund resources is spent on statistical activity as broadly defined.

The staff paper on the *Statistical Policy of the Fund* (SM/95/115, 5/18/95) discusses current statistical activities in the Fund and considers some ways in which the statistical practices of the Fund could be improved and refined. The Fund's statistical activity has developed over the past 50 years in response to the needs of the Fund and its members. A number of serious attempts have been made since the Fund's inception to improve statistical practices in the Fund, and the lessons learned from these experiences are highly relevant to the consideration of the issues discussed in SM/95/115. As background to the discussion of these issues, this paper traces the origins of the Fund's statistical activity; provides an account of the attempts that have been made over the years to bring greater efficiency to the Fund's statistical work, and describes the development of the major statistical activities of the Fund and the technological environment in which they are conducted. In addition, the opportunity has been taken in this, the fiftieth year of the Fund, to reflect more generally on the range of statistical activity that has been undertaken by the Fund. 1/

The remainder of the paper is organized as follows:

- Section II describes how the Fund's requirements for data have developed in response to new circumstances. It also recounts the development of institutional arrangements within the Fund for the discharge of the Fund's statistical responsibilities.

1/ Three previous Executive Board papers reviewing Fund statistics [SM/85/63 (2/21/1985), SM/86/55 (3/11/1986), and SM/88/11 (6/14/1988)] were focused mainly on the work of the (then) Bureau of Statistics, although they also described the Bureau's interaction with other departments of the Fund.

- Section III highlights the coordination that has taken place with other international organizations in all aspects of statistical activity.
- Section IV describes the evolution of Fund data collection and management. 1/ It emphasizes the diversity of current approaches to this set of activities and sketches the main reasons for that diversity. It describes efforts that have been made in the past to improve the efficiency of Fund data collection and management.
- Section V reviews the development of methodologies, the provision of technical assistance and training, and the publication of statistics, and describes the role of statistics in Fund surveillance and lending activities. It emphasizes the convergence of these efforts, in more recent years, on the production of analytically meaningful statistics that will meet the needs of the Fund and its member countries.
- Section VI describes the contributions that have been and continue to be made by technological developments to the shaping of the Fund's approach to statistical activity.

II. Origins of the Fund's Statistical Activity

The Fund's statistical activity has developed over the years in response to two major factors: (i) the recognition that the Fund's surveillance role and its operational work with countries could only be effectively fulfilled through analysis that was grounded in a broad macroeconomic framework; and (ii) the expansion of the range of the Fund's financing facilities and the implications of this expansion for monitoring developments in members' economies.

1. Development of data requirements

The provision of data to the Fund by member countries is rooted in the *Articles of Agreement (Articles)*. In addition, however, the 1977 surveillance decision recognized that effective surveillance could not be undertaken by reference to developments in isolated aspects of members' economies. Also, significant changes in the nature of the Fund's lending mechanisms over the years have resulted in a broadening of the range of economic and financial data required by the Fund. Thus, in practice, the Fund staff has requested of all member countries, in addition to the

1/ The term *data management* is used to refer to the techniques for assembling, storing, accessing, retrieving, modifying, extending, manipulating, describing, and conveying to authorized users time series of economic statistics.

information specified in the *Articles*, detailed data on government operations, monetary and financial statistics (including interest rates), and a range of real sector data (including components of the national accounts and data on sectoral production, employment, and wages).

a. The Articles of Agreement

The *Articles* contain general provisions on the furnishing of information by members. Under the heading of *General Obligations of Members* in Article VIII, basic principles are set forth in Section 5. Under Section 5(a), twelve categories of national data are identified as "the minimum necessary for the effective discharge of the Fund's duties," namely official, and unofficial banks' and financial agencies' holdings of gold and foreign exchange; gold production and international trade in gold by origin and destination; total international trade by origin and destination; the international balance of payments; the international investment position; national income; wholesale, retail, and trade prices; and exchange rates. Under the same section, the Fund "may require members to furnish it such information as it deems necessary for its activities." The determination of necessity is to be made by the Fund, i.e., the Executive Board. In addition, under Section 5(c), the Fund "may arrange to obtain further information by agreement with members" and "shall act as a centre for the collection and exchange of information on monetary and financial problems." The obligation of members to provide information requested by the Fund is subject to some qualifications relating to a member's capabilities and to confidentiality: under Section 5(b), the Fund in requesting information is to take into consideration the "varying ability of members to furnish the data requested" and members "shall be under no obligation to furnish information in such detail that the affairs of individuals or corporations are disclosed."

In addition, under the heading of *Obligations Regarding Exchange Arrangements*, Article IV contains a provision on the furnishing of information in the context of the Fund's exercise of firm surveillance over the exchange rate policies of members. Section 3(b) provides in part that "[e]ach member shall provide the Fund with the information necessary for such surveillance, and, when requested by the Fund, shall consult with it on the member's exchange rate policies." Again, the determination of necessity is to be made by the Fund.

The *Articles* do not specify the frequency with which data should be collected and provided to the Fund. However, the 1946 Executive Board discussion that led to the more systematic collection of data and their monthly dissemination through *International Financial Statistics (IFS)* established the presumption of monthly reporting of data, even where individual data series have a higher frequency. Monthly reporting of key statistical indicators has also become customary under the Fund's policy on the use of its resources.

b. The 1977 surveillance decision 1/

The 1977 surveillance decision includes among the principles of Fund surveillance over exchange rate policies provisions that refer to the data requirements of surveillance. The decision states, in part:

- The Fund's appraisal of a member's exchange rate policies shall be based on an evaluation of the developments in the member's balance of payments against the background of its reserve position and its external indebtedness. This appraisal shall be made within the framework of a comprehensive analysis of the general economic situation and economic policy strategy of the member, and shall recognize that domestic as well as external policies can contribute to timely adjustment of the balance of payments. The appraisal shall take into account the extent to which the policies of the member, including its exchange rate policies, serve the objectives of the continuing development of the orderly underlying conditions that are necessary for financial stability, the promotion of sustained sound economic growth, and reasonable levels of employment.

In respect of data involved in surveillance, this paragraph explicitly refers to the balance of payments, exchange rates, reserves, and external debt. In addition, the need for a broad range of economic data could be inferred from such phrases as "general economic situation and economic policy strategy of the member" and "domestic as well as external policies." Also, the need for exchange market data could be inferred from the function of appraising a member's "exchange rate policies."

Moreover, the 1977 decision also lists, without limitation, certain specific developments that might indicate the need for discussion with a member, all of which imply the availability of the corresponding data to the Fund. The list of developments includes: protracted large scale intervention in one direction; unsustainable official borrowing or excessive short-term official lending; restrictions on current payments or restrictions on, or incentives for, capital flows; monetary and other domestic financial policies that provide abnormal encouragement or discouragement to capital flows; and exchange rate developments unrelated to underlying competitiveness and long-term capital movements. 2/

The 1977 decision provides that, in principle, Article IV consultations shall take place annually. The periodicity of such consultations, however, does not modify the intrinsic characteristic of surveillance as a continuous

1/ *Surveillance Over Exchange Rate Policies*, Decision No. 5392-(77/63), April 29, 1977, as amended, *Selected Decisions*, Nineteenth Issue, pages 8-13.

2/ In April 1995, Decision No. 5392 was amended to include in this list of developments the size and sustainability of private capital flows.

function of the Fund and its implications for the frequency of the furnishing of information to the Fund.

The recent Executive Board discussion of *Strengthening Fund Surveillance - Provision of Statistical Data by Members* (SM/95/59, 3/24/95) resulted in the adoption of further measures, including measures relating to the furnishing of information to the Fund, which were intended to make surveillance more effective. This development is discussed in more detail in Section V.5 below.

c. Expansion of Fund facilities and the provision of information

The Fund established the Extended Fund Facility in September 1974, the Structural Adjustment Facility (SAF) in March 1986, the Enhanced Structural Adjustment Facility (ESAF) in December 1987, and the Systemic Transformation Facility (STF) in April 1993; the SAF and ESAF were intended in particular for members with protracted balance of payments problems. The establishment of these four facilities resulted in a broadening of the range of economic and financial data that were deemed necessary to assess countries' overall economic performance and potential, formulate appropriate structural as well as macroeconomic policies, design economic programs, and monitor compliance with program conditionality.

2. Institutional arrangements

In the years following the inception of the Fund, statistical activities were under the aegis of the Research Department, which was responsible for both methodological work in statistics and the production of the Fund's statistical publications. In recognition of the important role of statistics in the Fund's work and of the increasing attention being paid to the publication of statistics by the Fund, the Research Department was renamed the Research and Statistics Department in 1956, when the Bureau of Statistics was created within that department. It was not, however, until 1968 that the Bureau of Statistics was formally separated from the Research Department; the Bureau of Statistics assumed responsibility for the publication of the Fund's flagship statistical publication *IFS*.

In 1972, with the creation of a new division for the purpose, the Bureau of Statistics began a period of particularly close cooperation with the Fiscal Affairs Department in developing a conceptual framework and Fund standards for the presentation of government finance statistics, and this work culminated in the issuance of the draft *Manual on Government Finance Statistics (MGFS)* in 1974 and the initial publication of the *Government Finance Statistics Yearbook (GFSY)* in 1977. It was in 1977, also, following a reorganization of responsibilities within the Fund, that the Bureau of Statistics took over from the Research Department responsibility for the compilation of balance of payments data and the publication of the *Balance of Payments Statistics Yearbook (BOPSY)*.

In response to concerns expressed within the Executive Board about the magnitude of international capital movements, the Bureau of Statistics, in close coordination with the Bank for International Settlements (BIS), began work in 1982 to assemble a body of international banking statistics; this work was formalized in 1984 with the creation of a new division, which not only saw the international banking statistics project through to fruition but also began a period of intense cooperation with other international organizations in the area of external debt statistics.

The turn of the decade saw a period of close collaboration between the Bureau of Statistics and area departments in the enhanced statistical collaboration project, designed to assess the potential for closer harmonization of the Bureau of Statistics' and area departments' macroeconomic databases for a number of countries. In May 1990, in response to management's desire to facilitate closer collaboration between the Bureau of Statistics and area departments, a new coordinating division was created in the Bureau of Statistics. The greater involvement of the Bureau of Statistics in area departments' operational work was one of the factors that led to the creation of the Statistics Department in May 1991 1/. Finally, in 1992, the Statistics Department assumed a more active role in country review work.

III. International Coordination of Statistical Activity

1. Development of the United Nations statistical system

The role and complexity of international organizations have grown considerably since the United Nations (UN) Statistical Commission established the UN Statistical System in 1946. It was then envisaged that the Statistical Commission, acting through its Secretariat, would ensure that international organizations developed an integrated program of statistical standards, data collection, data processing, and dissemination. In pursuit of this objective, agreements were signed in 1947 between the UN and a number of its specialized agencies including the Food and Agriculture Organization (FAO), the Fund, 2/ the International Labor Organization (ILO), UN regional commissions, and the World Bank. However, these formal agreements were rather loosely worded and the UN has had to rely on informal coordination both with agencies that signed such agreements and with agencies that did not. The primary tool for sharing information and coordinating the work programs of countries was the biennial meetings of the UN Statistical Commission, a body composed of elected representatives (usually the heads of national statistical organizations), the meetings of

1/ In all references subsequent to this subsection, the Bureau of Statistics will be referred to as the Statistics Department for the sake of clarity.

2/ Provisions of the agreement with the Fund relating to statistical activities are recorded in Appendix I.

which were attended by representatives of international organizations. International organizations were also active participants in the working groups established by the UN Statistical Commission to facilitate the achievement of its mandate.

