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Organization - Economic Department - Computer Program - Volume 2

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# THIS FILE IS CLOSED AS OF DECEMBER 1968. FOR FURTHER CORRESPONDENCE SEE: 1969 - 1971.

RECORDS MANAGEMENT SECTION February 1969

org. - Econ. Dept - Comp. Program

December 30, 1968

Dr. L.E. Westphal 5F Magie Apartments Faculty Road Princeton, New Jersey

Dear Larry,

Thank you ever so much for the cards and writeup for the MFOR program. I have been after the source program for a long time and suddenly you have ended my search. I am having it adapted for the Burroughs 5500 that we have here.

Your research work sounds very promising and I shall be interested to hear how it comes out, and particularly what happens to the results when non-linear consumption functions are used.

Once again, thank you.

Sincerely yours,



Nicholas G. Carter

NGCarter/w

Er Dept. Compain Roge

Mr. Joseph Reamy

December 11, 1968

J. E. Twining, Jr.

Mileage Reimbursement in Connection with Business Use of Car by members of the Brogramming Section, Economics Department

Referring to my memorandum to you dated December 19, 1967, and even though the Bank has already acquired its own computer, it has still been necessary for Mrs. E. Comer, Mr. B. Krishna and Mr. H. Schneider to use their cars to go to the computer service bureaus CDC and CEIR to accomplish work on site. The situation will disappear as soon as all computer work is converted to the Bank's computer system.

In the meantime, I authorize Mrs. E. Comer, Mr. B. Krishna and Mr. H. Schneider to be reimbursed 12 cents per mile (or whatever the current rate is) for all travel on official business, which amount shall be paid out of pathy cask.

cc: Mr. Stevenson

Mr. Donovers

Mr. Tiemann

Mrs. Angel/Mrs. Comer/ Messrs. Krishna and Schneider

E : Dept Computer

Mr. Robert Sadove

December 10, 1968

Huguette Angel H.A.

Computer time and expenses for Transportation Division for the month of November, 1968

As requested in your memorandum to me of June 5, 1968, please find a table showing the computer time used for work done for the Transportation Division.

| Computer<br>Center | Number of | Input/<br>Output | Plotter | Main<br>Computer | Estimate of expenses(\$) |
|--------------------|-----------|------------------|---------|------------------|--------------------------|
| CEIR               | 2         | 14 min.          | -       | 5 min.           | 57                       |

cc: Messrs. Stevenson
Tiemann
Hogg/Pouliquen/Jaycox

E- Dept Consula

Mr. Arthur E. Tiemann

December 9, 1968

Catherine Slappey

Management Information Systems Seminars

I attended the Management Information Systems Seminars, offered by CEIR's Institute for Advanced Technology, December 2 - 4.

The instructor was very competent and the course informative. Unfortunately, the subject matter was of limited direct value to me in my work since the seminars were concerned with management (and, more particularly, top management) information systems. The course was directed towards the interests of people at the managerial level, and was, therefore, very generalized. In any case, in the limited time, it would have been impossible to explore specific techniques in detail.

co: Messrs. Stevenson McPhesters (5

Ec Dept Compete

Mrs. H. Angels

December 2, 1968

Tariq Husain T.H

# THAILAND - Computer Program for Forecasting Balance of Payments and GDP

- 1. I write to thank you and Harald for helping us out with the programming of the above model. As usual, Harald did a good job. This particular program was more involved and interdependent than the previous one. However, the job is done. Please say thanks to the star.
- 2. But, as you know, programming, like life, is a continuing business. There is always something to do. I hope to leave for home leave today and from now on Mr. Manfred Blobel or Mr. Peter Streng would deal with this model either to use it for processing data or to modify it ever closer to the complexity of the real world.
- 3. On my return I will start work on the livestock model, and also a more ambitious irrigation model. So let us hope the New Year would have lesser problems than this one had.

THusain:aos TBRD

cc: Mr. Blobel, Streng

Mr. Edward V.K. Jaycox

November 29, 1968

Arthur E. Tiemann

Computer Time Sharing Arrangement with Applied Logic Corporation

In response to your memo of November 22, 1968, we agree to have the amount of money authorized for use of the time sharing terminal and computer through ALC increased by \$2,000 to \$4,000 through December 31, 1968.

It is our understanding that the programs being run now through the ALC computer will be converted to the Burroughs 5500 as soon as possible.

cc: Messrs. Geolot/Sadove

Hogg
Twining
Carmichael
Mrs. Angel/ Mrs. Comer

HAngel/ms

HA.

x ang. Admin

Mr. Alexander Stevenson

November 29, 1968

Arthur E. Tiemann 201

Transfer of Programming Section

The pressure to expedite transferring the Programming Section of the Statistical Services Division to the Administrative Division raises a basic issue of what positive value to the Bank such a transfer will have. To the best of my knowledge, there has been no criticism of the existing organization in terms of its location. If such criticism exists, it would be appropriate to bring it to my attention to determine its validity.

The current organizational location of the Programming Section has many advantages which would be jeopardized by a transfer. Programmers work closely with the External Debt Section and have become intimately familiar with the programming problems of the debt system. During the next year an extensive effort will be mounted to revise this system, and many programming demands will arise. It will continue to be valuable to have the programmers in close proximity both physically and organizationally to the External Debt Section. Since both sections are now under one head, a coordination of their respective efforts can be assured, and the possibility of interruptions can be forestalled.

The Programming Section, by virtue of its scientific programming orientation, works very closely with the General Statistics Section. Even when the programming effort is for other parts of the Economics Department or for one of the Projects Departments, the programmer may be required to consult on technical statistical matters. Such consultation is not only facilitated by the close organizational prelationship which now exists but may be suggested by the division head because of his statistical background and his current control over the programming effort. The use by the General Statistics Section of the DAM program for regression analysis requires consultation with the Programming Section to clarify unusual situations which frequently arise. This two-way consultation works best within a single organization.

The review of the efforts of programmers who work primarily in scientific areas of statistics and operations research is most effectively accomplished by someone skilled in these technical fields and in the potentialities of such programming. The position of the chief of the Statistical Services Division calls for such skills. So far as I know neither the head of the Computer Center nor his chief programmer require this type of technical background to carry out their functions.

The morale of the programmers in the Programming Section is high partly because of the pride they have in meeting the challenges of scientific programming. If they were to be part of the Administration Department, they would probably be utilized for business-type programming

November 29, 1968

prit de corps which
1 location. The Bank

to some degree and would consequently lose the esprit de corps which has been generated in their present organizational location. The Bank may well lose their services under such conditions, and with the present shortage of skilled scientific programmers, such a loss would be serious.

In short, I fail to see how the Bank would benefit from moving the Programming Section out of the Statistical Services Division of the Economics Department.

cc: Mr. McPheeters Mrs. Angel

AETiemannara

Samir K. Bhatia

# Mrs. Catherine Slappey - Management Information Systems Seminars

- l. I have discussed this matter with Mr. Busse who agreed that during the time Mrs. Slappey is attending the Seminars she will be considered as on a mission and consequently her cab fare will be paid by the Bank.
- 2. Upon return from the Seminar Mrs. Slappey will fill out the Statement of Expense and a covering memorandum explaining the circumstances will be sent to Mr. Busse.
- 3. I have informed Mr. Tiemann to this effect.

Ashada

Mr. Tiemann

45 Jalou

Mr. Arthur E. Tiemann

November 25, 1968

Catherine Slappey

Management Information Systems Seminars

This is to request confirmation that the Bank will reimburse me for the travel costs involved in attending the seminars which are being held in Silver Spring, Md., December 2 - h, 9:00 A.M. to 5:00 P.M.

As you know, I depend upon a babysitter in order to work, and both the babysitter and I rely upon not very reliable public transportation. The only feasible way for me to travel between my home in Virginia and the seminars in Maryland is by cab. I estimate that the cost of cabfare (above my normal traveling expenses) will be approximately \$12.00 per day for three days.

cc: Mr. Stevenson CSlappey/ms

Computer Person Mr. Alexander Stevenson November 18, 1968 Bharat B. Krishna & Back-to-office report Following the instructions laid down in your terms of reference memo dated November 4, 1968, I proceeded to Detroit in the evening of November 10, 1968 to participate in the linear programming work-shop, which lasted until the afternoon of November 14, 1968. I attended all of the eight-class-sessions and both the lab-sessions. Throughout all the sessions, the emphasis was laid on the practical application of the Burroughs LP system rather than the theory involved. We learned, for example, how to formulate models, set-up jobs for runs on Burroughs' 5500 and to interpret the output, without going into the theory of simplex method or the matrix inversion. Lab-sessions were provided for us to run simple problems on the machine after we had formulated the problems ourselves. The work-shop was well organized and efficiently conducted by Messrs. Robert Mahar and Harold Mette - Mr. Mahar leading the discussions most of the time. He gave an excellent account of himself both in the knowledge of the system as well as the ability to impart the information to others. Though most of those attending the work-shop were employees of the Burroughs Corporation, there was a wide sampling of industry represented - ranging from super-market-chain to an airconditioner manufacturing firm. The group consisting of about twenty people was very cooperative and friendly. I found the workshop to be very useful. Discussions were held of the capabilities of the various Burroughs LP systems and we were told that the Burroughs Integer Programming System (BIPS) should be available for release next month. I made acquaintance with Mr. Maher who is a linear programming specialist at the Burroughs. He promised to provide whatever assistance we may need in the use of their system. cc: Mr. Tiemann Mrs. Angel

BKrishna/ms

November 13, 1968

Mrs. Huguette Angel

E.K. Hawkins

## Scientific Programming Reports

I attach the form you requested be completed by Mr. Carter in connection with his current program. As you know, we are very interested in programming in this Division, and I would be grateful, therefore, if you could supply us with more copies of this form for future use.

I am somewhat puzzled that we have not seen this document before, given the interests of this Division in this work. It may be that we were missed off the distribution list when you first evolved this new system. If so, perhaps you would be kind enough to send us any covering memorandum which was issued at that time.

EKHawkins/w

cc: Mr. Tiemann Mr. Carter

Computer Progr.

Mrs. Huguette Angel

November 6, 1968

Hans H. Thias

Data Processing for Kenya Case Study

Referring to our recent telephone conversation I would like to confirm that the following jobs may still be requested in connection with the above-mentioned study (depending partly on the availability of additional data):

- a) punching of cards containing information (5 variables, 800 observations) on age/education/income in rural areas (already completed);
- a few additional tabulations of the Labor Force Survey Data;
- another run (possibly with some additional data and using a step-by-step regression program) of the 1967 KPE results;
- d) primary education demand projections;
- e) secondary education demand projections;
- f) a migration model.

The last three items imply simple regression analysis (in each case about 5 variables and 40 observations).

g) a model for the demand for various types of labor (cross-section analysis, about 10 variables and 100 observations).

cc: Mr. Tiemann Mr. van der Tak

HHThias/wj

So Comput

Mr. Robert Sadove

November 5, 1968

Huguette Angel H.A

Computer time and expenses for Transportation Division for the month of October, 1968

As requested in your memorandum to me of June 5, 1968, please find a table showing the computer time used for work done for the Transportation Division.

| Center | Number of | Input/<br>Output | Plotter | Main<br>Computer | Estimate of expenses(\$) |
|--------|-----------|------------------|---------|------------------|--------------------------|
| CEIR   | 12        | 1 hr. 16 min.    | -       | 50 min.          | 466                      |
| CDC    | 7         | 37 min.          | l hr.   | 16 min.          | 239                      |
| Total  | 19        | 1 hr. 53 min.    | l hr.   | l hr. 6 min.     | 705                      |

cc: Messrs. Stevenson Tiemann Hogg Pouliquen Jaycox

Mr. Louis Y. Pouliquen

Hermober L, 1968

Arabanda Sunda CW

New Rate of Return Computer Program

Re your memo of September 13, 1968 and subsequent memo of October 14, 1968 from Mrs. Comer attaching the write up of the above program, we have looked into the methodology of calculations involved. The procedure for approximation to the true rate of return within a specified accuracy seems quite all right, and it does save some steps in the process of iteration. Hence this method of rate of return calculations is acceptable.

However, I have serious doubte about the efficiency of this method vis-a-vis others which may be available in computer programs or can be formulated. Without going into the mathematics of the rate of return calculations, the determination of the rate, since it must be done by iteration, depends basically on (1) how close your first approximation of the rate is, (2) what level of accuracy you want, and to some extent (3) whether the stream of not benefits follow a smooth distribution over time. In ideal conditions a few iterations may suffice to find the proper rate. But without any prior basededge the process could be lengthy beyond proportions.

I had long discussions with Mrs. Comer about her experience with this program. She found it very efficient indeed, but then most of the testing was done with your specific problem where the situations were in near ideal condition. I am therefore hesitant in recommending the new program as a general purpose rate of return calculator.

ec: Mrs. Comer Mr. Stevenson Mr. Tiensus Mrs. Angel

AKamm

Es Dept Comporter Mr. Arthur E. Tiemann November 4, 1968 (through Mr. E.K. Hawkins) Nicholas G. Carter Computer Usage While on Economic Mission to Chana During the Economic mission to Chana in October 1968 it was found necessary to perform certain calculations on a computer. The calculations were mainly regression analyses and provided assistance both to the mission and also to the Ministry of Economic Affairs of the Ghana government. The calculations were performed on an IBM 1130 computer that is located in the Volta River Authority headquarters in Accra. The total time used was three hours at a rate of \$15 per hour, thus the total cost of computer services was \$15. The receipt for this expenditure has been submitted with my expense account for the mission. 3. I would like to add that this series of calculations also served another purpose, that of transferring the technology necessary to do such computer calculations to members of the Ministry of Economic Affairs. whereas before they had to undertake such calculations at length by hand, they now are able to use the computer. NGC:lem ec: Mr. Hawkins

- hogh Confeeler

Mr. A. Stevenson

October 30, 1968

D. S. Ballantine

#### Workshop in Operations Analysis

We have been in touch with Mrs. Angel of your Department concerning a Workshop in Operations Analysis which is to be held in Philadelphia, on November 19-20 by the Association for Educational Data Systems. We have reviewed the scope of the Conference from the point of view of this Division and propose to have an economist, an educator, and an architect attend the Workshop. To make the best use of the Workshop in subsequent operations in the Bank it would be helpful if Mrs. Angel and a programmer could also attend the Conference. I hope you will support this suggestion, and let me know so that we can make arrangements for the group as a whole.

The content and scope of the Workshop appear to be of considerable interest to the economists, educators and architects of this Division and to the programmers of the data bank. We consider that there must be an integrated approach with the division staff members and the technical personnel pooling their experience and thinking during and after each of the workshop sessions to arrive at a common understanding of the problems we wish to have solved, the required presentation of the data, and the capabilities and limitations of the process.

This Conference also ties in with Mr. Kamarck's memorandum of September 27 on "Statistical guidance and scientific programming services". While at present we have no specific requests to make for computer services, we do envisage the possibility of using a computer in costing of new schools and in relating timetables in project schools to schedules of accommodation.

I am attaching the Brochure on the Operations Analysis Workshop.

cc: Messrs. Burt, Adamson, Thint, Germanacos, Tiemann, Fraser, Mrs. Angel

BMCheek:hpb

E. Dept Comp

Mr. Alexander Stevenson

October 30, 1968

Huguette Angel

# Meeting of Burroughs Users - Back to Office Report

According to terms of reference (Memo of Mr. Stevenson, Oct. 9, 1968), I attended the 13th meeting of CUBE (Cooperating Users of Burroughs Equipment) in Denver, Colorado, October 22 - 25, 1968. Mr. Lynn Alexander of the Bank also attended.

Some 430 people representing 175 user organisations and the Burroughs' Corporation attended the meeting. The B5500 subgroup was composed of 114 persons. (Sh user organisations).

The main sessions I attended were:

- 1. A panel discussion for new B5500 users. The topic discussed pertained mostly to hardware problems.
- 2. A presentation of simulation languages (useful for models in which changes occur at discrete intervals).
  - a) WALSE a language very similar to SIMSCRIPT which is being developed by Westinghouse.
  - b) SIMULA a language originally developed by the Norwegian Computing Center of UNIVAC and now maintained by Burroughs.
    - c) MACALGOL developed by Westinghouse.
  - 3. A presentation of the Time Sharing Master Control Program.
  - 4. A discussion of hardware testing routines.
- 5. A presentation of BASIS (Burroughs Advanced Statistical Inquiry System), an ALGOL precompiler which has been developed by Burroughs.

Various routines allow to select part of the data just to LOOK at it, to PLOT pairs of variables (rough plot, on-line), to compute correlations and simple and stepwise regressions. An extended BASIS, more powerful, will be delivered in the future.

6. A session on System support - a report of the system changes in the last 6 months was given. The status of Burroughs technical publication was also presented. The way of reporting software failures which has been formalized was explained.

7. A presentation of PROMIS (Project Oriented Management Information System), a COBOL package applicable to networks. It is similar to a PERT Program but has much more flexibility since various units of time can be used to describe activities within the same project and varying work and shift patterns can be taken into consideration. Options are given to print exactly what is desired (all activities between 2 dates, a "fragnet" or fragment of network, the activities of a given level...) allowing for easier use of the results.

Between sessions, Lynn Alexander and I had the opportunity to discuss specific problems with Mr. Wayne Nelson, director of management systems and Mr. Evangelista, systems director for the Eastern Region to which we belong. Both men are from Burroughs, Detroit office. I also discussed some FORTRAN problems with Mr. Louis K. Fisher of National Security Agency, Fort Meade and we will be able to contact him for help with FORTRAN.

Three registration lists were distributed:

one alphabetic by attendees' name one alphabetic by affiliation's name one alphabetic by attendees' name within equipment group

I found the meeting useful and stimulating. CUBE is still a rather small organisation but it is powerful because Burroughs users have a chance to hear about new developments in progress or contemplated by the Burroughs Corporation and also to voice their concerns or desires for the implementation of hardware or software features found desirable by the group as a whole.

From the comments voiced and problems described by various users, it seems that the local support offered by Burroughs is uneven in quality. However, whatever the competence of the Field Engineer and the Systems Representative assigned to an organisation, customers have a better chance to get good service if they impress on Burroughs their willingness to be intelligent users of the equipment.

The next meeting of CUBE will take place in Cleveland, Ohio, April 23 - 25, 1969.

cc: Messrs. Tiemann Fraser Dr. Wolsey (IMF)

Dept Comp Mr. Alexander Stevenson October 29, 1968 Arthur E. Tiemann Linear Programming Workshop, Detroit, Nov. 11-14, 1968 A Linear Programming workshop organized by Burroughs will take place in Detroit during the week of November 11 - 14, 1968. The announcement was made at the CUBE meeting attended by Mrs. Angel (October 22-25, 1968) and a notice was also received by Mr. Fraser last week. The purpose of the workshop is to discuss Linear Programming and to study setting up jobs to run Linear Programming problems on the various Burroughs computer systems. The programming section is responsible for scientific programming throughout the Bank and expects to be called upon to run LP problems or advise on setting up such jobs. It would thus appear very useful to send one programmer analyst to the workshop. We recommend that the Bank send Mr. B. Krishna.

Fr Dept Compute

Mr. Warren C. Baum

October 3, 1968

Huguette Angel H.A.

Computer time and expenses for Transportation Division for the month of September, 1968

As requested in your memorandum to me of June 5, 1968, please find a table showing the computer time used for work done for the Transportation Division.

| Computer<br>Center | Number of runs | Input/<br>Output | Plotter | Main<br>Computer | Estimate of expenses (\$) |
|--------------------|----------------|------------------|---------|------------------|---------------------------|
| CEIR               | 37             | 5 hr. 35 min.    | -       | 2 hr. 19 min.    | 1545                      |

cc: Messrs. Stevenson Tiemenn Hogg Pouliquen Jaycox

" - Ec Dept. Computer Program - Ec Dept. General Program - Services - Data Program

Department Heads

September 27, 1968

Andrew M. Kemarck

Statistical guidence and scicatific programing services

- The Statistical Services Division of the Economics Department provides service to other Departments and Offices of the Bank in connection with data collection, computations, and scientific computer programming. On request the Division also provides technical statistical analysis end assistance. With the acquisition of an in-house computer and the increased use of sophisticated statistical nethods for analytical purposes, the need for all these services appears likely to increase. Economy of effort is therefore all the more important.
- I should be glad if you would draw the attention of your staff to the existence and the functions of the statistical advicory service and oncourage staff members who encounter problems, which require the use of such statistical techniques as trend fitting, regression analysis, analysis of variance, rate of return calculations, distribution functions, queuing theory, linear programming, or time series analysis, to discuss them with the Statistics Section (Mr. Funda, extension 2600) at an early stage in their consideration so that appropriate methods can be recommended and/or adequate data collected in a usable form.
- The Statistical Services Division carries out its responsibility for scientific programming through its Programming Section. The attached form has been designed to assist in evaluating the scientific programing effort throughout the Bank and to provide brief documentation for compiling an up-to-date index of scientific programs developed in the Bank or obtained from other sources.
- The form should be filled out by Bank staff who intend either to write a scientific program or to modify an existing program obtained outside the Rank and should be approved by the individual who has been designated by you in your department to coordinate such efforts. The completed form should be sent to the Programming Section before the program is submitted for processing by the computer. Additional copies of the form (Form No. 21-E) can be obtained by calling ext. 1:061.

Attachment.

co: Messra. Stevenson

Tiemann

Kundu Mrs. Angel

Mr. Fraser

Ec Compute September 20, 1968 Mr. Gustavo Navarrete Departamento de Investigaciones Banco de la Republica Oficina Principal Bogota, Colombia Dear Mr. Navarrete: I am writing to you with regard to your request for a copy of our computer programs and code book, which you discussed with Miss Bullock during her recent mission. Due to the fact that we do not have written copies of definitions for the variables used, a listing of our programs would be unintelligible to another programmer. Aside from this, the program is unusually large and complex and has been amended in such a way as to invalidate certain parts of the original program. There is no documentation available to explain these amendments. In addition, our current programs fully utilize the capacity of a CDC 3600 computer, which has a much larger memory than the IBM 1620, which I understand is employed by the Banco de la Republica. In its present form, the code book lacks many interpretations which are provided to our staff members verbally. From the foregoing, I regret that neither the listing of our computer programs nor the code book would be practicable for use by the Banco de la Republica. However, I will be happy to answer any specific questions you may have regarding our computer operations. Yours truly, Arthur E. Tiemann Statistical Services Division Economics Department JBullock/ms cc: Messrs. Stevenson 1968 SEP 23 PM 4: 08 Frost Teigeiro COMMUNICATIONS Paulson Mrs. Mrs. Slappey

Mr. Gustavo Navarrete Departamento de Investigaciones Eanco de la Republica Oficina Principal Bogota, Colombia

Doer Mr. Mayarrete:

I am writing to you with regard to your request for a copy of our computer programs and code book, which you discussed with Miss Ballock during her recent mission.

Due to the fact that we do not have written copies of definitions for the variables used, a listing of our programs would be unintelligible to another programmer. Aside from this, the program is unusually large and complex and has been amended in such a way as to invalidate certain parts of the original program. There is no documentation available to explain these amendments.

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In its present form, the code book lacks many interpretations which are provided to our staff members verbally.

From the feregoing, I regret that meither the listing of our computer programs nor the code book would be practicable for use by the Banco de la Republica. However, I will be happy to answer any specific questions you may have regarding our computer operations.

Yours truly,

Arthur E. Memenn

Chief Statistical Services Division Decommics Department

JBullock/ms Pooceson

resers. Stevenso.

