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March 23, 1988

To: Members of the Executive Board

From: The Secretary

Subject: Review of EDP Accomplishments and Expenditures - FY 1985-FY 1988

        There is attached for the information of the Executive Directors
a paper reviewing the Electronic Data Processing (EDP) accomplishments and
expenditures for FY 1985-FY 1988.

        Mr. Minami (ext. 7500) is available to answer technical or
factual questions relating to this paper.

Att: (1)

Other Distribution:
Department Heads

INTERNATIONAL MONETARY FUND

Review of EDP Accomplishments and Expenditures:
FY 1985 - FY 1988

Prepared by the Bureau of Computing Services

Approved by W. N. Minami

March 22, 1988

Contents

Review of EDP Accomplishments and Expenditures:
FY 1985 - FY 1988

Summary

During its review of the FY 1988 budget, the Executive Board requested additional information on several budget categories. To assist the Executive Board in its budget review activities, the Bureau of Computing Services prepared a paper on the progress of the Fund's EDP program. Key aspects are presented in the following paragraphs.

Over the past four years, the Fund has expended and/or allocated significant funds to reconstruct its computer system portfolio in five major areas: economic functions, financial and accounting operations, administrative support, document preparation and management, and computer systems and end user computing support. The common goal of the reconstruction effort is to provide automated systems that support day-to-day operations and address long-term information processing objectives. The guiding strategy is to replace or upgrade archaic systems and to undertake new initiatives only where a demonstrated, unmet need exists.

Table I demonstrates that the Fund's investment in EDP activities has been relatively stable. Comparative examination of the actual, budgeted, and projected EDP costs reveals that programs in the economic functions area have received the greatest share of the EDP resources. Exhibit I indicates the distribution of the expenses and the relative progress in each program area.

Exhibit II indicates a trend toward increased EDP production costs and decreased EDP development costs. While the trend is expected to continue, it is anticipated that major capital investment will be required to replace and/or upgrade computing systems every three to four years and EDP programs, every five to seven years.

Exhibit II also demonstrates a widening gap between departmental demand for automated support and the supply of funds to meet the demand. Stringent cost containment measures must be continued, if bottom-line EDP expenditures are to remain stable, as the demand for EDP is expected to expand with increased staff proficiency in and dependency on computing technologies.

A review of the EDP program indicates that, although many have required scheduling refinements, most projects were completed and/or are progressing on schedule and within multi-year cost estimates with two exceptions—EIS and TIFS. Originally estimated to cost $4.8 million, EIS is expected to cost $5.3 million. In addition, EIS production was delayed four months to accommodate additional testing. The TIFS project also has been re-estimated from $4.4 million to $13.1 million and is being reviewed.

In assessing the benefits accrued from investments in EDP programs, it is clear that the phased design and implementation approach adopted by the major EDP programs has enhanced the opportunity to produce both tangible and intangible organizational benefits. The phased approach places completed modules of the EDP program in production at the earliest possible date. Therefore, benefits from the EDP investment have begun to accrue, although major EDP development efforts are still in progress.

Tangible benefits, associated with EDP activities, are often measured by comparing growth in organizational workload and staffing levels. Table II demonstrates consistent growth in Fund workload for the past several years. In contrast, the staffing level has remained relatively constant. 1/ As several major EDP programs became operational, during the same time period, it is reasonable to conclude that EDP support has contributed to cost avoidance savings by limiting the need to increase staff.

Typically, intangible benefits associated with EDP investment are related to increased staff productivity. As there is, currently, no reliable methodology for measuring staff productivity gains, it is impossible to quantify the impact of EDP support on staff productivity. What can be said is that EDP programs contribute greatly to creating a work environment that supports and encourages staff efficiency and effectiveness. Ultimately, however, positive impact of EDP effort on staff productivity relies on staff willingness to learn and use the automated tools provided by the EDP programs.

To summarize, the Fund has improved its technological base over the past four years. In general, EDP programs are progressing in a timely fashion and within budget. Due to stringent cost containment measures, overall EDP investment has remained level, with an increasing portion directed to EDP production activities. EDP expenditure in support of economic-related work has been greater than in other work areas. The EDP investment has produced both tangible (savings in salaries and related costs) and intangible benefits (staff productivity increases). To protect the EDP investment, significant capital expenditures will be required to replace obsolescent programs (five to seven years) and computing systems (three to four years).

1/ Staffing increases: FY 1985--3 percent; FY 1986--1.8 percent; FY 1987--0.2 percent. Data source: FY 1985, 1986, 1987 staff positions by category table.

Table I.   Summary of Costs by Key Area of EDP Activity
FY 1985 - FY 1987, FY 1988 Estimated Expenditures 1/

	FY 1985	FY 1986	FY 1987	FY 1985-FY 1987		FY 1988	
	In millions of US$			In US$ mill.	In per-cent	In US$ mill.	In per-cent
Economic functions	8.77	11.38	12.46	32.61	36.2	10.82	35.3
Financial and accounting operations	4.99	5.71	6.29	16.99	18.9	6.11	20.0
Administrative support	0.86	2.09	2.06	5.01	5.6	1.98	6.5
Document production and management	6.14	6.85	3.94	16.93	18.8	6.13	20.0
Computer systems and end-user computing support	10.03 2/	4.27	4.25	18.55	20.5	5.56	18.8
Total	30.79	30.30	29.00	90.09	100.0	30.60 3/	100.0

1/   Both production and development dollars are aggregated.
2/   Includes $6.1 million for IBM mainframe of which $4.8 million is considered as development costs.
3/   Excludes $473,000 for the relocation of the IBM mainframe computer to a renovated computer center in the Fund headquarters building.

Table II. Growth in Workload 1/

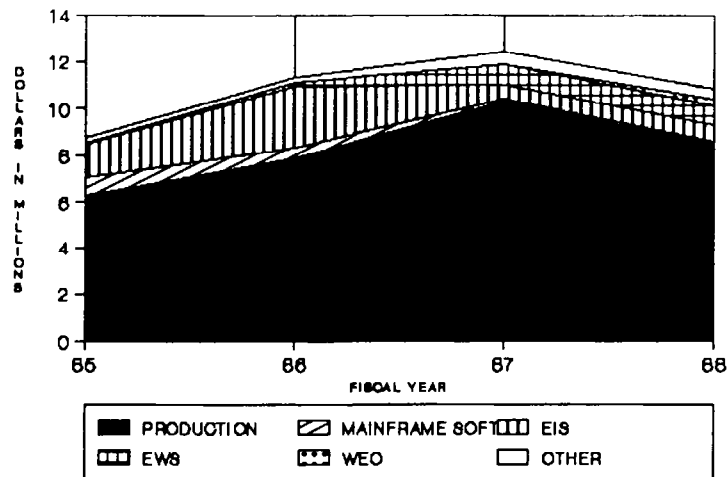| Workload Indicators	CY 1984	CY 1985	CY 1986
Economic Functions			
Research papers issued (DM and WP series)	54	59	65
Statistical time series (000's)	630	880	900
Volumes published	215	210	222
Consultation missions	123	135	142
Overseas trips 2/	1,668	1,718	1,695
Financial/Accounting Operations			
Accounting items (processing and audit)	42,600	47,478	58,100
Operational transfers	15,276	17,920	21,390
Administrative matters (vouchers and authorizations)	46,703	49,995	69,180
Purchases and repurchases	724	972	1,116
Administrative Support			
Purchase orders	1,995	2,231	2,580
Staff recruited	582	658	743
Document Production/Management			
Volumes published	215	210	222
Cables processed 3/	145.2	151.4	159.4
Periodicals loaned	53,715	59,237	59,196
Growth of Library Reference/ Collection 4/	2.7	4.3	7.7
Titles published	34	35	48
Pages edited and published	--	8,905	12,635
Computer Systems and End-User Computing Support			
EDP workstations	1,050	1,700	2,060
Installations and repair calls	2,312	3,867	4,684
EDP equipment requisitions reviewed	618	1,040	1,098
EDP projects administered	168	204	207
User consultations		3,800	8,500

1/ Source EBAP/87/69.
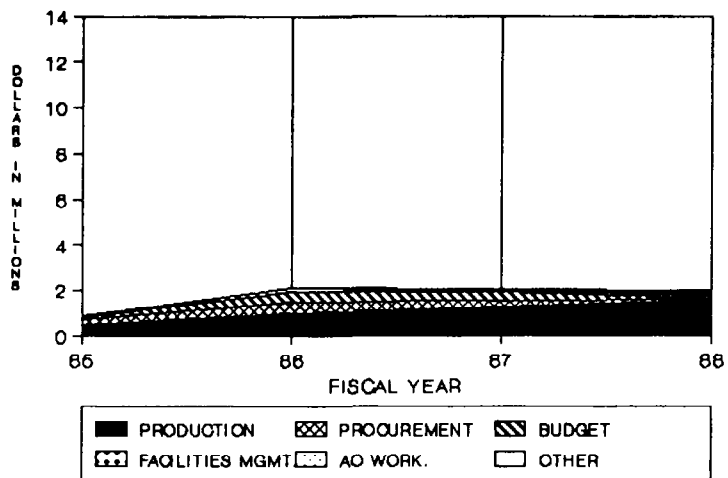2/ (A9 and above staff).
3/ (in thousands).
4/ (in millions).

ECONOMIC FUNCTIONS PROGRAM
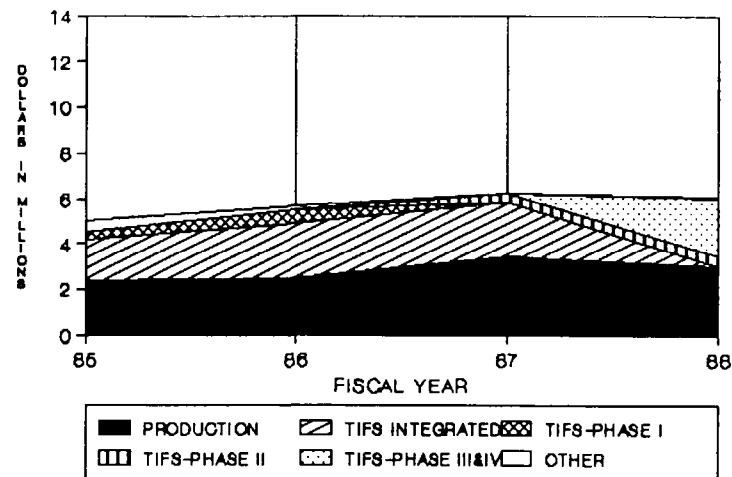
DOLLARS IN MILLIONS vs FISCAL YEAR (85–88)

Legend:
- PRODUCTION
- MAINFRAME SOFT
- EIS
- EWS
- WEO
- OTHER

FINANCIAL & ACCOUNTING PROGRAMS

DOLLARS IN MILLIONS vs FISCAL YEAR (85–88)

Legend:
- PRODUCTION
- TIFS INTEGRATED
- TIFS-PHASE I
- TIFS-PHASE II
- TIFS-PHASE III&IV
- OTHER

ADMINISTRATIVE SUPPORT PROGRAMS

DOLLARS IN MILLIONS vs FISCAL YEAR (85–88)

Legend:
- PRODUCTION
- PROCUREMENT
- BUDGET
- FACILITIES MGMT
- AO WORK.
- OTHER

DOCUMENT PRODUCTION AND MANAGEMENT

DOLLARS IN MILLIONS vs FISCAL YEAR (85–88)

Legend:
- PRODUCT.
- OA: OMD
- DMF
- CABLE SYS
- OA: DEPT
- JOLIS
- OTHER
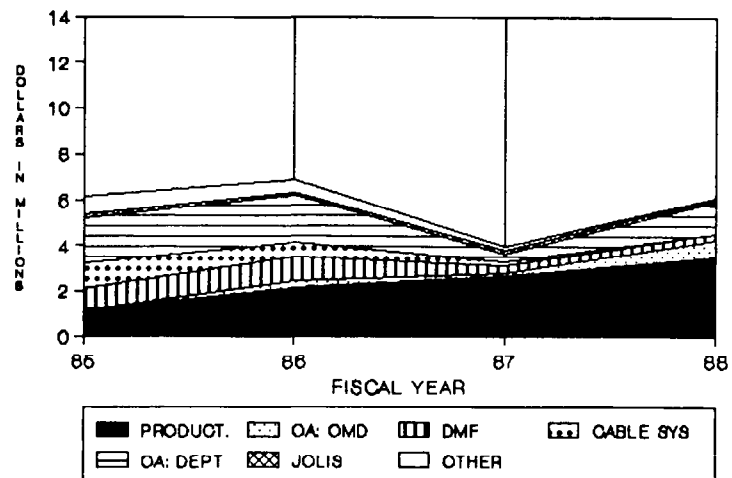
Exhibit I