To prompt a greater burden sharing by other international organizations, the coordination of the work programs of international organizations was addressed by the UN Administrative Committee on Coordination in 1966 through the establishment of a Subcommittee on Statistics (the ACC Subcommittee). The ACC Subcommittee (which is currently chaired by the Fund's Statistics Department) was to work closely with the UN Statistical Commission in coordinating the activities of countries and international organizations, including those international organizations that had not signed cooperation agreements with the UN. In particular, the establishment of the Subcommittee was prompted by concerns that international organizations should more actively coordinate their work in establishing methodologies and standards and in data collection activities and work programs, and determine the extent of duplication in their activities, the presence of any unnecessary reporting burden on national statistical offices, and the need for improved coordination of their technical cooperation/assistance programs. In the past decade, a more collaborative approach with other international organizations has been followed by the UN Statistical Commission in the areas of statistics where it has provided leadership, of which the prime example is the revision of the *System of National Accounts (SNA)*.

In 1991, in response to widespread concerns that the performance of the international statistical system needed to be improved, a major review was initiated by the UN Statistical Commission to find ways of strengthening international statistical cooperation. The subsequent report (the Begeer Report) found that: (i) the capabilities of the national statistical systems still differed excessively; (ii) the effort needed to improve this situation needed stronger coordination; (iii) there had been too slow a response to the fact that technological developments had transformed user requirements; and (iv) users had become more critical regarding the quality and timeliness of published data. To address this situation, the authors of the report conducted an assessment of the present role of international organizations against the ideal that, for a given subject, international organizations should collectively develop an integrated program of statistical standards, data collection, data processing and dissemination, and technical cooperation/assistance, and that each international organization should try to accommodate its own role within the constraints provided by this framework. The formulation of the integrated programs was to take account of existing resource constraints at the national level.

Partly in response to this assessment, the UN Statistical Commission, through its Working Group on International Statistical Programs and Coordination, established in key areas of concern a number of task forces in which concerned international organizations would take the lead role in (i) determining work being done on methods, collection, compilation, processing,

dissemination, and technical cooperation/assistance, (ii) assessing problems, duplication, weaknesses, imbalances and gaps, and (iii) studying how to carry out an evaluation of the databases maintained by international organizations. In addition to national accounts statistics (on which an international working group had already been established), task forces with mandates broadly along these lines were established in 1992 in environment statistics, finance statistics (for which the Fund is the convener), industrial and construction statistics, international trade statistics, and price statistics. Additional task forces were subsequently added in poverty statistics and services statistics.

In addition to working within the UN framework, the Fund has worked closely with a number of international organizations and specialized UN agencies, including the BIS, the European Monetary Institute (EMI), the Statistical Office of the European Union (EUROSTAT), the ILO, the Organisation for Economic Cooperation and Development (OECD), the World Bank, and the World Trade Organization (WTO) to promote a more coordinated approach.

With the World Bank, such cooperation initially took the form of the establishment of a Joint Computer Center in the 1960s and, from the 1970s, of electronic data exchange, by which the Fund gained access to the World Bank's operational country database and external debt database based on debtor reporting. The Bank for many years provided financial support for the development of statistics on local government finance and government expenditure by function. More recently, because of growing Fund use of GDP denominated in a common currency using purchasing power parities, the Fund has provided financial support for the World Bank's work in the international price comparison project. As noted below, the Fund has worked closely with the World Bank in developing methodology for external debt statistics and its integration with creditor sources.

During the 1970s and early 1980s, the Fund also gained access to other international databases with the electronic tape subscription collection and exchange program. In this connection, computer tapes were received directly from the United Nations on trade by country and by commodity and on national accounts.

With EUROSTAT, the Fund has been increasingly involved in the work of a number of committees and working parties covering national accounts, financial accounts, and balance of payments, financial, and monetary statistics; these have included the European Union (EU) Committee of Central Bank Governors, and, from 1994, the newly established EMI. The Fund's general objectives in these meetings have been to contribute to the development of European methodologies and standards, consistent, as far as possible, with the Fund's needs and internationally agreed standards, and promote data sharing arrangements with the Fund. In the latter respect, the Fund has recently taken a close interest in EUROSTAT's experience in developing electronic data exchange with its member countries through the use of the *United Nations Electronic Data Interchange for Administration*,

Commerce and Transport (UN/EDIFACT) program, which is initially being developed for balance of payments statistics.

With the OECD, the Fund has worked closely in national accounts, in external debt, services, and tax statistics, and, through the IMF Committee on Balance of Payments Statistics, in direct and portfolio investment statistics. The Fund has also collaborated with the OECD Group of Financial Statisticians in the identification of emerging needs. With the BIS, the Fund has worked closely in external debt, international banking, international liquidity, and money and banking statistics. Coordination with the WTO, which has so far largely addressed emerging common interests in commodity trade and services statistics, has been through joint participation in the task forces on commodity trade and services statistics.

2. Achievements in international cooperation

There has been a considerable degree of harmonization of the efforts of international organizations in establishing common standards in the macroeconomic statistical methodologies that they recommend to their member countries. At the same time, the growing integration of world capital markets has significantly increased monetary and regulatory authorities' interest in accurate and complete information on capital flows and financial markets and their integration, across countries, within a common framework of balance of payments and national accounts. The latter objective has been a driving force behind the Fund's efforts to promote the coordination of the contributions of international organizations to the completion of the *System of National Accounts 1993 (1993 SNA)* and the fifth edition of the *Balance of Payments Manual (BPM)*. The Fund is also working closely with other international organizations in establishing international standards, consistent with the *1993 SNA*, in money and banking and government finance statistics through the development of its first *Manual on Monetary and Financial Statistics (MMFS)* and a revised *Manual on Government Finance Statistics (MGFS)*. In external debt statistics, the BIS, the Fund, the OECD, and the World Bank have worked together to develop consistent definitions and complementary methodologies for the preparation of comprehensive external debt data, subject to the constraints set by national creditor and debtor sources.

Efforts to promote joint reporting by international organizations in macroeconomic statistics have been made over the years. These resulted, in the 1970s, in the establishment of joint reporting procedures (standardized questionnaires) by the Fund and the OECD in balance of payments and government revenue statistics. At the same time, data sharing arrangements were also introduced, by which, for example, the Fund established electronic access to the more detailed UN databases for national accounts and international trade statistics and the detailed databases underlying EUROSTAT's and the OECD's statistical publications. Over the past decade, advances in the development of electronic dissemination media have significantly increased the potential for efficient data sharing between international organizations and member countries. As a result, a

considerable body of data is now shared among international organizations through the exchange of tapes, and the use of computerized national databases (implicitly a form of data sharing as no separate reporting of data is required) is growing.

To some extent, these developments have superseded earlier attempts by international organizations to establish joint reporting procedures and have eased the burden of reporting by national statistical agencies. ^{1/} Although the Task Force on Finance Statistics has concluded that there appears to be no firm evidence of an excessive burden or duplication of requests on national authorities from the reporting of financial statistics to international organizations, concerns continue to be expressed at international meetings of duplicative demands by international organizations. More recently, the international organizations have been asked by the UN Statistical Commission to review their reporting requirements, including areas where duplicative requests may have been made by their nonstatistical units.

IV. Departmental Statistical Practices

1. Departmental approaches to data collection and management

a. Area departments

Area departments' work practices initially centered on the development of country databases compiled manually and based increasingly on data collected in the course of staff missions. The products of area departments' statistical activities have subsequently evolved in line with the evolution in computer technology. As the advent of personal computers and spreadsheet programs dramatically reduced the effort required for basic computational tasks, area departments set increasingly high standards for quantitative analysis, as reflected in programs for the use of Fund resources and multiple medium-term policy scenarios for Article IV consultations. In practice, this has meant a significant increase in the size and complexity of area department databases, which in turn has led to increased attention to developing standards for efficient management and documentation of databases in order to limit loss of institutional memory and other costs associated with changes in staff assignments.

Area department data management practices are broadly similar across departments for countries at similar levels of statistical development. Rule-based time series database management systems, such as represented by

^{1/} These findings were based on a questionnaire to central banks, ministries of finance, and national statistical offices in a number of industrial and developing countries in December 1992 to assess the problems and opportunities for better coordination and cooperation. The survey was conducted by the Fund on behalf of the Task Force on Finance Statistics.

the *Advanced Retrieval and Econometric Modelling Software (AREMOS)* and the Economic Information System (EIS), impose a discipline and structure on database management by requiring or facilitating many of the elements of documentation needed to preserve institutional memory. However, time series management software does not provide the flexibility of more widely used spreadsheets for making quick and easy adjustments to data and relationships between variables or for producing ad hoc reports and analysis.

A number of area departments have introduced data management guidelines governing the use of the software to produce transparently structured databases in which source data are clearly distinguished from transformed data. They require the full documentation of those databases with regard to data sources, definitions, and dimensions.

The extent to which missions collect primary source data and make their own estimates depends largely on the availability and quality of official statistics. Most area department databases also draw to some degree on data from official publications of member countries, from EIS, and from other departmental databases (such as those relating to the World Economic Outlook (WEO), effective exchange rates, and commodity prices). Between missions, particularly in the case of program countries, the authorities also provide area departments with certain data required for surveillance and/or program monitoring. Although the full range of data required is determined on the basis of individual country circumstances, a basic set of data, reflecting the core areas of macroeconomic statistics, is common to virtually all countries. Resident representatives provide an important conduit for collecting national data where such assignments exist.

b. The Statistics Department

The databases managed by the Statistics Department apply general methodological standards for the compilation of economic and financial data, which in turn promotes international comparability and methodological continuity over time. However, in many countries, the databases reflect underlying weaknesses in source data that make it difficult to develop data in full accord with international standards. These databases are in time series form and are stored and managed using a specially designed time series database manager, EIS. 1/

1/ The term *EIS* is frequently used also to refer to the collection of Statistics Department databases that are managed by the system, although there are EIS databases that are owned and used by other Fund departments. The latter include EIS databases updated from national source data reported on magnetic tape, for some developed countries, which constitute primary source data for both Statistics Department and area department databases. Examples include EIS databases updated from magnetic tapes received from the central banks and ministries of finance of some countries and the OECD.

The databases of the Statistics Department include time series in the following areas: balance of payments statistics; domestic price statistics; exchange rates; Fund accounts; government finance statistics; international banking statistics, including cross border positions by country reported by individual countries and the BIS; international reserves and the currency composition of foreign exchange reserves; international trade values, volumes, and prices and international trade by partner country; monetary statistics, including interest rates; national accounts; and production and employment indicators. 1/ The Statistics Department does not collect more specialized sectoral production/employment or trade-by-commodity 2/ data that may be of special relevance in particular countries, whereas area departments often collect such data for operational purposes.

The databases of the Statistics Department covered 274 countries and/or other geopolitical groupings as at end-1994. They contained 1.73 million time series, in total, of which 1.18 million were source data and 0.55 million were derived by equations. 3/ IFS correspondents report monthly or quarterly data that are the core of the Statistics Department's databases, and there are often specialized correspondents in addition for compiling and reporting quarterly direction of international trade, annual government finance, and annual and/or quarterly balance of payments data.

The frequency of data availability and reporting varies by topic and country. Balance of payments and government finance statistics compiled according to international standards are generally reported annually, although some 60 countries report quarterly balance of payments data and many countries report more frequent government finance data. National accounts are also available only annually for many countries, but the Statistics Department maintains a monthly reporting system to capture the most recent new and revised data. Data on the currency composition of foreign exchange reserves are collected by means of a quarterly questionnaire. International banking statistics on stocks of cross-border assets and liabilities are also collected quarterly from most reporting countries and the BIS. Special reporting arrangements have been established for reserves and exchange rates data, which are cabled to the Fund within five days of the end of each month. Most other data are reported at monthly or quarterly frequencies, on a monthly reporting cycle. Weekly and daily data are not currently stored in EIS.

1/ The detailed international banking data and the data on the currency composition of foreign exchange reserves are highly confidential and are available, other than in aggregate form, to only selected authorized staff in the Statistics Department. The databases containing these data are protected by electronic and administrative security procedures.

2/ The collection of data on trade by commodities was eliminated from the Statistics Department's activities some years ago as a budgetary measure.

3/ A single EIS time series includes monthly, quarterly, and annual frequencies, which are typically treated as three separate time series in other software such as *AREMOS*.