Telgeiro

Mrs. Paulson

1868 SEP 23 PM 4: 08

COMMONICATIONS
HEREBALLELES

Ec. Dep. Computer

Mrs. Paulson, Miss Hedley, Miss Bullock, Mr. Doultsinos Catherine Slappey September 16, 1968

### Current edit

Attached is a description of the checks made in the current edit (editing before projection).

Since some re-writing of the program must be done to make it work on the Burroughs computer, this would be a good time to delete unnecessary checks and to make any desired revisions in the items being checked or the wording of the error messages.

I would suggest that everyone make notes on items which require revision and that we meet to discuss the proposed changes.

Attachment.

C. Salppey/dg.

Mr. Warren C. Baum

Sept. 5, 1968

Huguette Angel H. A

Computer time and expenses for transportation division for the month of August, 1968

As requested in your memorandum to me of June 5, 1968, please find a table showing the computer time used for work done for the Transportation Division.

| Computer<br>Center | Number of runs | Input/<br>Output | Plotter      | Main<br>Computer | Estimate of expanses(\$) |
|--------------------|----------------|------------------|--------------|------------------|--------------------------|
| GEIR               | 19             | 2 hr. 22 min.    | •            | 1 hr. 5 min.     | 662                      |
| CDC                | 11             | 1 hr. 35 min.    | 1 hr. 1 min. | n 16 min.        | 294                      |
| Total              | 30             | 3 hr. 57 min.    | 1 hr. 1 min. | 1 hr.21 min.     | 956                      |

cc: Messrs. Stevenson Tiemann Hogg Pouliquen Jaycox

July 18, 1968

Mr. Robert Best Control Data Corporation Washington Data Center Rockville, Md.

Dear Mr. Best,

It is 12:45 PM and we have just received the output of the jobs we submitted last night.

Among the jobs submitted were jobs 2931 and 2932. The decks were made up of two boxes each clearly identified:

PROJ 1 of 1 PROJ 1 of 2

and

REG EDIT 1 of 1 REG EDIT 1 of 2

Unfortunately, your operator taped the second box of PROJ after the first box of REG EDIT and vice versa. The results are attached and of course we have to rearrange our two decks and submit them again.

I know you will give us credit for these as in the past but who will ever compensate for the time wasted and the frustration that we feel at being unable to keep any kind of schedule in our work?

Sincerely yours,

H.A.

Huguette Angel
Chief
Programming Section
Statistical Services Division
Economics Department

HAngel/ms cc: Mr. Twining Hr. Andrew M. Kassarok

July 2, 1968

80.9,500 (first month

rent-free)

322,000

\$16,500

Daguette Angel

# Computer Selection

The Bank and Fund have recently considered the following computers:

Approximate conthly rental INM 360-ho with 262 k memory IBM 360-h0 with 131 k memory Burroughs 5500

Burroughs 2500 \$24,500

IBM 360 versus Burroughes

I prefer Burroughe to the IBH 360 for the following reasons:

1) Technical superiority

a) Operating System: The Burroughs operating system is far shead of the one (or rather several ones) available for the IN 360.

#### The results are:

- Superiority in ease of operating

- Possibility of true multiprogramming - Great flexibility of sultiprogramming

- Better utilization of imput/output devices, dieke in particular

- Very good operating statistics

b) Faster Dieks on which the system and programs are resident. This results in greater throughout.

2) Reliabilitys

- a) The many Eurroughs users contacted by Sank and Fund members at various times all stated the reliability of the equipment and the software furnished by Burroughs.
- b) Burroughs manuals are clearly written they may lack details semetimes but never misinform.

As a result, I am convinced that the best choice for the Bank/Fund would be a Burroughs computer.

# Burroughs 3500 versus Burroughs 5500

The main practical difference between the two computer is that 85500 allows for automatic segmentation of programs and data while the 33500 programmers have to do the segmentation.

-2 - July 2, 1968

Segmenting the programs themselves is easy to accomplish. However, whenever the data area defined is too large for core, segmentation may mean a complete re-writing of the program.

Execution of programs may be considerably aloner when the programmer needs to segment data.

Price-wise the difference in rental between the B3500 and the B5500 is shout \$5,000 a mouth (or \$2,500 for the Bank alone).

Value-wise, the difference is as follows:

#### Program conversion 2)

With the B5500, I foresee no conversion problem. Because of automatic segmentation, programs larger than core can also be run without having to use a legger system at a service bureau.

If we acquire a 23500, my best estimate is that 15 to 18 mm months will be needed to re-write our several programs that require large data areas (among those are the external debt programs, the bank financial model, the regression and simulation packages, the each flow and the livestock model). This conversion job could cost the Bank \$15,000 to \$18,000 in staff salary or \$30,000 to \$35,000 in consulting fees, if the staff needed for reprogramwing is not available in the Bank.

The problem of conversion would of course, recur everytime semeone would acquire a progress written for an IBM 7090 or a CDC 3600.

#### Necessity to use service bureaus: 2)

If the in-house computer has memory restrictions, the necessity for using service bureaus could arise frequently.

There will be cases when a valuable program is acquired by an economist who can not wait for the one to two months conversion process before he can wake use of it. There will also be cases when a specific problem requires the use of a larger version of a program normally run on the in-house commiter.

When service bureaus are used, the cost is multiple: it includes the actual service bureau charge, the cost for messenger services and the lengthening of turneround time.

As an alternative to the larger computer, some have considered renting the commiler one (83500) and acquiring a terminal tying in to a larger system. However, in today's state of the ext, because of the low speed of communications, a terminal cannot practically be used with programsthat require large amounts of input/output (this applies to our external debt processing and to many of the regression jobs). However, the combined cost of the 33500 and a terminal would not be mignificantly lower than that of the B5500.

oc: Mesers. Stevenson/Hemann/Framer/Lecting

#### CROSS REFERENCE SHEET

COMMUNICATION:

Letter

DATED:

June 26, 1968

TO:

Mr. G. MILLER

FROM:

Mr. J. E. Twining, Jr.

FILED UNDER:

Admin. Data Processing

SUMMARY:

re Billing for the computer usage

Be, Dayot Compails

Mr. William Curtin

June 18, 1968

Arthur E. Tiemann

# IBM equipment rented by Statistical Services Division

During the year 1968/69, the Statistical Services Division would like to continue to rent from IBM the following equipment at the indicated monthly rates:

| PRINT CARD PUNC<br>26-A1354<br>26-A1355<br>26-A2154 | <b>H</b> | (\$)<br>63<br>63<br>95 |
|---|----------|------------------------|
| VERIFIER  |          |                        |
| 56-43028  |          | 53<br>50               |
| 56-76406  |          | 50                     |
| SORTER  |          |                        |
| 82-97343  |          | 77                     |
|   |          |                        |
| COLLATOR  |          |                        |
| 85-31444  |          | 125                    |
| REPRODUCER  |          |                        |
| 514-50804   |          | 85                     |
|   |          |                        |
| ACCOUNTING MACH                                     | INE      |                        |
| 407-24278   |          | 680                    |
|   |          | \$1,291                |
|   |          |                        |

cc: Messrs. Stevenson Williams Fraser

HAngel/ms H.A

Ec Dept. Computer Proj

Mr. Edward J. Donovan

June 11, 1968

Arthur E. Tiemann

Reimbursement for mileage in connection with business use of car for Bank business by Patrick T. Woodburn

This is to certify that Patrick T. Woodburn used his car on Bank business for the period May 3 to June 12, 1968, for a total of 100 miles. At 12¢ a mile, this amounts to \$12.00. I would appreciate it if you would please reimburse him.

/ms

June 5, 1968 Mr. Edward J. Donovan Eugenia C. Comer Reimbursement for trips to CEIR During the month of May, I used my car to make the following trips to the CEIR Computer Center: round Number of/trips Approx. mileage Date 8 1 Wed., May 1 Mon., May 6 1 8 8 Tue., May 7 1 Fri., May 17 8 Total L 32 I also had to make 1 round trip on May 22 from the Bank by taxicab at a charge of \$7.50. cc: Mr. Tiemann Mrs. Angel EComer/ms

Mr. Edward J. Donovan

Eugenia Comer

Reimbursement for Trips to CEIR

During the month of April, I used my car to make the following trips to the CEIR Computer Center:

| Tues., April 16 | 2                    | 16 |
|-----------------|----------------------|----|
| Wed., April 17  | 1                    | 8  |
| Tues., April 23 | 1                    | 8  |
| Wed., April 2h  | 1                    | 8  |
| Tues., April 30 | eracidades folicitas | 8  |
| Total.          | 6                    | 48 |

cc: Mr. Tiemann Mrs. Angel

EL Dept Compute

April 30, 1968

Mr. Arthur E. Tiemann

Micholas G. Carter (through E.K. Hawkins)

## Current Programming in the Applied Quantitative Research Division

- l. We are at present in this division running three computer programs of relatively recent origin. These programs have all been either written or modified in the division as an integral part of our on-going research efforts. This memo is to inform you briefly of the nature of these programs.
- The first program is SIMLN, an econometric model simulator. This program came to us from UNCTAD via the IMF and a write-up is available from either source. We have made extensive revisions to this program but this process is not sufficiently complete to warrant producing a new write-up.
- 3. The second program is titled BLACK BOX and is a collection of six gap and Keynesian models in a common consistent framework. It is an integral part of the Small Models Project now being undertaken by Mr. Hawkins and myself. Since this is a very new and incomplete program a write-up is not in order at this time.
- h. The third program is titled PARAMS and has been written to provide for the consistent calculation on a mass basis of various country economic parameters. This program was created especially for the Five-Year Outlook project and while it may ultimately come into general use, its specialized nature does not at present warrant a write-up.
- I would like to emphasize that in general the programs developed in this division are of a highly specialized nature. The present possibility of their being useful in other parts of the Bank is remote. We have however taken great care to ensure that these and all other programs we use are readily transferrable to any other interested users.

MCCarter:lom

ce: Mr. Hawkins Mrs. Angel Mr. van der Valk

April 22, 1968

Mr. Edward J. Donovan

Eugenia C. Comer - Programming Section, Statistical Services Division Reimbursement for trips to CEIR

During the month of March, I used my car to make the following trips to the CEIR Computer Center:

| DATE            | Number of<br>Round Trips | Approx.<br>Mileage |
|-----------------|--------------------------|--------------------|
| Wed., March 6   | 1                        | 10                 |
| Thur., March 7  | 2                        | 20                 |
| Fri,, March 8   | 1                        | 10                 |
| Mon., March 11  | 1                        | 10                 |
| Wed., March 13  | 2                        | 20                 |
| Thur., March 14 | 1                        | 10                 |
| Fri., March 15  | 1                        | 10                 |
| TOTAL           | 9                        | 90                 |

cc: Mr. Tiemann Mrs. Angel

Ec Stoff Compute

Mr. Arthur E. Tiemann

March 15, 1968

Eugenia Rudolphi

Back-to-office Report after attending "The Practical Utilization of Input/Output and Related Techniques for Business Planning and Forecasting" course.

The above two day course offered by CEIR, Inc. in Philadelphia, Pennsylvania was primarily concerned with the 106 sector 1966 FORTUNE INPUT/OUTPUT Matrix developed by CEIR as a relatively inexpensive tool for simulation and business forecasting. It was shown that this method can be used to make national, regional, inter or intra-industrial prediction on a short or long-term basis.

One and one-half days were spent on the I/O Model; this left one-half day to cover the "Related Techniques", Linear Programming, Time Series Analysis, Regression Analysis and Exponential Smoothing.

Both instructors impressed me as having full knowledge of their subject. One presented the economic feasibility of the I/O technique; the other concerned himself with the mathematics involved.

Any economist not familiar with I/O would find this course quite interesting and useful. As a programmer-analyst, I would be most interested to see the program CEIR has developed in operation.

In the event that anyone is interested, a complete portfolio on FORTUNE's 1966 Input/Output Matrix was given to me for the Bank's use. This includes computer generated output for a realistic problem.

cc: Messrs. Stevenson van Wagenen Mrs. Angel

ERudolphi tra

Ec Dept- Comp.

Mr. A. Tiemann (through Mr. J. Schmedtje)

March 4, 1968

L. Pouliquen

#### Computer Time

- I am referring to Mr. Jaycox memorandum to you dated July 25 and to the risk analysis we have conducted on Mogadiscio's port project.
- As far as the Projects Department is concerned, this work has now been completed, and I joined the Economics Department on February 5 in order to investigate the method from a more general standpoint. I, therefore, think that the computer time I have used last month at Maryland University and the whole of what I am planning to use this month should be charged to the Economics Department rather than to the Projects Department.
- The analysis I am conducting is based on experiments with various sample sizes and with different input distributions. In many cases I have to use relatively large samples and I anticipate the need of upto three more hours of computer time.

LPouliguen:bso

cc: Messrs. Reutlinger (cleared with) van der Tak Schmedtje

Ec St Conjula

Mr. B.A. de Vries (through E.K. Hawkins) ENG.

March b. 1968

N.O. Certer X

#### Data for Simple Brojection Models

In answer to your request I have considered the problem of simple projection models for country economics and have derived a list of the minimum information necessary for such models. The purpose of these models would be to provide a range of feasible alternatives for the projections of the future levels of economic activity in a particular country. All that would be needed is fourteen pieces of information. This information could then be used to make the projections. In general the information falls into three categories, past data parameters of performance, present levels of economic activity, and future targets and possible performance levels. The list is as follows:

Past: Marginal propensity to save
Harginal propensity to import
Incremental capital to output ratio

Present: Income, Consumption, Exports, Imports, Investment, and capital inflow.

Future: Estimated growth rates for income and exports
Probable level of capital inflow
Remsonable (feasible in the light of the specific
situation) values for the parameters of marginal import
and savings rate.

It will be noted that at this stage there is no distinction between GDP and GMP as on the very gross level we assume the problems of debt to be of a smaller magnitude than those of simple income projection. To include debt on this level would be to impart to the models an impression of accuracy that they do not really have. It is, of course, very easy to incorporate all the statistics of debt on the next level of refinement. The purpose of these models should initially be to give estimates of the magnitudes of possible levels of economic activity and to make sure that projections of these levels are consistent.

The details of the models and their projections for a number of countries will be worked out in this Division over the next few months.

MCCarter: to

FORM No. 209 (9-67)

# INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

# INTERNATIONAL DEVELOPMENT ASSOCIATION

| Mr. Aldewereld       | 308  | Mr. Kruithof       | 65   |
|----------------------|------|--------------------|------|
| Mr. Alter            | 510  | Mr. Lejeune        | 668  |
| Mr. Avramovic        | 1033 | Mr. Mason          | 617  |
| Mr. Bart             | 673  | Mr. McIvor         | 54   |
| Mr. Benjenk          | 668  | Mr. Melmoth        | 622  |
| Mr. Billington       | 553  | Mr. Michaels       | 1217 |
| Mr. Broches          | 810  | Mr. Mirza          | 659  |
| Mr. Calika           | 541  | Mr. Nelson         | 500  |
| Mr. Cargill          | 600  | Mr. Nurick         | 805  |
| Mr. Cavanaugh        | 700  | Office Services    |      |
| Mr. Chaufournier     | 510  | Personnel Division | 267  |
| Mr. Cheek            | 645  | Projects           |      |
| Mr. Clark            | 805  | Mr. Reamy          | 719  |
| Mr. Consolo          | 839  | Mr. Reitter        | 578  |
| Cope                 | 640  | Mr. Richardson     | 64!  |
| Mr. de la Renaudiere | 560  | Mr. Ripman         | 1210 |
| Mr. Demuth           | 845  | Secretary's Dept.  | 120  |
| E. D. I.             |      | Mr. Skillings      | 58   |
| Mr. El Emary         | 541  | Statistics         | 106  |
| Mr. Fontein          | 640  | Mr. Stevenson      | 80   |
| Mr. Friedman         | 1223 | Mr. Street         | 60   |
| Mr. Frost            | 572  | Travel Office      | 2.21 |
| Mr. Gibbs            | 625  | Treasurer's Dept.  | 717  |
| Mr. Goodman          | 600  | Mr. Tolley         | 55   |
| Mr. Hartwich         | 672  | Mr. Twining        | 1210 |
| Mr. Hoffman          | 845  | Mr. Votaw          | 677  |
| Mr. Hornstein        | 552  | Mr. Wiese          | 570  |
| Mr. Horsley          | 559  | Mr. Williams       | 85   |
| formation Dept.      | 461  | Mr. Woods          | 1220 |
| Kamarck              | 800  | Mr. Worthington    | 239  |
| Mr. Knapp            | 1220 |                    |      |

From: Communications Unit, Room 244, Extension 2023

Org. Comparter

# UNITED NATIONS WATIONS UNIES

CABLE ADDRESS · UNATIONS NEWYORK · ADRESSE TELEGRAPHIQUE

STAT/ICC.4

REFERENCE

15 February 1968

Dear Mr. Tiemann,

In response to your letter of 12 February 1968, the following is the detail of the costs for which you were billed:

Program modification Preparation of program control cards Computer usage 40.00 35.00 925.00

Total

\$1,000.00

If you have any further questions, please do not hesitate to contact me.

Yours sincerely,

S. Cashton

Chief

International Computing Centre

Mr. Arthur E. Tiemann, Chief Statistical Services Division Economics Department International Bank for Reconstruction and Development 1818 H Street, N.W. Washington, D.C. 20433



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Ec Dept Dala Roc

Mr. A. Stevenson

February 12, 1968

Arthur E. Tiemann

Control over Scientific Programming

The attached memorandum from Mrs. Angel describes a problem which is becoming more and more critical. The solution she suggests has already been worked out informally within the Economics Department with Mr. Hawkins' division and seems to be successful. If you think the idea has merit, we could draft something to implement the suggestion and coordinate it with Mr. Fraser's organization.

Attachment. cc: Mrs. Angel

AETiemann/ms

Mr. Arthur E. Tiemann

H. Angel

#### Control over Scientific Programming

In the spring 1967 a computer program for IFC financial forecasting was written by Mr. T. Husain, a Young Professional. At that time, IFC had been granted permission to use part of our computer budget for such an undertaking.

Recently, upon request of IFC, we have undertaken to revise Mr. Husain's program. Prior to revision, we reviewed the original program and found it inefficient in several respects.

As you know, scientific part-time programming is done by several people within in the Bank. Such programming is the responsibility of the units in which the part-time programmers are located as long as the computer budget can handle the work and the programming is limited to the immediate project. However, since our section is frequently called upon to use or modify programs written by others, I would like to obtain the right to exercise some control upon scientific programming. As a first step, I would suggest that part-time programmers work closely with our group while they are in the process of programming in order to benefit of exchange of ideas with full time programmers and to make the permanent programming staff aware of their methods and of the progress of their work.

HAngel/ms

H.A.

E Dep Computer February 12, 1968 Mr. Sydney Cashton International Computing Center of United Nations United Nations New York, N.Y. Dear Mr. Cashton: The statement of January 11, 1968, Ref. 45-12438, from the Office of the Comptroller, United Nations, bills the World Bank \$1,000 for computer services as per my letter of December 28, 1967 and Mr. Twining's letter of January 5, 1968. Since the bill only provides a general statement, I would appreciate it if a breakdown of the charges could be provided to us to assist us in evaluating various aspects of jobs to be handled by the computer. For example, it would be valuable to know how much we were charged for programming as distinct from the charges for the use of the computer itself. We should also like to know whether there were any other charges included in the total of \$1,000. I have not held up the bill for payment, but I would appreciate the information on the charges. Sincerely yours, RENT Arthur E. Tiemann Statistical Services Division Economics Department Ack. Feb. 15/68 cc: Messrs. Twining Stevenson AETiemann/ms

Er St. Empula.

Mr. Edward J. Donovan

February 8, 1968

Eugenia C. Rudolphi

Programming Section, Statistical Services Division Reimbursement for trips to CEIR

During the month of January, I used my car to make the following trips to the CEIR Computer Center:

| Date       | Number of trips | Approx. mileage |
|------------|-----------------|-----------------|
| Wed., Jan. | 3 1             | 10              |
| Sat., Jan. | 6 1             | 10              |
| Mon., Jan. | 8 1             | 10              |
| Tue., Jan. | 16 1            | 10              |
| Mon., Jan. | 29 1            | 10              |
| Tue., Jan. | 30 2            | 20              |
| Wed., Jan. | 31 1            | 10              |
| Total      | 7 8             | 80              |
|            |                 |                 |

cc: Mr. Tiemann Mrs. Angel

ERudolphi/ms

Ec St. Compute

Mr. B.K. Heukins

February 1, 1968

H.O. Carter

A

#### Compatter Time Charing

On the 30th of Jamery I visited the Commet Corporation here in Sachington and see a demonstration of their time shoring system. As you are more this is a continuation of my pre-implementation survey of time charing cined at providing us with solid facts and evaluations well in advance of possible consideration of having such a system in the Bank. The system at the Commet Corporation is based on the Burroughs 5500 computer, a masking which was at one time under active consideration as our in-bonce computer.

The system description via an ITT teletype terminal. This piece of equipment is about the size of a type-riter and can either be operated via its our line to the computer, or can be connected via the users can telephone. In the latter case the user simply dials a maker and then places the telephone receiver in a credit attached to the teletype. This feature misses the time charling terminal very mobile, allowing it to be used flexibily by many people much in the fashion of a deck calculator.

The Counct/Eurroughs system is very definitely superior to that of AEC. By reservations shout the latter system (many of Jan. 15) were based on the slow response times and the limited flexibility of the system. These faults are noticibly absent in the Eurroughs system. Showers the IEC system uses what is called "time slicing" (i.e. a rigid quote for a fixed amount of time), the Eurroughs uses true time shoring with each user being allotted CFU time according to his meeds, the result being a generally uniform fast response. Only when large amounts of data are being calculated is the delay even noticeable; on print outs the operation is continuous. Admittedly, there were not very many users on the system when I was it, but the Counct management appears consisted to a minimum of response time and thus does not intend to sign up more users than the system can optimally handle; this contrasts sharply with IEE's policy. IEE somes to feel that time charing itself is worth the expense, regardless of the relative institutionary, the Counct/Eurroughs people are intent on maximizing the user benefit and thus have an obviously superior product.

Another difference is in the use of peripheral devices. IRM restricts the user to his our terminals, Commet allows free use of any of the Eurroughs peripheral devices. Thus in the latter system a user our request that his valuations output be put on tope or on the line printer for later delivery and at the same time can have short summary output on the time sharing console. Furthermore the Eurroughs system allows what is known as remote initiation. Under this galeroe a user can set up a problem from his console and sek that it be calculated at the modifice's leisure rather than right every. This is done at a lower cost

and thus can be very convenient for work that is not issediately needed, furthermore it allows for initiation late in the afternoon for receipt the next morning. Output from this remote initiation can be put on the printer and physically delivered, or can be put in the user's disk files for inspection at a latter time. At current costs this feature would be superior to a service bureau for such programs as the DAM, etc.

Another feature of the Burroughs system is that it allows the storage of compiled programs so that they can be used at any time without recognilation. In other time sharing systems the programs generally must be recompiled each time unless they are common to the whole system. For this reason, IBM supplies a lot of progrem packages immediately callable by the user, but not recident in his files. Burroughs supplies the programming languages, Algol, Fortran, Cobel, etc. to all users and only gives utility programs (such as ALPS, Biomed, etc) upon special request. The IBM system is essentially designed for the businessman who needs a quick ensur from an easily understandable program; the Eurroughs system is for the more sophisticated scientific user who usually knows his own needs. In the centert of Bank work this type of system would allow us to use our own familiar programs, such as DAM. Commet will supply, if needed programs such as the linear programming ALPS, Dynamo and Simscript (minulation languages), and Diamed (statistical peckage).