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OVERALL EDP EXPENDITURES
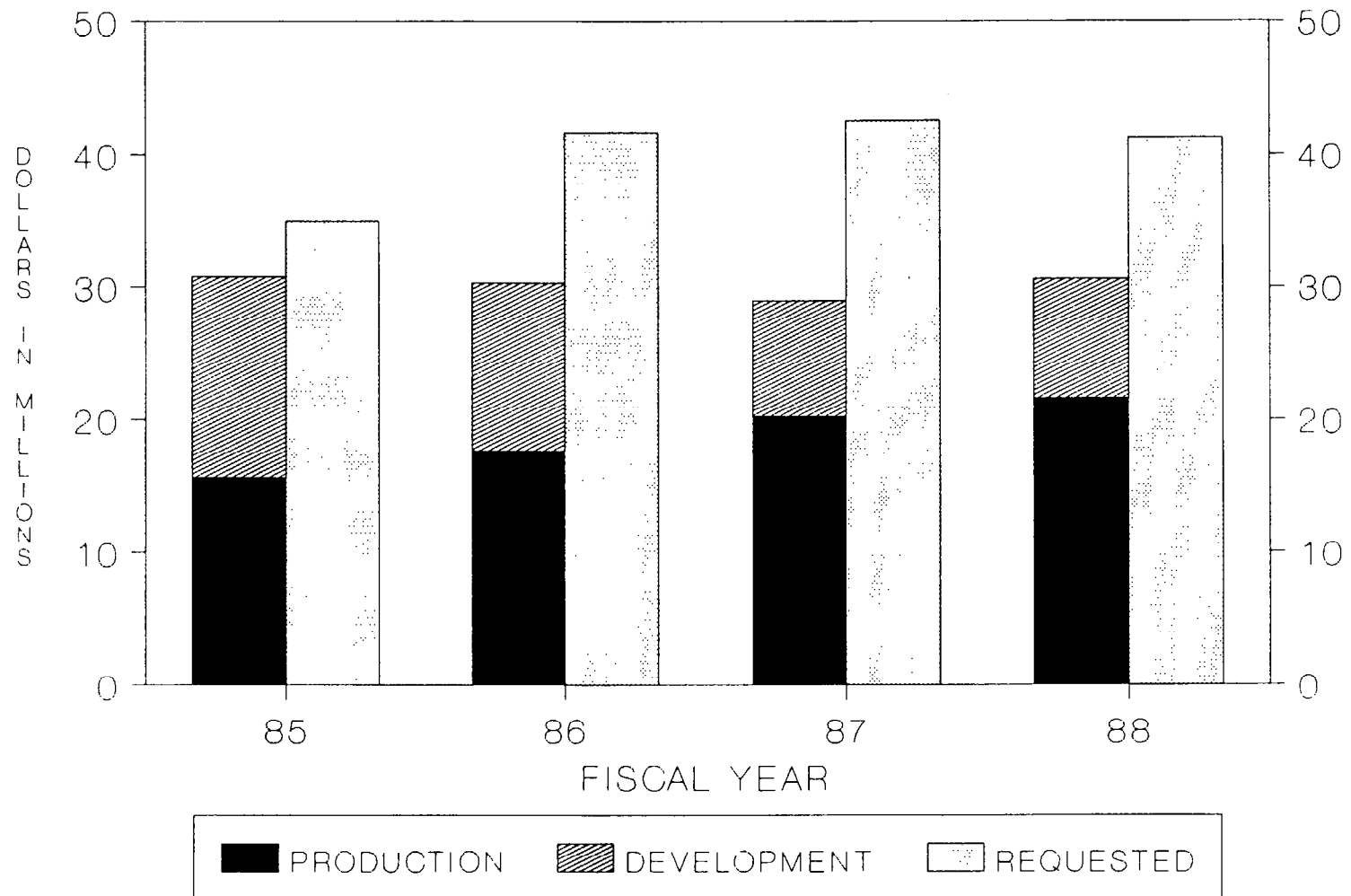
I. Introduction

Since 1984, approximately 12 percent of the Fund's yearly adminis-
trative budget has been allocated to electronic data processing (EDP)
activities. The Fund's EDP expenditures have resulted in a systems
portfolio of computing technologies that supports the performance of
day-to-day operations and provides a foundation for addressing long-term
information processing requirements. The purpose of this paper is to
present the Executive Board with information on the status of the Fund's
system portfolio.

Specifically, the paper addresses the following questions for each
key area of EDP activity in the Fund:

o   What are the goals of the program?

o   What are the major accomplishments and anticipated progress of
     the program?

o   What are the past, current, and projected costs of the program?

o   What benefits has/will the program produce?

A discussion and analysis of trends in EDP expenditures completes the
paper.

II. Key Areas of EDP Activity

There are five key areas of EDP activity in the Fund; they are: (1)
Economic Functions; (2) Financial and Accounting Operations; (3)
Administrative Support; (4) Document Production and Management; and, (5)
Computer Systems Operations and End-User Computing Support. 1/ The EDP
strategy, applied in each of the key areas, is first to replace and/or
enhance existing, out-of-date systems; and, second, to initiate systems
which satisfy newly justified requirements.

The remainder of this section describes key areas of EDP
activity. Included in the descriptions are a: summary of the overall
direction of the EDP effort (goals); delineation of the significant
programs (accomplishments); tabulation of dollars expended and allocated
(costs); review of realized and/or anticipated outcomes (benefits).

1/ The five EDP areas represent several hundred active EDP develop-
ment and production projects and it is beyond the scope of this paper to
detail the activities of all projects. The management and staff routinely
review project level information for budget allocation and other purposes.

1. Economic functions

In recent years, the demand has grown for facile access to up-to-date country economic statistics, including those published by the Bureau of Statistics and those used by area departments, to prepare reports on Article IV consultations and the use of Fund resources. The increased demand for country data is the result of the complexity of Fund programs, the demanding schedule of Fund missions, and increases in organizational activities that rely on shared data.

It has long been recognized that automation could be an effective vehicle for enhancing the ability of economists to assemble, store, update, manipulate, and report country economic statistics efficiently. In particular, automation offered significant opportunities to improve data management practices across desks and to facilitate access, by the area desks, to the data collected and maintained by the Bureau of Statistics. Furthermore, automation tools for sharing data can reduce the burdensome nature of existing, often manual procedures.

EDP effort in the economic functions area is directed at providing automated data management, storage and analysis tools for economists, at headquarters and in the field, and improving the use of, and access to, country economic time series data.

a. Goals

Successful execution of the Fund's financial responsibilities relies heavily on economic statistics that are timely, well documented, easily accessible, and maintained in a manner that facilitates data sharing. Thus, the goals of EDP efforts in the area of economic functions are to:

o   Support the Fund's decision making process by facilitating the management and sharing of country desk data;

o   Provide enhanced facilities for maintaining and accessing the Fund's data bases of internationally comparable, official economic statistics;

o   Reduce duplicative data collection and maintenance, and minimize the data reporting burden of member countries; and

o   Increase economists' productivity by reducing the manual effort associated with assembling, manipulating, and reporting economic data.

b. Accomplishments

EDP programs in the economist functions area facilitate the
management, manipulation, reporting, and sharing of economic data. The
programs offer automated tools that enable economists to devote less
effort to clerical tasks associated with data management and more to
substantive analyses.

Among the significant EDP programs in the area of economic
functions are the Economic Information System (EIS), the Economist's
Workstation (EWS), the World Economic Outlook (WEO), and the selection
of mainframe econometric products.

(1) Economic Information System (EIS)

In Phase I of its development, completed in October 1986, the
Economic Information System (EIS) replaced the Unisys-based Data Fund
System (DFS) as the repository for the Fund's data base of
internationally comparable, official economic time series. Although the
EIS is in production, many enhancements continue to be made to satisfy
the Bureau of Statistics' requirements.

The EIS supports the Bureau of Statistics' publication
requirements and incorporates a number of new features which
significantly facilitate the Bureau's electronic data maintenance and
dissemination work. Among the features are a "real time", menu-driven
data retrieval capability; the capacity to add substantive textual
description to each time series; and the ability to update time series
more rapidly and frequently.

The EIS enhances the Bureau of Statistics' monthly and annual
publication processes through the use of new photocomposition methods.
Using the new methods, the Bureau's staff now have extensive control
over the overall publication process. All Bureau of Statistics
publications are now produced in the EIS, except the Direction of Trade
Statistics, which is currently being converted from the Unisys system.

Training and support is provided to the Bureau of Statistics
staff through formal training classes, seminars on specific topics,
written documentation, and on-site assistance. The formal training
program consists of an introductory course and an advanced skill course,
both of which include intensive in-class use of the EIS. To date, 97
Bureau of Statistics staff have attended the introductory courses and 41
staff have participated in the advanced course. One introductory course
has been given in FY 1988 and another is scheduled prior to the end of
the fiscal year. On-site assistance is provided to the Bureau of
Statistics staff to enhance effective use of the EIS in their day-to-day
work for data maintenance.

During FY 1987 Phase II of EIS development began, the purpose of which is to make EIS data more accessible and useful to economists. Direct links between EWS and EIS are expected to be established, as well as facilities to support browsing and key word searching of time series data and documentation. Also being considered are enhancements to the substance of the EIS data. The costs and benefits of improving the descriptive information associated with EIS time series and of adding mnemonic codes from the Catalog of Economic Time Series are being evaluated. 1/

In the absence of a direct link between EIS and EWS, users currently may access EIS data through the Unisys-based Research and Analysis Language (RAL). The high-speed link between RAL and the EIS is used by economists in area and functional departments, and at the World Bank.

(2) Economist's Workstation (EWS)

The Economist's Workstation (EWS) program was initiated in FY 1984 to develop a Fund-wide system for improving data management and sharing at the desk level. The first production version of EWS, released in December 1986, included data management facilities; tools for econometric and spreadsheet analysis; links to the Fund's mainframe computers and word processing system; and tools for graphing and tabulating time series data.

EWS is an evolving system, regularly enhanced to satisfy identified user needs. The first update of EWS was released in June 1987. Incorporated in the updated version were enhancements to existing facilities, as well as new capabilities for calculating derived time series data. EWS now incorporates the Catalog of Economic Time Series, which provides Fund-wide guidelines for naming and describing economic time series in ten major subject areas. The Catalog fosters the development of uniformly structured country desk data bases that may be easily shared. Currently, EWS is installed on approximately 415 microcomputers throughout the Fund.

User support and training is provided through written documentation, formal training classes, and one-on-one assistance. Formal training classes include an introductory seminar and an intensive "hands-on" skills course. Fourteen introductory seminars and seven skills courses have been given in FY 1988, and one more course of each type is scheduled prior to the end of the fiscal year. To date, 243 persons have attended the EWS seminars and 100 staff have participated

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1/ The addition of mnemonic codes would enable desk economists to identify Bureau data similar in concept to country data maintained at each desk.

in the skills courses. One-on-one assistance is provided to economists to enhance data uniformity and expedite the construction and documentation of country desk data bases.

The current EWS installations represent about 41 percent of Fund economists. About 34 percent of Fund economists and research assistants have participated in at least one of the EWS training classes. Economists representing 35 country desks, which account for about 23 percent of the total, are receiving individual assistance. To meet existing demand, EWS installation and training will continue through the end of FY 1990.

A mission version of EWS was released in FY 1987. Installed on portable microcomputers, EWS now facilitates data gathering, analysis, and report preparation during missions, and reduces subsequent effort associated with preparing of recent economic development (RED) reports. In FY 1987, the computers used on missions were upgraded and, in the future, the provision of multiple portable computers will enable economists and secretaries to work concurrently.