The databases of the Statistics Department inevitably lag behind area departments' databases in currentness in the period immediately following an area department mission. Moreover, breakdowns in the correspondent system in a country may from time to time lead to lack of currentness, as well as to problems in capturing the most recent revisions to historical data. A particular problem occurs when countries delay submission of data and then provide updates covering a period of several months. However, EIS data are at times more current than area department data for countries where the annual Article IV consultation is the main area department data source. Area department databases benefit from desk officers' direct access to primary source data and national compilers.

c. The Research Department

The Research Department maintains six sets of databases, which include databases for WEO, indicators of competitiveness, current economic and financial indicators, operation of the multiregional econometric model (MULTIMOD), surveillance data, and data on commodity prices.

(1) The World Economic Outlook

The WEO database is used to analyze developments in the world economy, produce the WEO analyses and the *World Economic Outlook* publication, provide a reference database for Fund staff, and respond to data requests from Executive Directors, other international organizations, and national authorities. The database has grown considerably over time in terms of size and coverage. During the first ten years (1969-79), only industrial country historical data and projections were maintained. In the late 1970s, developing countries were included in the WEO database, initially with a limited number of series. In the early 1980s, data needs related to the debt crisis led to an expansion of data coverage for debt-burdened countries. Since 1990, the data coverage has been reviewed and adjusted on several occasions in the light of changing analytic concerns. Most recently, the system has been extended to include data for the countries in transition.

Most of the data are provided through submissions from area department country desks. The desk officer draws from a variety of Fund and non-Fund sources to review and revise the historical data and, most importantly, to provide projections. Supporting databases from the Fiscal Affairs, Research, Statistics, and Treasurer's Departments are accessed on a regular basis, as well as selected data from the OECD and the World Bank. Currently, the database contains some 25,000 time series. Some 20,000 series (containing historical data and projections) are collected from area department submissions or are generated from them. Another 3,600 series are maintained as part of the general assumptions and global economic environment (GEE) databases, provided to departments to assist desks in formulating country projections. The remaining series are primarily historical series used for analytical purposes or to create the output of the *World Economic Outlook* publication.

A key principle of the WEO is that it relies on those definitions that are considered to be the most appropriate measure of a particular concept for each country: although there are some exceptions, the system does not insist on the standardization of series across countries. This principle allows desks to submit series that are consistent with their reports on *Recent Economic Developments (REDs)*. The lack of strict consistency across countries and with *IFS* is not regarded by the Research Department as a major problem for analytic purposes.

The principal strengths of the WEO data collection system are considered to be that: (i) the WEO receives the most current data that the area department is able to provide; (ii) the WEO data definitions are those deemed most appropriate by the area department desk and the national authorities; and (iii) discussions regarding the data are facilitated by the collaborative nature of the submission process. The principal weakness is that area departments may not focus closely on revisions to historical data or methodological changes in series; this sometimes results in breaks in data series.

A combination of tools is used to produce the WEO, including *AREMOS*, the *Lotus* spreadsheet software, and other software packages. Full advantage is taken of the Fund's server-based network, including its electronic mail facilities, for data sharing and processing. The current software tools are not, however, robust enough to handle efficiently publication requirements at the end of the WEO cycle.

(2) Competitiveness indicators

The Competitive Indicators System (CIS) Database is designed to present nominal effective exchange rates and various measures of real effective exchange rates for industrial countries. The real effective exchange rate measures are based on relative unit labor costs, relative normalized unit labor costs, relative wholesale prices, relative export unit values of manufactures, and relative value added deflators, all in manufacturing. The database provides annual, quarterly, and monthly nominal and real effective rate estimates. Where possible, quarterly data are benchmarked on annual national accounts based data provided by the country or by the United States Bureau of Labor Statistics. The weights for the system were recently revised by the Policy Development and Review Department using aggregate trade flows for manufactures averaged over the period 1989-91, and the system was rebased to 1990.

Data from the CIS are published in *IFS* for only 17 of 21 industrial countries in the system, pending approval by country authorities for the remaining four. The Information Notice System (see below) uses the CIS for all 21 countries in the system. The CIS data are used in the Research Department for the WEO, the Surveillance Data Bank, and the periodic World Economic and Market Developments (WEMD) report for the Executive Board. The data are also used by area departments and the Policy Development and Review Department (for the Information Notice System). In addition there are

numerous requests for CIS data from member governments, academic and financial institutions, and individual researchers.

The sources of data vary among countries. For some countries, the data are obtained by electronic connection to other databases (EIS, the OECD Analytical Database, the OECD Main Economic Indicators, and Wharton Economic Forecasting Associates (WEFA), the last mentioned being a commercial source). For others, the data are received (from area departments or from other outside sources) by electronic mail, mail, facsimile, or diskettes. In all cases, an attempt is made to compare the data used in the system with other sources to check for consistency.

The chief strength of the system, which is written in *AREMOS*, is that it allows for fairly quick expansion to other countries and variables. The main weakness is that data collection is cumbersome, especially because the input data are not always provided directly to the Fund by the countries concerned.

(3) Current economic and financial indicators

The purpose of the current economic and financial indicators databases is to report the most current possible data for the G-7 countries. The databases consist of three separate *AREMOS* data banks: Current Economic Indicators (CEI); Current Indicators and Projections (CIP); and Market Development Report (MDR). These historical data banks should be considered as a single entity because they are utilized in tandem for some purposes and in some respects share and feed off the same data. The data banks were originally updated once every six to eight weeks, but demand for these data has grown and the data banks are now updated at least once a week.

The CEI, CIP, and MDR databases provide major input to the background material for WEMD Executive Board sessions. In addition, they are utilized to produce the weekly reports as they appear in the "blue binders", which are distributed throughout the Research Department and to area department desk economists. Used by economists and research officers in the Policy Development and Review, the Research, and the Treasurers Departments and in area departments, these databases also act as a source for other databases, such as the Surveillance Data Bank. Lastly, data from these three databases are an important part of the WEO.

Most of the data are retrieved electronically from third party sources (WEFA), which collect the data directly from national statistical agencies. It is easier and more timely to obtain data from WEFA than from area department desks or the EIS. However, both desks and EIS are used periodically as a reference to verify and check data and occasionally as a source for the data. EIS data are used to expand data history. Staff interpretations of data gathered from news wire services are relied upon for up-to-the-minute information. Because these data may sometimes be incomplete, data are checked and revised as primary sources become available.

The major strength of the CEI, CIP, and MDR databases is their timeliness. The main weaknesses are the onerous nature of the data collection process, due to the overriding requirement for timeliness, and the difficulty of data management when data definitions change or concepts are discontinued.

(4) MULTIMOD

The MULTIMOD database provides a baseline solution for MULTIMOD. The database for the standard model includes annual data for all G-7 countries and for aggregations of smaller industrialized countries, for developing countries, and for high-income oil-exporting countries. The contents of the database are driven by the requirements of the model. Although published data are used whenever possible, in many cases the data have to be transformed to make them consistent with the logic of the model. The database is usually updated twice a year, in May and October, following the publication of the WEO, but is also updated sometimes from preliminary versions of the WEO. Most data are derived from the WEO, but in a few cases data are drawn from OECD databases and the UN trade system. The database for the standard version of the model requires input for about 1,500 series and produces estimates for about 800 annual time series. A recent migration of data collection and management to a UNIX server system has allowed the use of *FAME*, a state-of-the-art software that has been designed explicitly for time series databases. The new system is much more powerful and flexible than *AREMOS*. The users of the data are mainly Fund staff, but outside the Fund at least 20 MULTIMOD users are provided with both the model and a baseline data set.

(5) Surveillance Data Bank

The Research Department, in cooperation with the Policy Development and Review Department and the relevant area departments, maintains a Surveillance Data Bank (SDB) that contains selected economic indicators for industrial countries and newly industrializing economies. The rationale for the SDB is to make available in a readily usable form a set of key economic variables that are particularly useful for surveillance issues. It is not designed to replace data that area departments gather and use for their own purposes. Rather, it serves as a convenient repackaging of existing data drawn largely from currently available sources, thereby saving users the time and effort of having to assemble such cross-country data themselves.

The system contains a broad range of data, including monthly, quarterly, and annual exchange rates, prices, interest rates, external positions, data on the real economy, and fiscal and monetary indicators. The data are generally drawn from existing Fund sources such as *IFS* (through the EIS), the current economic and financial indicators databases, and the WEO database, although external sources (WEFA and newswire services) are also used extensively. Every attempt is made to make these data as current as possible, and the data set is updated on a monthly basis. An additional data bank contains daily data on interest rates and exchange rates. These

high-frequency data allow more detailed and timely analysis of specific episodes. Taken from newswire services, they show rates at which market transactions are actually made. The daily data are updated every week.

(6) Commodity prices..

The Research Department maintains a detailed database of commodity prices and derived indices. Tables showing recent developments in commodity prices are transmitted each week to interested Fund staff and published in *IFS*. In addition, the indices are also used in the construction of GEE indicators for the WEO exercise.

The historical commodity price database comprises monthly, quarterly, and annual series for approximately 65 commodity prices from 1957 to the present. Of these, 35 price series are converted to 1980-based indices to represent 30 non-fuel primary commodities. These indices are then weighted to construct four commodity subgroups (food, beverages, agricultural raw materials, and metals and minerals). These subgroups are aggregated in a similar manner to derive an overall non-fuel commodity price index. In order to better reflect current trade patterns, the weights used in the construction of the non-fuel commodity price indices are revised periodically. Work is currently under way to compile a new set of non-fuel commodity price indices using updated weights. The representative prices for certain primary commodities are also being revised. The new indices will be based on 1990 for consistency with *IFS* and other Fund publications that have recently moved to 1990 as a base year. A decision by the World Bank for joint production of the new commodity price indices with the Fund is currently awaited, but it is expected that the revised indices will be implemented shortly. Price indices for commodity exports from developing and industrial countries are also maintained. Most of the source commodity prices are averages of daily or weekly price quotes collected from various trade publications and electronic news wire services.

The major strength of the commodity price database is its currentness, as most of the data originate from the latest available price quotations collected from a wide array of trade publications and news services. Another strength is that the commodity price indices are maintained in aggregated as well as disaggregated forms, thereby meeting the data requirements for analyzing a wide range of economies. Currently, most of the raw data are manually entered into the system. Until the data sources become available in electronic format, this method of entry will continue to be necessary. Work is currently under way to consolidate the software used for data processing, storage, and table production from a *Lotus/AREMOS*-based system to one that is based almost entirely in *AREMOS*.

d. Other departments

The Policy Development and Review Department maintains several Fund-supported program related-economic statistics databases. The Compensatory and Contingency Financing Facility (CCFF) database and files related to the Systemic Transformation Facility (STF) contain detailed statistical information related to these facilities, together with selected information on the country performance under these programs. Included are items such as Fund quota, date and amount of purchases, date of Executive Board meeting, information required for shortfall calculations (such as import and export value, volumes and unit values of commodity exports, cereal imports, petroleum exports, etc.). Similar databases are also maintained for the monitoring of ESAF and various other Fund programs. Databases are also maintained on commercial financing and rescheduling, general surveillance activity, and trade-related information. The Monitoring of Fund Arrangements (MONA) database (which is under development) will comprise data on objectives, outcomes, and monitoring mechanisms of programs supported by stand-by, EFF, SAF, and ESAF arrangements.

Since 1983, the Fund has constructed monthly indices of nominal and real effective exchange rates under the procedures for surveillance over exchange rate policies of its members. The database of these indices is maintained through an inter-departmental exercise coordinated by the Policy Development and Review Department and involving area departments, the Research Department, the Statistics Department, and the Bureau of Computing Services. These indices provide the basis for the Information Notice System reports to the Executive Board on indicators of real effective exchange rates and are also published in *IFS* for those countries that have given permission to do so. Fund staff have electronic access to the database for monitoring economic developments in member countries.