The cost appears on the surface to be greater than the IBM eystem, but in terms of actual work done both are the same order of magnitude. Consider the cost of doing an hour's worth of central processing unit computing. Under the INM system this would probably work out in the neighborhood of 3700, whereas with the Eurrougha/Commet the price would be about 3900. If the latter system was used after 6 p.m. the price would be about \$650, and if done on a remote initiation basis the cost would be about \$360.

The Commet corporation has available several applications engineers to help their customers with technical programming problems and in addition conducts free classes in the use of time sharing as part of their service.

In general I was impressed with the service offered by Comet/ Burroughs and I suggest that we give them serious consideration if and when we decide to implement time sharing in the Bank.

MOorterite

cc. Mesars: A. Stevenson

<sup>-</sup> If the Bank installs a Eurough 3500 computer, this feature can be easily and champly implemented.

W. Praser

G. Orcutt

A. Tiemann

Mr. Edward J. Donovan

Arthur E. Tiemann

Reimbursement for mileage in connection with business
use of car for Bank business by Patrick T. Woodburn

This is to certify that Patrick T. Woodburn used his car on
Bank business for the period January 12 to January 24, 1968, for a total
of 100 miles. At 12¢ a mile, this amounts to \$12.00. I would appreciate
it if you would please reimburse him.

Ec - Computer Prog. January 25, 1968 Mr. Alexander Stevenson Arthur E. Tiemann (ess Gross equivalent salary tables As requested by Personnel, we have updated the Gross equivalente salary tables on the computer, taking into consideration changes in the tax structure. Copies of the tables were given to the following: Mr. Busse (12 copies) Mr. Reamy (5 copies) Mr. Ripman (1 copy)

Mr. Twining (1 copy)

Mr. K. Clark (Personnel, IMF): 6 copies Mr. W. Powers (Treasurer's, IMF): 5 copies

If you would like to receive a copy, we will send it to you.

/ms

Ec Staff compute January 16, 1968 Registrar TAT CEIR 5272 River Road Washington, D.C. 20016 Dear Sir: Would you kindly place my name on your mailing list for all seminar announcements. Sincerely, R. A. Arnould Technical Supervisor RAA:es

Ec Staff Computer January 15, 1968 Mr. E.K. Hawkins H.G. Carter Computer Time Sharing On Friday the 12th of January I attended a demonstration of time-charing (remote access computer) at the IBM data center here in Washington. As I feel that this type of system is something that the Bank ought to have in the future, I have recorded below my impressions of the IBM service. The system demonstrated is called Quiktran 2. It operates via telephone line to a computer (70kl) located in Philadelphia. The only equipment needed on this end was a telephone and a terminal (2741) that looks something like a Selectric typewriter. The programs available for use on this system are quite impressive and quite extensive. Although we would probably want to use our own programs if we had such a system, those available on Quiktran 2 cover virtually all the areas that we would possibly need. In addition the system handles programming languages such as FORTRAN, allowing on-line composing of programs. The statistical package (STATPK) contains routines for every imaginable calculation including regression, factor analysis, and plotting. This package has a nice way of handling data and allowing its transfer from routine to routine. In addition they have a small linear programming package which will soon be replaced by the powerful MPS/360 (in about a Moon,). It seems to me that this system would be an excellent tool for use in research, especially by this division. Its costs (about \$300-500 per month) are less than a research assistant and the benefits could be substantial. In addition, as it is a small rented piece of equipment it could be moved in quickly if we decided we wanted it and moved out cuickly if we later decided against it. Based on my experience with a time sharing system at MIT, I have a few reservations about the IBM Quiktren system. These problems erise solely from the marmer in which IBM has organized the system. In the first place, the response time is not as good as it could be. This is because there are probably a good number of users on the system and as the machine services each one in strict order, without regard to program size or function desired, the impression at the terminal is rather haltering. Ideally the machine should separate out the calculating function from the input-output and there should be a much larger output buffer (as present it is only about three lines). One of the big efficiencies in a good timesharing system is that obtained from the fact that input-output takes so much longer than computing, but the central progessing unit time required for the former is very small. Such a system them allows for almost continuous input-output on all terminals while calculating at the same time. On the

TEM system a terminal has to wait for a fixed place in a queue just to get three lines into the output buffer. This problem becomes especially objectionable when the cost to the user is based on elasped time rather than CPU time. Another problem concerns the return of large amounts of data. There are many times when one is calculating a problem and has arrived at an answer and would then like all the details for report purposes. This may amount to many pages, and is usually not needed in a hurry. There is no way under the IBM system to request that this output be run off on a high speed printer and sent by mail or messenger, instead the user has to wait while the time sharing terminal, which is a very slow input-output device prints it all out.

These problems are not meant to suggest that time-sharing is a bad idea. I feel that it would be very helpful, but I think we should look at other systems, as well as IBM, especially CDC and GE if and when we decide to try such a system.

Should anyone be interested, I have a folder of literature on Quiktran which includes program descriptions and cost estimates.

NGCarter:te

CC. Mesars. Stevenson Fraser Orcutt Tiemann

Ec Staff Computy

Mr. Alexander Stevenson

E.K. Hawkins and N.G. Carter

January 15, 1968

#### Programming Services within the Bank

You asked for our views on the question of reorganization of programming within the Bank. The following observations are based on our experience over the past year involving a considerable amount of computing in connection with the construction of econometric models. As a result of that experience, as you will know, we have already argued for the right, in consultation with the Statistical Services Division, to engage in some programming of our own. In general the problem is not so much one of location of programmers as one of a misinterpretation by programmers of their role in the data processing framework.

There is a strong argument in favor of the centralization of programming services, especially if this can be accomplished in the vicinity of the computer. Data processing machines have their idiosyncracies and the best and most efficient programmers are those who can program around these features and use them to best advantage. Putting the programmers together near the machine creates an environment where they can all become more efficient and more able to facilitate the data processing flow. (This is essentially the same reason why we argue that econometricians should be together.) Programmers who are separated tend to work in textbook fashion and are rarely able to reach full potential.

Regardless of where the programmers are placed, however, there is always a strong danger of an exaggeration of their role; this danger is intensified in a centralized situation. Programmers are necessary to facilitate the flow of information from the researcher to the machine and back again; they should never be allowed to get into this flow and act like "high priests". Unfortunately, this is a hard thing to prevent because of the tendency for programming to become a profession. This causes the members of this "profession" to attempt to solidify the basis for their existence, and in the absence of universal programming skills there is a temptation to achieve this by getting between the researcher and the machine.

In reality programming is just a skill and a tool, very much like algebra or calculus (in fact, considerably easier to master than the latter). Within the next generation it will probably be taught as such. In this light the present posture of programmers is something like requiring an engineer to call in a mathematician every time he wants to solve an equation. There are, of course, equations that he cannot solve quickly at which point he calls in a mathematician; in like fashion there are occasional programs and programming problems that call for specialized (often machine-specific) skills, and this is the appropriate place for a programmer.

The arguments that are often raised to support the programmers posture seem to be based on machine economy. It should be kept clearly in mind that machine time is very much cheaper than human time. When one considers the time that would have to be spent by programmers and researchers, not to mention the problems of explaining to the programmer what the problem is about, under a mandatory programmer scheme, the cost of machine time becomes relatively small. When one adds in the time the researcher must wait to get his answers under such a scheme it quickly becomes evident that the optimal strategy is to let him make his few mistakes and calculate his possibly sub-optimal program. The best way to control such inefficiencies, if indeed such control is necessary, is not through direct intervention, but with indirect budgetary methods. With an in-house machine the accounting problem is very simple, and the budgetary problem can be handled by asking for reasonable descriptions of the project and estimates of the time needed. If and when the actual time exceeds the estimate the programming staff can be brought in to advise on efficiencies, etc., but not otherwise.

The other argument used by the programmers is that a program may duplicate something already available. All too often this happens because the programmers have failed to let people know what programs exist. If the programming staff would maintain, update, and circulate a catalog of descriptions of the programs that are available, the duplication phenomenon would be relatively rare.

The essential point in the entire situation is that the computer is a research tool and as such must be as close as possible to the person who is conducting the research. Ideal communication with the machine should be direct and with a minimum of feedback time. Anything that interrupts this process or slows down the information flow, however well meant, will tend to seriously impede the research process.

We do not mean to belittle the importance of programmers. It is important, however, that we establish before the machine arrives the exact role of programmers and make sure that their function is to assist with rather than to control the flows to and from the computer. To the end that they become better programmers then centralization is a good idea, but if this will result in a "priesthood" then dispersion is called for. We must never allow a situation where the only way to the machine is through a programmer.

Ec Dept Confed

Mr. Samir K. Bhatia

January 12, 1968

Arthur E. Tiemann

1967-68 Budget@67

In response to your note of January 12, 1968, concerning the budget, Positions 38, 12, and 69 are vacant. However, Position 38 is in fact being encumbered by Miss Constantinopoulou, whom we attempted to make professional. Apparently formal qualifications prevented this, and instead, she was taken out of the non-professional ranks and placed in a "gray" area, with a professional salary scale and other professional benefits. We are satisfied from a budgetary point of view to have her encumber Position 38 if her non-professional position can be released so that we can recruit for it.

Position 42 is being held for possible use by promotion of Miss Gatbonton, pending a review of her qualifications in about one month from now.

Position 69 is also vacant, but two candidates are under active consideration. If the more experienced one confirms his availability, he will probably be selected.

With respect to the Data Processing questions, my memo of December 26, 1967, revised the estimates shown in question 1, and a special job at the UN International Computing Center necessitated a further revision, as follows:

| Control Data Corp. | \$25,000  |
|--------------------|-----------|
| CEIR               | 60,000    |
| U. of Maryland     | 5,000     |
| UN                 | 1,000     |
| Uncommitted        | 29,000    |
|                    | \$120,000 |

Question 2 is correct except for \$30 to be added to the University of Maryland line and the totals in columns C and (B + C - A).

It is now estimated that \$72,000 will be required as expenses for January-June 1968.

Negotiations are continuing with the Asian Development Bank but it is not possible to estimate an effective date or an expected reimbursement for the current fiscal year.

Ec. Stoff Computer January 11, 1968 Mr. Richard Van Wagenen Arthur E. Tienem agy CEIR Course on Practical Utilisation of Input Output On January 8 and 9, 1968, I attended a course on Input-Output and Linear Programming, givenbby CEIR. Of the 12 others taking the course, ten were from private industry and occupied positions primarily in the areas of market research and management analysis. The emphasis of the presentation was on the marketing use of the techniques with a minimum requirement for economic sophistication. Although the data used in the examples were from United States sources, the techniques were explained in general terms applicable to the economies of developing countries. Because so much stress was placed on the practical use of the techniques, their limitations, their flexibility and their relevance to planning, the course will prove valuable to me in my efforts to provide statistical assistance to staff personnel throughout the Bank. CEIR provided those attending with a large quantity of material, giving examples of applications. In view of our current relationship with CEIR as a computer service bureau, we should be able to take adventage of their know-how, programs and facilities with relatively little additional cost. The experience of the Projects Department with the linear programming application on the Indus Basin was apparently favorable, and this course dealt with techniques, such as the one used in that study. Similar studies planned for the future could benefit to the extent that staff personnel not already familiar with the technique were exposed to this course. Area department economists or others who are considering applying Input-Output techniques to developing countries would find this course an excellent introduction to the subject and the basis on which to plan specific applications. On the other hand, econometricians who has already studied or used these techniques would probably find the course too elementary to be of use. co: Messrs. Stevenson **Bhatia** AETiemann/ms

January 9, 1968 Mrs. Hugette Angel J.B. Hendry Computer Program for Agricultural Project Cash Flows Mr. Jose Andreu has asked me to forward a written request for assistance in making a computer program for agricultural project cash flows at the levels of the central banks and the commercial banks. A program of this type would enable staff in the Agricultural Division to save an appreciable amount of time by eliminating the need to do routine artthmetical exercises by desk calculator. Messrs. Schmacher, Husain and Andreu have sat with Mrt. Kumsher of the Statistics Division on several occasions, and have exchanged views on the inputs required to permit the widest possible future application in projects which involve credit operations. This project has the approval of the Agricultural Division, and your assistance in carrying it out is greatly appreciated. cc: Mr. S. Takahashi Mr. J. Andreu JBHendry: asl

Mr. Edward J. Donovan

January 8, 1968

Bugenia C. Rudolphi & &
Programming Section, Statistical Services Division Reimbursement for trips to CEIR

During the month of December, I used my car to make the following trips to the CEIR Computer Center:

| Date   | Number of trips | Approx. mileage                  |
|--|-----------------|----------------------------------|
| Mon., Dec. 11 Tue., Dec. 12 Thur., Dec. 14 Fri., Dec. 15 Sat., Dec. 16 Mon., Dec. 18 Tue., Dec. 19 Wed., Dec. 20 | 1 1 1 1 1 1 1   | 10<br>10<br>10<br>10<br>10<br>10 |
| Thur., Dec. 21<br>Total  | 2 10            | 20                               |

co: Mr. Tiemann, Mrs. Angel

EC STOP

Jan. 5, 1968

Mr. Samir K. Bhatia

Stanley Please

### Duke University

- l. I assume your memorandum was requesting names solely from my own Division. Might I make the following suggestions:
- a) If a general discussion of economic research activities in the Bank is thought to be desirable whilst at the same time buttressing this with a presentation of one or perhaps two of our research projects in greater detail, then I would be pleased to go along.
- b) If it is thought desirable to address the seminar on one specific subject then I would suggest one of the following:

Mr. Churchill - "Road User Charges"

Mr. Beier - "The Pricing of Electricity"

Mr. Churchill or Mr. Beier - "Public Utility Pricing Problems and Policies".

2. Might I point out that Churchill will be out of the country for the next two weeks or so and that I will be away for from 3-4 weeks as from the 20's of January.

Please/lo

Mr. Thomas K. Mitchell

Arthur E. Tiemann (00)

#### Computer services by UN Computing Centre

Attached is a copy of a letter signed by Mr. Twining authorizing the UN Computing Centre to bill the Bank up to \$1,000 for computer services for a specific job for which they have both programs and data and for which a short deadline had been set. The funds for this job are available in the budget for computer services and could be taken from the \$30,000 heretofore unallocated to any specific service bureau.

cc: Messrs. Twining
Stevenson
Reamy
Fraser

AETiemann:ra

Arthur E. Tiemann

#### Computer services by UN Computing Centre

Attached is a copy of a letter signed by Mr. Twining authorizing the UN Computing Centre to bill the Bank up to \$1,000 for computer services for a specific job for which they have both programs and data and for which a short deadline had been set.

cc: Messrs. Twining
Stevenson
Mitchell
Fraser

AETiemenn:ra

Mr. Sidney Cashton
International Computing Centre
Statistical Office of the United Nations
United Nations
New York, New York

Dear Sir:

You are authorized to bill us up to \$1,000 for the computer work to be performed as specified in Mr. Tiemann's letter of December 28, 1967, and further elaborated in subsequent telephone conversations between you and him with respect to format, number of copies, and essentiality of a specified deadline of January 10, 1968.

Sincerely yours,

James E. Twining, Jr. Deputy Director

Administration Department

cc: Messrs. Stevenson

Fraser

Mitchell/Leeming

Tiemann Reamy

AETiemamn:ra

Ec. Computer

Mr. Arthur E. Tiemann

January 2, 1968

Alexander Stevenson

Attendance at CEIR course on "The Practical Utilization of Input-Output and Related Techniques for Business Planning and Forecasting."

As the Personnel Office has registered you in the course offered in Arlington, Virginia by the Institute for Advanced Technology of CEIR on "The Practical Utilization of Input-Output and Related Techniques for Business Planning and Forecasting" on January 8 and 9, 1968, you are to attend the course and provide an assessment of it to Mr. Richard W. Van Wagenen of Training for the benefit of possible future participants from the Bank.

I it in

D.

AETiemannira

EC Computer pray December 28, 1967 Mr. Sydney Cashton Head, International Computing Center of United Nations United Nations New York, N.Y. Dear Mr. Cashton, Following our telephone conversation of yesterday morning on the availability of data on Trade Statistics of Portugal for 1964, 1965 and 1966, I would like to request you for the information spelled out in the Annex. If you can produce the required tabulations, please let us know, preferably by telephone as to i) how soon we can receive the completed tabulations and, ii) the total cost, as we have been requested to produce the data as soon as possible. Sincerely yours, Arthur E. Tiemann Chief Statistical Services Division Economics Department Att. ce: Messrs. Stevenson Balassa Parinbam Kundu an AKundusra

#### ANNEX

Table A. Exports of Portugal to selected destinations in 1964, 1965 and 1966. (value in U.S.\$)

For this table A -

Destinations:

Total U.S. and Canada

Buropean Common Market

European Free Trade Association

Angola and Mozambique

All other countries

Export categories: SITC (revised) classification, (groups are separated by);)

0; 022, 023, 024, 025; 031; 032; 051; 052, 053; 054; 055; rest of '0'.

Also 051.7 shown separately.

1; 112; rest of '1'.

Also 112.1 shown separately.

2; 244; 241, 242, 243; 251; 273; 274; 283; 291, 292; rest of '2'.

Also 274.2; 283.92 separately.

3 ; 332; rest of '3'.

4 ; 421; rest of '4'.

Also 421.5 separately.

5 ; 541; 551, 553, 554; 561; 581; 599; rest of '5'.
Also 599.6 separately.

6 ; 629; 631, 632; 633; 641, 642; 651; 652; 653; 655; 654, 656, 657; 661; 664, 665; 667; 671 to 679; 682; 695; 697; 691, 692, 693, 694, 696, 698, 699; rest of '6'.

Also 629.1; 651.3, 651.4; 653.2; 653.4; 653.5; 653.6; 655.6; 661.2; 661.3; 667.2 separately.

- 7.; 711, 712, 714, 715, 717, 718, 719; 722, 723, 724, 725, 726, 729; 732; 731, 733, 734, 735; rest of '7'.
- 8; 841; 851; rest of '8'.
  Also 841.4 separately.

9 1

All commodities 0 to 9.

- Table B (i): Exports of Portugal according to industrial classification in 1964, 1965 and 1966. (value in U.S.\$)
- Table B (ii): Imports of Portugal according to industrial classification in 1964, 1965 and 1966.

  (value in U.S.\$)

For tables B(i) and B(ii) -

Only total exports and imports are needed.

#### Industrial categories:

| ISIC | Corresponding SITC  |
|------|---|
| 20   | Food preparations 011, 012, 013, 022, 023, 024, 032, 046, 047, 048, 052, 053, 055, 061, 062, 073, 091, 099, 211 |
| 21   | Beverages 111, 1112   |
| 52   | Tobaceo 122   |
| 23   | Textiles 651, 652, 653, 654, 655, 657   |
| 24   | Clothing 656, 841, 842, 851   |
| 25   | Wood manufactures 243, 244, 631, 632, 633   |
| 26   | Furniture 821   |
| 27   | Pulp paper and paper products 251, 641, 642   |
| 28   | Printing and publishing 892   |
| 29   | Leather and leather products 611, 612, 613, 831   |
| 30   | Rubber products 621, 629  |
| 31   | Chemicals 5   |
| 32   | Petroleum products 332  |
| 33   | Non-metal minerals 661, 662, 663, 664, 665, 666   |
| 34   | Metals 671, 672, 673, 674, 675, 676, 677, 678, 679, 681, 682, 683, 684, 685, 686, 687, 688, 689                 |
| 35   | Metal manufactures 691, 692, 693, 694, 695, 696, 697, 698, 812  |

| ISIC | Corresponding SITC                    |      |      |      |      |      |      |      |      |
|------|---------------------------------------|------|------|------|------|------|------|------|------|
| 36   | Machinery other<br>than electric 711, | 712, | 714, | 715, | 717, | 718, | 719, | 725  |      |
| 37   | Electrical machinery                  | 722, | 723, | 724, | 726, | 729  |      |      |      |
| 38   | Transport equipment                   | 731, | 732, | 733, | 734, | 735  | v    |      |      |
| 39   | Other manufactures                    | 861, | 862, | 86h, | 891, | 893, | 894, | 895, | 897, |

NTERNATIONAL FINANCE

DATE: December 26, 196

office memorandua

Twining, Jr.

FROM:

Arthur E. Tiemann

SUBJECT:

Increase in authorization for computer work

Vec 26, 1967

Attached is a letter to CEIR to increase our authorization by \$30,000 to June 30, 1968.

In our memo of May 2, 1967, we indicated that we would spend \$40,000 of our computer budget at CEIR, and \$25,000 at CDC and \$25,000 at University of Maryland. At that time we indicated that our estimate for the University of Maryland may be high because of pickup and delivery problems. It now appears that the \$5,000 which was authorized for University of Maryland will probably last us for the entire fiscal year. Consequently the current request for an additional \$30,000 for CEIR can be considered as including the remaining \$10,000 estimated for CEIR and \$20,000 out of the \$25,000 estimated for the University of Maryland.

It now appears that the estimate of \$25,000 for CDC may be high and we are examining our requests to ascertain whether some of the CDC funds should also be shifted to CEIR.

cc: Messrs. Kamarck Stevenson Johnston Reamy Mitchell/Leeming Fraser

December 26, 1967

Manager of Contracts Washington Center, CEIR, Inc. 5272 River Road Washington, D.C. 20016

Dear Sir:

As stated in my letter of June 30, 1967, you were authorized to bill us up to a total of \$30,000 for computer work through June 30, 1968.

Based on our estimate of additional computer requirements, you are hereby authorized to bill us for an additional \$30,000 through June 30, 1968.

Sincerely yours,

James Z. Twining, Jr. Deputy Director of Administration

cc: Messrs. Kamarck
Stevenson
Johnston
Reamy
Mitchell/Leeming
Fraser
Tiemann/Angel

AETiemann:ra

Mr. A. Kundu

December 21, 1967

N.G. Carter

Regression Programs.

I would like to draw your attention to an article in the September issue of the JASA. Entitled "An Appraisal of Least Squares Programs for the Electronic Computer from the Point of View of the User", it looks at the relative performance of a number of regression packages when confronted with a highly collinear problem. Although not explicitly named, DAM is one of the programs tested, (it is referred to as NIPD\*).

The results I think reise some interesting questions about the

The results I think raise some interesting questions about the accuracy of DAM and suggest that we should perhaps think about replacing its inversion routine with a Gram-Schmidt orthonormalization program.

NGCarter:te

December 19, 1967 Mr. Joseph C. Resmy J. E. Twining, Jr. Mileage Reimbursement in Connection with Business Use of Car by Mr. Patrick Woodburn, Economics Department and Miss Eugenia Rudolphi This is to authorise Mr. Patrick Woodburn and Miss Eugenia Rudolphi, Economics Department to be reimbursed 12 cents per mile for all travel on official business which amount shall be paid out of petty cash. These arrangements are necessary in order that Mr. Woodburn and Miss Rudolphi may use their cars to travel to and from CEIR to accomplish computer work on site. It is my understanding that Mr. Woodburn's and Miss Budolphi's insurance covers the use of their cars for these purposes and that no additional premium is involved. These arrangements ere authorized, as long as such travel is officially required, until December 1, 1968, or until the Bank acquires its own computer system. cc: Mr. Stevenson Mr. Donovan Mrs. Angel Mr. Woodburn Miss Rudolphi Jacoba

Mr. Edward J. Donovan

Arthur E. Tiemann

Reimbursement for mileage in connection with business use of car for Bank business by Patrick T. Woodburn

This is to certify that Patrick T. Woodburn used his car on Bank business to and from CEIR on September 26, December 13 and December 14, 1967 for a total of 100 miles. At 12¢ a mile, this amounts to \$12.00.