At the end of FY 1987, desktop microcomputers had been provided to all resident representatives. A new goal is to increase the capacity of the microcomputers to accommodate the most recent EWS enhancements.

(3) World Economic Outlook (WEO)

Redesign of the World Economic Outlook (WEO) began, in earnest, in May 1987. Although funds for this project were appropriated in several previous fiscal years, initiation of the project was delayed by the need to formulate a revised set of arrangements that would best meet the current needs of the Research Department and the area departments, within the evolving technological environment. Now that country desk data bases are being constructed in EWS, user and system requirements for the WEO are being identified.

A draft of the user requirements study is currently being reviewed by the Research Department, and alternative methods for satisfying requirements will be outlined, beginning in FY 1989.

The goals of this project are to tailor the new WEO system to the timing and availability of data from each country, to enable global developments to be monitored more accurately, frequently, and flexibly, and to facilitate greater Fund-wide consistency of global analyses and data reporting. It is planned that the new system will be implemented in FY 1992, and that it will be fully integrated with EWS and EIS.

(4) Mainframe econometric software products

Several mainframe econometric software products have been evaluated, and two products (TROLL and AREMOS) have been acquired for the IBM mainframe computing environment to facilitate large-scale modeling work and to provide a mainframe econometric software product compatible with EWS. To enable the Research Department to use the mainframe software products for World Trade Model simulations and global policy analyses, the security features of the IBM mainframe environment have been enhanced, and disk storage capacity has been increased.

Additional mainframe analytic software products may need to be acquired to satisfy the requirements of the new WEO system. To accommodate the addition of the econometric software products, WEO development efforts, and increased use of the EIS system, the acquisition of additional IBM mainframe computing capacity may also become necessary.

c. Costs

Table 1 identifies actual development and production costs for FY 1985 through FY 1987 and the dollars allocated for FY 1988 for EDP efforts in the economic functions area. As the table indicates, at the end of FY 1988, $43.4 million will have been expended on economist function programs. Seventy-six percent of the $43.4 million represents production costs, while 24 percent represents development costs.

An analysis of the production costs indicates: 46 percent is associated with Bureau of Statistics activities (including publication production and data base maintenance); 23 percent with current WEO operations and other analytical and operational activities in the Research Department. The remainder of the production expenditures, approximately 31 percent, represents the acquisition of hardware and software products and production projects to facilitate the mission and research work of area and functional departments.

An analysis of the development costs indicates: 51 percent is associated with EIS and related development activities; 19 percent with EWS activities; 3 percent with WEO redesign efforts and 6 percent with the selection of mainframe econometric software. Other departmental development projects of the Bureau of Statistics and functional departments account for the remaining 21 percent of the expenditures related to development activities.

Table 1. Summary of EDP Costs: Economic Functions

(In millions of U.S. dollars)

| | Actual | | | Total | Estimated |
	FY 1985	FY 1986	FY 1987	FY 1985-FY 1987	FY 1988
Development	2.46	3.53	2.15	8.14	2.36
Production	6.31	7.85	10.31	24.47	8.46
Total	8.77	11.38	12.46	32.61	10.82

Chart I graphs expended and budgeted dollar investment from FY 1985-FY 1988 for EDP programs in support of economic functions. EDP production dollars are aggregated, while EDP development dollars are presented by economic program.

The level of effort required to meet EDP goals in the economic functions area is expected to increase in the next five years. EIS and EWS activities will require the acquisition of additional facilities and analytical tools to enhance the existing foundation, satisfy outstanding user requirements, and broaden the user base. In particular, the need for budgetary resources for user training and support is expected to grow, as EIS and EWS complete the migration path from development to production.

In addition, the five-year redesign of WEO will likely require computer hardware and software acquisitions to address user and system requirements identified during FY 1988. Also, production costs for the existing WEO system will continue, until replaced.

d. Benefits

Benefits accrued as a result of EDP effort in the area of economic functions are difficult to measure, as the EDP programs aim at improving professional staff productivity and organizational decision making. While it is relatively simple to construct models to measure the dollar value of productivity gains in manufacturing activities, for example, tracing improvement in professional work and organizational decisions to the bottom line is often infeasible.

Typically, computer technology shortens the amount of time required to complete a given task and/or allows more of the task to be completed in the same amount of time (efficiency). In addition, computer technology can be the basis for a shift in work patterns, such that more

time is spent on analytical activities and less on clerical activities
(effectiveness). EDP efforts that support efficient and effective work
patterns provide opportunities for improvements in staff productivity
and, importantly, communicate organizational support and productivity
expectations to the staff. Ultimately, however, positive impact of EDP
effort on organizational productivity relies on staff willingness to
learn and use the automated tools provided by the organization.

The EDP programs in the area of economic functions are designed to
promote organizational and staff productivity. It has been anticipated
that EIS would accrue efficiency gains in the Bureau of Statistics, and
that EWS would generate great efficiency in area departments, where
economists spend substantial amounts of time collecting and analyzing
economic data. Benefits are expected to accrue as more desk economists
are trained to utilize the new systems effectively.

It should be emphasized that staff savings will accrue only to the
extent that staff receive the necessary training, links between micro-
computer and mainframe data bases are completed, and analytic work
currently performed on mainframe computers is transferred to economists'
workstations. In addition, substantial questions remain regarding the
extent to which the data maintained by the Bureau of Statistics will be
used by desk economists to support area department work. The cost and
benefit of enhancing both software and data content to facilitate
increased utilization of the EIS by desk economists are the focus of
current data integration and management efforts.

Organizational benefits that will result from investments made in
economist support programs include an improvement in the quality and
timeliness of economic statistics. The improvements will support timely
policy decisions, based on reliable and consistent data.

The workload indicators presented below (Table 2) demonstrate that
key economic products have increased over the past three years. The
economist staffing level has, during the same time period, remained
relatively constant. 1/

1/ Economist and research assistant staffing levels: 476 (FY 1985),
493 (FY 1986), and 488 (FY 1987). Data source: FY 1985, 1986, 1987
staff positions by category.

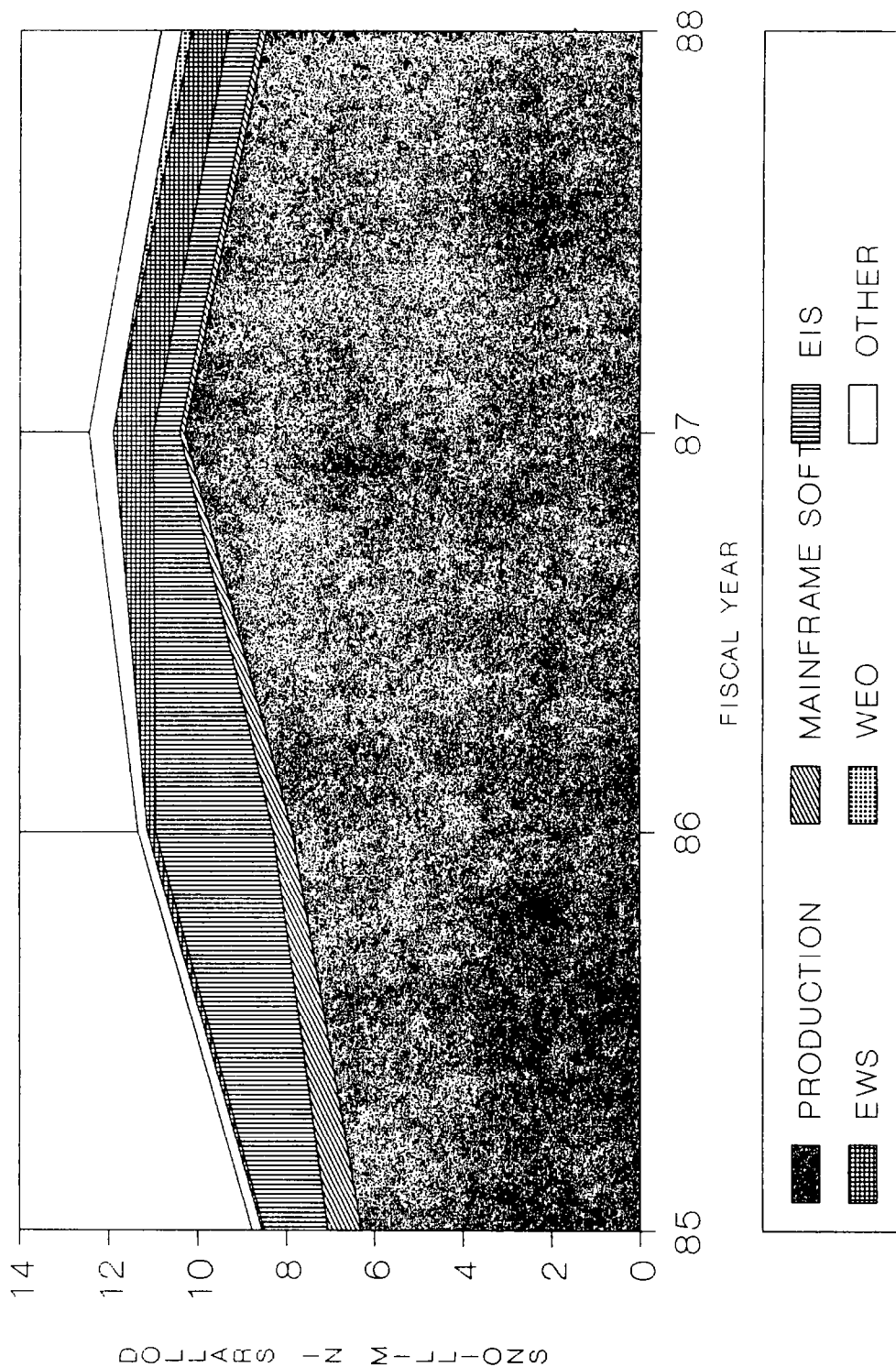Chart I

ECONOMIC FUNCTIONS PROGRAM

Table 2. Workload Growth: Economic Functions 1/

Workload Indicators	CY 1984	CY 1985	CY 1986
EIS time series	630,000	880,000	900,000
Consultation missions	123	135	142
Research papers (DM and WPS)	54	59	65
Volumes/issues published	215	210	222

2. Financial and accounting operations

The mission of the Fund requires confidence in the accuracy and timeliness of its financial data, financial transactions and accounting activities. In addition, Fund members, directors, managers, economists, and operational staff expect and depend on timely financial data and information. The growing complexity of Fund programs has intensified and increased the Fund's financial and accounting operations.

EDP effort in the financial and accounting operations area is driven by the need to support qualitative, quantitative, and timely processing of financial information by the Treasurer's Department.

a. Goals

The nature of the Fund's financial transactions is complex and characterized by the processing of operational and administrative financial transactions, control and reporting of financial accounts, and financial analysis and recommendations.

Some of the Fund's financial activities are supported by the Treasurer's Accounting Database (TAD) System. However, TAD is primarily an accounting system and does not offer capabilities essential to analytic and managerial decision support activities. Therefore, the goals of EDP efforts in the area of financial and accounting operations have been to:

o   Improve information flow within Treasurer's Department to enhance daily operations, policy analysis, and data availability;

1/ CY 1987 data are not reflected in the workload growth tables presented throughout the paper, as they were unavailable at the time of the paper's publication.

o   Automate, to the extent possible, transactions that are
     increasing in number and complexity;

o   Enhance planning, reporting and decision-making capabilities
     by improving the accuracy, completeness, consistency and
     timeliness of financial information;

o   Eliminate and/or reduce labor intensive activities by
     streamlining both intra- and interdepartmental operational
     work flows; and

o   Ensure long-term computer capability to support financial
     transaction processing and other key financial activities;

b.   Accomplishments

The high degree of interdependence of financial information, the
necessity for stringent accounting controls and security measures, and
the need for timely, accurate, and reliable conduct of financial
operations guide the EDP effort in the area of financial and accounting
operations. The significant EDP program in the financial/accounting
area has been the Treasurer's Integrated Financial System (TIFS).