The official accounting records of Fund transactions and operations are maintained by the Treasurer's Department in the TAD, which is a *Sybase* relational database management system containing a comprehensive twenty-year history of financial transactions and operations between the Fund and its members in the General Department and the SDR Department and in the accounts administered by the Fund. TAD is used extensively to provide information to members, for publication, and for financial analysis and policy support on the part of Fund staff. The Treasurer's Operations System (TOS) is a *Paradox* relational database that draws on the TAD to facilitate the monitoring and proper execution of transactions in the General Department. TOS generates weekly reports for management. The Late Payments System (LPS), an integral component of the TOS, is used to generate periodic tabular reports to management and the Executive Board on overdue Fund obligations.

The Integrated Database Management System (IDMS) of the Treasurer's Department, operating on the IBM mainframe, contains daily exchange rates for about 50 countries, daily long- and short-term interest rates for the G-7 countries, and daily gold quotations from the principal world gold

markets. Data are gathered from official sources, wire services, and financial newspapers. The database is used for many purposes, including the preparation of reports on foreign exchange and financial markets, the calculation of the official value of the SDR and the rates of remuneration and charge for the SDR Department, and the calculation of interest rates on Fund borrowing. The Quota System Database, written in AREMOS, contains a number of variables that facilitate the calculation of quota shares for all members in a general review of quotas and for the calculation of quota shares for new members.

2. Efforts to improve the efficiency of Fund data management

There have been a number of efforts to strengthen the Fund's work in data collection and management. These include the appointment of a committee of outside experts in the 1960s, and through the 1980s, the establishment of a series of interdepartmental committees. In particular, the 1980s saw a surge of interest in the coordination of data management practices in the Fund, in part a delayed response to the expanded data needs that emerged from the Fund's wider surveillance role in the 1970s and the increased resources taken up in data management. This occurred concurrently with a rapid expansion in both area department and WEO databases and the development of more flexible tools for data management.

In June 1988, a Data Management Policy Committee (DMPC) was established by management to be responsible for developing an overall strategy to improve data management practices in the Fund and address questions raised by Executive Directors concerning the need to evaluate the Fund's computer and more general budgetary requirements for data management. More specifically, the terms of reference noted that the development of EIS and the economists work station (EWS) as data management tools of use to area departments should help them to: (i) establish a software environment in which they could store, document, access, and process information in an efficient way and with appropriate security safeguards; (ii) meet the demand for frequent and timely access to those statistics by a growing number of authorized users; and (iii) achieve a more effective integration of the data resources of the Fund. The DMPC succeeded an earlier informal interdepartmental committee, the FRANCS (Facility for the Retrieval and Analysis of Country Series) Working Group, which was established in March 1982 to review the feasibility of establishing a computerized online database for management and concerned heads of departments to provide selected statistical information as a basis for comparative analysis of Fund-supported programs.

A survey of data management practices in the Fund, conducted by the DMPC whose report was issued in June 1989, found that there was a wide variety of data management practices followed by area departments and that there was considerable scope for improvement in current practices. The results highlighted the problems which had been known to impede the transfer of desk data from one economist to the next without undue losses in continuity. The survey also confirmed the perception of, and reasons for,

the low usage by desk economists of the Statistics Department database. Finally, the survey showed that data sharing was not prevalent among country desks. The survey also found that the use of microcomputers had eased the data management burden of individual economists but that commensurate benefits in data management had not been realized.

In response to the survey, and in collaboration with area and functional departments, the Statistics Department completed an intensive comparison of the coverage and quality of *RED* and Statistics Department data (the enhanced statistical collaboration project) for a representative sample of countries. This study highlighted the fact that efforts to harmonize area department and Statistics Department databases required close collaboration and intensive country-specific work over an extended period. It was also evident that, even if harmonization could be achieved, continued efforts would be needed to maintain those gains. Since harmonization was a resource-intensive activity, and given the increased demands on resources from the accession to membership in the Fund of new members, work on this initiative was suspended.

A work program of Fund statistical collaboration was agreed among departments under the then Deputy Managing Director's direction in late 1990. This called for: (i) the preparation of an inventory of major data weaknesses for every member country; (ii) the design of a work program to address those weaknesses; (iii) a discussion of major data weaknesses in Article IV consultation reports, both in the main text and (in more detail) in statistical appendices; (iv) emphasis, in technical assistance, on countries where data problems were impeding, or were likely to impede, the development and monitoring of Fund programs; (v) the institution of multisector technical assistance missions in statistics; (vi) focus, in technical assistance reports, on issues of policy relevance; (vii) the reorientation of the Fund's training program in statistics; (viii) the overhaul of the Fund's statistical publications; (ix) the review of the international methodologies in balance of payments, government finance, and money and banking statistics; and (x) the intensification of collaboration with other international agencies. A new division, the Country Economic Data Division, was also created in 1990 in the Statistics Department to provide an integrated, macroeconomic orientation to the Statistics Department's work and to act as a focal point for interaction between the Statistics Department and area department staff on countries' overall statistical problems.

The preparation of statistical inventories for all member countries was followed by the preparation of a detailed work program in statistics for selected countries for which there were both severe data problems and the existence or early prospect of a Fund program; this work was undertaken with close collaboration between area departments and the Statistics Department. The effort led naturally to closer interdepartmental collaboration in the design, implementation, and follow-up of work programs in statistics for all member countries that required Fund technical assistance in the development

and improvement of their macroeconomic databases for national policy and Fund surveillance purposes.

The need for a stocktaking of previous initiatives and of data management practices in the Fund was prompted by concerns to find ways of improving the efficiency of the Fund's decentralized approach to data management, including an assessment of both current work practices and the optimal use of the technology now available. These concerns led to the establishment, in December 1994, of the Interdepartmental Working Group on Data Management (IWGDM). More specifically, the IWGDM:

- assessed the work practices that have developed as a result of the Fund's decentralized approach to data management, including the collection, storage, documentation, and sharing of statistics;
- considered the requirements for technology to support these practices;
- considered the opportunities afforded by adopting newly available technology and the implications of the latter for best work practices;
- considered ways of strengthening the decentralized approach to data management to facilitate a more coordinated approach to data collection and to meet growing needs for data sharing;
- considered the problem of externalities that may arise in a decentralized system when data users in one department are dependent on data managers in another department that has different data needs;
- considered the strategy for selecting appropriate software for time series data managed by area departments, for the replacement of EIS, and the related system that would facilitate data sharing across departments; and
- prepared terms of reference for outside consultancies that could help achieve these objectives.

In its report, which was sent to department heads for their review in May 1995, the IWGDM produced a number of recommendations dealing with (i) the formulation of data management guidelines for use in a flexible manner across departments; (ii) the introduction of more coordinated data collection methods to serve the needs of all departments; and (iii) the launching of a study by an outside consultant to identify and apply more harmonized Fund-wide data management technologies that will serve the needs of individual departments while promoting data sharing among departments.

V. Pillars of the Fund's Statistical Activities

1. Statistical methodologies

Over the last ten years, intensive work has been carried out on the revision and updating of the Fund's statistical methodologies. The decision by the international statistical community to revise the 1968 SNA provided a framework for the revision of other methodologies. Until the revision of the SNA, relatively little had been done to recognize the specific overlaps between the Fund's specialized methodologies and the national accounts, or to evaluate whether the differences that existed among them were needed to facilitate their special roles. As a result of reviewing the differences, the Fund, supported by the international statistical community, decided that, in the revisions of its own methodologies, high priority would be placed on harmonizing concepts, definitions, analytical frameworks, and classifications among national accounts and balance of payments, government finance, and money and banking statistics. In the revision of the specialized methodologies, first emphasis would be placed on serving the needs of compilers and users of these systems, but harmonization would be achieved in all areas where differences were not essential to the objectives of the specialized system. Where differences had to remain, there would be a full and explicit mapping of these differences between the systems. The following sections trace the development of the Fund's work in statistical methodologies.

a. Balance of payments statistics

The Fund's early concern about statistical methodology is evidenced by the publication of the first edition of the *BPM* in January 1948. The major objective of this first edition was to provide a basis for regular reporting of balance of payments data to the Fund. This was a continuation of work started by the League of Nations to develop balance of payments statistics in a standardized form. The manual was a cooperative effort of the Fund, the UN, and other international organizations. Economists and other specialists from many countries contributed to the manual, and representatives of some 30 countries and international organizations met in Washington in September 1947 to finalize the draft of the manual.

The first edition of the *BPM* consisted primarily of tables for reporting data and very summarized instructions for completing them. No general discussion of balance of payments concepts or compilation methods was included. The second edition, published in 1949, greatly expanded the material describing the concepts of the system. The third edition of the *BPM*, issued in 1961, moved far beyond the first two editions by providing both a basis for reporting and a complete set of balance of payments principles that could be used by countries to serve their own needs.

The fourth edition of the *BPM*, published in 1977, was necessitated by the important changes that had taken place in the way in which international transactions were carried out and by the changes in the international

monetary system in which they were set. Much fuller treatment of the underlying principles of residence, valuation, and other accounting conventions and a greater elaboration of balance of payments concepts were included. The fourth edition also introduced for the first time a full discussion of the analytic presentation of balance of payments accounts and standard components that could be used flexibly to construct various balances. No single analytic presentation was preferred, but a range of widely used balances designed to serve both compilers and users of balance of payments statistics was discussed.

The fifth edition of the *BPM* was published in September 1993, following a long period of intensive effort that included the results of the Expert Group Meeting on the External Sector convened by the Fund in 1987 and the results of two working parties on balance of payments issues established by the Fund. It differed in a number of important respects from the previous editions. For the first time, the *BPM* was expanded to cover not only balance of payments transactions but also the stocks of external assets and liabilities in the international investment position. A number of changes were made to the structure of the balance of payments accounts to enhance the linkages with the 1993 *SNA*, including clearer distinctions in the areas of income, services, current and capital transfers, and financial transactions. The coverage of financial transactions and stocks was also substantially expanded and restructured to encompass the widespread changes in international financial transactions and to bring the *BPM* into closer harmony with the 1993 *SNA* and the Fund's other statistical systems.

An expert group, consisting of representatives of all Fund constituencies and concerned international organizations, was convened in March 1992 to review the entire draft of the *BPM* and reach final conclusions on methodological issues.

The *BPM* is primarily concerned with providing the standards for concepts, definitions, and classifications to facilitate national and international compilation and comparability of data. It does not, however, provide practical guidance on how to gather data. To meet these needs, a companion volume, the *Balance of Payments Compilation Guide (BOP Guide)*, has been developed. The primary purpose of the *BOP Guide* is to provide practical direction on using sources and methods to compile statistics on the balance of payments and the international investment position. The *BOP Guide* reflects the emergence of new data sources and adaptations in the application of statistical methodologies to evolving circumstances. The *BOP Guide* does not present a prescriptive or definitive approach to compiling statistics on the balance of payments and the international investment position but sets out the relative strengths and weaknesses of a variety of approaches and notes source data adjustments required to derive, in conformity with recommendations of the *BPM*, data on flows and stocks. The *BOP Guide* also discusses relationships between the compilation of balance of payments statistics and relevant aspects of national accounts. The *BOP Guide* was published in March 1995.

Work is also well advanced on the *Balance of Payments Textbook (BOP Textbook)*, which is a comprehensive training guide for balance of payments compilers. Publication of the *BOP Textbook* is expected in late 1995.

The parallel development of the *BPM* and the *1993 SNA* (discussed below) and the close collaboration of experts working on both revisions permitted frequent feedback on, and assessment of, decisions being made in both areas. This resulted in almost complete concordance of both systems. In particular, the *BPM* and the *1993 SNA* share a common approach to residency, valuation, the time of recording, conversion procedures, the coverage of international transactions in goods, services, income, and transfers, the treatment of external financial assets and liabilities, balance sheets, and the international investment position. The accounting structures of both systems were also closely aligned, so that the balance of payments now contains current, capital, and financial accounts. In some cases the *SNA* was modified to coincide with balance of payments standards, while in others the balance of payments adopted *SNA* guidelines; in many cases both systems were revised to reflect changed international conditions. As was the case with previous revisions of the *BPM*, extensive effort was made to reflect the needs of both users and compilers of balance of payments statistics.

b. Government finance statistics

The creation of a new division in the Statistics Department in 1972 to deal specifically with government finance statistics was largely in response to concerns expressed by the Executive Board about the quality and variability of data on the public sector that were included in country papers prepared by the staff. The highest priority was, therefore, assigned to the development of a manual that would provide a generally agreed but flexible analytic framework, practical accounting rules, and detailed classification schemes for government revenue, grants, expenditure, financing, and debt statistics. A draft of the *MGFS* was produced in 1974. This draft drew upon many existing materials for the development of economic accounts and the treatment of government transactions, particularly *the 1968 SNA* and several other UN manuals on government accounting and budgeting, the *BPM*, and guidelines and practices for monetary statistics in *IFS*.