I would appreciate it if you would please reimburse him.

ce: Mrs. Armstrong

ra

Ec. Computer Pro. December 15, 1967 Data Proc.

Mr. Alexander Stevenson

B.K. Hawkins

Calculating Machines for Use in the Applied Quantitative Research Division

Dec. 14, 1967

I attach a memorandum prepared by Mr. Carter which discusses a new type of calculating machine which has come to the attention of the Bank. The advantages of this machine are set out very clearly by Mr. Carter and I wish to suggest that you consider obtaining such a machine for use in this Division.

At the moment there are three ordinary desk type calculators in constant use in the Division. If one of these machines were replaced by an Olivetti Programma 101 I estimate that we could both handle our existing work more efficiently and be able to make the services of this machine available to other divisions in the Department. It would be particularly valuable to Mr. Hulley's Division to have such a machine housed close at hand. The benefits of this scheme would be very great during the period when the Department is still scaptered and we are physically separated from the Statistical Services Division. There would be a considerable time saving on many of the statistical calculations we require which now involve visits to the G. Street Bldg., and further delays while the calculations are done at the outside computer centers. As you will see from Mr. Carter's memo, there would still be a case for such a machine as this even when a computer is installed in the building. The case for it is even greater at this time, especially when the relatively modest cost of this machine is taken into account.

EKHawkins/w

cc: Mesars. de Vries, Tiemann and Hulley

Mr. W.D.S. Fraser (through E.K. Hawkins)

M.G. Carter

### Evaluation of the Clivetti Programma 101

I am quite impressed with this little machine. While it is definitely not a computer, it does fill a gap between a deak calculator (add and multiply machine) and a fully fledged computer. There are a considerable number of calculations being made at present by Bank staff on a computer that could be shifted to the Programma. In addition the Programma would provide the sorely needed fast turnaround on calculations that does not now exist in the Bank; moreover it is extremely doubtful that, even when we have an in house computer, that we could achieve such speed in the return of calculations.

The machine is very easy to use. For the average user the training required would be no more than the ability to use a desk calculator. This type of user need never be concerned with the details of programming, and yet for those who desire to write their can routines, a knowledge of any kind of programming would be sufficient. Furthermore, the extensive program library (why they bother to charge 50¢ per program is a bit of a puzzle) makes it unlikely that much additional programming will be necessary. (In the context of program library let me point out that what Olivetti has to offer on their little machine is vastly superior to the so-called "scientific subroutine library" of Honeywell.)

The machine would save us a large amount of time. There are at present numerous statistical calculations that are not really feasible on a desk calculator which are now being submitted to the DAM program with its consequent minimum of 2h hours of turnaround. The use of a Programma would enable us to get the answers quickly, thus raising our potential output, while at the same time allow us to cut down somewhat on our use of DAM. Furthermore there are a fair number of small mathematical calculations that now have to be tackled by writing a Fortran program. The average amount of time to get back the final answers, taking into account keypunching and debugging, is now about two weeks; with the Programma the answers could be had in less than an hour.

while the machine can never be a replacement for DAM, it televaly tainly can cut down on the usage and amount of output of that program. Typically in a regression one may only went the coefficients of the equation and the R<sup>2</sup>, but DAM returns a lot of other statistics that are useful only if the particular regression is the final model. Taking into account the empirical type of regression analysis that normally goes on, one usually makes a large number of runs before the final model is chosen and the need for the entire set of statistics comes up. Thus I am suggesting that while the Programma, by virtue of its limited memory (regressions for example require two steps) will never replace DAM it will certainly provide a partial substitute and screening device for the use of DAM and a big, expensive, computer.

Another use of this machine is its powerful mathematical routines. Such routines are very valuable in mathematical economic analysis and include such things as the solution to cubic and quartic equations and n degree polynominals. Furthermore the machine provides in its routines a valuable table lookup function, giving values of natural logs, nth roots, chi square, F, and t tables, exponential and trigonometric functions. Also, of great use to the Bank, it will calculate present and future values at specified rates of interest, simply by dropping in a program card and keying in a couple of numbers.

Another argument in favor of this machine is that in its calculator capacity it provides a tape, something that is often sorely needed when entering a lot of numbers on a Frieden.

All this, however, hinges on availability of the machine. I estimate that this division could make use of the computer ability of the Programma for about 35% of each day. However, it is quite probable that other divisions of the economies department located nearby in this building could use the machine here in an intensity so as to bring the daily usage up to over 90%. On the other hand the inconvenience of having it located on G Street would cut down considerably on our direct usage of the machine as it would then be necessary to spend time using memos and research assistants to physically bridge the gap thus introducing some of the delays that are now a consequent part of using the DAM.

In general the ease of use, capabilities, and fast turnaround speak very strongly for this machine. Also it would provide immediate relief from the current unpleasant data processing situation. Regardless, however, of whether or not there is an inhouse computer, the only thing that would be superior to the Programma in this very vital field of fast return of moderately complicated calculations is a time sharing line.

MCCarterite

Mr. Edward J. Donovan December 14, 1967 Arthur E. Tiemann (04) Reimbursement for trips to CEIR Further to Mrs. Angel's memorandum to you of December 8, 1967, operational requirements demand that Mr. Patrick Woodburn and Miss Eugenia Rudolphi use private transportation to travel to and from CEIR to accomplish computer work on site. It is requested that the Bank reimburse these individuals for the cost of this transportation in accordance with the previously established pattern. It is expected that requirement for the use of private transportation will continue until the Bank acquires its own computer (probably during the summer of 1968), or if more conveniently located computer facilities are obtained. cc: Mr. Stevenson Mr. Nott Mrs. Angel Mr. Woodburn Miss Rudolphi AlTiemamura

Ec. St. Comp. Pray.

**DECLASSIFIED** 

CONFIDENTIAL

Mr. H.B. Ripman

JUN 0 1 2022

December 11, 1967

W.D.S. Fraser W

### **WBG ARCHIVES**

### ORGANIZATION OF EDP

In reading Mr. Stevenson's memorandum of December 6, I am rather surprised at his reaction as Mr. Tiemann had seemed quite happy and relaxed about losing the programming section (which gives him some headaches anyway) and had told me that he hoped the reorganization would take place sooner rather than later because of the effects on morale in the programming section.

As you can imagine there are arguments pro and con centralizing programming effort in any organization. I can give you the prose and no doubt Mr. Stevenson or Mr. Tiemann can give you the cons. So it is my word against theirs which won't help you much. If we get into that situation I suggest PECD be brought in to make a report and recommendation. Mr. Leeming would be well qualified to do this though, I must admit, he is already firmly on our side.

A person to talk to might be Mr. B. King who, when he was Adviser in the Economics Department, learned a great deal about their EDP activities and how well they were run.

I might mention that the Administration of the IMF wishes they could centralize their programming efforts for efficiency's sake, but they are not prepared to get into a fight with Hicks, Altman, etc. to achieve it. Had the computer center been established in the IMF they would, however, have attempted it (so says Henri King).

cc: Mr. Twining General Files WDSF:hh V

Mr. Edward J. Donovan December 8, 1967 Huguette Angel Programming Section, Statistical Services Division Reimbursement for trips to CEIR Miss E. Rudolphi, Programmer Analyst, has been using her own car to go to the CEIR computer center, 5272 River Road, Bethesda, Maryland and we would like to ask you to have her reimbursed for the expenses incurred. The reason for Miss Rudolphi's trips to the computer center, instead of her relying on messenger services, has been to expedite the debugging of computer programs. The length of the trip under consideration is approximately 10 miles round trip from her home, 2829 Connecticut Ave., Wash., D.C. (corner of Connecticut and Cathedral Aves.) to 5272 River Road, Bethesda. Following is a list of the trips made, the dates and approximate

mileage:

| Date           | Number of trips                         | Approx. mileage |
|----------------|---|-----------------|
| Pri., Nov. 10  | 2                                       | 20              |
| Sat., Nov. 11  | 2                                       | 20              |
| Mon., Nov. 13  | 1                                       | 10              |
| Tue., Nov. IL  | 1                                       | 10              |
| Wed., Nov. 15  | 1                                       | 10              |
| Thur., Nov. 16 | 2                                       | 20              |
| Fri., Nov. 17  | 2                                       | 20              |
| Sat., Nov. 18  | 1                                       | 10              |
| Sun., Nov. 19  | 1                                       | 10              |
| Mona, Nov. 20  | 1                                       | 10              |
| Tue., Nov. 21  | 2                                       | 20              |
| Wed., Nov. 22  | 1                                       | 10              |
| Sat. Dec. 2    | and | 10              |
| Total          | 18                                      | 180             |

cc: Mr. Tiemann Miss Rudolphi

HAngel/ms

H.A.

E = Stoff Computer Program December 6, 1967 Mr. Robert Best Control Data Corporation 11428 Rockville Pike Rockville, Maryland 20852 Dear Mr. Best: I would like to express my disappointment that we have not yet been able to obtain a computer output as good as the sample that you sent us prior to our deciding to run routinely on CDC equipment our PROJECTION and HISTORICAL TABLE programs. It is true that whenever your attention was called to it, you were able to secure for us some improvement in the printing. However, a few days after the reminder, the operators seem to slip back to careless operation. Unless the printing situation can be remedied at once and on a permanent basis, we will have to discontinue running the two above mentioned programs on your equipment. Sincerely yours, Huguette Angel Programming Section Statistical Services Division Economics Department cest HAngel/ms 4.A. cleared with and cc to: Mr. Tiemann cc: Messrs. Stevenson Fraser

Ec. Staffi Comp. Rg. X Data Roc. December 6, 1967

Mr. H. B. Ripman

Alexander Stevenson

Organization of EUP

CONFIDENTIAL

I wish to comment on your memorandum of Hovember 29, 1967 on the above subject, suggesting that the Programming Section of the Statistical Services Division be transferred to the Data Processing Center within the Administration Department as of January 1, 1968. I do not think your memorandum gives a convincing justification for transferring the entire section now. Neither does it indicate what sort of modus operandi would exist subsequent to such transfer between the Data Processing Center on the one hand and the Statistical Services Division on the other. As you note, the recommendation is contrary to the A.D. Little recommendation contained in its Computer Feasibility Study and I note that Mr. Withington would be prepared to revise his original recommendation if all members in the Bank group are satisfied that they would get the same services under the centralized arrangement. Without further discussion with Mr. Withington on the reasons for his original recommendation and the possible consequences of the proposed change, I do not think it is possible to say that the Economics Department would be a satisfied customer under the proposed new arrangement. I gather that other organizations have in certain circumstances found it desirable to have programmer staff nearer to the users of their services.

On the five reasons for organizational centralization cited in the memorandum I have the following comments:

- ad a) Control of service bureau and RAM work might well be better achieved in one department whether or not the programming section is transferred. We should look into it.
- ad b) Bank-wide standards for programming are highly desirable, but do not, I think, necessarily require a transfer of all programmers to one place. In fact, in the Bank some staff who have some programming ability will no doubt reamin in the Economics or Projects Department. any case, therefore, there should be programming standards in any event in order to make the Bank's total computer effort more efficient. In this connection, I may note that use of the DAM program involves programming on a limited scale by members of the General Statistics Section and this arrangement would have to be provided for should a transfer be made.
- ad c) The programmers in the Statistical Services Division are already assigned tasks on the basis of Bank-wide priority rather than in response to the needs of one department, in much the same way as the other tasks of the Division are assigned priority. Since the planned organization would maintain this group of programmers intact, there should be no need to change criteria for allocating priorities.

- ad d) This seems to become a practical problem only when space becomes available in the new building, i.e. not until next summer at least.
- ad a) I recognize the need for the best possible organization and scheduling of training. A centralized organization might do better on that but I do not see that better training following necessarily from centralization.

What I think we need is not a precipitate transfer of personnel but a closer study, at least than what I have seen, of how the various computer-related functions are actually performed in the Statistical Services Division, notably by the Programming Section. Such a study should come up with a plan for the orderly transfer to the Center of such functions as are deemed to be best done there from the point of view of the Bank as a whole. Such a plan should make clear to all parties conserved any changes in their responsibilities which would result.

As you have indicated, there are various parts to the problem: service bureau work, EAM work, as well as programming work proper. The desirability of transferring these functions might not be equal, nor the timing of any desirable transfer equally urgent.

The transfer of functions is complicated by the fact that the programming function as it is now performed in the Statistical Services Division is fully integrated with the total operation of that division; e.g. the decision to use computer programming or manual tabulation or some combination of both is worked out among the sections of the Division concerned and the decision as to which course of action to pursue is based on urgency, available programmer personnel and available clerical personnel. The effectiveness of this relationship suggest that care should be taken that it not be lost in any organizational transfer. The close working relationship which now exists between the External Debt Section and the Programming Section programmers and EAM personnel should also be preserved. It should be noted that the EAM personnel involved are specialists in the handling of external debt data problems.

These are some examples of issues which should be considered before any organizational transfer is made in order to avoid subsequent misunder-standings about responsibilities and administrative channels. I suggest that we might meet at your earliest convenience with those concerned to discuss the whole matter in greater detail.

ASterphon: ja

ces léssrs. Chadenet

Villiams Preser

One & C. Dept Comput.

#### CROSS REFERENCE SHEET

COMMUNICATION:

Memorandum

DATED:

December 1, 1967

TO:

Mr. Alexander Stevenson

FROM:

Arthur E. Tiemann

FILED UNDER:

Data Processing

SUMMARY:

Organization of EDP.

Mr. Ripman's Memorandum of Nov. 29, 1967, attached herewith recommends that the Programming Section of the Statistical Service Division be transferred to the Data Processing Division of the Administration Department as of January 1, 1968. This recommendation is counter to the A.D. Little recommendation contained in its computer Feasibility Study and agreable to Mr. Withington only if all parties in the Bank Group are satisfied.

etc.....

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL FINANCE CORPORATION - Rope

## OFFICE MEMORANDUM

CONFIDENTIAL

TO: Mr. H. B. Ripman

DATE:

November 22, 1967

FROM:

J. H. Williams

SUBJECT:

Operation of EDP

I refer to Mr. Fraser's confidential memo to you of November 20. In discussing this memo with Mr. Fraser, Mr. Leeming has fully represented the views of this Department, and in particular the advantages of consolidating the Programming Group. I would only add, as a gloss, that the original A.D. Little recommendation about the location of the Economics Department's Programmers appears to have been based on a view of the volume and direction of work to be carried out, which is not wholly in accordance with at least some current thinking on the subject.

JHW:mk

c.c. Messrs. Twining

Fraser Leeming DECLASSIFIED

AUG 22 2022

**WBG ARCHIVES** 

Ong. En Dept. Comp.

Mr. Alexander Stevenson

Hovember 2, 1967

E.K. Hawkins

Collaboration with the Statistical Services Division - Revision of Programs

In the limited experience we have had so far with the estimation and simulation of econometric models, it has become clear to us that substantial imprevements are possible in the basic program used for this purpose, known as the DAM Program. The possibility of these revisions often becomes apparent only when particular problems are tackled and then only to the people in the division who are concerned with the work. We recently discussed with the Statistical Services Division whether the experience we have obtained could not now be incorporated into revisions to the DAM Program. I had a meeting recently with Mr. Tiemann at which we discussed the correct way in which this collaboration might be handled. Unfortunately, we kept no record of that meeting, since we did not deem it necessary to do so at the time. Before he left for his current mission, however, Mr. Tiemann sont me a memorandum, dated November 1, with a copy to yourself, and I would like to take the opportunity of replying to that memorandum to state again what I understood to be the principles on which we agreed. I will, of course, take up the matter again with Mr. Tiemann when he returns from his mission but in the maentime I wish to give you the necessary background information.

There are two central principles involved, the first being the obvious point that since Mr. Tiemann is responsible for the budget for computer time and related items, nothing would be done which might have implications for that budget which was not first discussed with him. The second point was that these discussions would also take into account the possibility that any revisions we might suggest would be of interest to other potential users of the program. We were both anxious to avoid a situation where there might be a proliferation of special cases, each requiring some programming and computertime with an ultimate yield that might be relatively small for the Bank as a whole. Only Mr. Tiemann, who knows the total demands being made within the Bank as a whole, is in a position to make that assessment and hence the need for constant consultation. (I take it that at some future date the necessary consultations will have to be with the computer center.)

The third point we discussed is the question of the extent to which professionals in this Division should themselves enter into programming. This question arises now with the Applied Quantitative Research Division but is potentially liable to arise in any part of the Bank where there are professionals engaged in quantitative techniques. There are many economists in the Bank, especially the younger economists, who have the necessary know-how and interest to write and revise programs for themselves. (If the Bank undertook any scheme of training professionals for this purpose the question might become vary widespread indeed.) We agreed that it did not make any sense in these circumstances to draw a strict boundary between what would be done in this Division and what would be done in the Statistical Services Division. In the present case under discussion, for example, the need for a revision of the program only became apparent when it was used for our

purposes and the appropriate solutions became apparent only to the people here concerned with the initial problems.

The revisions we are now proposing center on operations required for the estimation and simulation of econometric models, the use of output/input methods and cases involving simultaneous equations systems. The revisions we propose are expected to save about hos of the time that the program requires in its present form for certain key operations. In addition, there would also be an additional 80% saving in the key punching time necessary to prepare the control cards for these operations.

I believe that a very clear case can be made for undertaking these revisions, not only in the interests of this Division but also for all other users of the program. Ar. Tiemann and myself agreed that the miner smount of programming involved that would be done in this Division would be in no way duplicate the mork of his staff but would, in fact, prove of considerable assistance to him at a time when they were fully occupied with more routine assignments.

The best way to handle this kind of collaboration is by frequent personal centact. If you agree, I would propose that I take up these questions again with the Statistical Services Rivision and elaborate on any points which may still not be clear as to our interests in this matter.

TKHAN Kina A

co: Megars, de Vries, Tiemann, Kundu, Carter and Mrs. Angel

Ong. La Dept. Comp. Pro,

Mr. A. Kundu

E.K. Hawkins

November 2, 1967

### Revisions to DAN Program

old in Data Processing

I refer to Mr. Tiemann's memorandum of November 1, on the above subject. We are able to answer three of your four questions. I do not fully understand question h, and I suggest that we discuss this further.

The enswers to questions 1 to 3 are as follows:

- (1) 30-h0 cards, involving an estimated keypunch time of 15-20 minutes.
- (2) 5-6 minutes computer time.
- (3) 10 minutes staff time.

The proposed changes to the DAM Program have already been coded so that the involvement of the staff time of your Division will extend solely to providing a copy of the source deck of the program.

You will appreciate that Mr. Carter's original memorandum of October 27, was sent to you as a means of spelling out in more detail what we had in mind. Mr. Tiemann and myself had met previously and agreed, in principle, on the way in which this collaboration was to be handled. The point covered in his last paragraph was, of course, central to that agreement. Hather than spell out again what we discussed on that occasion, I attach a copy of an explanatory memorandum which I have sent to Mr. Stevenson to give him the background on the whole subject.

EKHaskins/s

co: Messrs. Stevenson, de Vries, Tiemann, Carter and Mrs. Angel

Enclosure

Ec Dept . C.P. October 19. 1967 Mr. Russell G. Strover Program Librarian Data and Program Library Service The University of Wisconsin Madison, Wisconsin 53706 Dear Mr. Strover: Thank you very much for sending me the MATINV deck and for your promise to send me a deck of GRAPH 2 when it becomes available. Sincerely yours, Huguette Angel Programming Section Economics Department H.A -HAngel/ms cc: Mr. Oury

Le Dopt - C.P. September 21, 1967 Mr. John Bennett Applied Data Research Inc. 2425 Wilson Boulevard Arlington, Virginia Dear Sir: We would like to submit some of the Bank's Statistical Services Division FORTRAN programs to your AUTOFLOW system. As stated by you in a phone conversation with Mrs. Angel of our staff, the charge for autoflow service is 9 cents per progrem card submitted. You are hereby authorized to bill us up to \$1,000 through June 30, 1968, for the analysis described above and for additional analyses under your AUTOMOW system. Sincerely yours, James E. Twining, Jr. Deputy Director of \*dainistration cc: Messrs. Kamarck Stevenson Johns ton Reamy Mitchell and Tiemann/Mrs. Angel HA. HAngel/ms

E Dept - CP

Mrs. Huguette Angel

Sept. 20, 1967

E. C. Rudolphi EC Rudoph Report on Progress of Converting External Debt Data from cards to a Tape System and from FMS to IBSYS

- To date the following has been completed: 1.
  - a. A program has been writeen and debugged to standardize the data that is now on cards. This was necessary because of various irregularities in the present data that IBSYS I/O and the IBSYS SORT routine cannot process correctly. For example, the fileds on some cards contain leading seros; on other cards leading blanks. The IBSYS SORT Routine distinguishes between zeros and blanks; therefore a sort without standardizing the data would not order the records correctly.
  - b. A program has been written and debugged to update the tape file. The tape file will contain all existing data in blocked form - ten logical records per physical record. By blocking, it is possible that all data can be put on one reel; without blocking three possibly four reels would be necessary.

The "MPDATE" program has the following five capabilities which should be sufficient to effect any desired change in the file:

- Deletes single logical records.
- ii. Deletes whole loans of a part thereof.
- iii. Adds logical records in proper sequence.
- iv. Replaces logical records.
- v. Codes a 1 in col. 82 of a complete loan. (This would be done for retired loans for which no editing is desired).
- c. The Regular and Historical Edit programs have been changed from FMS to IBSYS. This entailed changing all read, write and function statements. Also a new read routine was necessary for each program since the data will be in blocked form. One of the routines in the Regular Edit was too large to compile under IBSYS. It has been divided into two separate subroutines.

Both Edit programs have been run and checked against parallel runs done on cards. From all indications the converted programs are working properly.

d. A program has been written and debugged to insert the group control cards meeded for the Projection and Historical Tables programs.

This progrem has been designed primarily for the routine runs, but may be altered in the future to also include those that are somewhat irregular.

e. The Projection and Historical Tables programs have been converted from FMS to IBSYS.

After several attempts, the Projection program is now properly. Complications arose through the necessity to use the overlay feature since the program is too large for the 7090 memory.

Execution of the Historical Tables program has not been attempted but I anticipate no serious problems in this regard.

2. Now an unanticipated problem has arisen. Approximately 65,000 cards were transferred to tape. This data included different countries. Routine update runs were done in parallel with the card dock updates. When countries near the beginning of the filesand near the end were updated, the 7090 time for update was .5 hr.

Without further approval, I feel I cannot continue since a daily update run could involve up to 3 hours per week. As the file size increases, so would the time.

The following are possible solutions to the above problems:

- a. Reblocking the data so that each physical record contains 20 logical records instead of 10. This would speed up I/O, however, I am doubtful that the .5 hour would be decreased considerably.
- b. Split the file so that there are fewer countries per tape.
  When an update is done on countries on any one (or any two)
  roals, the time would be decreased; when all reels must be
  updated, the time would probably be increased a bit.
- c. Consider using another computer (possibly the 360) where time and/or cost would be less.
- 3. Providing the obstacle in 2 can be overcome, the following remains to be done in order to have a working system:

- a. Getting the Historical Tables program to execute properly and verifying the results.
- b. Transferring the data cards to tape.
- c. Integration of the whole system such that several programs can be run in succession.

oc: Mr. Tiemann Mrs. Slappey Mr. Kumsher

/ms

September 20, 1967

Mr. S. R. Guha Lecturer in Computer Science Dept. of Computer Science State University of New York at Albany Albany, New York - 12203

Dear Mr. Guha:

Your letter to Dr. Bernard Oury of August 25, 1967 has been referred to me. We appreciate your offer of assistance in working with the STATJOB system.

At this stage, we have only obtained a partial deck of the MULTILIN program and have thus not yet made use of the program.