TIFS was intended to serve as a financial information management
system, designed to support work activities in the Treasurer's
Department. The activities included performing financial transactions
between and among the Fund, members and depositories, including the
determination of the media to be used; processing and controlling
accounting entries; collecting and disseminating interest and exchange
rate data; and reporting on the financial status of members.

EDP development efforts on TIFS began in FY 1984. In addressing
user requirements, the need for an integrated set of systems emerged.
Simultaneous development work of the systems continued until FY 1987.

In FY 1987, the system design approach for TIFS was refined to
support modular development and phased implementation. The revised
approach permitted aspects of the system to be placed in production,
prior to the completion of the entire system. As a result, by November
1987, the Rates Maintenance System, which supports the calculation and
storage of exchange and interest rates, and the Repurchase/Repayment
Facility, which supports operations relates to repurchase cables and
Supplementary Financing Facility repayment cables, were operational.

The TIFS program is being reassessed and the future structure and
direction of its development and implementation will be an outcome of
the reassessment.

Beginning in 1983, the Treasurer's Department initiated a search for a local area network to improve productivity and decision support activities and to allow electronic data sharing. In 1984, as an interim measure, a microcomputer network was installed and continues to operate.

c. Costs

Table 3 identifies actual development and production costs for FY 1985 - FY 1987 and the dollars allocated for FY 1988. As the table indicates, an equal amount of dollars has been expended for development and production activities. A review of the cost data indicates that development costs have greatly exceeded initial estimates. Decisions regarding future funding for TIFS development will be predicated on the reassessment of the TIFS program, mentioned in the previous section.

Table 3. Summary of EDP Costs: Financial and Accounting Operations

(In millions of U.S. dollars)

| | Actual | | | Total | Estimated |
	FY 1985	FY 1986	FY 1987	FY 1985-FY 1987	FY 1988
Development	2.57	3.19	2.81	8.57	3.08
Production	2.41	2.52	3.48	8.41	3.03
Total	4.99	5.71	6.29	16.99 1/	6.11

1/ Figures do not add due to rounding.

Chart II graphs expended and budgeted dollar investment in TIFS from FY 1985 - FY 1988. Aggregated production dollars are primarily TAD-related. TIFS development dollars are presented by implementation phases.

d. Benefits

Much of TIFS is intended for professional staff. Some of the anticipated, intangible benefits include: the decision support capacity to respond to queries from management, the Executive Board, and other Fund departments; the ability to analyze and forecast critical Fund positions efficiently and effectively; and improved service to members through more timely, accurate, and complete information on their financial positions with the Fund.

As the workload indicators in Table 4 demonstrate, the workload of the Treasurer's Department has grown steadily in recent years, while the staffing level has remained constant. 1/ For the past three years, the average annual increase of operational transfers of funds and other commitments has been 6 percent, while accounting items have similarly increased by 6 percent and administrative matters by 7 percent.

At present, approximately 600 repurchase and repayment transactions occur each quarter. The transactions result in the drafting, reviewing and authorization of between 1,200 and 1,500 repurchase and repayment-related cables. In addition, the staff of the Treasurer's Department currently processes some 70,000 complex accounting entries per year. The departmental computer network in the Treasurer's Department was installed specifically to address the transaction and accounting workload.

Table 4. Workload Growth: Financial and Accounting Operations

Workload Indicators	CY 1984	CY 1985	CY 1986
Purchases and repurchases	724	972	1,116
Operational transfers	15,276	17,920	21,390
Administrative matters	46,703	49,995	69,180
Accounting items	42,600	47,478	58,100

3. Administrative support

The daily work of the Fund requires a spectrum of administrative support services. Effective management of the Fund's human and facilities resources requires a service delivery system that is unobtrusive, dependable, responsive, and adheres to industry standard business practices.
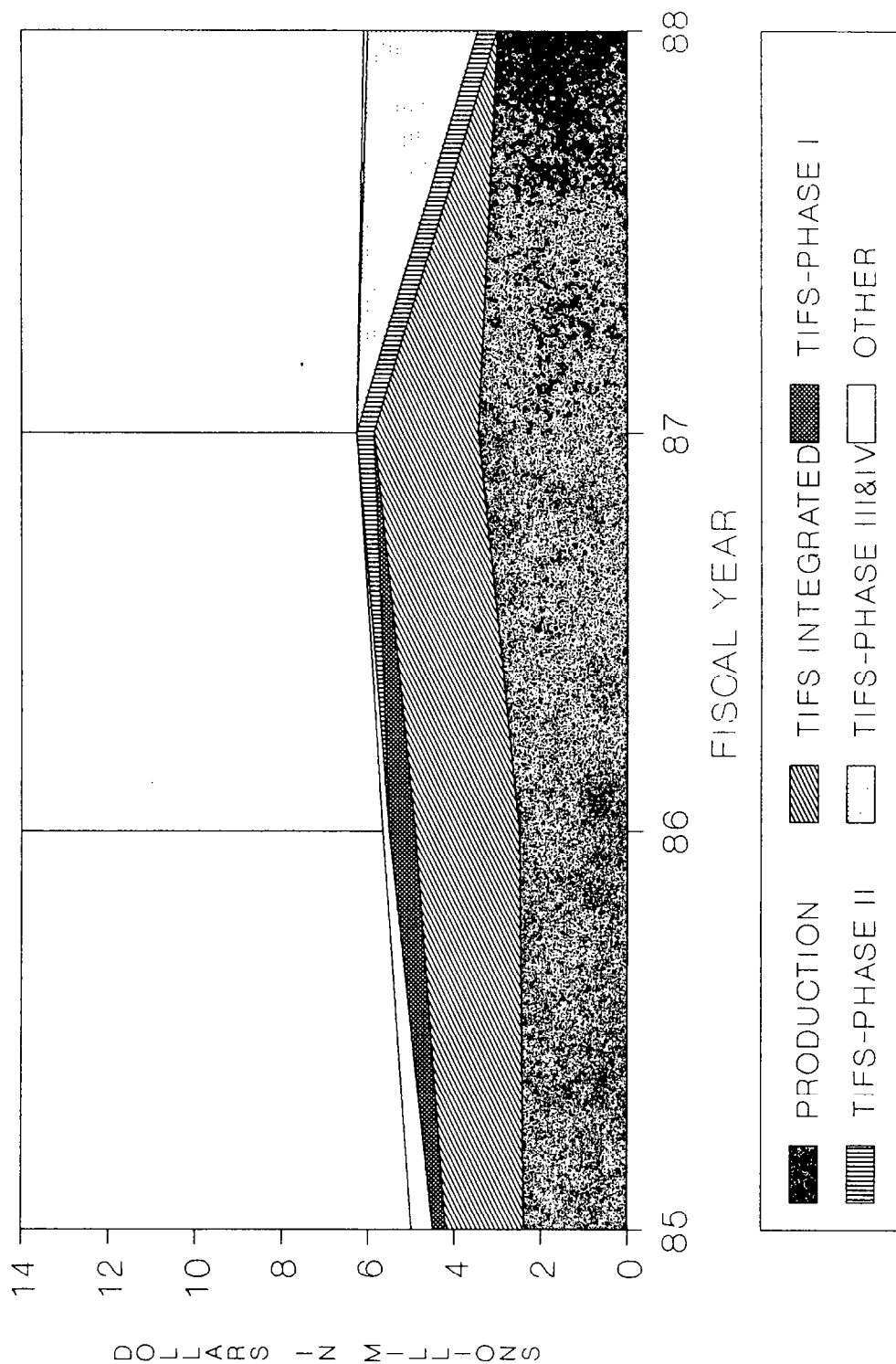
EDP effort in the area of administrative support aims at providing a foundation of integrated, automated systems to support the day-to-day work activities of the Fund's administrative staff and to provide Fund management with reliable and timely data and information for administrative decision making.

1/ Treasurer's Department staffing levels: 130 (FY 1985), 131 (FY 1986), and 131 (FY 1987). Data Source: FY 1985, 1986, 1987 staff positions by category.

Chart II

FINANCIAL & ACCOUNTING PROGRAMS

a. <u>Goals</u>

A productive organization requires effective, coordinated management of its human and material resources. Therefore, the primary goals of the EDP effort in the area of administrative support are to:

o   Improve management of the Fund's human resources and physical facilities;

o   Provide automated tools and procedures to support departmental accountability and management of administrative budgets and expenditures; and

o   Enhance delivery of administrative services (e.g. personnel, procurement, and budget services).

b.   <u>Accomplishments</u>

The need for timely, accurate information; streamlined practices; departmental accountability; and coordinated procedures drives the EDP effort in the area of administrative support. The overall design and implementation approach is to establish required capabilities within the Administration Department, and, then, to provide subsets of automated capabilities to appropriate staff in other Fund departments.

The first step in the EDP effort defined, documented, and analyzed the Fund's administrative support requirements. As a result of the analysis, program needs were identified. They are: personnel, budget, procurement, facilities management, transportation, etc. The analysis also demonstrated the need to provide those responsible for management of resources in other departments access top relevant data that affect them directly, such as personnel information, travel information, etc.

(1) <u>Personnel</u>

An analysis of the existing personnel system, which has been functioning effectively for several years on the Unisys (Burroughs) computer, indicated that the system is well established and meets the current requirements of the Fund. No EDP development effort in that area is necessary at this time. In the future, the personnel system might require some enhancing to improve its compatibility with other elements in the overall management information system being developed in the Administration Department.

(2) <u>Budget</u>

EDP development effort on the budget system commenced in FY 1985; the budget system became operational in FY 1988. The budget system provides Budget Officers with status information by account and unit of organization where specified. Next steps are to provide departmental managers access to the budget system to manage their

respective administrative budgets and expenditures, and to unify the general ledger into the official general ledger of the Treasurer's Department, thereby reducing duplication of effort for general ledger maintenance.

There also are small but important improvements under way in the systems processing and reporting information on administrative expenditures. These aim at improving the integration between financial and administrative support systems so as to provide more useful data for financial management of the administrative budget.

(3) Procurement

The development of an automated procurement system was initiated in FY 1985 and completed, on schedule and under budget, in October 1986. The system provides an information base whereby the procurement function can be more responsive to its users and take advantage of cost saving opportunities like bulk purchase. The system is linked to the budget system so that commitment and expenditure information is available to the Budget and Planning Division on a timely basis.

Future plans include: (1) connecting the procurement systems with the invoicing and payments system module, to be developed in the Administrative Expenditures Division of the Treasurer's Department, and (2) providing individual departments, through their Administrative Officers, with access to the procurement system for requisition tracking and, ultimately, generation.

(4) Property Administration, Transportation, Contract Administration, Space Management

Auxiliary administrative systems, related to the Fund's building facilities and equipment resources, are in early stages of development. Requirements for funded systems—the Facilities Space Management System and the Property Administration System—are being defined. Major functions of the property administration system are also expected to be operational in FY 1988, with completion of the system scheduled for next fiscal year. Preliminary work on the Transportation Systems is being initiated.

(5) Administrative Officer's Workstation (AOW)

The organizational value of EDP effort in Administrative Support is enhanced by the ability of administrative staff, in departments beyond the Administration Department, to access administrative information systems. The Administrative Officer's Workstation (AOW) is the first major step in migrating automated administrative capabilities to departments. A "pilot" approach was adopted to ensure that departmental administrative requirements are clearly understood and documented to establish a sound foundation of automated administrative tools.

A "pilot" AOW is being developed and implemented on the workstations of four Administrative Officers in FY 1988. Capabilities being established in FY 1988 include: access to the Personnel System for information gathering and report generation; calendar management; tracking clerical staff overtime and discretionary staff travel. An evaluation of the pilot effort is to be completed by the end of FY 1988. Further AOW enhancements and implementation will be predicated on the evaluation report.

The initiative to provide desktop, automated administrative support to departmental managers is envisioned to continue for the next several years. Future EDP efforts might include tailoring the AOW to meet the administrative control and accountability requirements of directors, advisors, and division chiefs.

c. Costs

Table 5 identifies actual development and production costs for FY 1985 - FY 1987 and the dollars allocated for FY 1988 for EDP efforts in the Administrative support area. As the table indicates, at the end of FY 1988, $6.99 million will have been expended on administrative support programs. Sixty-three percent of the expended dollars represents production costs, while 37 percent represents development costs.