The draft was reviewed by experts at five seminars organized by the Fund covering all regions of the world. In 1976, a system was established for member countries to report government finance statistics to the Fund by means of a standardized questionnaire that followed the concepts and classifications of the draft manual, leading to the publication in 1977 of the first *GFSY*. Comments provided during the regional seminars, experience gained in processing and analyzing data submitted by country correspondents, and extensive work with compilers and users of government statistics both within the Fund and in member countries contributed substantially to the eventual publication of a revised *MGFS* in 1986.

The *MGFS* was intended as a reference work to assist compilers of data on government operations. It was not meant to serve as the basis for

organizing government budget and accounting systems, although a number of member countries have found its rules and classifications useful when undertaking revisions of these systems. It was recognized that for many purposes national budget and accounting formulations were also needed for presentation of fiscal data. The *MGFS* was not, therefore, as prescriptive as the *BPM*.

A revision of the *MGFS* was begun in late 1994. As in the case of the other methodologies, the main objective of the revision is to meet the specialized needs of compilers and users of these data while linking the fiscal methodology as closely as possible with that of the 1993 *SNA*. One of the key elements of the revision will be an examination of the scope for moving from the current cash basis for GFS accounts toward the accrual basis of the *SNA* and other methodologies. Adopting accrual accounting will resolve some of the major shortcomings of the present system, such as inadequate treatment of government payment arrears and in-kind transactions, but the full implications and practicality of using accrual accounts for government have not yet been evaluated. The review will give emphasis to measurement of quasi-fiscal operations of the financial system and nonfinancial public enterprises. The detailed classifications for revenue, expenditure, financing, and debt will also be reviewed, including, in particular, the classification of privatization receipts.

The revision process for the *MGFS* will follow similar procedures to those used in the revision of the *BPM* and now being used in the drafting of the *MMFS*. A detailed annotated outline will be prepared for comment by Fund member countries and concerned international organizations; these will also review various stages of the draft. Completion of the revised *MGFS* is expected in 1998.

c. Money and banking statistics

While the Fund has not published a manual on monetary statistics that is comparable in scope and purpose to the *BPM* and the *MGFS*, a substantial amount of methodological work has been carried out over the years to meet the needs of compilation and analysis of monetary data for operational purposes and for publication. Work undertaken during the 1950s and 1960s to develop a framework for monetary statistics was a direct outgrowth of the theoretical work on the monetary approach to the balance of payments. This work was codified to various degrees in different departments. In particular, studies were published as part of the *Papers on International Financial Statistics (PIFS)* series. Several attempts were made over the years to produce a manual in this area, but for a number of reasons these attempts were not successful.

To partially fill this gap, the Statistics Department produced in 1984 a draft of *A Guide to Money and Banking Statistics in International Financial Statistics (MBS Guide)*. The purpose of the *MBS Guide* was to describe to users of *IFS* the methodology underlying the compilation of the monetary statistics that were presented in that publication. Monetary data

had been published continuously in *IFS* since its first issue in January 1948, but, aside from introductory material in *IFS*, the methodology had never been formally presented. The *MBS Guide* was not intended to be as definitive as the *BPM* and *MGFS*, which provided guidelines for national compilation or the development of internationally comparable data. The *MBS Guide* was circulated to official users but was never finalized and made available to the general public.

Subsequently, extensive discussions with compilers and users of monetary and broader types of financial statistics led to the decision not to revise and publish the *MBS Guide*. Approaches to monetary and financial analysis had been undergoing significant changes in many countries owing to the substantial innovations that affected financial markets, instruments, and institutions. The concept of money itself had undergone considerable revision. Many countries began to focus on money measures considerably broader than currency plus demand deposits (narrow money or M1), which previously was regarded as having a stable relationship with output and income. A decision was taken to produce a new *MMFS* on which work began in 1993.

A detailed annotated outline for the *MMFS* was prepared in the Fund and circulated for comment in 1993 to all Fund member countries and interested international agencies. The *MMFS* has been designed to use the 1993 *SNA* as an overall framework and will place specialized monetary statistics within that context. Harmonization with the 1993 *SNA* and the *BPM* is a central principle for the development of the new manual; indeed, countries that commented on the annotated outline placed great emphasis on the need for such harmonization. One of the key features of the new manual, inspired by the 1993 *SNA*, is the emphasis on financial transactions as well as balances, and the *MMFS* will also address the development of *SNA* financial accounts and flow of funds statistics in addition to specialized monetary statistics. First drafts of chapters of the *MMFS* have already been circulated for comment to countries, and a complete revised draft is expected in late 1995. Publication is expected in late 1996.

d. National accounts

The Fund played an active role in the development of the 1993 *SNA*, joining with the statistical agencies of the EU, the OECD, the UN, and the World Bank to form the Intersecretariat Working Group on National Accounts (ISWGNA) to manage the revision process over a ten-year period. The two main objectives of the Fund's involvement were to improve national accounts statistics in Fund member countries and to harmonize the national accounts with the other statistical systems for which the Fund has major responsibility. One of the key stages of the *SNA* revision process was the convening of a series of expert group meetings on a broad range of topics. The Fund organized and hosted expert meetings on external sector accounts, public sector accounts, and financial flows and balances. Each of these meetings addressed the links between the 1968 *SNA* and the specialized statistical systems developed in the Fund. The Fund was closely involved in

all later stages of the revision process through its participation in the ISWGNA. The Fund also prepared the 1993 *SNA* chapters on the financial account and the rest of the world account and contributed to other parts of the text.

The *SNA* provides a global framework for analyzing all transactions of the economy, stock positions as reflected in the national balance sheet, and all other flows, such as revaluations, that are necessary to reconcile changes in balance sheets from one period to the next. The *SNA* also provides within its framework the means to analyze particular sectors and subsectors, including the government sector, the financial sector, and the economy's transactions and positions with the rest of the world. The question, therefore, arose as to whether specialized statistical systems were needed to analyze these sectors or whether all necessary analysis could be integrated within the *SNA* framework. It was concluded that the *SNA* framework could not cover all needs for macroeconomic statistics and that the specialized systems of balance of payments, government finance, and monetary statistics must continue to exist since they directly served the specialized needs of analysts and policy makers in the relevant areas. It was recognized that full integration of these systems within the *SNA* would not be possible; however, much more could be done to harmonize each of these systems with the *SNA* and with each other.

Achieving this level of harmonization required changes not only in the specialized systems but also in the *SNA*. In each case where different approaches were identified, experts in national accounts and the specialized areas addressed the needs in each area and tried to find a common solution. If a solution was achievable, appropriate modifications were made to the systems. Where such a solution could not be found, the reasons for remaining differences were made explicit. Harmonizing the systems and explaining the remaining differences makes all the systems more analytically useful for users and facilitates compilation of the national accounts, as the specialized systems can be used as a direct intermediate stage in *SNA* compilation.

e. International banking statistics

The Fund, in response to concern expressed by the Executive Board about the difficulty of measuring and monitoring international capital flows, began to assemble a body of international banking statistics around 1982 and over the ensuing years developed a complex system for compiling such statistics that led eventually to the issuance of a quarterly Executive Board paper on international capital flows and to the publication of international banking statistics in *IFS*. The system is unique in that it combines statistics on banks' external positions already available in the Fund's money and banking statistics collection with data derived from confidential detailed reports from the BIS and international banking centers on the geographic distribution of banks' external positions. While no formal methodology has been published for international banking statistics, the general outlines of the methods used have been set out in two papers

issued in the PIFS series 1/ and have been published in a Fund pamphlet. 2/

f. Other methodological work

Two further areas of statistical methodology have received added emphasis in the Fund in recent years. The Fund, in coordination with the Berne Union, the BIS, the OECD, and the World Bank, formed the International Working group on External Debt Statistics in 1984 to explain these organizations' activities in the field of debt statistics and to identify linkages in external debt statistics drawing on information from both creditor and debtor sources. Two volumes have been prepared by the group: *External Debt: Definitions, Statistical Coverage, and Methodology (1988)*; and *Debt Stocks, Debt Flows, and the Balance of Payments (1994)*.

The Fund has also become more involved, through its technical assistance activities, with methodological issues relating to price statistics, particularly in transition economies. Innovative methods for compiling consumer and producer price indices have been developed and implemented in a number of the group of countries comprising the Baltic countries, Russia, and the other countries of the former Soviet Union.

2. Technical assistance

The Fund did not have a formal program of technical assistance in statistics before 1968. Occasional missions in the 1950s and early 1960s were undertaken by the staff of the Fund's Research and Statistics Department in support of area departments' consultation or stand-by arrangement missions or in response to ad hoc requests by member countries.

In December 1968, the Executive Board approved a special program of technical assistance designed to help members to establish or improve their central bank bulletins or statistical bulletins containing basic financial and macroeconomic indicators. In February 1969, the Statistics Department launched the central bank bulletin project. This project was founded on the premises that: (i) there is a set of interrelated economic statistics that are relevant to economic analysis required for the formulation of financial and monetary policies; (ii) the assembly and publication of such statistics by member countries are valuable to the national authorities of the countries concerned, the Fund, and others interested in monetary and payments problems; and (iii) in the development of bulletins, the discipline imposed on central banks would give an impetus to the development of their analytical capabilities. The establishment of a central bank bulletin was also expected to highlight those areas where further technical assistance would be necessary and to ensure continuity in the compilation of data.

1/ *International Banking Statistics (PIFS/1984/1)* and *Methodology for the Fund's International Banking Statistics (PIFS 1985/1)*.

2/ *The Fund's International Banking Statistics*, 1986.

From its inception through the 1970s, the central bank bulletin project had assisted 88 countries and four regional organizations; monetary authorities in the majority of countries were publishing statistical bulletins on a regular basis.

From these origins the technical assistance program evolved into a more comprehensive effort that encompassed assistance in government finance and balance of payments statistics, and its focus shifted towards meeting the needs of the Fund's members in various areas of macroeconomic statistics as well as those of the Fund. International banking and external debt statistics were added to the technical assistance program in 1982 in order to secure the participation of member countries in the Fund's effort to improve the collection of international banking statistics, especially for those countries with significant international banking flows.

The scope of the technical assistance program was expanded in the 1980s with emphasis on assisting countries in improving the quality and timeliness of data for their own analysis and policy purposes and for use by the Fund in its surveillance work. Technical assistance in the period continued to take the form largely of single-topic staff visits undertaken in response to requests from member countries following discussions with area departments. In the formulation of the technical assistance program, priority was accorded to relatively new member countries, developing countries at an early stage of statistical development, and member countries requesting use of Fund resources where data deficiencies identified by area departments were considered an impediment to the formulation and implementation of Fund arrangements.

The level of technical assistance increased during the period FY 1981 through FY 1985 (Appendix II) from 74 missions in FY 1981 to 88 missions in FY 1985 but declined over the next few years to 37 missions in FY 1989, reflecting, in part, work pressures in other areas including in data management and training and, in part, the conversion of the Statistics Department's databases from the Burroughs to the IBM mainframe system for EIS. At the beginning of the 1990s, a sharp increase in demand for technical assistance due to the accession to Fund membership of the new transition countries was met, in part, by the introduction of multisector missions. These missions permitted the staff to focus on all the major macroeconomic statistical systems and their institutional underpinnings in order to assess requirements for institutional restructuring and future technical assistance in each area. This approach also provided the opportunity to examine the consistency of data across the major macroeconomic statistical systems. These missions have enabled technical assistance advice to reach senior government officials, including ministers of finance and governors of central banks, and have become an important part of the technical assistance strategy.