Sincerely yours,

H A .

(Mrs.) Huguette Angel Acting Chief, Programming Section Statistical Services Division Economics Department

cc: Mr. Oury

HA:SS

En Daget - CP September 19, 1967 Mr. Peter Wolfe University of Wisconsin Computing Center 1210 W. Dayton Street Madison, Wisconsin 53706 Dear Mr. Wolfe, We tried to assemble and run, on a CDC 3600 computer, the FORTRAN deck of MJLTILIN that you had sent Dr. Oury earlier. However, two subroutines MATINV and GRAPH 2 are missing from the deck. Would it be possible for you to send us a listing of these routines or a copy of the FORTRAN deck? Also would it be possible for you to give us some brief notes on the tape units used for input output and temporary storage since these unites are not described in the manual. Please let us know of any costs that may be involved. I thank you very much in advance. Sincerely yours, MA. Huguette Angel Acting Chief, Programming Section Statistical Services Division Economics Department Acting, C cc: Messrs. Tiemann Oury /ms

Ec Dyst - C.P.

Mr. Edward J. Donovan

Sept. 18, 1967

Arthur E. Tiemann Olo

Reimbursement for mileage in connection with business use of car for Bank business by Patrick T. Woodburn

This is to certify that Patrick T. Woodburn used his car on Bank business for the period August 25 to September 1h, 1967, for a total of 80 miles. At 12¢ a mile, this amounts to \$9.60. I would appreciate it if you would please reimburse him.

/ms

le Dept. Cho.

Mr. Alexander Stevenson

September 6, 1967

John Hulley

# Computer Programs for Calculating Ways to Fill a Resource Gap (Debt Models)

Our table on "Major Studies" may have answered in part your question last month about our work on debt models. I understood that you would like a short account of the current use of these models here in the Bank. Attached is a brief description thereof, prepared by Mr. Karaosmanoglu.

Cc: Messrs. Collier Kalmanoff

jh/jb

# Note on Computer Programs Designed to Calculate Capital Requirements to Fill the Resource Gap of a Country

- 1. Three computer programs have been developed in the Bank since 1962 to carry out exercises estimating the capital requirements to fill the resource gap. However, these programs have been put to very limited use.
- (a) The model for the first program was developed in 1962 by Mr. Hayes. It was hoped that it would become the standard model for country economic work. Its object was formulated as "to set up a standard computer program for simple macro-economic projections, to allow a dynamic treatment of problems of capital requirements and creditworthiness". It is a difficult program to work with, partly because the terms used in the model cannot easily be matched to generally available data.
- (b) Another program was developed later for the book by
  Mr. Avramovic and associates on Economic Growth and External Debt (1964).
  It calculates the necessary disbursements to fill a given capital requirement, under certain assumptions concerning the composition of capital flows. This program assumes that the net new borrowing each year will equal the resource gap, with suitable adjustments for transfers, changes in reserves and service on existing debt. In a sense it is not a complete program because it does not calculate the necessary credit commitments. Furthermore, for some simple exercises this program may be too time-consuming because it requires giving explicit inputs for all years covered in the projection for the following items: resource gap, exports, investment, service payments, private transfers, changes in reserves and grants.
- (c) A complete program which starts from net requirements for loan capital and calculates necessary commitments was developed for the Indian debt exercise in 1966. This is a program that can be used easily, once the net resource requirements are established. In this program it is possible to deal with several lenders and more than one lending scheme for each lender at the same time. It is possible, therefore, to arrive, in one operation, at more realistic service figures than one can obtain by using

The program is flexible as to the ways in which capital requirements may be defined.

<sup>2/</sup> Here defined as the net goods and services item in the balance of payments minus interest payments on existing medium and long-term external debt. The latter item is usually restricted to service payments on public debt due to the lack of information on private debt.

<sup>3/</sup> This assumes that a long-term balance of payments projection has been carried out and the net loan capital requirements estimated.

one set of average terms of lending as in the case of the previous program. Doing the same thing with the preceding program requires separate computer runs for each set of terms, and then manually adding them. To produce realistic projections with this program, it is necessary to make realistic assumptions on the commitment-disbursements relationships, in addition to good estimates of net loan capital requirements. The output of the program is well designed. It gives new commitments, outstanding debt, disbursed amounts and service payments on existing and new debt separately; and, furthermore, it gives all these magnitudes for each lender, each lending scheme (for each lender) as well as for the total debt.

- 2. The uses of the existing programs have been very limited so far. This could be due to the lack of knowledge about their existence or nature on the part of the Area Departments:
- (a) The first program mentioned above was used recently only once for an exercise on Colombia.
- (b) In addition to its application extensively in Mr. Avramovic's study, the second program has been used for Nigeria, Tunisia, and Uganda.
- (c) The third program was used for India and more recently for a current study by Mr. de Vries on Prospective Capital Flows and International Indebtedness.

A. Karaosmanoglu:yd September 28, 1967

Computer Propert September 5, 1967 Mr. John Bennett Applied Data Research Inc. 2425 Wilson Blvd.

Arlington, Va.

Dear Mr. Bennett:

Please find the FORTRAN II deck of our Rate of Return program. As we discussed this morning by phone, I would be thankful if you could flowchart it for us. Upon examination of the output, I willd discuss with my supervisors the benefits of sending you other programs for flowcharting.

Sincerely yours,

H.A.

Huguette Angel Programming Section Statistical Services Division

Attachment. cc: Mr. Tiemann /ms

Ec Rept - Conjuter Project September 1, 1967 Mr. H.G. van der Tak Bernard Oury Protection of Computer Programs You requested a little note on the question of the protection of computer programs. From experience and hearsay, I can only report the following. In the United States, the usage seems to be that computer programs, the development of which was supported by public funds, are available to the general public. It is on the basis of such usage that the University of Wisconsin kindly agreed to make available to us large capacity package programs MULTILIN and REGANI. The problem of patenting, copyrighting or selling sophisticated programs for a high fee, has been in the air for some time. The first case I heard of patenting a program was reported some months ago in the Lockheed Digest over the radio. Another case (unverified) was that a private computing center would have charged as much as \$80,000 for a sophisticated linear programming package. A third case of my personal experience is that of a large corporation where sophisticated programs giving them an edge either in research or in operation, are classified. This general question would rather have to be referred to the Legal Department for more particulars. I do not think, however, that the Bank should be overly concerned with this problem for the time being. ce: Mr. J. K. Schmedtje BO:jln

Mr. Arthur E. Tieman

August 2, 1967

Murray Ross

Data for Computer Run

- 1. Further to my memorandum to you of July 31, 1967, the Central American Division was able sooner than expected to obtain the data required for revised regression estimates for El Salvador. The table is attached. If it is possible for you to process this material before the week of August 21 previously specified, we would very much welcome the gain in time.
- 2. Please note also one correction: in equation (16) of Schmitt's memo to Ross dated July 27, 1967, the dependent variable should be TC (total credit) not PC (private credit). Thank you very much.

Attachment: as stated

cc: Mr. A. O. Schmitt

le Dept-Computer Project

Mr. Arthur E. Tiemann

July 31, 1967

Murray Ross

### Request for Computer Time

- In accordance with our telephone conversation of this morning I am attaching hereto a memo from Mr. Hans O. Schmidt of July 27 on the subject of required computer time during the week of August 21 for the Central American Division of the Western Hemisphere Department. As you will note from the memo, the computer time will be needed for revised regression estimates for El Salvadore.
- 2. In line with our conversation this morning I understand that, unless I hear from you to the contrary, we can assume that the needed time will be available as required. Thank you very much for your kind and prompt attention to this matter.

Attachment As stated

ce: Mr. H. O. Schmitt

MRoss/rwm

Ec. Doppt - C.V.

Mr. J. Albert Schaech Chief, Data Processing Section Charles G. Goor July 26, 1967

Disbursement cards on IDA credits

We would appreciate receiving a deck of cards that shall be called "Disbursement cards on IDA credits". We need them for each quarter beginning in 1960 (the beginning of IDA) to the end of the last quarter (06/30/67). These cards will follow the attached format.

Attachment.

EKumsher/ms ECA

Gc. Dept - C. Poro.

Mr. Tiemann

July 25, 1967

Wh

E.V.K. Jaycox

### Request for Computer Time and Programmer Service

- 1. I am referring to the telephone conversation Mr. Pouliquen had with you on July 20 and to the further discussion he had with Miss Rudolphi, from the programming unit, about the possibility of resolving on computer the mathematical model we are planning to develop for the investigation of the economic justification of the Port of Mogadiscio project.
- 2. The aim of the construction of this model is to evaluate the uncertainty of the internal rate of return of the project given the uncertainty of traffic projections and of various others parameters used in the computation of the rate of return. We are planning to carry this investigation in two phases. In the first phase we shall study a deterministic model and make a sensitivity analysis of the variation of the parameters so as to select those which have a significant influence on the value of the rate of return. In the second phase we shall introduce probability distribution for the parameters selected in the first phase and deduct the corresponding probability distribution of the rate of return.
- 3. It seems that this problem could be treated on the IBM7090 of the computer center of the University of Maryland. The computer time needed is tentatively estimated at 15 minutes and the writing of the program would require the services of one programmer for about 2 weeks distributed over a period of about 2 months.
- 4. Following your approval of this request, we would like to proceed as soon as possible with the first phase of our study since it is related to a current project appraisal.

LYPouliguenimic

Cleared with: Mr. Baum

ce: Miss Rudolphi Mr. Pouliquen

E. Rept -Computer Program

Mr. A. Kundu

July 12, 1967

N.G. Carter

X

### Regression Program

With reference to our conversation, the following items are felt by my colleagues and I as being useful in a regression program and not now available. We agree that with the advent of the new machine it will be advisable to make a thorough revision of the DAM and perhaps completely rewrite it using bits and pieces lof other peoples'programs. In this context it may well be useful to gather together the major programs, for example, SLURP (Harvard), REGRII and REGRI (N.I.T.), the Wisconsin program, the Biomed, etc., and to tabulate the various input and output features that each has and them make a decision among the users here as to the things we need. One thing that is definitely needed is a better write-up.

A step-wise program would be useful, but does not presently fall into the category of maximum priority, and it should be noted that stepwise regressions are far more liable to error from multicollinearity than is the method used in DAM.

Another thing that should be done to the present system is to modify the input information to the transformation phase in order to allow transforms to be specified in FORTRAN format. This, however, may turn out to be a machine-specific operation, in which case it whall have to wait for the new system.

It would be useful if the Durbin-Watson statistic could be accompanied by figures from the table showing the limits for serial correlation, uncertainty, and no serial correlation.

As for the problem of multicollinearity, the article I mentioned was Multicollinearity in Regression Analysis: the Problem Revisited, by D.E. Farrar and R.R. Glauber, R.E. Stat, FEB 1967. The measures they suggest are currently in the SLURP program and they refer to various transformations of information in the inverse matrix which can be tested against chi square (general multicol.), F test (specific multicol.) and Student t (pattern of multicol). What I shall suggest below is the way to modify the DAM in order to present the first one, the general.

The general measure is derived from the determinant of the matrix,

 $C(v) = -(N-1-1/6(2n+5))\log | X'X$ 

where  $X^{\dagger}X$  is the determinant, N is the sample size, n is the number of independent variables, and v is the degrees of freedom for the chi square and is equal to  $\frac{1}{2}n(n-1)$ . The other two measures of multicollinearity

are a bit more complicated and require the inverse correlation matrix; as I am not quite sure which inverse matrix DAM uses these will have to wait.

Suggested coding is as follows, all within Subroutine MUREM.

Statement 60+2

IF(FM-2.) 601,601,602 602 COLH \*-(FH-1.-(1./6.)\*(2.\*(FM-1.)\*5.))\*LOGF(D) MDF\* \*.5\*(FM-1.)\*(FM-2.)

601 COLM-0.

HOF WO.

603 ESS -OC

, this statement is already in program, however, it needs a number.

Statement 132+1 WRITE(IO2,137)MDF,COLM

137 FORMAT (1HO, 25H94ULTICOLLINEARITY MEASURE, 31,2HC(,13,2H)=F8.2)

The way this is set up it will produce an extra line in the output, but the way things are written in DAN, the only alternative is to carry over the values into the residuals routine and hope the user takes the option.

One final suggestion as to things we would like to see in DAM, is it possible to give some kind of plot, either of actual against fitted, or normalised residuals?

MCCorterite

oc. Mesers. Hankins Krishneserty Niebuhr E. Kept Competer Pregram

July 7, 1967

Mr. John Sorrell C.E.I.R. 5272 River Road Washington, D.C. 20016

Mr. Sorrell:

Thank you for your response to my Incident Report Concerning Run Number 7725. I am enclosing the process sheet from the re-run of that job.

I am also enclosing a partial listing of a job done last night for your observation. Note the parity errors. Recently I have had several of these errors appear within my program listings and I assume that the binary deck from this compilation would also be in error.

I call your attention to this since it is an apparent system error. I do not expect to be credited for this run as another error suppressed execution - but I do want you to be aware of this error.

Sincerely,

Eugenia Rudolphi Programmer Analyst Economics Department

ERudolphi:ra

E Rept. -Computer Program

Mr. A.E. Tiemann (through E.K. Hawkins)

July 5, 1967

N.G. Carter

Computer Usage for Linear Programming Model

This memo is in reference to my linear programming model of Jamaica that is currently being run at Control Data in Rockville.

As is often the case with such models, a number of runs are required before the system becomes "feasible", my model is no exception. The causes of this have been various, punching errors, errors in data, and in one instance an error in the formulation of the model. However, the corrections needed have been minor and thus rather than have the program deck returned to your office each time, I have made the corrections by phone to the CDC office. This has resulted in a considerable saving over a normally excessive turn-around time.

At this writing the model is being run for the fifth time. Each run takes approximately 1 to 1/2 minutes, and some of them have been done on prime rather than night time, the difference being about \$4 per run.

If this current method of running my problem is agreeable to you, I shall continue in this manner until I obtain a correct, feasible solution to the system.

Let me take this opportunity to mention that the technical programming staff at CDC have been extremely cooperative and helpful during what has been a frustrating set of attempts to get a solution to the problem.

NGCarter:te

Ec Dept - Comp. Program June 30, 1967 Mr. George Miller Computer Science Center University of Maryland College Park, Md. Dear Sir: We would like to use your computer center on the same basis as we did during the fiscal year ending June 30, 1967. You are hereby authorized to bill us up to \$5,000 for computer work through June 30, 1967. Sincerely yours, James E. Twining, Jr. Deputy Director of Administration HAngel/ms co: Messre. Kamarck Stevenson King Johns ton Reamy Mitchell Co Tismann/Mrs. Angel

Mr. Dick Brindley Control Data Corporation 11428 Rockville Pike Rockville, Md.

Dear Sir:

We would like to use your computer center on the same basis as we did during the fiscal year ending June 30, 1967.

You are hereby authorised to bill us up to \$12,000 for computer work through June 30, 1968.

Sincerely yours,

James M. Twining, Jr. Deputy Director of Administration

HAngel/ms

co: Messrs. Kamarck

Stevenson

King

Johns ton

Reamy

Mitchell (M)

Tiemann/Mre. Angel

Manager of Contracts Washington Center, CEIR, Inc. 5272 River Road Washington, D.G. 20016

Dear Sir:

We would like to use your computer center on the same basis as we did during the fiscal year ending June 30, 1967.

You are hereby authorised to bill us up to 330,000 for computer work through June 30, 1968.

Sincerely yours,

Jeres Z. Twining, Jr. Deputy Director of Administration

HAngel/ms

oc: Mesers. Kamarck

Stevenson

King Johnston

Reamy

Mitchell (to)

Tiemann/Mrs. Angel

June 29, 1967

Mr. Peter Wolfe University of Wisconsin Computing Center 1210 W. Dayton Street Madison, Wisconsin 53706

Dear Mr. Wolfe,

This is to acknowledge receipt of your June 14th letter and to thank you very much for sending me a copy of the UWCC users manual pertaining to the STATJOB system. Our programming section who has just looked into it reported that we currently have access to a CDC 3600 and not to a 1604 of the type mentioned.

I would therefore suggest that you let us know when STATJOB will be operational on the 3600.

Sincerely yours,

Bernard Oury Economics Department

cc: Mr. Jan de Weille Mr. A. Tiemann Mrs. H. Angel

Ec Dept - Coup P.

Mr. Edward J. Donovan

June 26, 1967

Arthur B. Tiemann Red

Reimbursement for mileage in connection with business use of car for Bank business by Patrick T. Woodburn

This is to certify that Patrick T. Woodburn used his car on Bank business for the period May 26 to June 7, 1967, for a total of 60 miles. At 12¢ a mile, this amounts to \$7.20. I would appreciate it if you would please reimburse him.

/ms

Te Dapit C. P.

Mr. Arthur E. Tiemann

June 26, 1967

Edvin Kunsher 4CK

## Demonstration of benchmark programs by CDC

Mr. Harris (from IMF) and I observed the demonstration of the benchmark programs on the CDC 3300 computer in Minneapolis, Minnesota. Mr. Thomas of CDC was in charge of converting and running the programs and Mr. Kane, also from CDC, was in charge of the demonstration.

The system configuration used for the demonstration consisted of a CDC 3300 computer with 61K storage, four disk packs, six tape drives, a card punch, a card reader and a console. The MASTER operating system was used.

Mr. Harris checked the runs from the DAM program and is writing about the corresponding problems and applicable comments.

I checked the runs from the IBRD projection of disbursements programs. The program that generated and punched cards functioned correctly the first time. The projection of loan disbursements program did not run properly the first time because the Fortran compiler contained an Input/Output error. Due to this error the input tape generated here in Washington was not compatible with their Fortran IV. The error was corrected by regenerating the operating system, thus bringing in a later version of the Fortran IV compiler. The projection of loan disbursements program functioned correctly when compiled under the corrected Fortran IV compiler.

One minor change was required in the coding of these programs. The logical IF statement in the CDC Fortran IV compiler requires two transfer vectors, one for TRUE and the other for FAISE. Under IBSYS a second statement on the same card is executed under a TRUE situation and the next statement is executed if the logical expression is FALSE. A new version of the CDC Fortran IV compiler is being tested and this change will be incorporated in it. The new Fortran IV version should be available in September, 1967.

The printed output is easy to read but the lines are slightly wavy. Also there are some smudge marks on and between the lines.

oc: Mr. King Mr. Fraser Mrs. Angel Mr. Harris

Ec Daget C.P.

Mr. Arthur E. Tiemann

June 23, 1967

Huguette Angel

## REGAN 1 computer program

As stated by Mr. P. Wolfe in his letter of June 14, 1967 to Mr. B. Gury, the STATJOB system is not yet operational on the CDC 3600 computer which is available at the CCDC Service bureau in Rockville, Md. Thus, it seems premature to me to obtain a tape of such a program.

After reading the write up of the REGAN 1 program, its main advantage (over DAM) is that when no regression equations are run, a matrix of correlation coefficients of up to 130 variables can be obtained. When regression equations are fun, the number goes down to 20 or less (depending on the number of equations run).

Similarly to the MULTILIN program (see note dated June 14, 1967), the REGAN 1 program seems much less flexible than DAM.

/ms

cos Mr. Oury

Mles

June 21, 1967

Enguette Angel H.A

## University of Maryland Computer Center

Having used the University of Maryland Computer Center since May 8, 1967, here are comments about some of the problems encountered:

- 1) Turnaround time is in general satisfactory. However, whenever the computer is down, output is delayed by usually 2h hours.
- 2) Jobs are run overnight on the 709h as requested. However, tapes (this is especially true with additional tapes) are often kept and printed next morning or afternoon.
- 3) We often need to run jobs twice for the following reasons: A job is not completed because of an error in the data. However, the output up to the place of error is good. In this case, the operator will automatically print only one copy (when 2 or 3 are necessary) and the tapes once printed are opased.
- h) Messenger costs are very high for the following reasons:
  - a) each trip to University of Maryland costs 39.00.
    b) often the messenger has to go twice two the Genter because he is told by phone that a job is ready when only part of the output is ready. This has happened an average of twice a week. Also in several occasions cards and output were not stored in the same place and the messenger could not return to us everything.

cc: Messrs. Stevenson Fraser Tiemann

HAngel/ms

Ec Dept C.P.

June 19, 1967

Dr. Bill Benz Harvard Economic Research Program 1583 Massachussetts Avenue Cambridge, Mass.

Dear Dr. Benz:

The programming group at the World Bank is trying to establish a library of computer programs to be used in statistical analysis of economic data.

In the course of my consultation with staff members here, I have found out that Harvard has developed a Matrix Inversion program called HERP 5. Would it be possible for us to receive from you a write up and a listing of the FORTRAN instructions of the HERP 5 program. Please let us know of any expenses involved.

Thank you very much.

Sincerely yours,

Huguette Angel Programmer Analyst

cc: Mr. King

Mr. Fraser

Mr. Tiemann

Mr. Willoughby

HAngel:ra H P .

Prof. Dudley Dillard Head, Economics Department University of Maryland College Park, Md. 20740

Dear Prof. Dillard:

Please find enclosed some Application forms (authorization to use a project number) furnished us by Mr. George Miller and duly filled with a list of users as of June 7, 1967.

Sincerely yours,

Arthur E. Tiemann
Acting Chief
Statistical Services Division
Economics Department

Enclosures.

HAngel/ms

June 6, 1967

Mr. Richard H. Day Social Systems Research Institute The University of Wisconsin 1180 Observatory Drive Madison, Wisconsin 53706

Dear Dick,

Let me thank you for mailing your MULTILIN FORTRAN deck and writeup. Enclosed herewith are copies of my letters to Messrs. Strover and Wolf. I am having MULTILIN studied by our Computing Service to look into it. On the other hand, I wrote to Peter Wolf on Mr. Strover's suggestion to inquire about REGANI.

Originally, I was prompted to write to you by the need I have for a large input matrix correlation and regression program, with the RGR in mind which would meet my current needs. Do you still use it? I am checking with Mr. Strover about some particulars of MULTILIN and as we currently contract out the processing of our data, I would like to be sure that the programs kindly made available to us are duly protected. You may know that there is currently a certain awareness of the need for copyrights or patents to protect such sophisticated programs from which we would gain considerable marginal advantages.

The best to you and family,

Sincerely,

Bernard Oury Economics Department

Encls: 2 letters

cc: Mr. B. B. King (through Mr. van der Tak)

Mr. H. G. van der Tak

Mr. Tiemann

Mr. Peter Wolf University of Wisconsin Computing Center 1210 West Dayton Street Madison, Wisconsin 53706

Dear Mr. Wolf,

I recently wrote to Professor Richard H. Day of the Social Systems Research Institute to inquire of him about what kind of arrangement could be made with SSRI for us to use some of their programs for our research here at the Bank. Following this request, Mr. Strover kindly mailed me the MULTILIN FORTRAN deck and writeup. He also indicated that I write to you about REGANI, which is written in FORTRAN and is part of a larger system called STATJOB, and which might be easier for us to use. I would appreciate it very much that you send me more particulars about REGANI and STATJOB and about the kind of arrangement which could be made for us to use it. Should the Wisconsin Computer Center be agreable to kindly make the program available to us, we would like to make sure that it is duly protected either by copyright or by patent.

Your prompt answer will be greatly appreciated. Incidentally, your name sounds rather familiar to me as one of my former students. Am I not corrent?

Sincerely yours,

Bernard Oury Economics Department

cc: Mr. Day Mr. Strover

Mr. H. G. van der Tak

Mr. Tiemann

BO:jln

June 5, 1967

Mr. Russell G. Strover
Program Librarian
Data and Program Library Service
Social Systems Research Institute
The University of Wisconsin
1180 Observatory Drive
Madison, Wisconsin 53706

Dear Mr. Strover,

This is to acknowledge receipt of your letter dated May 31, 1967 and of the MULTILIN FORTRAN deck and writeup which I received today. I wish to thank you very much for both the information given in your letter and for the regression program.