Table 5. Summary of EDP Costs: Administrative Support

(In millions of U.S. dollars)

| | Actual | | | Total | Estimated |
	FY 1985	FY 1986	FY 1987	FY 1985-FY 1987	FY 1988
Development	0.34	1.11	0.76	2.21	0.40
Production	0.52	0.98	1.30	2.80	1.58
Total	0.86	2.09	2.06	5.01	1.98

Chart III graphs expended and budgeted dollar investment from FY 1985 - FY 1988 for EDP programs in the administrative support area. EDP production dollars are aggregated, while EDP development dollars are presented by program.

d. <u>Benefits</u>

EDP effort in the area of administrative support yields both intangible and tangible benefits. Intangible benefits include increased staff efficiency due to improved access to up-to-date budget data, enhanced processing capabilities, and report generation opportunities. Also, as the automated systems eliminate redundant and conflicting data, foster expenditure projection analyses, and reduce data maintenance tasks, staff effectiveness is enhanced.

The tangible benefits are cost avoidance opportunities associated with savings in staff time and salaries. Project plans for the purchasing and budget systems project annual staff time savings of $87,000 and $163,000, respectively. Annual cost avoidance of $143,000, for new staff positions in the budget area, and $203,000, in the purchasing area, are also estimated. A survey of three departments indicates that savings in staff time spent on budget preparation and requisition tracking would result in annual savings of $305,000, as aspects of the budget and procurement systems become available Fund-wide.

In addition, yearly savings of approximately $450,000 are estimated through EDP-created opportunities for quantity purchases, prompt payment to vendors, and prevention of equipment loss.
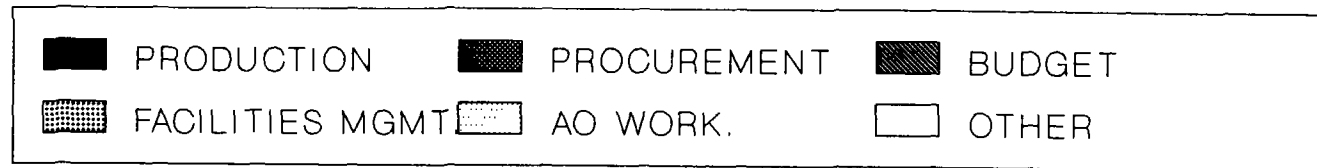
The workload indicators presented in Table 6 highlight administrative activities that have grown steadily over the previous three years. The Administration Department's staffing level has remained stable for the same time period. 1/

Table 6. Workload Growth: Administrative Support

Workload Indicators	CY 1984	CY 1985	CY 1986
Purchase orders written	1,995	2,231	2,580
Staff recruited	582	658	743

1/ Administration Department staffing level: 235.5 (FY 1985), 227.5 (FY 1986), 224.5 (FY 1987). Data source: FY 1985, 1986, 1987 staff positions by category.

Chart III

ADMINISTRATIVE SUPPORT PROGRAMS

Legend:
- PRODUCTION
- PROCUREMENT
- BUDGET
- FACILITIES MGMT
- AO WORK.
- OTHER

Y-axis: DOLLARS IN MILLIONS (0, 2, 4, 6, 8, 10, 12, 14)

X-axis: FISCAL YEAR (85, 86, 87, 88)

- 16a -
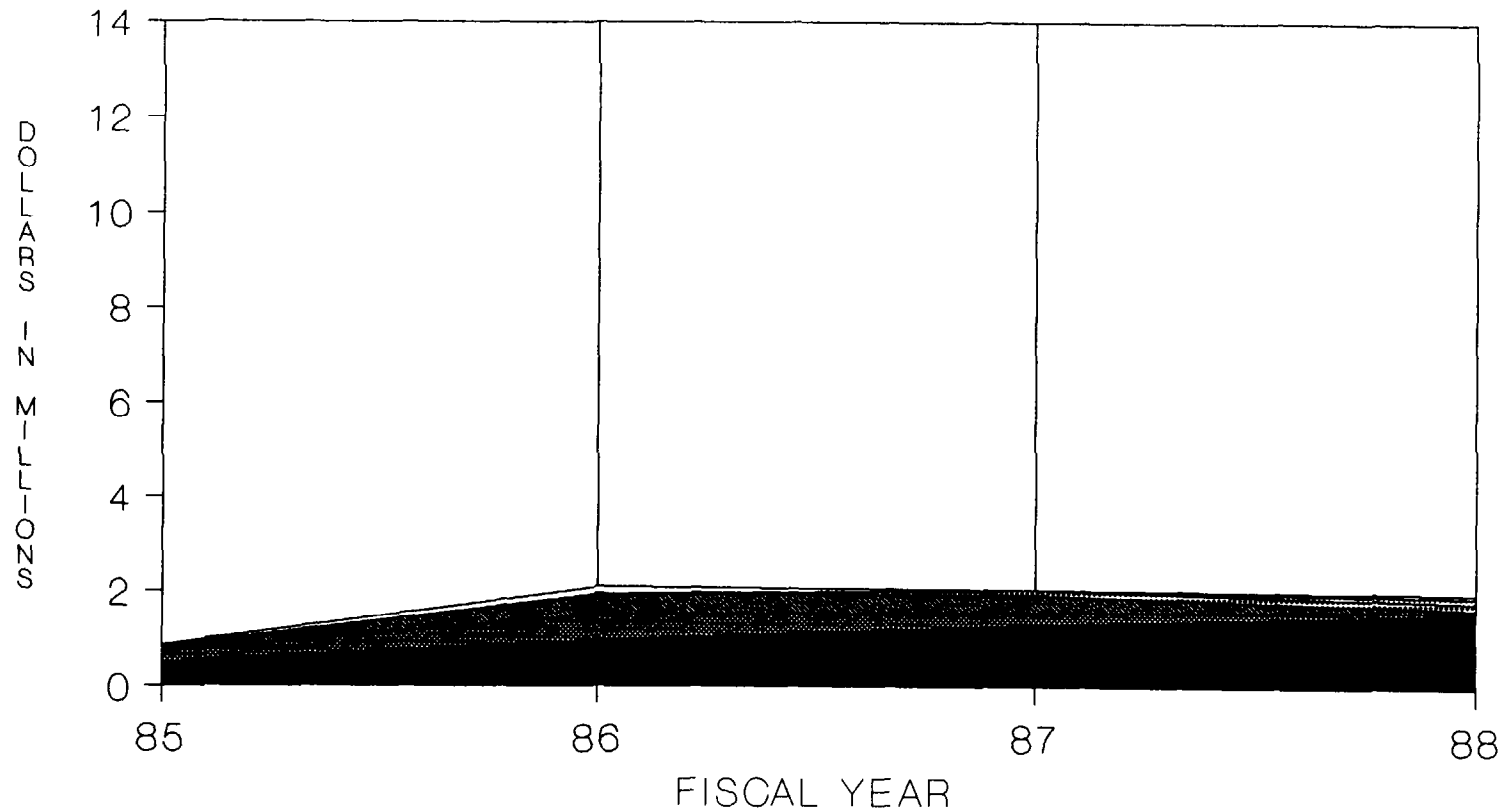
4. Document production and management

Documents are the Fund's key work products and cables are key vehicles for transmitting official communications. The significance of documents and cables to the mission of the Fund, the work of its staff, and to its members cannot be overstated.

EDP effort in the document production and management area targets the creation, preparation, organization, storage, retrieval, and transmittal of documents, cables, and other textual information.

a. Goals

The importance of creating, communicating, and accessing accurate and timely documents and messages underlies all of the Fund's work activities. The goals of EDP efforts in the area of document production and management are to:

o   Facilitate the creation, revision, and review of the Fund's documents;

o   Enhance the timeliness and efficiency of document translations;

o   Improve the timeliness of transmitting memoranda, cables, and reports within the Fund and to member country sites; and

o   Increase the efficiency of storing, retrieving, and utilization of documents and information on a Fund-wide basis.

b. Accomplishments

Document production and management programs encompass automated support for the creation, transfer, storage, and use of documents and messages, produced and/or utilized by the Fund staff. Among the significant EDP programs in the area of document production and management are: Office/Word Processing Systems; the Cable Room System; the Document Management Facility (DMF); the Joint Library Information System (JOLIS).

Other programs include a publications system in the External Relations Department and the automation of on-site registration, accommodation, and attendance activities at the Annual Meetings. The Annual Meetings System, enhanced over the past several years, provides each meeting delegate with automatic registration, badge preparation, hotel reservation, and, in addition, prepares cables and telexes, and tabulates all expenditures and reimbursement of payments.

(1) Office/word processing systems

In FY 1984, following a successful pilot project, the replacement of obsolete word processing equipment with specialized word processing office systems was initiated. The office systems provide enhanced word processing capabilities, support coproduction of departmental documents, and provide centralized storage facilities for departmental documents. To date, nine departments are served by the specialized office systems. In addition, specialized word processing systems for translation services have been implemented in the Bureau of Language Services.

In FY 1987, the implementation strategy of providing enhanced word processing capabilities on specialized office systems was refined. Enhanced document production facilities, installed on Fund standard microcomputer equipment, was implemented in one department. Microcomputer-based word processing facilities for secretarial staff are being implemented in four additional departments in FY 1988. By the end of FY 1990, it is expected that all Fund departments will be equipped with workstations to meet advanced word processing and document preparation requirements.

In FY 1987 an office system demonstration project for the Office of Executive Directors (OED) was established. The demonstration project, utilizing Fund standard microcomputer systems, offered desktop, integrated computing facilities to support the work activities of the OED staff. As a result of the demonstration project, desktop workstations are being installed in OED offices. It is anticipated that by the end of FY 1988, 40 workstations will have been installed, with additional workstations to be installed in FY 1989.

(2) Cable Room System

Automation of the Fund's Cable Room operations initiated in 1979, migrated to a Digital Equipment Corporation (DEC) computer in FY 1985, to provide an improved technological platform for system development and implementation activities. The Cable Room System supports external communications and is designed for Fund-wide use. The Cable Management System is operational for outgoing message traffic and will be operational for incoming message traffic in FY 1989.

(3) Document Management Facility (DMF)

The Document Management Facility (DMF) provides the Records Division of the Secretary's Department with fully automated storage and retrieval capabilities for Fund documents. The DMF contains a bibliographic record of Executive Board documents from January 1, 1983 to the present and a bibliographic record and full text of Executive Board decisions and minutes from January 1, 1983. In FY 1987, 30 staff were trained to use the DMF, and additional classes were scheduled during FY 1988. The DMF was originally intended to be expanded to

contain "historical" material and be accessible to other Fund departments. However, in FY 1987, funding for further development of the DMF and its implementation beyond the Secretary's Department was postponed until other systems and technologies, required to implement and extend fully the DMF's capabilities, were in place in the Fund.

(4) Joint Library Information System (JOLIS)

The cataloging and search operations for the entire collection of books, periodicals and journals in the Bank-Fund Joint Library are automated in the Joint Library Information System (JOLIS). More than one quarter million information items and publications are referenced in JOLIS. All ordering and payment of Joint Library items have also been automated. Development of JOLIS began in FY 1982; and JOLIS became operational in FY 1983.

c. Costs

Table 7 identifies actual development and production costs for FY 1985 - FY 1987 and the dollars allocated for FY 1988 for EDP efforts in the document production and management area. As the table indicates, at the end of FY 1988, $23 million will have been expended on document production and management programs. Forty-one percent of the $23 million represents production costs, while 58 percent represents development costs. As the table indicates, development costs peaked in FY 1986, when major components of the document production and management program were established and a large inventory of computer equipment was acquired.

Table 7. Summary of EDP Costs: Document Production and Management

(In millions of U.S. dollars)

| | Actual | | | Total | Estimate |
	FY 1985	FY 1986	FY 1987	FY 1985-FY 1987	FY 1988
Development	4.97	4.67	1.27	10.91	2.59
Production	1.17	2.18	2.67	6.02	3.54
Total	6.14	6.85	3.94	16.93	6.13

Chart IV graphs expended, budgeted, and/or projected dollar investment from FY 1985-FY 1990 for EDP programs in the document production and management area. EDP production dollars are aggregated, while EDP development dollars are presented by program.