As described in SM/95/115, the technical assistance program in recent years has benefited from the use of consultant experts and the placement of resident statistical advisors in selected countries. To date, resident

advisors have been assigned to some of the countries in the group comprising the Baltic countries, Russia, and the countries of the former Soviet Union. They have been placed in the central bank and/or the national statistical office of those countries. The main functions of these advisors are to support all the principal statistical agencies (especially the central bank, the ministry of finance, and the statistical office) and, in close coordination with area departments and the Statistics Department, to help the authorities improve the quality of macroeconomic data used for their own policy needs and for the Fund's operational work, including support for area department and Statistics Department missions. They also act as a liaison for technical assistance provided by other international organizations.

In response to the rise in technical assistance requests, the increasing use of outside experts for technical assistance assignments, and the need to ensure coordination within the framework of the TAC, the Statistics Department established a Technical Assistance Unit in early 1993 to manage its technical assistance activities.

3. Training

The importance of training in statistics for member country officials was recognized in the early years of the Fund. Early training courses included segments in balance of payments statistics. Training in statistics has been linked to developments in the work on statistical methodologies. Courses in balance of payments methodology have been presented at the IMF Institute by staff of the Statistics Department since 1964. Drawing on the draft *MGFS*, the first course in government finance statistics was presented at the IMF Institute in 1981. Similarly, the first course on money and banking statistics, based upon the *MBS Guide*, was given at the IMF Institute in 1986. These courses have been presented annually (in earlier years, the courses in balance of payments methodology were on a biannual basis) and, in addition to those in English, are given at intervals in French and Spanish. These three courses have been targeted at compilers of statistics in the respective fields. While mainly developing country representatives participate in these courses, the inclusion of a few participants from industrial countries has facilitated a good mix of experience in sharing information on statistical systems and compilation arrangements. Training in statistics will break new ground in late 1995 when the first course in national accounting will be offered.

Increasing emphasis has been given in recent years to regional training in statistics, where courses in the main areas of statistics have been presented in a more concentrated form, and for a shorter duration. These courses have been given at the Joint Vienna Institute (JVI) for officials of transition countries, including Eastern Europe, the Baltic countries, Russia, and the other countries of the former Soviet Union, as well as the transition countries of Asia. A new course on macroeconomic statistics for users has also been given at the JVI. Courses in statistics have also been given at other regional locations for officials from selected country groupings.

A full discussion of the training program in statistics is presented in SM/95/115.

4. Publications ^{1/}

IFS, first published in January 1948, resulted from a decision by the Executive Board in 1946 authorizing a monthly or quarterly Fund bulletin containing statistics essential for the analysis of international financial problems. The editorial policy and content of *IFS* are determined by the Statistics Department, subject to various procedures for consultation and clearance with other departments, and the collection of data on a regular basis is effected by enlisting the cooperation of member countries and certain nonmembers, which are asked to nominate statistical correspondents on whom the Fund can depend for regular reports. Now in its forty-eighth year, *IFS* is the longest-standing publication devoted to international financial statistics. The May 1995 issue contains 150 country pages (148 members, two nonmembers) and 39 world and area tables; the June 1995 issue will contain 153 country pages. The Fund first published *BOPSY* in 1949, *DOTS* in 1950, and *GFSY* in 1977. A full account of the evolution of the Fund statistical publications in their printed and electronic versions is presented in Appendix III.

As indicated in Table 2 in Appendix III, the total number of subscriptions to the printed versions of *IFS* as of December 1994 equaled nearly 11,500. In addition, magnetic tape subscriptions to *IFS* numbered 160 and CD-ROM subscriptions 372. *IFS* on tape and CD-ROM is also available to a much wider audience through on-line time-sharing services and subscriptions for networks.

As noted in Table 3 in Appendix III, the main categories of recipients of *IFS* in order of their size are private corporations (financial and nonfinancial), governments and central banks, other (including copies distributed internally in the Fund and the World Bank), universities and libraries, international and nongovernmental organizations, and news media. The decline in subscriptions to *IFS* in both the printed and computer tape versions during the period from December 1985 through December 1994 may be attributed to the introduction of the CD-ROM version, which facilitated multiple use.

In a comprehensive user survey completed in 1988/89 by an independent consultant, it was found that users generally valued the Fund's statistical publications and considered them to be an important product of the Fund. In many areas, users believed the Fund's statistical publications to be the

^{1/} In addition to the statistical publications (*IFS*, *BOPSY*, *DOTS*, and *GFSY*), Fund statistics are disseminated in a number of other publications, including *Country Economic Reviews* and the *World Economic Outlook*, and authorization has been given by the Executive Board for the publication of selected *RED* reports.

authoritative source, and the Fund is considered the sole source for financial data on developing countries. Users also particularly valued the international standards applied in the Fund's statistical publications and the resulting ability to compare data across countries. The survey found that the major uses of the Fund's statistical publications are to monitor and report on economic conditions and to conduct research.

5. Statistical aspects of Fund surveillance and programs supported by the use of Fund resources

In order to strengthen the effectiveness of the surveillance process and to give practical effect to the decisions and views of the Executive Board in this respect, management has included in its guidelines to the staff at various times instructions designed to strengthen the statistical foundation on which the staff's assessment of macroeconomic developments and policies is based. The guidelines have required that major data issues affecting policy formulation and implementation and/or *IFS* reporting should be referred to in the main text of Article IV consultation reports and be reviewed in an appendix to every second report. They have also required that the Statistics Department's view on the strength and weaknesses of the data and the institutional structure be provided on the occasion of country strategy papers and mission briefs and staff reports for Article IV consultations and use of Fund resources, when such issues are considered important or when technical assistance requirements and priorities are considered. 1/ 2/

The recent Executive Board discussion of *Strengthening Fund Surveillance - Provision of Statistical Data by Members* (SM/95/59, 3/24/95) considerably tightened the requirements by which data deficiencies should be addressed by the staff and brought to the Executive Board's attention. 3/ Among the numerous points emphasized by Executive Directors were the following:

- The need for provision of complete and consistent data by members in the context of Article IV consultations and the importance of a regular flow of key information between Article IV consultations for surveillance to be effective, continuous, and timely;

1/ Management's guidelines, in addition, have required that technical assistance in statistics continue to be targeted toward those countries where there are severe data deficiencies and that the Statistics Department, area, and other functional departments collaborate closely in order to ensure that priority technical assistance needs are met.

2/ Relevant guidelines are contained in documents issued to the staff by the Managing Director (March 13, 1992) and the Deputy Managing Director (September 4, 1992 and January 27, 1993).

3/ SUR/95/34, April 7, 1995

- The need for members to report to the Fund on a timely basis and with minimum lag the key indicators listed in the staff paper along with balance sheets of the central bank; and
- The importance of Executive Board scrutiny of data quality, coverage, and timeliness in Article IV consultations.

The responsibility within the Fund for ensuring the acquisition and use of timely, accurate, and high-quality data for surveillance and programming purposes is shared by a number of departments. The Policy Development and Review Department exercises a general mandate to ensure the effectiveness and evenhandedness of surveillance. Area departments develop and maintain the principal country surveillance databases in their operational work with countries. The Statistics Department has methodological and technical expertise in statistical areas and responsibility for dissemination, and is involved in reviewing the treatment of statistical deficiencies and the quality of data used for analysis in country papers. Other functional departments contribute to the review of data quality in their areas of specialization.

The review of statistical content of papers, including country briefing papers and staff reports, country strategy papers, and other country operational papers such as letters of intent, memoranda of economic and financial policies, and policy framework papers, is guided mainly by the following considerations in relation to data quality:

- The extent to which data are accurate and complete, or at least broadly representative in terms of the coverage of both institutions and transactions; 1/
- The extent to which data are methodologically sound. That is, do they conform to the maximum degree possible with international methodological standards in terms of sectorization of the economy, classification of accounts, and other methodological aspects?

1/ For example, the organs of government covered by government finance statistics should include those that have a significant impact, in a macroeconomic sense, on the government's fiscal stance, and significant extrabudgetary transactions of the government should be included; monetary statistics should include reports from banks and financial institutions that have significant intermediation functions in the economy, and due account should be taken of off-balance-sheet items; balance of payments statistics should cover the external transactions of the economy and should be compiled either by full aggregation or by sampling techniques using truly representative samples; and the consumer price index should cover consumer price movements nationwide and not just in the capital city.

- The extent to which data are based on reliable sources 1/ and basic reference data 2/ are updated with an appropriate periodicity; and
- The extent to which data are intersectorally consistent. This goes beyond the criteria of complete coverage and methodological soundness in the sense that it requires that decisions be made about the reliability of alternative data sources at the points of overlap among the methodologies. 3/

VI. Technological Developments

The use of technology in support of the Fund's data management activities has evolved dramatically since the late 1960s, as changes in computer hardware and software technologies have generally led to significant increases in personnel productivity in the areas of gathering, processing, analyzing, and sharing data. The current statistical environment of the Fund comprises a variety of software tools for managing, analyzing, and reporting statistical time series information. Neither the specific tools used nor the underlying purposes for which they are used are uniform across the Fund. The range of standard software products available to Fund staff reflects the diverse set of user requirements. In the case of spreadsheet software, these requirements are user-driven, whereas, in the case of economic time series tools, there was a management objective to promote more consistent data management practices and the creation of more transparent data systems. An account of the evolution and current status of the EIS is provided in Appendix IV.

1/ Data are often compiled in countries primarily for purposes other than macroeconomic analysis and policy making. Many entities, both private and public, maintain accounting systems and compile data primarily for purposes of complying with the law and/or for internal management. Such administrative records are not necessarily well suited for other purposes. The art of macroeconomic data compilation consists in the judicious use of such administrative records, supplemented by other information as and where necessary, to compile data that are well suited for analysis and policy making at the macrolevel.

2/ Such as the household expenditure survey in the compilation of the consumer price index.

3/ For example, in a truly integrated set of macroeconomic accounts, net domestic bank financing of the government deficit presented in the monetary and financial accounts should be consistent with net government borrowing from the monetary and financial system presented in the government finance statistics; and the movement of net foreign assets of the monetary and financial system should be consistent with the appropriate financial account entries in the balance of payments.

Agreement between the United Nations and the IMF

The agreement of 1947 signed by the UN and the Fund included the following provisions in Article IX (on statistical services):

- In the interests of efficiency and for the purpose of reducing the burden of national governments and other organizations, the UN and the Fund agree to cooperate in eliminating unnecessary duplication in the collection, analysis, publication, and dissemination of statistical information.
- The Fund recognizes the UN as the central agency for the collection, analysis, publication, standardization and improvement of statistics serving the general purposes of international organizations, without prejudice to the right of the Fund to concern itself with any statistics so far as they may be essential for its own purposes.
- The UN recognizes the Fund as the appropriate agency for the collection, analysis, publication, standardization, and improvement of statistics within its special sphere, without prejudice to the right of the UN to concern itself with any statistics so far as they may be essential for its own purposes.
- In its statistical activities the Fund agrees to give full consideration to the requirements of the UN and of the specialized agencies. In its statistical activities the UN agrees to give full consideration to the requirements of the Fund.
- The UN and the Fund agree to furnish each other promptly with their nonconfidential statistical information.