As you suggested, I am also writing to Mr. Peter Wolf for information on the STATJOB.

I glanced quickly over the writeup of the MULTILIN FORTRAN and I found no indication of its size limitations (especially maximum size of the input matrix) and of the estimates of the time for correlation and regression computations, the number of regressions that can be processed in a single run, stepwise or forced. Should you be able to provide me with these particulars, I would appreciate it very much. In any case, I am having the program studied by our Computing Service to look into it.

Originally, I was prompted to write to Mr. Day by the need I have for a large input matrix correlation and regression program and I had in mind the RGR which I used to work with and which would meet my current needs.

In writing to Mr. Day, I also asked him what kind of arrangements could be made between the University of Wisconsin and IBRD for using the programs kindly made available to us. Usually, regression programs available from users' libraries do not reach above the 85 variables input matrix capacity, and we would gain considerably marginal advantage from using your large input matrix programs. There is currently a certain awareness of the need for copyrights or patents to protect such sophisticated programs.

In this regard, I would like to be sure, as we currently contract out the processing of our data, that the programs kindly made available to us are duly protected.

Sincerely yours,

Bernard Oury Economics Department

cc: Mr. Richard Day

Mr. H. G. van der Tak

Mr. Tiemann

BO:jln

Ec Dept Comp.

Mr. Alexander Stevenson

June 2, 1967

Arthur E. Tiemann Co

#### Computer costs

Attached are tables showing the breakdown of computer costs, by application and service bureau, through May, 1967, with an estimate for June, 1967. Because some of the allocations were made in thousands of dollars and the actual costs are in dollars, an uncommitted amount of \$507 arises. Actually we will probably not use the full balance at the University of Maryland since operations there are still somewhat on a trial basis. However, part of what we do not spend at the University of Maryland may be required at CDC or CEIR. In summary, we expect to operate within the 1966/67 budget.

The amounts authorized or allocated reflect the latest changes in the letters signed by Twining this past week.

Att:2

cc: Mr. King Mrs. Angel

AETiemarm:ra

FORM No. 57

INTERNATIONAL DEVELOPMENT

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL FINANCE
CORPORATION

Schron

2/ Seneral Files

OFFICE MEMORANDUM

TO: Mr. James E. Twining, Jr.

DATE: May 31, 1967

FROM:

Arthur E. Tiemann (2007)

SUBJECT:

Change of authorization for computer work

May 31/67

Attached are copies of letters of authorization for your signature. The first letter to CEIR increases the authorization by \$11,000 to cover expenditure in May and those expected in June. The second letter is to reduce the National Bureau of Standard's authorization by \$4,750 in view of the fact that we are practically out of that installation.

The third letter is to the University of Maryland reducing their authorization from \$10,000 to \$5,000 based on 1 month's experience with their computer facilities.

These changes in authorization should still be within the total budgeted amount of \$70,000, directly budgeted, plus \$2,500 from the Inter-American Development Bank.

Attachments.

cc: Messrs. Kamarck

Stevenson

King

Johnston .

Reamy

Mitchell

Mrs. Angel

Mr. James Chambles Computer Science Center University of Haryland College Park, Md.

Dear Sirt

On April 2h, 1967, you were authorized to bill us for computer work for us up to the amount of \$10,000 through June 30, 1967. Now that we have had an opportunity to utilize your facilities we find that this amount would probably be greater than will be required. Consequently, it is requested that our authorization be reduced to \$5,000 through June 30, 1967.

Sincerely yours,

James S. Twining, Jr. Deputy Director of Administration

AETiemann/ms 247

co: Messra. Kamarck

Stevenson King

Johnston Reamy Mitchell

Tiemann Mrs. Angel Mr. Irving V. Voltin, Chief Computer Services Division National Bureau of Standards U.S. Department of Commerce Room A-200, Administration Building Washington, D.C. 2023h

Dear Sir:

In my letter to Mr. E.W. Cannon dated February 10, 1967 I had reduced the amount of money that IBRD could use at NBS from 950,000 to 320,000. Since we are practically unable to use the 7094, we would like to further reduce your authorization to June 30, 1967 by 34,750.

We have received your Memorandum of May 8, 1967 (163.00) to computer users and wish to let you know that at present we have not made any plans to use the UNIVAC 1108 at Gaithersburg and thus will not authorize any funds for the Fiscal year 1967/68. We are thankful to you and the Computer Division personnel for the services furnished to the World Bank during the years 1960-1967.

Sincerely yours,

James E. Twining, Jr. Deputy Director of Administration

AETiemann/me

cc: Messrs. Kamarck

Stevenson

King Johnston Reamy

Mitchell Tiemann

Mrs. Angel

Manager of Contracts Washington Center, CEIR, Inc. 5272 River Road Washington, D.C. 20016

Dear Sir:

As stated in my letter dated February 8, 1967, you were authorized to bill us up to a total of \$35,000 through June 30, 1967. Based on our estimate of additional computer requirements, you are hereby authorized to bill us for an additional \$11,000 through June 30, 1967.

Sincerely yours,

James E. Twining, Jr. Deputy Director of Administration

Hangel/ms +A. (200

cc: Mesers. Kamarck

Stevenson

King

Johns ton

Reamy

Mitchell

Tiemann

Mrs. Angel

Ec Dept Comp. May 29, 1967 Mr. A. Francis Norcio Computer Science Center University of Maryland College Park 20740, Md. Dear Mr. Norcio. Following your telephone conversation of this morning with Mrs. Huguette Angel, I am happy to send you a copy of the FORTRAN deck of the Data and Multiple Regression (DAM) program. This version has been prepared to fit an IBRD 7040 computer. I am also sending you a copy of the write up which was prepared for the version of DAM written in FORTRAN II and run under Bell System. Please note that the FORTRAN deck and the write up were furnished to me by Mr. Leonard Harris of the International Monetary Fund who has been reviewing and improving the DAM program originally written by Mr. R. Rhomberg and Miss L. Boissonneault. Sincerely yours. Arthur E. Tiemann Acting Chief Statistical Services Division Economics Department cc: Messrs: Twining Harris (IMF) Mrs. Angel HAngel:ss

#### CROSS REFERENCE SHEET

COMMUNICATION:

SENIOR STAFF MEETING

SSM/M/67-21

DATED:

May 26, 1967

TO:

FROM:

FILED UNDER: SENIOR STAFF MEETING

SUMMARY:

## BANK USE OF COMPUTERS

Mr. Kamarck reported that the Bank had hitherto relied, first on U.S. Government agencies such as the Bureau of Standards and later on a private firm, for computer service, which had proved very expensive. Thanks to the good offices of the Department of Economics of the University of Maryland, the Bank had been given temporary access to the University's computer, at a cost of \$280 an hour compared with the \$500 an hour previously paid.

E Dept . C. Pro.

Mr. Edward J. Donovan

May 19, 1967

Arthur E. Tiemann @207

Reimbursement for mileage in connection with business use of car for Bank business by Patrick T. Woodburn

This is to certify that Patrick T. Woodburn used his car on Bank business for the period May 1: through May 18, 1967, for a total of 81 miles. At 12¢ a mile, this amounts to \$10.08. I would appreciate it if you would please reimburse him.

/ms

Ec. Wapt - Comp P. May 4, 1967 Mr. W. B. O'Neill IBM Corporation 3833 North Fairfax Drive Arlington, Va. 22203 Dear Mr. O'Neille The Statistical Services Division of the Economics Department will need to rent two additional keypunch machines (026, scientific set), one as soon as possible and the second one later on during the Fiscal year 1967/68. Could you please put our request on record as of this date. We would be willing to use one off-the-shelf machine, with a commercial character set (to be replaced later on by one with a scientific character set) if this can speed up the delivery of our first machine. Please let me know when one of the two machines requested would be ready for delivery so that we may in the meantime arrange for a budget authorization and a formal order would then be sent to you. Sincerely yours, H.A .

Huguette Angel
Statistical Services Division
Economics Department

/ms cc: Messrs. Curtin Tiemann

Le Dept Cong. P.

Mr. Thomas K. Mitchell

May 2, 1967

Huguette Angel \*\*
Statistical Services Division
Computer Expenses

As requested by Mr. A. Stevenson in his Memorandum to Mr. Arthur Tiemann dated April 28, 1967, please find a breakdown by agency of the computer expenses for fiscal year 1968.

| Control Data Corporation | (CDC) | \$25,000  |
|--------------------------|-------|-----------|
| CEIR                     |       | 340,000   |
| University of Maryland   |       | \$25,000  |
| Uncommitted              |       | 330,000   |
| Total                    |       | \$120,000 |

The breakdown should be considered very preliminary since we have not as yet tested the services of the University of Maryland computer center. In case those services (because of the computer center itself or because of the difficulties in getting a proper pickup and delivery setup) do not prove acceptable, we may have to use more fully the CEIR center, with a corresponding increase in the total budget by some \$25,000 or more.

The amount uncommitted may be needed to run programs at an installation equipped with a computer similar to the one chosen by the Bank and Fund, once that choice is made.

cc: Messrs. Kamarck Stevenson Tiemann

HAngel/ms

Mr. A. M. Kamarck

May 1, 1967

J. H. Williams

Computer Budget (1966-67)

Your memo of March 31. This is to confirm the conversation between Mr. Chadenet, Mr. de Vries and Mr. A. R. Whyte.

Given the uncertainty about extent of work originating from the Economics Department for the last quarter of FY 1967, I agree that you should continue, as you propose in the last paragraph of your memorandum, to maintain a watchful attitude on current computer expenditure on a month-to-month basis without asking for additional funds. However, I would not wish to charge Projects Department computer service costs artificially to "consultants" as a way of avoiding the appearance of an overrun. I would rather handle directly any overrun that may arise.

Jen.

C.C. Messrs. Chadenet de Vries King Tiemann

JHWilliams:mk

Le Dapet - Cong.

#### CROSS REFERENCE SHEET

COMMUNICATION:

Memo

DATED:

April 28, 1967

TO: Mr. B.B. King

FROM: Mr. Tiemann

FILED UNDER: Indebtedness - General

SUMMARY:

Form of debt tables - information which can be incorporated into

tables mechanically.

Ec. Dupt - Comp. P. April 28, 1967 Professor Richard H. Day Social Systems Research Institute The University of Wisconsin Madison Wisconsin Dear Dick, It is now some time since I have not heard from you and I am wondering if you are presently in Madison or doing some professional travelling. I am writing this time as an economist of the World Bank. The work here is most interesting. However, I have currently some difficulties about data processing because of the lack of a large matrix program. This leads me to ask you about what kind of arrangement could be made with SSRI for us to use the RGR large matrix program I have worked a lot with you while at Wisconsin. We process our data here on IBM 7090 and CDC 3600. And I gather from the RGR write-up that there would be no apparent difficulty to use RGR on the latter since it was originally written for CDC 1604. Though smaller, the SWR correlation regression program (Simpson) would also help greatly. It has a remarkable output format. I would appreciate it very much that you could give me an answer at your earliest convenience and possibly mail me duplicates of these two programs with their listing in order to trace any change in the Fortran version since the time I used them. I am looking forward to hearing from you. Please let me know also if you plan to be in Washington, D.C., in the near future. I would be very glad to see you. The best to you. Sincerely, Bernard Oury Economics Department cc: Messrs. H. G. van der Tak (cleared with) B. B. King A. E. Tiemann BO:jln:es

Ec. Dapt . Comp.

Mr. A. Tiemann

April 28, 1967

Alexander Stevenson

Computer Expenses

With reference to your memorandum of April 27 on computer expenses for fiscal 1968, could you please send to Mr. Mitchell, copy to me, a breakdown of these expenses by agency (University of Maryland, CRIR, etc.) less expected contributions from IDB and African Development Bank.

cc: Mr. Kamarek Mr. Mitchell



AStevenson: js

Es Dept. Coup.P.

Mr. Alexander Stevenson

April 27, 1967

Arthur E. Tiemann Coly

Computer Expenses

With reference to our conversation this morning on the budget for computer work, we have spent \$6,275 from April 1 to April 27, of which \$5,560 went to CEIR. As a result, our computer expenditures through April 27 amounted to \$50,248, leaving about \$22,000 which should be adequate for the increased workload, for the balance of this fiscal year.

The University of Maryland, as I indicated to you, may well relieve the computer cost situation for 1967-68 for operational work; but because of the distance and the lack of an in-house messenger service at Maryland, much of the programming will still have to be done at CEIR where we can get quicker service. Consequently, even if the University of Maryland works out, we still will require CEIR for some computer work. Our budget for 1967-68 will probably not drop to \$95,000 as we discussed but may be as low as \$120,000.

cc: Mr. King Mrs. Angel

Affiquenn:re

Es Dept - Comp.

Mr. Edward J. Donovan

April 26, 1967

Arthur E. Tiemann Der

Reimbursement for mileage in connection with business use of car for Bank business by Patrick T. Woodburn

This is to certify that Patrick T. Woodburn used his car on Bank business for the period April 18 through April 25, 1967, for a total of 80 miles. At 12¢ a mile, this amounts to \$9.60. I would appreciate it if you would please reimburse him.

/ms

Ec Dojet - Comp

April 2h, 1967

Mr. James Chamblee Computer Science Center University of Maryland College Park, Md.

Dear Sira

Mr. Arthur S. Tiemann, Acting Chief of the Statistical Services Division of the Economics Department of the International Sank for Reconstruction and Development, has written to you requesting authorization to utilize the University of Haryland's computer facilities for the Sank's work. You have indicated to him by telephone that such authorization had been granted under the sponsorship of the University's Economics Department and have assigned project number 352/01/12h to the Beak.

Mr. Tiemann or Mrs. Huguette Angel of his staff will be responsible for determining the scope of work to be done and will arrange for its delivery. In this connection, you are hereby authorized to bill us for actual work performed for us at the computer facilities of the Computer Science Center of the University of Maryland up to an amount of \$10,000 through June 30, 1967.

Sincerely yours,

James E. Twining, Jr. Deputy Director of Administration

ASTiemann/ms co: Messrs. Kamarok

de Vries King Fraser Beamy

Mrs. Angel

# OFFICE MEMORANDUM

TO: Mr. James E. Twining, Jr.

DATE: April 24, 1967

FROM:

Arthur E. Tiemann (ear)

SUBJECT:

Changes in Authorization to Service Bureaus

- Since the time when the Bank had to shift its computer work from the National Bureau of Standards to more expensive commercial services bureaus, we have made an effort to locate a computer organization which had lower charges. On March 8, 1967, I sent a letter to the University of Maryland and requested that they arrange for us to be properly sponsored so that we could use their computer, which is relatively inexpensive. Mr. de Vries then made arrangements with the University of Maryland Economics Department to provide the appropriate sponsorship. We have just received a copy of the correspondence applying for our sponsorship dated April 18, 1967, a copy of which is attached.
- Mr. Chamblee of the Computer Science Center of the University has 2. informed me by telephone that the sponsorship is approved. We have been assigned project number 352/01/124 and are now authorized by the University to use their computer.
- It is requested that \$10,000, heretofore uncomitted, be allocated 3. for the University of Maryland Computer Science Center for the balance of 1966-67. Since the University charges less than CEIR, an effort will be made to shift our computer work to the lower cost installation, and consequently we should require less money for CEIR. We would like to retain the current CEIR authorization until we have tried out the University's facilities and found them to be acceptable.

Attachment.

cc: Messrs. Kamarck

de Vries

King

Fraser

Reamy

Mitchell

Mrs. Angel

Mu Steren JE Dut Co All Lothies April 18, 1967

Mr. George E. Miller Chief of Users' Services Computer Science Center Campus

Dear Mr. Miller:

My colleagues and I in the Economics Department wish to sponsor the application of the Economics Division of the International Bank for Reconstruction and Development, of Washington, D. C., for computer servicing assistance at the University's Computer Science Center. The research being done by the Bank is of interest to the University's Economics Department, and, I dare say, to Economics Departments throughout the country and the world. The Bank is one of the leading research organizations in international economics and economic development.

Dr. Barend A. deVries, Deputy Director of the Bank's Economics Department, has visited the Campus to discuss the research of his staff. Arthur E. Tiemann, Acting Chief of the Statistical Services Division of the Bank's Economics Department, wrote to Mr. Chamblee last month concerning the type of projects for which the Bank would like to utilize the University's computer facilities. As Mr. Tiemann has indicated, the Bank can arrange for funds to pay for the services rendered to it by the Computer Science Center.

Enclosed is a filled-out application form. If you have any questions, please call me on extension 3450.

Sincerely Lilland

Dudley Di Vlard, Head Economics Department

DD: hj & de Vies, IBRD

Donald W. O'Connell, BPA

James Chamblee, CSC

DD: hj & de Vula mand hape you well return

The Campus and hape you well with

Any time I can be I help with

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April 18, 1967

Mr. George E. Miller Chief of Users' Services Camputer Science Center Campus

Dear Mr. Miller:

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Dr. Barend A. deVries, Deputy Director of the Bank's Economics Department, has visited the Campus to discuss the research of his staff. Arthur E. Tiemann, Acting Chief of the Statistical Services Division of the Bank's Economics Department, wrote to Mr. Chamblee last month concerning the type of projects for which the Bank would like to utilize the University's computer facilities. As Mr. Tiemanninas indicated, the Bank can arrange for funds to pay for the services rendered to it by the Computer Science Center.

If you have Enclosed is a filled-out application form. any questions, please call me on extension 3450.

Budley Dillard, Head Economics Department

cc: Barend A. devries, IBRD

Arthur E. Tiemann, IBED

Donald W. O'Connell, BPA

James Champine

Ec. Dept - Comp.

Mr. J. Andreu

April 7, 1967

Huguette Angel H.P.

Computer progrem for Agricultural Credit Project Cash Flow

Based on the orelal and written information supplied by you and under the assumption that the calculations are rather standard, my estimate as to the cost of computerizing such a calculation is \$900 and as to the necessary time for completing the job is 3 weeks.

cc: Mr. Tiemann /ms

Mr. Berend A. de Vries

Arthur E. Tiemann OUT

#### University of Maryland Computer

Vesterday afternoon I called Professor Dillard of the University of Maryland to find out the status of our request for use of their computer. Professor Dillard had not yet filled out the forms by the University for sponsorship of computer work and apparently had questions about some of the items. We discussed them and he appeared satisfied that he had all the necessary information. He promised to complete the forms over the weekend. If he does, we should be able to use the computer within a week.

cc: Mr. King

AETiemann:re

Ec. Dept - Comp.

Mr. Barend A. de Vries

April 5, 1967

Arthur B. Tiemann aco

#### Computer Related Personnel

The table summarizing present and additional staff positions of computer-related personnel, as shown in your memo of April 3, 1967, is not in conformity with either the present or the requested staff, as I understand it. I have checked the present staff situation with Personnel and believe that the following table is correct:

| Professional                    |  |
|---------------------------------|--|
| Programmer Analysts             | h  |
| Non professional                |  |
| Programmer Assistants           | 2  |
| Key Punch Operators             | 3  |
| Data Processing Technician      | 1  |
| Statistical Clerk               | 1  |
| Total professional and non pro- | - AND DESIGNATION OF THE PERSON OF THE PERSO |
| fessional                       | 11   |

Of the 11 positions shown above, one programmer analyst position and one key punch operator position are vacant. In addition, one programmer analyst position was taken from the Statistical Services Division in February.

The additional staff positions required for 1967/68 for computerrelated personnel were included in the description of the 1967/68 budget for the Statistical Services Division, dated February 13, 1967. The following table summarizes these additional requirements:

| Professional                    |   |
|---------------------------------|---|
| Programmer Analysts             | 2   |
| Non professional                |   |
| Programmer Assistants           | 2   |
| Key Punch Operator              | 1   |
| Total professional and non pro- | - Andrews Control of the Control of |
| fessional                       | 5   |

In the 1967/68 budget, it was assumed that the programmer analyst position which we lost would be restored in 1967/68; so that the total staff would be 17.

A more complete count of computer related personnel should include two non professional positions currently assigned to the External Debt Section. Although these positions are classified as Statistical assistants, the incumbents are actually assisting in the operation of the EAM equipment. I am currently discussing with Personnel the possibility of shifting these two positions from External Debt totthe Programming Section. In addition, one Programmer Analyst position is located in the External Debt Section and should remain there to work full-time on the new debt reporting section.

The designation "Data Processing Section" which appears in your memo is not the one used in the Rebruary 21, 1967 listing of Bank and IDA assignments. Programming Section, as far as I can determine, is still a correct title.

cc: Messre. Kamarok King Fraser Tyer

AETiemann/ms

#### CROSS REFERENCE SHEET

COMMUNICATION: Memo

DATED: Mar. 31, 1967

TO: Mr. J.H. Williams

FROM: Mr. Kamarck

FILED UNDER: Administration - Budget (IBRD/IDA)

SUMMARY:

Computer Budget (1966-67)

Esc Dapit. Comp.

Mr. Barend A. de Vries

March 22, 1967

Arthur E. Tiemann

Computer time

The 1967/68 budget for the Statistical Services Division indicated that \$190,000 would be required for computer work. These estimates included an allowance for Projects and Area Departments based on our own estimates. The data provided by the Projects and Area Departments support the figures we have already submitted and no change is proposed for the overall figure. For 1966/67, the estimates of the Projects Department are estimated to cost about \$3,000 and the Area Departments' costs amount to about \$600. If we meet the computer needs of these departments, we may exceed the current year's budget or force Economics Department projects to be deferred or eliminated.

Since we have not yet received any estimate from the other departments for computer requirements for the balance of this fiscal year, we may be in even worse shape with respect to our computer budget. However, if the University of Maryland computer works out, we may well be able to make it through the year.

ec: Mr. Kamarck Mr. King

AETiemann:ra

E. Dept Congs.

Mr. Edward J. Donovan

March 20, 1967

Arthur E. Tiemann all

Reimbursement for mileage in connection with business use of car for Bank business by Patrick T. Woodburn

This is to certify that Patrick T. Woodburn used his car on Bank business for the period March 9 through March 14, 1967, for a total of 140 miles. At 12¢ a mile, this amounts to \$16.80. I would appreciate it if you would please reimburse him.

AETiemann/ms

March 17, 1967

Mr. Robert H. Best Data Centers Division Control Data Corporation 11428 Rockville Pike Rockville, Md. 20852

Dear Mr. Best:

Please find enclosed the weekly records of our computer expenses at CDC for the month of February.

The run #3477 had to be done over (of run #3661) and it has been my understanding that we would not be charged for it.

Sincerely yours,

Huguette Angel
Programming Section
Statistical Services Division
Economics Department

Enclosures.

cc: A. Tiemann

HAngel/ms H.A

Ec Dept.

Mr. Arthur Tiemann

March 16, 1967

Huguette Angel 4.6.

### Computer Budget for Projects Department

Using the estimates of computer time furnished to us by the Projects Department (cf Memo of Mr. Chadenet to Mr. Kamarck dated March 10, 1967) and information given to me by telephone by Mr. Friedgut, here is an estimate of the corresponding cost:

# 1) Fiscal year 1966-67

| Agriculture Division                     |       | \$1,500.00 |
|--|-------|------------|
| Education Division<br>Disbursement Study |       | 1,000.00   |
| Dispursement out                         | TOTAL | \$3,000.00 |

#### 2) Fiscal year 1967-68

Agriculture Division - Estimates will be furnished to us by Mr. Friedgut at a later date.