(d) Benefits

EDP effort in the area of document production and management results in intangible and tangible benefits, similar to those in the administrative support area. The intangible benefits are increased staff productivity, while the tangible benefits are dollar savings in staff salary expenditures. Productivity gains are also anticipated from the specialized office system installed in the Bureau of Language Services. Office systems and the Cable Room System produce overall savings in the drafting, revision, and transmission of documents and cables.

The DMF and the JOLIS systems enhance staff decision making and produce tangible benefits as well. For example, project plans for JOLIS project operational cost savings of $300,000.

Finally, substantial savings are realized by the Annual Meetings System. Workload estimates indicate that the system eliminates the need for 13 additional staff during the meeting timeframe.

Table 8 presents workload indicators that demonstrate the increase in workload for key document production and management activities over the past three years.

Table 8. Workload Growth: Document Production and Management

Workload Indicators	CY 1984	CY 1985	CY 1986
Cables processed	145,000	151,000	159,000
Books/periodicals loaned	54,000	59,000	59,000
Catalogued search keys (millions)	2.7	4.3	7.7

5. Computer systems and end-user computing support

For the most part, EDP effort in functional, service, operational, and management areas produce programs in response to staff and/or organizational requirements. Successful program design, development, implementation, and maintenance requires an underlying structure of computer systems and user support efforts. EDP effort in the area of computer systems and end-user computing support establishes "behind the scenes" technical and management structures to support all program areas.

Chart IV

DOCUMENT PRODUCTION AND MANAGEMENT

DOLLARS IN MILLIONS

FISCAL YEAR

| PRODUCT. | OA: OMD | DMF | CABLE SYS |
| OA: DEPT | JOLIS | OTHER | |
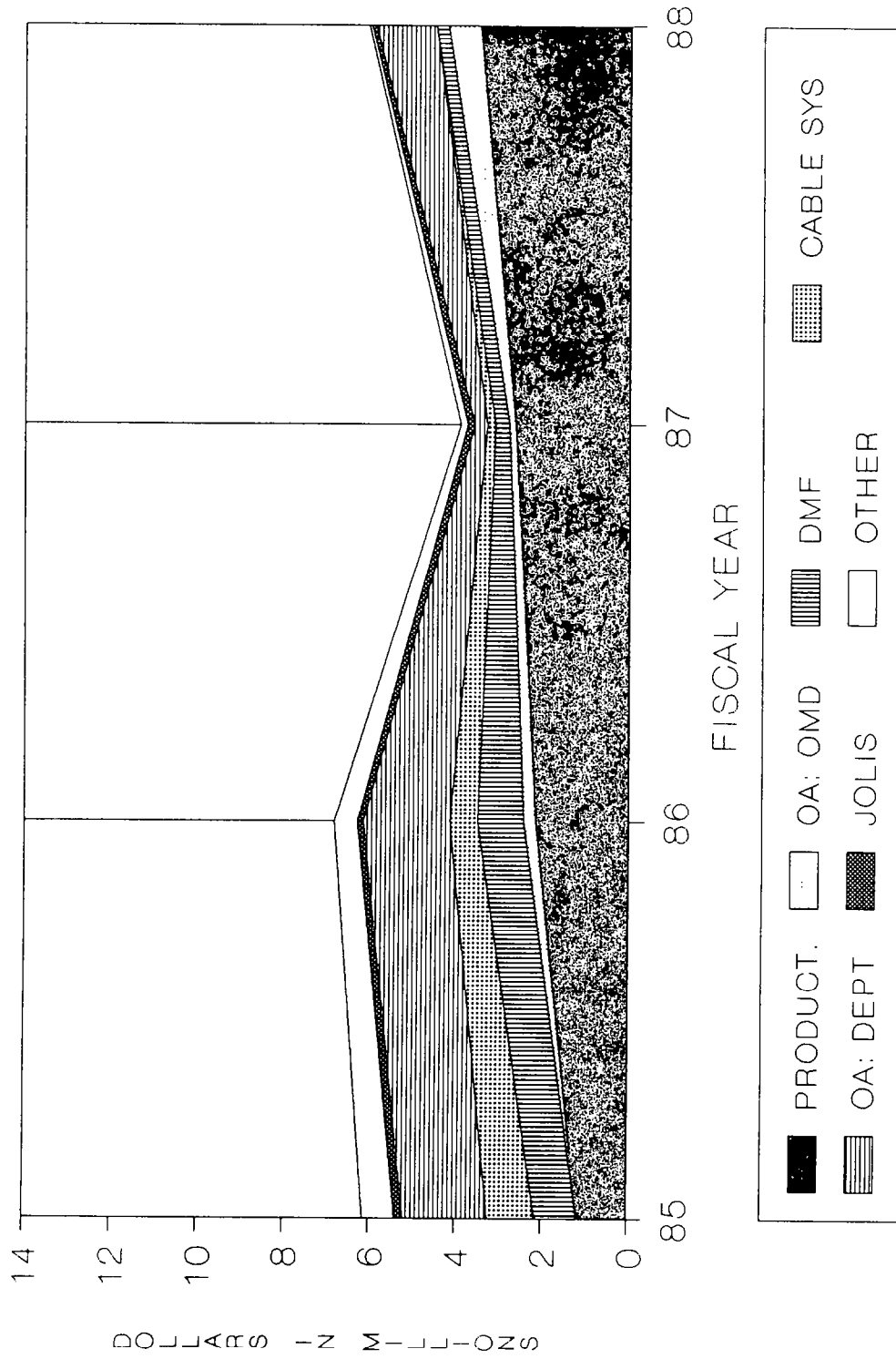
a. Goals

The fundamental goal of computer systems and end-user computing support is to ensure that appropriate EDP technology, policies, procedures and user support mechanisms are established to:

o   Select and manage information resources that support EDP programs designed to address staff requirements and the overall mission of the Fund;

o   Create a responsive, reliable, and secure information processing environment; and

o   Ensure that all Fund information processing resources are utilized to the maximum benefit of the staff and the organization.

b. Accomplishments

EDP effort in the area of computer systems and end-user computing support is characterized by three, interrelated program structures: technology management, project management, and user services.

Technology management programs monitor the Fund's inventory of computer systems to ensure that computing resources and computing demand are in balance. Project management programs control the timely completion, quality, and costs of the Fund's EDP programs. User services programs protect organizational investment in EDP systems by assisting and instructing staff in the optimal use of systems.

(1) Technology management programs

Technology management programs establish a foundation of computing facilities to support EDP project development, implementation, and system utilization activities, and provide mechanisms to monitor the secure operations of the computing facilities.

In FY 1985, to ensure the day-to-day viability of computing operations and to meet long-term information processing goals in a cost effective manner, the replacement of obsolete computing equipment was initiated. To date, computing capacity at the Fund has increased in five principal areas: mainframes, minicomputers, microcomputers, word processing equipment, and data communications:

o   The Unisys mainframe was upgraded to a Unisys A15 mainframe in FY 1986, and the IBM 3081 mainframe was acquired in FY 1985.

o   Digital Equipment Corporation (DEC) and Hewlett-Packard minicomputers were acquired between FY 1983 and FY 1987 to support specialized activities (cables, document and library retrievals, office automation, project management and data communications).

o   Acquisition of microcomputers, primarily IBM personal computers,
        commenced in earnest in FY 1984. By the end of FY 1988, a
        total of 1,350 microcomputers will have been acquired--
        approximately 80 percent installed at Fund headquarters and
        the remainder for use on missions or by resident
        representatives.

To optimize user access to applications and functions on
existing computer systems, an effort to improve the Fund's data
communication facilities at headquarters was initiated in FY 1987. A
baseline data communication network is in place and desk level access to
the array of centralized computing systems is being implemented. To
identify actual or potential data communication dysfunction, a Network
Management System was installed. Other technical management systems to
increase system security and to measure system performance and usage
have also been implemented.

Utilization statistics indicate that IBM demand is greater
than anticipated, due to the addition of economic time series to the
EIS, at a rate faster than projected. (EIS-related activities account
for 90 percent of the current usage of the IBM computer.) As a result,
the demand for mainframe processing for routine maintenance activities
has exceeded the physical capacity of the IBM mainframe during seasonal
workload peaks. Chart V graphically demonstrates CPU utilization of the
IBM mainframe. Capacity is being monitored very closely and a variety
of techniques are being introduced to increase efficiency and thereby
reduce the load on the IBM mainframe.

Future EDP programs related to computer equipment will focus
on the: (1) planning, monitoring, and acquisition (if warranted) of
additional mainframe and minicomputer storage capacity and processing
capability; (2) continued acquisition of desktop and portable
microcomputers; and (3) electronic interconnection of computer systems
at headquarters; and (4) improvements to system utilization monitoring.

(2) Project management programs

EDP project management programs offer methods for (1)
budgeting and allocating EDP resources to reflect staff and
organizational requirements, (2) monitoring EDP system development and
implementation activities, and (3) establishing and documenting EDP
standards. EDP project management programs share the objective of
ensuring that technology direction and financial decisions are
consistent, within the Fund's information processing goals.

To support EDP project management goals, a decision and
accountability structure was established. The structure places
departmental responsibility with Systems Executives, and responsibility
for technical support and business advice with the Bureau of Computing
Services (BCS). The Executive Committee for Computing Services has had

Chart V

IBM Utilization
Average CPU Usage
June 1985 – February 1988

Average CPU Busy (%)

CPU Busy Percentage
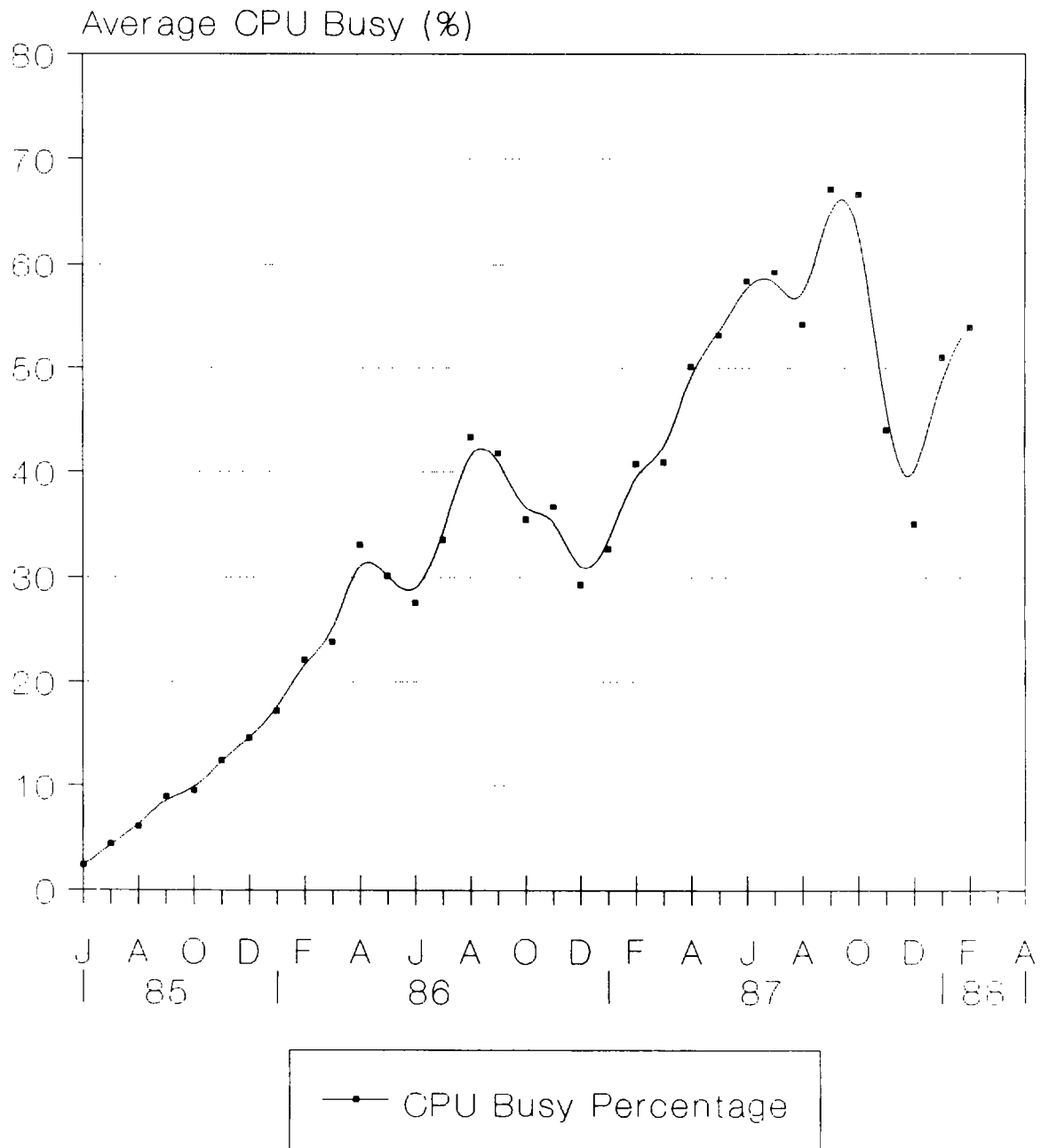
primary responsibility for EDP budget decisions. In the future, however, annual EDP budget decisions will be integrated into the general administrative budget process and a multiyear rolling plan will be developed further. The BCS is expected to assume additional responsibilities in other EDP areas, such as information resource planning, the establishment of priorities, and project control.