Data on Technical Assistance Missions in Statistics

Table 1. Technical Assistance Missions in Statistics by Topic, FY 1981-FY 1995
(Number of missions)

Year	Total Missions	of which: Multi-sector	Balance of Payments	Real Sector	Government Finance	Money and Banking	Supervision/Recruitment	Other
FY 1981	74	--	...	...	...	...	--	...
FY 1982	80	--	...	...	...	...	--	...
FY 1983	71	--	23	3	14	31	--	0
FY 1984	82	--	22	11	18	30	--	1
FY 1985	88	--	25	18	11	31	--	3
FY 1986	69	--	22	10	17	17	--	3
FY 1987	64	--	17	10	15	18	--	4
FY 1988	63	--	...	...	...	...	--	...
FY 1989	37	--	15	4	3	9	--	6
FY 1990	50	2	13	4	8	14	1	8
FY 1991	57	4	12	4	3	18	9	7
FY 1992	66	14	9	10	5	16	7	5
FY 1993	143	19	35	24	12	32	8	13
FY 1994	150	15	39	26	20	46	--	4
FY 1995	150	13	40	39	16	40	2	--

Legend ... = n.a.
 -- = nil

Fund Statistical Publications

1. International Financial Statistics (monthly and Yearbook)

IFS, first published in January 1948, resulted from a decision by the Executive Board in 1946 authorizing a monthly or quarterly Fund bulletin containing statistics essential for the analysis of international financial problems, "[.....] thus facilitating the preparation of studies designed to assist members in developing policies, which further the purposes of the Fund." 1/

The release of the first issue of *IFS*, which included data for 56 countries, was welcomed by the international community, as it provided financial data on an internationally comparable basis unavailable elsewhere. Readers found especially valuable the detailed description of the exchange rate system of each country and of its development since 1935. In addition, a table provided for the first time quotations for prices and yields of foreign government dollar bonds in New York from 1936 to 1948.

Subscriptions to *IFS* climbed quickly. By the date of the first subscription analysis report, as of August 1951, the figure for total subscriptions to *IFS*—including paid, exchange, complimentary, and official subscriptions—stood at over 2,500. By 1953, the figure had climbed to more than 3,000.

Because English was the working language of the Fund, little apart from a few explanatory leaflets was published other than in English in the first 15 years of the Fund's operations. It was not until the sharp expansion in membership during the 1960s that decisions were made to publish in French and Spanish with regularity. In 1966, the production of a trilingual version of *IFS* began. Since May 1975, separate English, French, and Spanish editions have been published.

IFS rapidly established itself as a standard source of data on domestic and international finance, containing thousands of time series for international trade, prices, reserves, banking, and money supply. It had become the principal channel for making available to member governments and the public the macroeconomic statistical data collected by the Fund. Over time, profound changes in the world economy were reflected in the increase in scope and complexity of *IFS*, as seen in the addition of new countries, the introduction of new world and regional tables, and the expansion in topical coverage in the country pages and in country coverage in world and regional tables. With the collapse of the par value system, there ensued a significant increase in the amount of exchange rate data reported. The introduction of the basket valuation of the SDR necessitated the reporting of exchange rates in SDRs as well as in dollars. New Fund facilities

1/ Articles, Article VIII 5(c).

required more complex reporting of Fund accounts. Greater detail in the *IFS* presentation of the balance of payments was introduced to satisfy increasing analytical and policy requirements. Additional statistical data became available for publication as a result of the expansion in the membership of the Fund and the general improvement in national statistics.

The *IFS Yearbook (IFSY)* first appeared in the form of a *Supplement to the 1961/1962 Issues of IFS*. It filled the need to make historical data available for series that had been introduced more recently. The *IFSY* replaced the May issue of *IFS* during 1976-78. In September 1979, the *IFSY* was again published as a separate thirteenth issue, in English, French, and Spanish, reporting data for some 115 countries. It traced on an annual basis the deep and widespread changes in economic conditions that had developed over three decades. The *IFSY* now provides a longer-run perspective than the monthly issues and includes some additional time series in country tables and some additional tables of regional and world aggregates.

The principal objective of the *IFS Supplement* series, which commenced in 1981, was to provide more information on important economic variables than were available in the monthly and annual issues of *IFS*. In addition, in view of the wider circulation of the *Supplements*, it was possible to provide information in the areas of balance of payments, government finance, and international trade to a larger audience than that reached by the specialized statistical publications devoted to those topics. The *Supplements* were a useful complement to the Fund's computer tape subscription service, which generally provided all historical information contained in the Fund's database.

Supplements have been issued on a range of topics, including balance of payments, economic indicators, exchange rates, Fund accounts, government finance, international liquidity, international reserves, international trade, money, output, prices, and public sector institutions. Resource constraints resulted in a curtailment of the *Supplement* series in 1988. However, in 1993, the Fund published a special *IFS Supplement* containing macroeconomic data and explanatory notes for 14 of the group of 15 countries comprising the Baltic countries, Russia, and the other countries of the former Soviet Union.

IFS, now in its forty-eighth year, is the longest-standing publication devoted to international financial statistics. The May 1995 issue contains 150 country pages (148 members, 2 new members) and 39 world and area tables; the June 1995 issue will contain 153 country pages.

In FY 1995, total revenue from all statistical printed and electronic publications amounted to \$2,830,000, compared to total revenue from non-statistical publications of \$2,092,000. Revenue from printed and electronic versions of *IFS* alone accounted for one-third of total revenue from all Fund publications.

High priority is given to the preparation of country pages for all members. Of the 31 member countries without pages in the May 1995 issue of *IFS*, 21 have become members in the last three years. Many of these new members, such as the countries of Eastern Europe, the Baltic countries, Russia, and the other countries of the former Soviet Union, have statistical systems that require fundamental restructuring to generate macroeconomic data suitable for policy formulation and analysis in a market economy. With technical assistance from the Fund, work is progressing to improve statistical standards and develop regular reporting arrangements in these countries so that country pages can be published in *IFS* as soon as possible.

The staff continues efforts to collect and disseminate *IFS* data by electronic means in order to satisfy the information needs of users. More significant enhancements are likely to result from the development of direct electronic data links.

2. Balance of Payments Statistics Yearbook

Because *IFS* sought to present a complete coverage of those statistics that were of primary interest to the Fund, it was not able to provide detailed information in certain areas such as the balance of payments. The Fund published its first *BOPSY* in July 1949; *BOPSY* expanded balance of payments statements that first appeared for 36 countries in the January 1949 issue of *IFS*.

The first volume of *BOPSY* presented a series of regional and analytic tables and statements for 51 countries for 1938, 1946, and 1947 in considerable detail with extensive explanatory notes. Regional balance of payments statements were shown for Europe and the twenty Latin American countries. The data, based on the first edition of the *BPM* of 1948, were given both in the standard form of the *BPM* and in an analytic form that took account of the varying characteristics of the different national economies and focused attention on the international surplus or deficit for which the monetary authorities supplied compensatory financing.

The data were compiled in such a way as to facilitate country-by-country comparisons. Many of these statements--for Brazil, China, Iceland, Indonesia, Iran, Nicaragua, the Philippines, Poland, and Turkey, for example--had never before appeared in public tabulation. Furthermore, the data were not confined to Fund members but covered, among other countries, Argentina, Germany, Japan, Sweden, and Switzerland.

There have been continuing changes in the presentation and content of the *BOPSY*.

- In the 1954 *BOPSY*, as a result of discussions with member countries, the form of data presentation was modified to provide a basic presentation (with more detail and subitems significant for each particular country) and an analytic presentation accompanied by explanatory texts. This volume was the first to be composed of

a series of loose-leaf sections issued monthly from February to December.

- By 1969, the basic presentation became known as the "standard" presentation.
- In 1972, data were published for the first time in terms of SDRs. By 1973-74, more than 100 countries were covered; tape subscription began with this volume.
- Data in 1974-75 were arranged in a series of tables that provided aggregations by category of transaction rather than by country. These data were published for the first time separately as a supplement to *BOPSY*, entitled *World Summary of International Transactions, 1968-73*.
- Commencing in 1978, monthly issues of *BOPSY* were published containing annual, half-yearly, or quarterly balance of payments data in the form of an analytic presentation. Notes and additional tables to complete each country section of the *BOPSY* were published only at the end of the year.
- In 1981, Part II of the *BOPSY* (replacing the supplement) provided area and world totals of balance of payments components and aggregates. Data for international organizations were included for the first time in 1986. From 1990, data were published in terms of US dollars rather than in SDRs.
- Monthly issues were discontinued in 1991.
- The 1994 issue of *BOPSY*, covering data for 138 countries for the period 1986-93, was the last volume in which the classification of data was based on the recommendations of the fourth edition of the *BPM*.
- The 1995 issue of *BOPSY* will present balance of payments data based on the fifth edition of the *BPM*. It is also planned to increase progressively the coverage of *BOPSY* in several respects. Recent increases in the Fund's membership have not yet fully been reflected in the country coverage of *BOPSY*, but the objective remains to include country pages for all Fund members as soon as possible.

Data are presently being developed to permit the inclusion in *BOPSY* of a consolidated balance of payments presentation of the principal international organizations. Following the introduction of the fifth edition of the *BPM*, which devotes for the first time a chapter to international investment position data, major progress is expected both in the presentation of detailed international investment position data and in

the number of countries with an international investment position table in *BOPSY*. *BOPSY* is also planned to be released on CD-ROM in the coming year.

3. *Direction of Trade Statistics (quarterly and Yearbook)*

DOTS, first published in 1950 with the title *Direction of International Trade*, was issued originally under the sponsorship of the Fund, the World Bank, and the UN. Countries forwarded their trade-by-country statistics to the Fund; the Fund and the World Bank processed the returns and produced the tables, while the UN undertook the printing and distribution. In 1964 the UN discontinued its sponsorship, and *DOTS*, to which the name was then changed, was published jointly with the World Bank until May 1976, when the Fund assumed sole responsibility for publication.

Since its inception, *DOTS* has undergone many changes. The initial issue presented, for the first three months of 1950, data on nearly 100 countries. Coverage subsequently expanded so that, by 1995, the quarterly issues, which replaced monthly issues in early 1991, included data for 152 countries, and the *Yearbook (DOTSY)* included data on 178 countries.

Along with the expansion in coverage came an increase in external demand for *DOTS*. The external subscriber list has grown to include other international organizations, governments, central banks, universities, major international banks, financial institutions, multinational companies, and students throughout the world. Annual circulation has increased to approximately 5,400 copies of both *DOTS* and *DOTSY*.

The *DOTS* database incorporates exports by destination and imports by origin from data directly reported to the Fund by member countries and from official national and international publications. *DOTSY* has always incorporated partner country information in developing estimates of the direction of trade for late reporting and non-reporting countries and represents a current source of information on global trade patterns for subscribers with interests in international trade and finance, as well as for the Fund in conducting its own operations.

The forthcoming 1995 issue of *DOTSY* is expected to incorporate additional countries, including those emerging from the dissolution of Yugoslavia at the end of 1992. *DOTS* is planned to be released on CD-ROM within the coming year.

4. *Government Finance Statistics Yearbook*

The first volume of *GFSY*, covering 100 countries, was introduced in August 1977 to provide current and internationally comparable data on the finances of member governments. The establishment of *GFSY* improved the availability of statistics on government operations for use by the Fund, other international organizations, member countries, and the academic community. The statistics, compiled by government finance statistics correspondents in each member country, were presented in accordance with the

concepts, definitions, and classifications established in *MGFS*, which was issued in 1976.

From the outset, *GFSY* was the main international publication containing comprehensive data on government operations. After the Fund developed the government finance statistics database on which *GFSY* is based, several international organizations ceased maintaining their own databases, among them the Inter-American Development Bank (IDB), the UN, and (except for tax revenue data that are shared with the Fund) the OECD. Through a temporary financial sharing agreement, the World Bank cooperated with the Fund to expand the government finance statistics database in the first half of the 1980s; this cooperation resulted in an expansion of the data collection to include local governments and capital expenditure classified by function.

The country presentation of the first editions of *GFSY* included not only the standardized statistical tables but also, when available, derivation tables. Derivation tables for more than half the countries covered indicated the national sources of the data and the detailed adjustments necessary to bring the data to the internationally comparable standards followed in the *GFSY*.

For many countries, the amount of data shown expanded as a result of the inclusion of data on the operations of local governments and of consolidated data for general government (a summarized presentation consolidating data on central, regional, and local government operations). Also, for many countries the tables included the transactions of nonfinancial public enterprises and public financial institutions.

To facilitate international comparison, many world tables were added through the years, their number growing from four tables in the 1977 edition to 61 tables in the 1988 edition. These tables provided economic ratios such as expenditure by function as percentages of total expenditure and overall deficit/surplus as percentage of gross domestic product (GDP).