Education Division \$2,500.00 Disbursement Study 1,500.00

Since the Projects data bank may or may not be our concern, I raised the question with Mr. Friedgut who will inquire whether the computer work involved will come out of a special budget or some estimates should be included within the regular computer budget.

Ec. Dept-Comp.

Mr. Arthur E. Tiemann

March 13, 1967

Huguette Angel H.A.

#### IBM courses

Here is the schedule of IBM courses that Ed Kumsher and I will attend:

| 1) | Operating System Concepts and Facilities | Kumsher<br>April 5 - 7 | <u>Angel</u><br>May 10 - 12 |
|----|--|------------------------|-----------------------------|
| 5) | Operating System Coding                  | April 24-May 5         | May 15 - 26                 |
| 3) | Operating System Generation              | June 21-23             | June 21-23                  |

cc: Mr. E. Kumsher HAngel/ms Files

March 10, 1967

Huguette Angel (1. 1.

#### The NBS new computer at Gaithersburg, Maryland

On March 9, 1967, Messre. Tiemann, Kumsher and I attended a Briefing on the Univac 1108 computer that will be installed at the National Bureau of Standards, Gaithersburg, Md., by June 30, 1967. Mr. I. Voltin and Mr. M. Elster of the computer services division made a presentation and answered questions.

Characteristics of the Univac 1108: it is a 65 K machine (36-bil) words), set-up for multiprocessing with the possibility of attaching to it is to h096 terminals.

Two FASTRAND II drums will carry the operating system (EXEC VIII), the compilers (FORTRAN V, COBOL and SIMSCRIPT) and the programs the users will be compiling and executing. The drums will be regularly purged to eliminate programs that are not in use and provide space for others.

A program to be debugged will be transmitted (and put on FASTRAND) only once. Afterwards, only corrections will be transmitted. Speed of the FORTRAN companier is 6-9000. Statements per minute as compared to 6-700 on the 709h.

A drum-type plotter is being chosen now, reducing the necessity for paper handling since paper comes in rells of 110-120. At the beginning, all tapes will be 7-track, IEM compatible. Later on (within 9 months after specifications are drawn), 6 tapes will be replaced by 9 tracks.

Right now, the NBS installation consists of two 100h terminals hooked on the 1107 UNIVAC at 2121 Wisconsin Ave. and, if necessary, on the 1107 UNIVAC at Hamesville, Alabama. One 100h is tied through a commercial telephone line - transmission is by groups of 300 characters at a time (about 150-180 cards/minutes). The second 100h uses Telepak A (through a 301 B which is rented for \$250/month) and fast reading and printing can take place at the same time.

Sixty four remote controls - UNIVAC 9300 (to be placed on-site, scattered throughout the Gaithersburg compus and downtown) are on order. The location of downtown general purpose terminals has not been decided yet.

Agencies interested in getting themr own terminal should discuss their computer needs with the systems personnel on the NBS staff.

Requests for computer time should be placed through GSA. However, it was pointed out that the present policy is for NBS to keep servicing present users but not to encourage new users to join or new applications to be developed.

In the area of data retrieval, one agency, concerned with that problem, will have a special FASTRAND drum ordered to take care of its needs.

The rates charged will be as follows: Priority Maximum time Turn around (sec.) (min.) cents/sec. A 60 10 20 B 120 15 30 C 300 120 10 D

On priority A, there will be a restriction on the amount of output. Nothing was said about priority D.

For Input/output, charges will be:

\$108/page printed (132 print positions/line) \$1.00/200 cards punched \$1.00/1000 cards read in

The maximum time and maximum number of pages printed as punched on the control cards will be all important. A job taking longer than the maximum time given will be dumped and whatever was produced until them will be output. Same goes for the number of pages printed. The printer will kick out a job after printing the maximum number of lines as indicated.

HAngel/ms cc: Mr. Tiemann

Go Dagst - Comp

Mr. Andrew M. Kamarck

March 10, 1967

S. N. McIvor

Computer Time

With reference to your memorandum of February 17, 1967, on the above, we may have need of two or three long term debt service growth model projections to be handled on the computer between now and the end of June. We also have the usual need for debt service projections for perhaps 6 countries, but I assume this is done on an IBM machine and not the computer.

cc: Mr. Edelman

Mr. Larsen (o/r)

OHCalika/fg

Ec Wept - Comp.

March 10, 1967

Mr. Andrew M. Kamarck

B. Chadenet B. Chadenet

Computer Time

In reply to your memorandum of February 17, 1967, the only foreseeable demands for computer time from the Projects Department during this and the next fiscal year will be from the Agriculture and Education divisions. I attach descriptions of the work from both divisions. The Education division is unable to estimate the computer time required for its work, but has given a full description of the work's scope.

Attachments

cc: Mr. Agnew

BChadenet/JGWAgnew:em

Es Dept Comp.

Mr. B. Chadenet

March 8, 1967

D. S. Ballantine

Request by Mr. Kamarck on Computer Time

The following investigations by the Education Division would entail use of computer services:

- 1. School location and school size analysis in Uganda, Kenya and perhaps two other countries. (FY 1966/67 and 1967/68) This project has been discussed in some detail with Mr. A. Tiemann.
- 2. Manpower projections and their implications for the expansion of education. Economic growth and labor productivity targets should be translated into projections of the required occupational structure and educational attainment of the future labor force. A comparison with the existing labor force would set targets for the output of the educational and training system. Given the scarcity of statistical data in developing countries fairly simple models would have to be found or developed to make this exercise practicable. (FY 1967/68)
- 3. Analysis and projection of education expenditure. Financial and school enrollment data for a number of years should be analyzed to provide trends in unit costs for different sectors, levels and types of education. Wherever possible correlation of these trends with other variables (e.g., teachers' salaries) could provide further refinements of the analysis. Extrapolation of trends into the future would facilitate the calculation of the financial consequences of educational development plans including the cost implications of World Bank/IDA projects. (FY 1967/68)

Investigations at 2 and 3 above would cover only two or perhaps three countries.

MHultin:vet St

Ec West: Conys. March 8, 1967 Mr. James Chamblee Computer Science Center University of Maryland College Park, Md. Bear Sir: Following our meeting with you on February 16, 1967, we would like to request authorisation to utilize the computer facilities at the University of Maryland. At that time, you indicated that it would be necessary for us to have a sponsor from the staff of the University. A description of the type of work performed on the computer is attached for the information of such a potential sponsor, and we are available to answer any questions concerning this work. Based on informalidiscussions, we understand that the Economics Department of the University is interested in the research efforts of the Bank, and someone from that Department may be willing to sponsor our computer efforts. If our work is sponsored and we are authorised to use your computer facilities, we will arrange for funds to be made available in payment for such utilization. We appreciate your courteey in showing us your computer facilities and look forward to further relations with you. Sincerely yours. Arthur E. Tiemana Acting Chief Statistical Services Division Economics Department Attachment. cc: Messrs. Kamarck De Vries(2) Fraser Twining King Mrs. Angel AETiemann/ms

#### IBRD COMPUTER WORK

The following is typical of the work of the Bank for which computers are utilized:

#### 1. External Debt

The computer is used extensively and regularly in the Bank for the development and maintenance of a statistical reporting system on long-term external debt. Under this system, approximately 35 debtor countries report semi-annually on such items as the amount of their debt, the terms, the maturities, the purposes of loans and the creditors. These data are processed with the assistance of the computer in order to determine the total outstanding debt of actual or prospective borrowers and projected payments under these debts. These data also serve as the basis for showing the historical development of the external debt of each country. The analysis of this type of information is taken into consideration in connection with new loans by the Bank, and the Area Departments may make requests for special analyses of external debt data toassist them in considering a specific new loan. This type of information is also furnished to International Development Bank on Latin American countries.

#### 2. OECD oreditor reporting system development

In collaboration with the Organization for Economic Co-Operation and Development, a creditor reporting system is being developed to supplement the debtor reporting system. The analysis of creditor information related to debtor information through the use of the computer will provide a more complete picture of the world debt situation and should be of value in economic analysis.

#### 3. Regression and country models

In addition to the above ongoing requirements, the computer is utilized as an analytical tool as part of the many economic studies performed throughout the Bank. For exemple, computers are utilized to facilitate regression analysis and to calculate elasticities of demand and supply for various commodities. An extension of this type of computation is the development of economic models for developing countries and the calculation of the effects of changes in the parameters.

#### 4. Special problems

Special computer applications are carried out to assist staff members in the Projects Department, the Personnel Division and the Economics Department. A livestock model for projecting herd size under various conditions is typical of such problems. Other problems require linear programming, rate of return computations and index number analysis for the IBRD Commodity Price Index.

Mr. R. W. Cavanaugh

S. R. Cope

#### Financial projections

In the course of using financial projections prepared in your Department in connection with the memorandum on interest rates, it occurred to me that a great deal of time might be saved in the future if the elements involved in financial projections were programmed on a computer. I realize that we don't have a computer at the moment, but considerable amount of work has to be done preparing for it, and if after consideration you feel that a computer could be useful for this kind of work, it might be a good idea to start preparing for it now.



SRCope:mmr IBRD cc: Mr. W. D. S. Fraser

Ec Dapt - Comp.

Mr. Barend A. de Vries

March 6, 1967

Arthur E. Tiemann (2007)

Computer requirements applicable to the University of Maryland computer

If the University of Maryland will authorize us to use their computer, the following work will be performed there:

#### 1. External Debt

The computer is used extensively and regularly in the Bank for the development and maintenance of a statistical reporting system on long-term external debt. Under this system, approximately 85 debtor countries report semi-annually on such items as the amount of their debt, the terms, the maturities, the purposes of loans and the creditors. These data are processed with the assistance of the computer in order to determine the total outstanding debt of actual or prospective borrowers and projected payments under these debts. These data also serve as the basis for showing the historical development of the external debt of each country. The analysis of this type of information is taken into consideration in connection with new loans by the Bank, and the Area Departments may make requests for special analyses of external debt data to assist them in considering a specific new loan. This type of information is also furnished to IDB on latin American countries.

#### 2. OECD creditor reporting system development

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cc: Messrs. Kamarck King Kundu Mrs. Angel Paulson

AETiemann:ra

Mr. Takahashi

March 6, 1967

T. Friedgut 11.

# Estimate of Computer Use by the Agricultural Division to the End of the Financial Year

1. On the basis of information supplied by section heads in the Agricultural Division the program use and estimated time for computation and input-output are as follows:

|   | Rate<br>Retu<br>Comp. | of<br>I/0 <sup>2</sup> / | Develo | stock<br>opment<br>. I/O<br>minute | Prog<br>Develo<br>Comp.  | pment<br>I/O   |  | . I/O   |
|---|-----------------------|--------------------------|--------|------------------------------------|--|--|--|---|
| Technical Assistance<br>and Special Studies | nil                   | L                        | ni     | 11                                 | n  | il   | n  | il  |
| Irrigation                                  | nil                   | L                        | ni     | 1                                  | n  | il   | n  | il  |
| General Agriculture                         | 7                     | 14                       | *** ** | e ===                              |  | NO. NO.  | 7  | 14  |
| Livestock/Credit                            | 4                     | 8                        | 16     | 30                                 | 90   | 189  | 110  | 218   |
| Economic                                    | nil                   |                          | ni     | 1                                  | n  | il   | ni   | il  |
| Division Total                              | 11                    | 22                       | 16     | 30                                 | 90   | 180  | 117  | 232   |
| 20% Contingency                             | 2                     | 4                        | 3      | 6                                  | 18   | 36   | 23   | 46)   |
| Total                                       | 13                    | 26                       | 19     | 36                                 | 108  | 216  | N <sup>t</sup> O   | 278   |
| 1/  |                       |                          |        |                                    | THE RESERVE THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TRANSPORT NAMED IN COLUMN TWO IS NAMED IN COLUMN TRANSPORT NAME | THE RESERVE OF THE PARTY OF THE | The state of the s | of the self-report and a service of the self-report and the |

<sup>1/</sup>Computation

<sup>2/</sup> Input-Output

<sup>2/</sup>Rough estimate.

<sup>2.</sup> As seen in the table, only General Agriculture and Livestock intend to make to make use of the computer facilities during the remainder of the financial year--General Agriculture for analysis in seven project appraisals and Livestock for analysis in two or otherse projects.

- 3. Additional time has been allocated for development and improvement of the herd development calculation recently written for the Livestock section.
- Assuming that in the analyses to be carried out additional calculations may be desired in the course of sensitivity analysis a twenty per cent contingency factor has been added. However, if large changes were to be introduced in the livestock development model it is possible that twice as much calculating time might be needed for that item.
- 5. Approximate running times for the programs are presented in Appendix I.

#### Appendix I

Computer Time for Program Calculation and Input - Output

#### General:

- 1. The unit of time for which we are billed is a minute. Many programs and calculations take less than one minute of computer time but will be billed as though they took a full minute.
- Feeding of data on to magnetic tape and printing of results (input-output) are performed on a computer separate from that on which calculations are done.
- Rate of Return Calculation
  15 sets of assumptions less than one minute
  20 pages of output two minutes
- 4. Herd Development Model
  2 sets of assumptions three minutes
  output of results nine minutes

Mr. Tully I. Priedgut

March 3, 1967

Muguette Angel HA.

Computer time estimates for Livestock section of Projects Department (March - June 1967)

Rate of return calculations: (15 sets of data)

computations:

20 min.

imput/output:

Mo min.

Idvestock development model:

1) production runs (10 sets of data, 3 alternatives per set):

computations: imput/outputs 30 min.

1 hours

2) revisions in the model:

computations

1/2 hours

imput/outputs

3 hours

co: Messrs. Gerring Tiomann

HAngel/ms

Ec Dopt - Comp.

Merch 2, 1967

Mr. Barend A. de Vries

E.K. Hewkins

Capital Requirements Study

I refer to your memorandum of February 28, on the question of computer requirements for the capital requirements study in 1967/68. I understand that the figure of \$1,500 for computer requirements was inserted in the budget by the Statistical Services Division. I am in agreement with Mr. Maiss' viewpoint that the actual mechanics of the capital requirements study do not require computer services at this stage.

You will also be aware that the capital requirements study does not form part of the work program of this Division, although I have been personally involved in the project. I would hope that when the present draft is completed we can review within the Department the extent to which this Division should be involved in future work. We shall be able to produce estimates of capital requirements in the normal course of manipulating the kind of model we now have under construction. I cannot foresee, however, that these will replace the present method of deriving figures from country economic reports.

We have discussed the question of estimating certain parameters and this could well be done on the computer. I believe that this could be done in the most logical way in connection with the proposals that Mr. Levy is now exploring to put the World Tables into a data bank.

EKHawkins/w

cc: Messrs. Maiss, Levy and Leon

ac Dept - Conjunter

Mr. B. Chadenet

March 1, 1967

Request by Mr. Kamarck on Computer Time

I refer to your memorandum of February 27 on the above. It is unlikely that the Public Utilities Division will wish to send any work to the Statistical Services Division between now and the end of this financial year.

ADKnox/mv

Mrs. Huguette Angel

February 28, 1967

Catherine Slappey
External Debt Section - Statistical Services Division
Programming request

We shall appreciate it if you will have a program prepared for use in the External Debt Section.

The purpose of the program is to subtract internally held sales from our IBRD loan file. The reasons for doing this job by computer are:

 The data on internal sales and the loan file have completely different formats and do not have the same identifying information. In addition, the internal sales data are split into many parts (by type of transaction, currency and interest rate) while the loan data are in summary form. These differences are easily handled by computer but would make hand-processing extremely difficult.

 A good computer program can do the task much quicker and with greater accuracy than would be possible if the data were hand-processed.

3. It would save work for our fully-occupied key-punchers.

The input would consist of

1. The existing IBRD loan file (cards for loans with internal sales for the years 1956-1966)

2. IBRD Treasurer's cards for internal sales for the same period.

The output would consist of

1. IBRD losn file with internal sales subtracted out.

 Supplementary cards in the same form as the loan file for the internal sales (these cards would be identified by a category code of 325).

cc: Mr. Tiemenn

C. Slappey/dg (5

FORM No. 5 (2-60)

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL FINANCE

INTERNATIONAL DEVELOPMENT ASSOCIATION

| ROUTING SLIP                                       | Date<br>March                 | 2, 1967                              |
|--|-------------------------------|--------------------------------------|
| NAME   |                               | ROOM NO.                             |
| Mr. Tiemann, (informatio                           | on gent                       | G-1065                               |
| Mr. Ready MRSAN                                    | 6 Car base.                   | 722                                  |
|  |                               | -                                    |
| General Files (?)                                  |                               | 233                                  |
|  | Note an                       |                                      |
| To Handle  |                               |                                      |
|  |                               | d File                               |
| To Handle  | Note an                       | d File                               |
| To Handle 'opropriate Disposition                  | Note an<br>Prepare<br>Per Our | d File<br>d Return                   |
| To Handle 'opropriate Disposition Approval Comment | Note an<br>Prepare<br>Per Our | d File d Return e Reply Conversation |

In the future, please address Purchase Orders to:

Mr. Irvin V. Voltin Chief, Computer Services Division National Bureau of Standards Washington, D. C. 20234 Attn: Mrs. Pat Kinard

Ex West - Compuler U.S. DEPARTMENT OF COMMERCE NATIONAL BUREAU OF STANDARDS FORM NBS-54 FEB 2 8 1967 (REV. 8/66) WASHINGTON, D. C. 20234 YOUR REFERENCE Ltr of 2/10/67 signed by ACCEPTANCE NOTIFICATION James E. Twining, Jr. NBS REFERENCE 123/4450506 International Bank for Reconstruction and Development Task 0506 1818 H St. N.W. TO: Washington, D. C. 20433 PLEASE REFER TO THIS NUMBER IN FUTURE COMMUNICATIONS WITH NBS THE ORDER REFERENCED ABOVE IS ACCEPTED ACCEPTED AS MODIFIED X SEE REMARKS COPY(S) OF ORDER ENCLOSED ESTIMATED COSTS THIS ORDER OR AMENDMENT REVISED TOTAL \$ 20,000.00 s - 30,000.00Note: This order is accepted in accordance with NBS statutory authority (15 USC 271-278e). The amount stated is the estimated cost. Final charges will be based on actual costs incurred which include directly related expenses and appropriate charges for indirect and administrative expenses (15 USC 278b(e)) as determined through the NBS cost accounting system. In the event the estimated amount is not sufficient to complete the work or if excess funds appear to be available for return you will be advised as early as possible. \_ TO NATIONAL BUREAU OF STANDARDS WORKING CAPITAL FUND. (THE NBS IS AUTHORIZED TO REQUIRE AN ADVANCE TO ITS WORKING CAPITAL FUND BY 15 USC 275a.) ENCLOSED SEE REMARKS ALTHOUGH THE NORMAL PRACTICE OF THE NATIONAL BUREAU OF STANDARDS IS TO REQUIRE AN ADVANCE OF FUNDS, IN THIS INSTANCE THE ORDER IS ACCEPTED ON A REIMBURSABLE BASIS. YOU WILL BE BILLED: AT COMPLETION OF PROJECT OR SERVICE MONTHLY QUARTERLY OTHER REMARKS: Reducing financing by \$30,000 as requested in Mr. Twining's letter. SIGNATURE OF ACCEPTING OFFICE FOR FISCAL OR CONTRACTUAL INFORMATION ON THIS ORDER CONTACT: WASHINGTON, D. C. 20234 BOULDER, COLO. 80302 NAME NAME T. C. Austin J. E. Skillington, Jr. Area Code 301, 921 ) Area Code 303, 442-2161 Ext. 2637

Ext. 3242

BUDGET OFFICER

Govt. Dial Code 164

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|--|--|
|  | WASHINGTON, D. C. 2022A  |
| Ltr of 2/10/67 signed by James E. Twining, Jr.   | ACCEPTANCE NOTIFICATION  |
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| 123/4450506<br>Tesk 0506   | International Bank for Reconstruction and Development of 1818 H St. N.W. Washington, D. C. 20433   |
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|  | YOU WILL BE BILLED!  |
|  | BONTHLY STRONGETION OF PROJECT OR SERVICE  |
|  | REMARKS:   |
| in Mr. Twining's letter,   | Reducing financing by \$30,000 as requested in   |
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| noted  |  |
| SIGNATURE OF ACCEPTING OFFICE  | FOR SECAL TH CONTRACTUAL INFORMATION ON THIS ORDER CONTACT:  |
| Carlo Carlo  | WASHINGTON, D. C. 201067 HIM 8: 22 DER COLO. MINOS   |
| to a constant in   | T. C. Austin COMMUNICATIONS  |
| auocen operous   | Area Code 301; 921   Ext. 2637   Ext. 2637   Ext. 3242   Ext. 3242 |

Pebruary 27, 1967

Files

Catherine Slappey
External Debt Section - Statistical Services Division
Processing creditor data for GECD

It would be impractical to process Form 1 data and supply tapes on new and revised data on a monthly basis as originally planned. Updated edited tapes should be furnished twice a year when the Form 2 and Form 3 data have been processed.

The problems in providing monthly tapes are:

 The unnecessary expense of producing and shipping tapes for a relatively small number of items.

2. Difficulty in maintaining control over and records of

the processing and transmittal.

3. Form 1 data for loans and credits cannot be fully edited until the Forms 2 and 3 are received. Since we wish to avoid asking questions about a single transaction more than once, these Forms 1 should be held for cross-checking against the Forms 2 and 3.

This last problem could be solved by producing an unedited tape, but the usefulness of the data would be questionable. Moreover there would be a substantial amount of updating necessary every six months (after receipt of the status reports).

ec: Mr. Tiemann Mrs. Paulson Mrs. Amgel Mr. Suto

C.Slappey/dg

Es. Dagat -C. Program

Messrs. Ballantine, Baum, Evans and Knox

February 27, 1967

B. Chadenet B. Chadenet

Request by Mr. Kamarck on Computer Time

Will you please send me for Wednesday, March 8, the information requested by Mr. Kamarck on the work that would entail use of computer services (see attached memorandum from Mr. Kamarck). Mr. Kamarck refers to the fact that the Bureau of Standards' computer, which the Bank was using at marginal tariffs, is now saturated and we have to farm out our computer work to commercial firms who charge much higher rates.

Attachment

BChadenet:jfe

E Dept Pone.

Mr. Barend de Vries

February 2h, 1967

Arthur E. Tiemann (207

Computer Costs for 1966/67 and 1967/68

The attached table shows the computer requirements for the balance of this fiscal year and for the coming fiscal year for the Economics Department. During the first 7s months of this fiscal year, the Economics Department has spent approximately \$26,000, of which nearly \$2,000 was for programs other than External Debt. In the remaining 1/2 months, the staff of the Economics Department projected programs which are estimated to cost nearly \$9,500. The External Debt Section work is expected to cost about \$22,000.

The \$57,700 for the Economics Department's work in 1966/67, combined with approximately \$12,000 already spent for the Area Departments and Projects Department comes close to using up the full amount budgeted for computer work for 1966/67. The plans for computer time which are submitted in response to Mr. Kamarck's memorandum of February 17, 1967, will reflect the expected deficit for the year. If the departments could compensate us for their use of computer time for the balance of this fiscal year, we may well be able to make it.

For 1967/68, the Economics Department budget is projected at \$153,000 and an additional \$h0,000 is estimated for the rest of the Bank, in the absence of specific plans from Projects and the Area Departments.