Key EDP management responsibilities of the BCS include selecting, implementing, and monitoring computing resources and planning and monitoring Fund-wide projects. Among the EDP program planning and monitoring mechanisms instituted by BCS are:

o   The Systems Policies and Standards manual - an umbrella document, which describes organizational structures and systems policies and standards.

o   "Fund Systems Technology Plan"- an overview of the Fund's information processing strategy.

o   Documented Fund-wide standards for departmental and desk level computing equipment - manuals that contain system description, configuration, and cost information.

o   The SPECTRUM Project Life Cycle methodology - management guidelines for monitoring the design, development, testing, implementation and overall quality of EDP systems. All large development projects (more than six staff months of work) adhere to the SPECTRUM guidelines.

(3)   User services programs

There are two types of user services programs. One program type focuses on installing, repairing, maintaining, and moving desktop computing equipment. The other program type focuses on assisting staff in the utilization of computing resources. The objective of both program types is to improve and promote staff utilization of EDP resources.

Users receive direct support from the Assistance Desk for the installation, repair, maintenance and moves of workstations (e.g., terminals and/or microcomputers), utilized at headquarters or mission sites. The Information Center for Computer Services (ICCS) assists users in operating desktop equipment, utilizing Fund standard software products, and accessing the Fund's EDP application programs. In addition to ad hoc consulting support, the ICCS performs a spectrum of services ranging from document conversions to software evaluation.

Table 9 presents a list of assistance desk and ICCS services and associated workload.

Table 9. Workload Growth: Computer Systems/End-User
Computing Support

Technical Support Activity	FY 1986 1/	FY 1987	FY 1988 2/
Consultation/ad hoc support	3,736	9,553	10,940
Document conversions	--	--	9,372
Training courses	35	48	96
User documentation	7	8	72
Seminars/briefings	--	--	152
Software upgrades	--	1,222	652
Applications developed	--	5	32
Software distributed	--	1,434	1,584
Software library items	--	38	732
Telephone assistance calls	8,702	9,208	18,288
Repairs	2,388	2,164	3,748
Installations	1,334	1,228	1,028

1/ As the Information Center was established on May 1, 1985, some data, prior to November 1985, was unavailable.
2/ Projected.

d. Costs

EDP programs in the area of computer systems and end-user computing support operate as a utility and tabulates costs on a pro rata usage basis. Table 10 identifies actual costs for FY 1985 - FY 1987 and dollars allocated for FY 1988. As the table indicates, at the end of FY 1988, $24 million will have been expended on computer systems and end-user computing programs. Seventy percent of the $24 million represents user support costs, while 30 percent represents costs for the acquisition of mainframe computers and data communication equipment.

User support costs include activities in direct support of end-users, as well as, "behind the scenes" management and quality control support. Costs associated with direct user support will increase in

direct proportion to the increase in the number of users, and the facilities and systems they use. However, the rate of increase is expected to stabilize over time, as user expertise increases.

Table 10. Summary of EDP Costs: Computer Systems and End-User Computing Support

(In millions of U.S. dollars)

	Actual			Total	Estimated
	FY 1985	FY 1986	FY 1987	FY 1985-FY 1987	FY 1988
Mainframe and datacomm. acquisition	4.80	0.13	1.74	6.67	0.53
User systems support	5.23	4.14	2.51	11.88	5.03
Total	10.03	4.27	4.25	18.55	5.56

Chart VI graphs expended and budgeted dollar investment from FY 1985-FY 1988 for EDP programs in support of computer systems and end-users. Production and development dollars were aggregated to accommodate the reticular nature of the programs. The dramatic increase, in FY 1985, is due to the acquisition of a mainframe computer system.

d. Benefits

Cost justification for computer systems and end-user computing support effort is addressed in user projects. Therefore, the benefits derived from the support effort are realized through successful delivery of EDP programs to the organization and through comprehensive EDP service to the staff.

III. Expenditure Trends and Assessment

This section of the paper examines aggregated EDP expenditures and allocations for FY 1985 through FY 1988, profiles the progress of development projects representative of the Fund's key EDP activities, offers observations about EDP expenditure trends, and tabulates areas of workload growth in the Fund. As in the previous section, EDP expenditures are presented by fiscal year and tabulated as production and development costs, within each fiscal year.

EBAP/84/281 (12/28/84), references a three-year EDP budget expenditure of $98.4 million 1/ for FY 1985 through FY 1987. The actual data processing expenditures between FY 1985 and FY 1987 were $90.1 million. The variance between the estimated and actual data processing expenditures is 1.6 percent. Table 11 presents actual EDP development and production expenditures for FY 1985 - FY 1987 and the EDP budget allocation for FY 1988, while Table 12 summarizes expenditures by area of EDP effort. Table 13 reviews the status of the Fund's major EDP development projects. The status of the projects reflects overall progress in the related program area.

Table 11. EDP Expenditures for FY 1985 - FY 1987

(In millions of U.S. dollars)

	FY 1985	FY 1986	FY 1987	FY 1985-FY 1987	Estimate FY 1988
Production	15.65	17.68	20.28	53.61	21.65
Development	15.14 1/	12.62	8.72	36.48	8.95
Total	30.79	30.30	29.00	90.09	30.60

1/ Includes $4.8 million for IBM mainframe purchase.

Examination of the FY 1985 - FY 1987 EDP expenditure and FY 1988 budget data reveals: (1) data processing expenditures have been contained; (2) investment in production is increasing and, conversely, (3) investment in development activities is decreasing; (4) expenditures for economic functions represent the greatest portion of the overall budget.

1/ The $98.4 million estimate includes an anticipated $9.7 million expenditure for renovation of the computer center. The renovation of the computer center was delayed to the FY 1987 - FY 1989 timeframe with associated costs now estimated at $4 million (EBAP/87/69, p.112). Deducting computer center costs from the anticipated $98.4 million expenditures yields an estimated expenditure of $88.7 million for the remainder of the data processing activities.
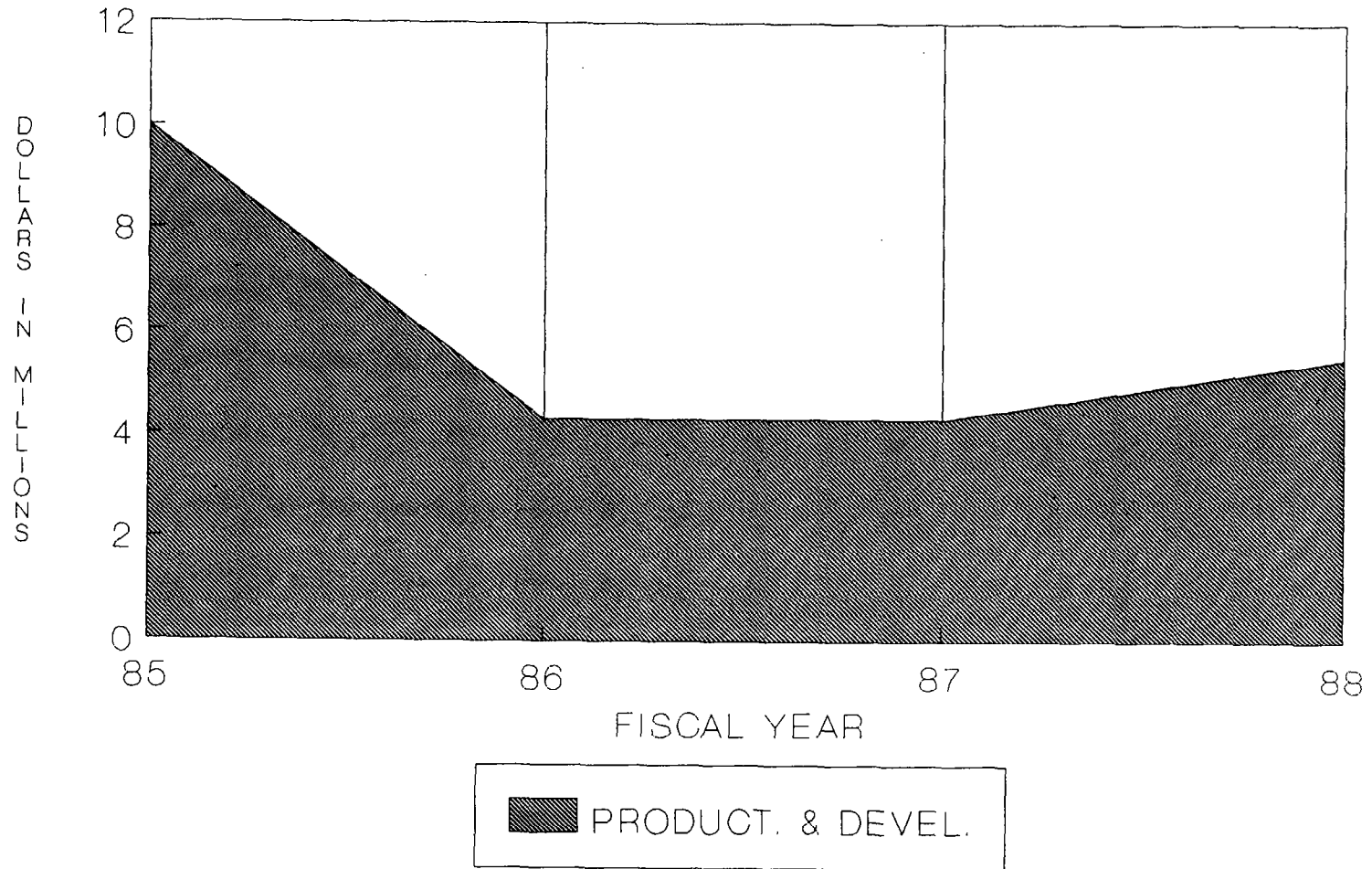
Chart VI

COMPUTER SYSTEM & END USER COMPUTING SUPPORT

Table 12. Summary of Costs by Key Area of EDP Activity
FY 1985 - FY 1987, FY 1988 Estimated Expenditures 1/

	FY 1985	FY 1986	FY 1987	FY 1985-FY 1987		FY 1988	
	In millions of US$			In US$ mill.	In per-cent	In US$ mill.	In per-cent
Economic functions	8.77	11.38	12.46	32.61	36.2	10.82	35.3
Financial and accounting operations	4.99	5.71	6.29	16.99	18.9	6.11	20.0
Administrative support	0.86	2.09	2.06	5.01	5.6	1.98	6.5
Document production and management	6.14	6.85	3.94	16.93	18.8	6.13	20.0
Computer systems and end-user computing support	10.03 2/	4.27	4.25	18.55	20.5	5.56	18.8
Total	30.79	30.30	29.00	90.09	100.0	30.60 3/	100.0

1/ Both production and development dollars are aggregated.
2/ Includes $6.1 million for IBM mainframe of which $4.8 million is considered as development costs.
3/ Excludes $473,000 for the relocation of the IBM mainframe computer to a renovated computer center in the Fund headquarters building.