By 1986, *GFSY* coverage reached a peak of 132 countries. A number of additional features were included in this issue, in particular preliminary, provisional, or projected data for major aggregates. A summary table on budgetary central government was also added to facilitate comparison with data from other sources, in particular *REDS*. In addition, to permit analysis of national currency data in real terms, in U.S. dollars as a percent of GDP, or on a per capita basis, fiscal year data for each country's CPI, exchange rate, GDP, and population were published.

A review of the usefulness of the *GFSY* in 1989 indicated that it had become too large and detailed, while lacking sufficiently up-to-date data. Since then, actions have been taken to reduce the level of detail, including the elimination of data for consolidated general government, to reduce the number of country tables lacking up-to-date data, to reduce the number of world tables, and to cease publication of the derivation tables. In

parallel, more up-to-date data in the form of provisional and forecast data have been included.

The 1994 *GFSY* contains a set of standardized statistical and institutional tables for 115 countries. Despite efforts by the staff, there has been a decline in the number of countries included in the *GFSY* in recent years due both to a fall-off in the number of countries reporting data and the removal of 30 countries that had formerly reported data to the Fund but whose statistics had become too outdated for publication. In the 1994 issue, about 40 percent of countries included data for 1993, and 11 countries included data for 1994.

5. Electronic dissemination of data (magnetic tapes and CD-ROM)

In May 1972, the Fund began to provide its publications in machine-readable form to those with access to computer systems for reading the data. Magnetic tape versions of *IFS* and *DOTS* were introduced in 1972, of *BOPSY* in 1973-74, and of *GFSY* in 1977.

Whereas monthly issues of statistical publications continue to serve the purpose of providing current data and yearbook issues serve the purpose of providing long strings of annual data, magnetic tape subscriptions are able to provide long strings of monthly and quarterly data. Since the early years of tape production, the number of time series offered on magnetic tape has grown dramatically. As of December 1994, the number of *IFS* time series had increased from the original 10,500 to 26,000; *DOTS* time series, from approximately 45,000 to 62,000; *BOPSY* time series from 18,000 to more than 63,000; and annual *GFSY* time series from approximately 15,000 to 46,000.

With the availability of *IFS* on CD-ROM, the number of tape subscriptions has declined over the past few years—from 501 in October 1990 to 426 in December 1994. Of the 426 subscriptions, the number of *IFS* tape subscriptions, including time-sharing arrangements and subscriptions at regular rates, special rates, and complimentary rates, stood at 160; the number of *DOTS* subscribers at 101; of *BOPSY* at 95; and of *GFSY* at 70.

More than three years in development, with financial support from the World Bank, *IFS* on CD-ROM was introduced in June 1991. It includes historical data not found in the monthly printed issues, and the data are presented with a greater degree of precision than in the magnetic tapes. Software included on the CD-ROM supports data extraction and downloading and provides multilingual instructions and help screens. CD-ROM subscriptions, numbering nearly 400, continue to grow steadily. Plans are under way to upgrade the features of the CD-ROM, including the offering of a Windows version and the enhancement of the descriptive features of the database, as well as to provide *BOPSY*, *DOTS*, and *GFSY* on CD-ROM.

6. Data on subscription rates

The following tables provide data on subscription rates to the Fund's statistical publications over the years:

Table 2. Circulation of Statistical Publications (Number of subscriptions and single-copy sales)			
	Dec. 1976	Dec. 1985	Dec. 1994
<i>International Financial Statistics:</i>			
Printed version ^{1/}	11,157	12,819	11,428
Computer tapes	80	237	160
CD-Rom	--	--	372
<i>Direction of Trade Statistics</i>			
Printed version	5,400	5,423	5,361
Computer tapes	39	107	101
<i>Balance of Payments Statistics</i>			
Yearbook			
Printed version	3,287	4,181	4,212
Computer tapes	32	101	95
<i>Government Finance Statistics</i>			
Yearbook			
Printed version	--	3,882	3,125
Computer tapes	--	69	70
^{1/} Of which French and Spanish versions comprised 580 and 670, respectively, as at December 1994. Includes copies distributed internally in the Fund and the World Bank			

Table 3. Readership of <i>IFS</i> : Recipients by Main Category (Number of subscriptions as of December 1994)	
Corporations (financial and nonfinancial)	3,390
Official (governments and central banks)	2,807
Universities and libraries	2,224
International and nongovernmental organizations	359
News media	195
Other <u>1</u> /	2,453
Total	11,428
<u>1</u> / Includes copies distributed internally in the Fund and the World Bank.	

Development of the Economic Information System

1. The IFS Data Fund and the Data Fund System

The IFS Data Fund computerized system, and its successor, the Data Fund System (DFS), were used to manage the Statistics Department's data and produce its publications from 1969 through 1986. These systems, based on a Burroughs mainframe, provided for assembling, compiling, and publishing country source data.

Development of the IFS Data Fund occurred in two phases. In the first phase, national data were manually assembled from national balance sheets, bulletins, and other sources into work sheets. The data were manually transformed and combined into *IFS* entries, and the latter were posted on printer galleys and proofed. Simultaneously, the manually calculated *IFS* entries were entered into the Data Fund files, to ensure identity in content and currentness between *IFS* and the Data Fund data.

The addition of the "automatic update facility" in 1970 signaled the second phase of development. Automatic update largely replaced manual calculation of *IFS* data with a computerized system that derived finished *IFS* data from source components. The move towards computerized calculation meant that national source component data had to be incorporated into the Data Fund, along with information (in the form of equations and table definitions) on how components were to be used in calculation and presentation. The automatic update facility made possible the generation of report forms that *IFS* correspondents could update; this in turn contributed to the improvement of *IFS* data in terms of quality and currentness.

The DFS was the name given to an updated version of the IFS Data Fund. From the users' perspective, DFS was essentially the same database management system, but in technical terms DFS represented a major advance in processing modalities. DFS also generated predefined tables for viewing and printing data but offered little in the way of a user interface that might appeal to a nonspecialist.

By 1983, a new requirement for on-line data access and retrieval, a demand for enhanced storage and space as the system grew larger and larger, and the need to have the facility for on-line updating of time series triggered consideration of the need to replace DFS. Other reasons to replace DFS included the desire to reduce the Fund's software maintenance burden by replacing the system with commercial products and the decision to adopt IBM technology in place of Burroughs. At that time, IBM offered a wide variety of applications and programming tools, software packages, and econometric and statistical packages that were not available in the Burroughs environment. The opportunity to increase the utility of DFS, while ultimately making applications development cheaper, faster, and more flexible, was a critical objective in the replacement effort.

2. Economic Information System

After a review by consultants, it was decided in 1983 to move from the Burroughs system then in place to an IBM system, based on the *Model 204 Database Management System* software. The move to IBM was expected to offer new possibilities for developing tools that would increase the use of data collection and maintenance capabilities of the Statistics Department and promote Fund-wide data sharing. However, the driving force was to provide the Statistics Department with a set of data maintenance tools that would allow the more effective and timely development of information within the database.

It took several years to convert fully the Statistics Department's databases to the new IBM platform. Neither institutional nor Statistics Department information flows and work processes were re-examined in converting to EIS, so that EIS was functionally nearly identical to DFS and in most respects did not provide for Fund-wide statistical services.

Model 204 provides a non-interactive, batch environment where updates, calculations, and other specialized routines are queued for overnight execution and processing. The two main components of EIS are the applications language, *EISL*, which is used mostly by specialists in the Bureau of Computing Services to perform the batch functions and to program many data management tasks, and the on-line system used by staff of the Statistics Department to view, print, and update data using a set of formatted menu screens. The Fund's statistical publications are produced directly from the database by computerized photocomposition and plotting processes.

In 1982, the Statistics Department's databases comprised approximately 400,000 time series; by 1988, the total was 1 million time series; and, by the end of 1994, there were in excess of 1.7 million time series maintained in EIS.

EIS has a number of unique features designed to manage and document both the inter- and intra-series relationships as they are observed in the time series of actual economic statistics. Thus, EIS can deal with exceptions to the usual relationship between a time series at different frequencies that may result from partial revisions. Similarly, the system of inter-series relations (equations) accommodates a hierarchy of formulae to handle changes in compilation procedures over time involving the same statistical concept. The system also allows the definition of different versions of the same statistical concept, so as to account for changes in coverage or classification that sometimes give rise to unavoidable discontinuities in data. The use of different versions of single time series allows discrete discontinuities to be documented. It also provides a basis for series linking using various statistical processes from simple splicing (as done in *IFS* for data on outstanding stocks) and chaining based on simple series overlap ratios (as done in *IFS* for average data, e.g., on prices) to more sophisticated regression and other techniques that are

available using other analytical tools. Thus, usable long time series may be constructed even where there are discrete discontinuities in series.

Many of the unique features of EIS relate to managing a long historical record. In order to deal with the complexity of all the possible inter- and intra-series relationships and their evolution over time, EIS is itself a highly specialized and complex system with which few staff, even of the Statistics Department, become fully conversant. Moreover, the specialized knowledge required to use EIS effectively is not well documented, and only limited formal training is available. Although physical access to the EIS system may also be an issue, it is largely because of the highly specialized knowledge required to use EIS that the system is effectively not accessible to the Fund staff at large. EIS has also become increasingly difficult for Statistics Department's economists and research staff to manage properly as turnover rates and mobility have increased and the average level of experience has declined. Area departments recognize the user-unfriendliness of the EIS system as one barrier to efforts at reconciliation of area department and Statistics Department data.

From the user's perspective, EIS lacks sufficient analytical tools and is a cumbersome and difficult system to learn. For example, data managers in the Statistics Department have cited the need to have updated data available immediately for review and correction. Additionally, many routine data management tasks must be programmed by specialists in the EIS and IBM application languages; this leads to long product development time, relative to more modern systems. These limitations have a direct negative impact on the productivity of the Statistics Department. One of the most critical factors is that the skill levels needed within the Statistics Department and the Bureau of Computing Services to manage the Statistics Department's databases are not easily transferable to new staff; as older staff leave the institution, the integrity of the system is threatened.

From an organizational perspective, EIS has serious limitations in relation to the ease with which users outside of the Statistics Department may access the EIS databases. With the exception of *IFS* on CD-ROM, users find it difficult to identify and retrieve the specific time series that they require. Even using the CD-ROM product, users outside the Statistics Department have difficulty deciphering the coding scheme and differentiating between closely related time series, a problem that will be addressed by improved software. Within the Department, data managers are sometimes forced to violate the rules of the coding scheme in order to overcome limitations in the number of positions available to represent economic concepts. The result is that the Statistics Department's comprehensive data acquisition activities and methodological work, as reflected in its country databases, cannot be exploited adequately by the rest of the Fund.

Among the most serious technical limitations of the current EIS are the inability to handle data observations beyond the end of calendar year 1999 and the insufficient room within the existing time series coding scheme to represent adequately the full range of time series concepts. In addition,

Model 204 runs only on the IBM mainframe. The availability of less expensive and more flexible computer technology will improve the EIS database system considerably and likely save Fund resources.

3. Data transfer facilities

A common thread among all data management applications has been the need to transfer time series data between applications for further processing, analysis, and/or presentation. Data transfer facilities have increasingly become a feature of software products. On the other hand, data transfer between microcomputers and mainframes has mostly been accomplished through procedures developed within the Fund. Despite the successful implementation of data links between the Fund's mainframes and microcomputers, their usage requires a specialized knowledge of EDP systems and/or database structures, which has restricted the usefulness of these tools.

IFS on CD-ROM was the first comprehensible and user-friendly tool for accessing the *IFS* database. It offered menu-driven facilities to browse, select, and transfer *IFS* data to microcomputers. *IFS* on CD-ROM was made available to Fund staff on the Fund data server in late 1993. This database, accessed on average more than 500 times per month, is the most widely used database on the server, which also provides access to WEO data, the OECD Analytical Database (on a limited basis), commodity prices, and four World Bank databases (Social Indicators of Development, World Debt Tables, World Development Indicators, and World Tables).