Table 13. EDP Program/Representative Projects: Status

(In millions of U.S. dollars)

EDP Program Rep/Dev Projects	Original Estimate	Revised Estimate	Expenditures (FY 85 – 87)	FY 1988 Budget	Milestones
Economic Functions					
EIS	4.8 (FY 85)	5.3 (FY 87)	4.4	0	In production (10/86); 0.9 expended in FY 1984
EWS	0.4 (FY 85)	--	1.16	0.6	In production (12/86)
WEO	-- (FY 85)	4.2 (FY 88)	0.08	0.2	Reqts. analysis (4/88)
Mainframe Software	Funded on annual basis		4.4	0.12	Reqts. analysis (ongoing)
Financial/Acct. Operations					
TIFS "Core"	4.4 (FY 84)	13.1 (FY 87)	6.3	--	Reorganized into Phase I-IV (6/87)
TIFS Phase I	0.5 (FY 84)	--	0.92	--	In production (6/86)
TIFS Phase II	1.4 (FY 87)	1.5 (FY 88)	1.1	0.4	Prod. scheduled (11/87)
TIFS Phase III & IV	6.0 (FY 87)	--	0	2.5	TIFS program under review.
Administrative Support					
Budget/Procurement	2.3 (FY 84)	--	1.9	0	Procure: In prod. (10/86) Budget: In prod. (5/87)
Prop. Adm/Space Mgmt.	0.5 (FY 87)	--	0.1	0.1	Prop. Adm.: Sched. prod.(4/88) Space Mgmnt.: Not funded
AO Workstation	0.07 (FY 87)	0.1 (FY 88)	0	0.1	Pilot completion (4/88)
Document Production/Management					
Cable Room System	2.5 (FY 85)	--	1.94	0	Phase I of DEC-based system. In production (4/87) Phase II of DEC-based system. Prod. sched. (4/88)
DMF	1.9 (FY 86)	2.1 (FY 86)	1.65	0	Segment containing main data base in production 9/86. The original plan called for development work in the area of imaging systems.
OA/Depts.	13.0 (FY 84)	14.2 (FY 88)	4.3	1.4	11 depts. implemented (4/87) 4 depts. implemented (4/88) Remaining depts. not funded
OA/OMD & OED	2.28 (FY 88)	--	0.4	0.75	Installation of 40 workstations scheduled (4/88)
JOLIS (integration)	0.33 (FY 84)	0.46 (FY 87)	0.42	0.09	Production scheduled (FY 89)

1. **EDP expenditures have been contained**

A key factor in budget stability is the budget process. Although departmental requests for data processing support and services increase yearly, prudent cost containment measures have been adopted to ensure that the bottom-line expenditure remain relatively constant. A result of the cost containment measures is that EDP expenditures and/or budget allocations for FY 1985 - FY 1988 have been relatively stable. 1/

The stabilization/cost containment trend, evidenced in the past three years of EDP expenditures, is expected to continue, such that increases in EDP expenditures will be taken into account in the context of the overall administrative budget. It is also likely that departmental demand for EDP support will continue to increase, as users become more proficient in and dependent on computing facilities. The need to continue stringent cost containment practices is evident.

However, it is important to note EDP activities are cyclical in nature. Factors that contribute to a system's life cycle are user requirements and available technologies. Thus, it is likely that a system that has migrated from development to production will, at some future time, require significant design adjustments to address new user requirements and/or computing technologies. Typically, the life cycle of a major system is four to six years.

2. **Investment in production activities is increasing**

Production expenditures have increased steadily from $15 million in FY 1985 to $22 million in FY 1988. The uptrend in production expenditures reflects the: (1) migration of large systems into the production cycle; (2) increase in mainframe, minicomputer and microcomputer systems.

Production expenditures are expected to increase as additional systems become operational, overall computing capacity is adjusted, and manpower costs increase. Consequently, a larger portion of future EDP budgets will be allocated to production programs and activities.

Price decreases in data processing equipment are only expected to have a moderate effect on the growth in production expenditures. The computing industry regularly reports increases in the price/performance ratio of data processing equipment. Often increase in price/performance is interpreted as a bottom line decrease in computer equipment costs. In fact, price/performance increases mean that: (1) data processing equipment offer additional features and/or capabilities at a cost

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1/ EDP expenditures for FY 1983 were $10.733 million and for FY 1984 $15.970 million. Reconstruction of the Fund's systems portfolio began in FY 1985.

comparable to the previous version of the equipment, and/or (2) that the cost for the new features is less than the cost of similar features on earlier versions of the data processing equipment

3. Investment in development activities is decreasing

Between FY 1985 and FY 1988, $45.4 million was invested in developing data processing facilities. About one sixth ($7.2 million) of the expenditure was for computer system and end-user computing support, with the acquisition of the IBM mainframe computer representing a significant cost. The remaining $38.2 million was shared among the application areas.

Development expenditures have decreased from $15 million in FY 1985 to $9 million in FY 1988. The downtrend accurately indicates that, in general, the Fund's major system development effort (i.e., the replacement of existing systems or the initiation of new systems) has progressed sufficiently, so that planned development activities can be accomplished within the parameters of an EDP budget whose overall growth is constrained.

4. EDP expenditures in support of economic functions
   continue to increase

Between FY 1985 and FY 1988, $43.4 million was invested in EDP effort associated with economic functions. About 24 percent of the EDP expenditures was for development programs, while 76 percent was for production activities. The $43.4 million represents approximately 36 percent of the total EDP budget. Future expenditures for EDP development and production support for economic functions are expected to increase.

Chart VII demonstrates the Fund's EDP program shift from system development to system production, as major EDP development efforts in many areas. In the future, more of the EDP budget will be expended on system support activities and less on development. Although user demand for computing support will continue to grow, the EDP dollar expenditure to meet user demand, is not expected to increase significantly due to budget constraints.

A discussion of the Fund's EDP expenditures would be incomplete without an examination of workload statistics and staffing levels. Table 14 lists major workload indicators for each EDP program area and tabulates workload growth from CY 1984 through CY 1986. As the table demonstrates, there have been significant increases in work products produced and distributed, data generated and maintained, transactions documented and performed, and information processed and disseminated. The Fund's staffing level, on the other hand, has remained relatively

Chart VII

OVERALL EDP EXPENDITURES

FISCAL YEAR

PRODUCTION   DEVELOPMENT   REQUESTED
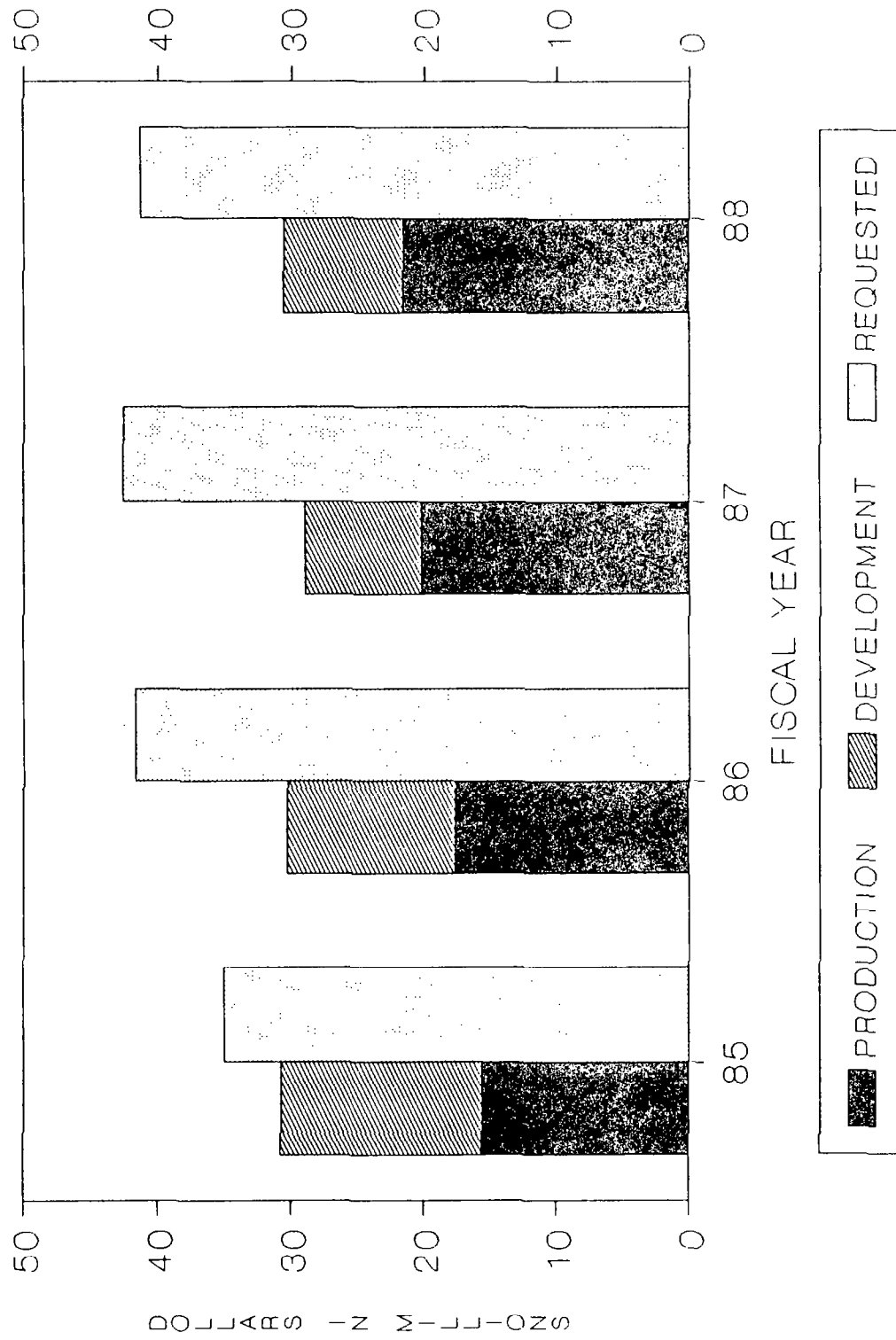
constant for the past several years. 1/ The ability of the organization to increase its work products, without increasing its staff size, is a tribute to staff efficiency and effectiveness.

While it is impossible to demonstrate a direct quantitative relationship between EDP expenditures and staff productivity, the opportunity to work in an efficient and effective manner is, in part, an outcome of appropriate EDP support. As positive agents of change, EDP programs contribute to establishing a work environment in which staff productivity gains are possible, if not certain.

1/ Staffing increases: FY 1985 - 3 percent; FY 1986 - 1.8 percent; FY 1987 - 0.2 percent. Data source: FY 1985, 1986, 1987 staff positions by category table.

Table 14. Growth in Workload 1/

Workload Indicators	CY 1984	CY 1985	CY 1986
Economic Functions			
Research papers issued (DM and WP series)	54	59	65
Statistical time series (000's)	630	880	900
Volumes published	215	210	222
Consultation missions	123	135	142
Overseas trips 2/	1,668	1,718	1,695
Financial/Accounting Operations			
Accounting items (processing and audit)	42,600	47,478	58,100
Operational transfers	15,276	17,920	21,390
Administrative matters (vouchers and authorizations)	46,703	49,995	69,180
Purchases and repurchases	724	972	1,116
Administrative Support			
Purchase orders	1,995	2,231	2,580
Staff recruited	582	658	743
Document Production/Management			
Volumes published	215	210	222
Cables processed 3/	145.2	151.4	159.4
Periodicals loaned	53,715	59,237	59,196
Growth of Library Reference/ Collection 4/	2.7	4.3	7.7
Titles published	34	35	48
Pages edited and published	--	8,905	12,635
Computer Systems and End-User Computing Support			
EDP workstations	1,050	1,700	2,060
Installations and repair calls	2,312	3,867	4,684
EDP equipment requisitions reviewed	618	1,040	1,098
EDP projects administered	168	204	207
User consultations		3,800	8,500

1/ Source EBAP/87/69.
2/ (A9 and above staff).
3/ (in thousands).
4/ (in millions).