Attachment.
cc: Messrs. Kamarck
King
Mrs. Angel

ATiemann:ms

# COMPUTER BUDGET 1966/67 and 1967/68 ECONOMICS DEPARTMENT

|   |           | 1966/67      |            | 20/01/0   | CECHNIC PORTER SHAPE |
|---|-----------|--------------|------------|-----------|----------------------|
|   | To date   | Bal. of year | Total      | 1967/68   | eli Sugninuele a     |
| EXTERNAL DEBT   |           |              |            |           |                      |
| Regular operations (preparation of standard projections and historical tables)  | \$ 21,200 | \$ 16,000    | \$ 37,200  | \$ 63,000 |                      |
| Special requirements (preparation of special projection tables, computation of weighted average terms of loans, etc.) | 3,200     | 2,500        | 5,700      | 10,000    |                      |
| OECD (development of new program and running operating program  | -         | 3,000        | 3,000      | 16,000    |                      |
| New system (modifying existing system to reduce manual editing)   | -         | -            | •          | 15,000    |                      |
| Project X   | -         | 500          | 500        |           |                      |
| TOTAL EXTERNAL DEBT   | 24,400    | 22,000       | 46,400     | 104,000   |                      |
| OTHER ECONOMICS DEPARTMENT  |           |              |            |           |                      |
| Leon Long-term debt proj. (Indian debt exercise) -  |           |              |            |           |                      |
| 3 countries<br>Regressions (tourism)  |           | 300<br>100   | 300<br>100 | 1,500     |                      |
| Levy<br>Data Bank   |           | 2,000        | 2,000      | 12,000    |                      |
| Macone Regressions: Coffee demand Plywood   |           |              |            |           |                      |
| Jute<br>Rice  |           | 1,000        | 1,000      | 5,000     |                      |
| Friedman gp - instability of exports  |           | 500          | 500        |           |                      |
|   |           |              |            |           |                      |

## COMPUTER BUDGET 1966/67 and 1967/68 (CONT.)

#### ECONOMICS DEPARTMENT

|   |         |                         | 1                   | Page 2  | Charles or the same |
|---|---------|-------------------------|---------------------|---------|---------------------|
|   | to date | 1966/67<br>Bal. of year | Total               | 1967/68 |                     |
| OTHER ECON. DEPARTMENT (Cont.)                        |         |                         |                     |         |                     |
| Hawkins Existing programs Carter (?) Krishnsmurty (?) |         | 1,500<br>500<br>500     | 1,500<br>500<br>500 | 13,000  |                     |
| Dury  | 700     | 1,500                   | 2,200               | 6,000   |                     |
| Maiss<br>Capital requirement study                    |         |                         |                     | 1,500   |                     |
| Miscellaneous   | 1,200   | 1,500                   | 2,700               | 10,000  |                     |
| TOTAL OTHER ECON. DEPT.                               | 2.200   | 2.400                   | 11,300              | 1,9,000 |                     |
| TOTAL ECON. DEPT.                                     | 26,300  | 31., LOO                | 57,700              | 153,000 |                     |
|   |         |                         |                     |         |                     |

Statistical Services Division Economics Department February 24, 1967 Mr. Benjamin B. King

February 23, 1967

Arthur E. Momann agy

Tabulations of Imports for Mr. Balassa

Tabulations of imports were requested by Mr. Balassa to be completed by the first week in March. Because of the shortage of computer funds, it was decided to utilize the Bank's EAM equipment in conjunction with an extensive hand tabulation effort. The size of the job was such that tabulation exclusively by hand would have been too time-consuming.

Even with MAM equipment, it has proved necessary to have the key punch personnel work overtime during the past two weekends, and on February 22 and 25. Through February 22, approximately 60 hours of overtime have been worked, and an additional 30 hours will be required to meet Mr. Balassa's deadling.

This cost is brought to your attention because it otherwise would be buried in total personnel costs for the Division. The short deadline and the very extensive key punching requirement have made these tabulations very expensive and have made it difficult to plan the workload of the Division in any organized fashion. It would be desirable if large scale jobs like this one could be planned far enough in advance to permit a more efficient allocation of manpower. Since there is a tendency for staff members to underestimate statistical manpower requirements, an early discussion with the Division would be valuable.

oc: Mrs. Angel Mr. Kundu

February 23, 1967

Manager of Contracts Washington Center C-E-I-R, Inc. 1200 Jefferson Davis Highway Arlington, Virginia

Dear Sire

On behalf of the Economics Department of the International Bank for Reconstruction and Development I would like to request computer time up to a value of \$1,000.00 on your Washington, D.C. 7090 computer with ancillary use of your 1401. Mr. Heinz Vergin has been authorized to make arrangements to use CEIR services within the above limits.

Yours sincerely,

45-

Robert A. Sadove Deputy Head Indus Special Study

HVergin:pd

cc: Mr. Sadove Mr. Laing

Lo . Waget - Mas

Mr. Benjamin B. King

February 20, 1967

Arthur E. Tiemann

### External Debt Computer Budget

Attached is a copy of the estimated computer budget for the External Debt Section operations for the balance of this fiscal year and for the next one. The balance of the year 1966/67 covers a little less than a five month period and reflects somewhat of a stretchout of operations because of the current tight budget situation. This is one of the many factors which contributes to the increase in 1967/68.

The elimination of Project X (Exchange of Information) from the 1967/68 budget is based on including it in the development of the OECD reporting system.

Att.

cc: Mrs. Angel

AE liemann:ra

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

TO: Files

DATE:

February 17, 1967

FROM:

Rosalind Gilmore

SUBJECT:

Computer Expenditure

- 1. A meeting was held at 10.30 a.m. on February 14 in Conference Room 866 to discuss expenditure on purchase of computer time in fiscal 1966-67 and 1967-68. There were present Mr. de Vries, Mr. Hawkins, Mr. Kundu, Mr. Leon, Mr. Levy, Mr. Macone, Mr. Oury, Mr. Tiemann and Mrs. Gilmore.
- 2. Mr. de Vries said that any continuation of the upward trend in payments for computer time would mean overstepping this year's appropriation. Before deciding how to deal with this problem we needed to form a clear picture of the work in prospect for the rest of the financial year, and at the same time to start building a budget for 1967-68, which must be as accurate as possible since there was little doubt that we would be held to it. Mr. King and Mr. Tiemann were considering separately the processing of external debt statistics, which was the largest single item. The purpose of the present meeting was to make a preliminary survey of the other work in prospect in the Department.
- 3. Mr. Hawkins said he estimated his Division's needs in this financial year at three hours of computer time (with already available programs), not including what might turn out to be needed by Mr. Carter (perhaps another hour) and Mr. Krishnamurty (not identifiable) when their assignments were more fully worked out. He had put a provisional estimate of 20 hours into his budget submission for 1967-68. He would consider both estimates further with Mr. Kundu after the February 15 meeting with Mr. de Vries on the Division's work program.
- 4. Mr. Leon said he foresaw little computer work from his Division within this financial year, though on the debt side it might be necessary to run data for three more countries on the program that had been used for the India projections.
- 5. For next year, he would discuss with Mr. Hawkins, Mr. Maiss and Mr. Tiemann the means of storing and processing the capital requirements data on computer, so that, amongst other things, basic parameters for as many countries as possible might be formed into a master table on which to test the implications of various changes in parameters for capital requirements and debt service projections.
- 6. Mr. Levy said that the only project for which his Division was likely to want computer time was the country data bank. Data gathering could not proceed far enough this year for any time to be needed; nor could a comprehensive data bank be set up next year. He would, however, discuss with Statistical Services the computer budget implications for the current budget year and for 1967-68 of the design of the data bank.

- 7. Mr. Oury said that he would discuss the computer needs of his own project, most of which were likely to fall into the next financial year, with Mr. Kundu: he considered that within the Investment Planning Division Mr. de Weille and Mr. Meroz were also likely to need computer time in the foreseeable future, and should be included in the budget discussions.
- 8. Mr. Macone said that his Division's use of computer facilities in the first half of this budget year had been abnormally light and the work would now increase. Computations on the coffee, plywood, jute and rice studies would be needed, and he also knew that Mr. Sundrum had some work on export instabilities in prospect.
- 9. Mr. Kundu said that he foresaw no difficulties in providing for commodity work so far as regression analysis was involved, but problems might arise if there were any commodity models to be dealt with. This was a part of the general budgetary point that the work it was most important to identify was that which could not be handled on existing programs, since writing, rewriting and adapting programs consumed a high proportion of time and money.
- 10. From Statistical Services own point of view, one item for which provision would have to be made in 1967-68 was the cost of building up a library of programs against the installation of a Bank computer. This expenditure would be part of the transitional provisions to be included in the 1967-68 budget, though the Bank computer was not likely to be in-house until after the end of the financial year.
- 11. In conclusion, it was agreed that:
  - Mr. Leon would inform Mr. Maiss of the need to discuss capital requirements work, and to estimate any other computer needs the Comparative Country Analysis Division might possibly have;
  - (ii) Mr. Oury would inform Mr. de Weille and Mr. Meroz of the need to discuss estimates for their work;
  - (iii) Division Chiefs, Mr. Oury, Mr. de Weille and Mr. Meroz would complete discussions of their estimates with Statistical Services in the course of the next fortnight;
  - (iv) Further meetings of those now present and including also Mr. Maiss would be held periodically to consider the whole field of computer work.

Distribution: Those Present

Mr. Kamarck

Mr. King

Mr. Maiss

FORM No. 57

## OFFICE MEMORANDUM

TO: Mr. Bernard Chadenet

DATE: February 17, 1967

FROM:

Andrew M. Kamarck and

5 Copies

SUBJECT:

Computer Time

- As you know, the switch to a private, more expensive computer, coupled with an increased workload, leaves us in some danger of running out of funds to buy computer time before the end of this financial year. Before we seek Budget Office guidance on how to handle this difficulty, we are trying to get fairly precise figures on the computer time we will need for work both in the remainder of this budget year and in the coming one. We should be very grateful if you could provide as good a forecast as possible of the work and problems you will be sending the Statistical Services Division from Projects Department that will entail use of computer services: we need enough information on these to make it possible for us to make an adequate estimate of how much computer time is likely to be involved.
- I should also be grateful if the Directors of the Area Departments, to whom I am sending copies of this memorandum, could let me have notes of any work which they can foresee arising in their departments in either of these periods which will call for use of computer time in calculations carried out for them by the Statistical Services Division.
- In order to face the problem of funds for this year, without risking delays in work, I need to have these notes by March 10, 1967.

cc: Mr. Alter

Mr. Cargill

Mr. Cope

Mr. El Emary

Mr. Williams

Mr. de Vries

Mr. Tiemann

AMKamarck/jb

### INTERNATIONAL FINANCE CORPORATION

FEB 2 3 1967

## OFFICE MEMORANDUM

TO: Mr. Bernard Chadenet

Andrew M. Kamarck

SUBJECT: Computer Time

FROM:

DATE: February 17, 1967

no Colla

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cc: Mr. Alter

Mr. Cargill

Mr. Cope

Mr. El Emary

Mr. Williams

Mr. de Vries

Mr. Tiemann

AMKamarck/jb

We may have need of two or three long term clift servine - growth model projections to be hardled on he computer between how ad he and of The was have he would need for debt servine projection, for perhaps to countrie, but I gather this is done on than one marked matched not he

Jacqueline Borda

## Macroeconomic data bank

- 1. Further to our meeting of February 15, I would like to sum up the steps that will be taken upon my return the 13th of March.
- 2. The data input and output sheets will be studied, and with the cooperation and support of the Comparative Country Data Group a system will be designed to be presented for your approval.
- 3. It was understood that a meeting, with Mr. King, would be arranged. The purpose of the meeting would be to discuss the value of the data bank as related to the expense of setting it up.

oc: Mr. Tiemann Mrs. Angel

JBorda/ms 16

February 16, 1967

Huguette Angel

Files

Computer facilities at the University of Maryland, College Park, Md.

On February 16, 1967 morning, Mr. Tiemann and I visited the computer center at the University of Maryland. We were received by Mr. James Chambree, in charge of the Computer Operations and we discussed the possibility for us to transfer part or all of our computer work there.

The University of Maryland computers serve primarily as teaching and research tools for the student body and the faculty. However, rem-profit organizations may be sponsored by a faculty member and allowed to use the computer facilities.

The University has an IBM 70%; Computer (16 tape drives), and 2 lkOl and a 360 Mod 30 (65 K) used primarily for Input/Output.

The 360-30 has h Disks, 5 tapes, 2 printers and 1 remote terminal. It can be used for computations but is rather slow.

The University is in the process of selecting an additional computer, probably an 1108 Univec or a 6400 CDC.

Users 66 the 709h computer are charged at the rate of \$263 per hour. Input/output is free unless the times spent on the 1h01 are very important; in which case, the charge would be \$30 per hour. Supplies are also free of charge unless we need a very large amount of cards to be punched or special paper (several parts lined or unlined) for the computer print-outs.

The turnaround time is 1-5 hours for short jobs (taking up to 10 minutes of 709h time). All jobs (large or small) submitted in the afternoon or evening (up to 9 PM) will - unless the equipment is down - be run and results ready for pick up next morning. In the early morning hours (7-8AM) and Saturdays turnaround time is much shorter.

Keypunching is available: free for Program punching (turnaround time: 24 hours) and at the rate of \$3.50/hour for data punching.

The keypunch and operating staff is of high quality, according to Mr. Chambree. However, the center uses a lot of student help and there is a chance that print-outs do not always come out neat (a solution is to have the tapes kept for a 2h to h8 hours to allow a second printing if necessary). Also, there is a slight chance that decks may be dropped or lost.

A program library (with regression programs in particular) is available. A plotter is also available.

Mr. Chambies asked us to furnish him with a detailed write-up of our work so that he may present it to the board of the University of Maryland economics department and find a sponsor for us.

Hangel/ms co: Hr. Tiemann Jacqueline Bonds 46 Statistics Miv. Economics Department Computer Requirements

- 1. The object of the meeting held on the 10th of February, was to discuss the short and long range computer requirements of the Comparative Country Data Group. It was a valuable way to become sequainted with the activities of the Division.
- 2. The requirements are varied and there are several possibilities for computer applications. Since the division has been in existence for a short time it is difficult to make a complete study and outline all the requirements. However, it is possible to make some suggestions concerning the work that can be prepared in the near future.
- 3. Although during the meeting several points were considered, only two should be exemined at present: the Country Data Files and the World Tables File. The different correlation studies as well as the varied computer application which can be performed for the Division should be studied at a later date, when the work is more clearly defined.
- 4. It was agreed that there is a definite need for a computer system and for the generation of a Data Bank. As requested, following are some suggestions for the creation of a Data Bank. This work seems indispensable and will be discussed at some length.
- 5. During the course of the meeting it was noted that it might be advisable to initiate the work with the creation of a file containing the data which was gathered to create the World Tables. This will permit for the immediate preparation of the World Tables and allow a great flexibility with formats and data computations. It will also permit certain studies and projections on the data.
- 6. It was noted that the information for creating the complete Comparative Countries Data Files will not be available for several months, at present only a limited amount is ready to be transposed onto keypunch cards. Therefore, the original thought of deriving the World Tables from this file will not be possible for a considerable amount of time. Taking the former into consideration it is strongly urged that a data bank for producing the World Tables be prepared. This file will be the initiation of the data bank, which will be completed as the information is made available.
- 7. It should be noted that the information that will be created when producing the World Tables data file will be available for the Comperative Country Data File. Correlations will be possible, as well as comparative studies etc.

- 3. As the Division grows and more services are required within the Department as well as outside the Department, more computer applications can be considered.
- 9. The realisation of a computer system is lengthy and demands a great deal of planning. Since it might require as much as a year to design and implement a basic file generation and maintenance system, and since the bank is planning to install a computer, squatime in the near future; it would be advisable to establish a work plan as soon as possible.

Following are the basic points to be taken into account when preparing the data bank which will produce the World Tables:

- a. Defining the problem. This phase requires a few weeks. Several weekly meetings, between the Comparative Data Group and the Computer Group, will be required.
- b. Designing the file records to include all relevant information and allow for expension and changes.
- c. Designing the computer system.
- d. Implementing the system. The time requirement for this phase can be reduced considerably by using available software.
- e. When all the above requirements have been met and sample output has been prepared, it will be possible to proceed and keypunch the data to be stored in the data bank. After the preliminary data file has been generated, it will be possible to propare, using the available data, a very diversified type of calculations; and provide services to the Comparative Country Data Group.
- 10. It is difficult to estimate any time requirement or draw a work plan until 9a is completed. This phase requires careful thought and planning, and should be sterted as soon as it is feasible.
- ll. It is noted that it will not be necessary for any staff member of the Comparative Data Group to devote full time to this problem. The only requirement will be for the Computer Group to measult at intervals, with the staff members, in order to prepare a proposal that will meet the needs of the Division. As the work progresses the demands on the Comparative Country Data Group will diminish.
- 12. As an immediate step it would be advisable, to start discussing the procedures as soon as the responsible staff members become available.

Pebruary 16, 1967
be a problem as the into the Data Bank

- 13. One point should be exphasized. It will not be a problem as the requirement grows larger, to introduce additional data into the Data Bank. This will be planned for during phase 9a.
- 14. Items 9 through 13 apply both to the World Table and the Comparative Data Bank. The latter will require more time to plan and implement since it is a more complex and detailed problem. However, it should be emphasized that there will never be two data banks. The information pertaining to the World Table and the Comparative Countries will be contained in one data bank.
- 15. It might be concluded that the first task to consider is to prepare the data with the information gathered for the World Tables. For this purpose the input data will be studied and a proposal will be submitted at a later date.
- 16. It should be clear that during phases 9a through 9c it will not be necessary to decide which computer is to perform the task. Consequently, during the remainder of this fiscal year there wight not be any budget requirements for computer services. However, for fiscal year 1967-68, there will definitely be a need for computer usage at service bureaus in order to implement the system.

00: Mr. Tiemann Mrs.Angel

Borda/ms Ho

Ec Dapt - Conpeter



### U.S. DEPARTMENT OF COMMERCE NATIONAL BUREAU OF STANDARDS WASHINGTON, D.C. 20234

February 15, 1967

IN REPLY REFER TO 205.00

\*

Mr. James E. Twining, Jr.

Deputy Director for Administration

International Bank for

Reconstruction and Development 1818 H Street, Northwest Washington, D. C. 20433

Dear Mr. Twining:

I am in receipt of your letter of February 10, 1967, in which you advise us that the Bureau's authorization to bill for actual computer work performed has been reduced from \$50,000 to \$20,000.

In August 1965 the Computation Laboratory was transferred from the Applied Mathematics Division to another division in the National Bureau of Standards. I am, therefore, forwarding your letter to Mr. I. V. Voltin, who is now in charge of computer services, and whose address is as follows: Mr. I. V. Voltin, Chief, Computer Services Division, Room A-200 Administration Building, Washington, D. C. 20234 (Telephone: 921-3424).

Sincerely yours,

E. W. Cannon, Chief

Applied Mathematics Division (IBS)



1818 H Street, Northwest Entington, U. C. Burgh

Dear Mr. Twin duri

I am the scoring of you letter on Pobruary 10, 1901, in which year no. ; us that the Research and herbaciton to til for actual computer verte performed has been in large \$50,000 to \$20,000.

of Standards. I .. . There to working your lead F to ". I. . Valler, are is see in chara it computer serious, and whose adores as in inflame: Mr. L. V. Voltin, Chies, Computer servages higher the n. Rob. 3-200 Advintagetent But they W. State, for C. 202 (T (98 logb mel 32:-3(24).

Cappor Aleccards

L. V. Cannon, W. d.

1867 FEB 17 MM 9: 13

COMMUNICATIONS

NES INSTITUTES PORECENEDE AND TECHNOLOGY

INSTITUTE FOR BASIC STANDARDS

INSTITUTE FOR APPLIED TECHNOLOGY

Mr. Charles G. Goor

J. R. Crowley Ju

### Reimbursement for Mr. Woodburn

Re your recent request to reimburse Mr. Woodburn the difference between the \$12.00 per month he paid for parking in a lot and the \$15.00 he pays for parking in the garage, per Mr. Twining's memorandum of November 9, 1966, authorizing this arrangement, Mr. Woodburn is to be charged the normal garage rent.

While it is true these arrangements are being made for the convenience of the Bank, it is also true that Mr. Woodburn is provided with premium space, convenient to him, and for which we have a considerable number of open requests. Under these circumstances we feel the regular going rate of \$15.00 per month is warranted.

JRC: hm

Mr. A.M. Kamarck

Rosalind Gilmore

### Computer Budget

In case you wanted a draft memorandum on this, one is attached. I have not filled in the date in the last paragraph, as I am not sure how soon you will want these memoranda, but we should perhaps fix some deadline.

Attachment

RGilmore/afw

RG.

Mr. E. W. Cannon Chief, Applied Mathematics Division Mational Bureau of Standards Washington 25, D. C.

Dear Sir:

By my letter of July 6, 1966, you were authorised to bill us for actual computer work performed for us up to an amount of \$50,000 to June 30, 1967. Subsequently as a result of changes in your operational requirements, the computers service which you could provide us was curtailed, and we had to utilize other service bureaus for much of our computer work. We are, therefore, reducing your authorization from \$50,000 to \$20,000, which should be adequate for the work which you have performed or will perform for us to June 30, 1967.

Sincerely yours,

James E. Twining, Jr. Deputy Director of Administration

cc: Messrs. Kamarck de Vries Johnston (2) Tiemann Twining

ATICMANN/MS (LY)

1967 FEB 13 PM 6: 18

MECEIVED MENERAL FILES COMMUNICATIONS ak. 3eb-15/67

Mr. E. W. Cammon Chief, Applied Hathematics Division National Bureau of Standards Washington 25, D. C.

Deer Sire

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Simoerely yours,

James M. Trining, Jr.

co: Mesars. Kamarck de Vries Johnston (2) Tiesann Twining

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1967 FEB 13 PM 6: 18

GENERAL FILES RECEIVED

toler det

Mr. William D.S. Fraser

February 8, 1967

Charles G. Goor

Computer contract with Control Data Corporation

This is in answer to your question "what happens next?" attached to the letter from Control Data Corporation of October 31, 1966 concerning the establishment of an open account type contract. This letter stated thetstandard terms and conditions for computer usage at the Control Data Corporation. It was indicated that these terms and conditions were a pre-requisite to establishing a processing agreement. Since some of the items could have raised questions, we checked with the International Monetary Fund, which has been dealing with this service bureau for some time. We were informed that these were merely conditions of relationship and that nothing further need be done. In fact the Fund has not signed any such statement of terms and conditions.

From the point of view of the Bank, we need take no further action except to wait for bills on service which this service bureau performs for us.

Attachment. cc: Messrs. Twining Reamy

AETiemann:ms

February 8, 1967

Dear Sir:

On October 4, 1966, you were authorized to bill us for computer work performed for us up to the amount of \$5,000 through June 30, 1967. Based on our estimate of additional computer requirements you are hereby authorized to bill us for an additional \$30,000 through June 30, 1967.

Sincerely yours,

James E. Twining, Jr. Deputy Director of Administration

Manager of Contracts Washington Center, CEIR, Inc. 1200 Jefferson Davis Highway Arlington, Va. 22202

cc: Messrs. Kamarck
de Vries
King
Johnston
Reamy
Goor

AETiemann:ra

COMMUNICATIONS
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Sincerely yours,

January Training, Jr.

Manager of Contracts Weshington Center, CEIB, Inc. 1200 Jefferson Davis Highway Arlington, Va. 22202

> cc: Messrs. Kamerok de Vries King Johnston Reamy

> > AFTiemann:ra

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INTERNATIONAL DEVELOPMENT

## OFFICE MEMORANDUM

Mr. James E. Twining, Jr.

DATE: February 8, 1967

INTERNATIONAL FINANCE

Charles G. Goor

FROM:

Changes in authorizations to service bureaus for computer work. SUBJECT:

- We have had to shift most of our computer work to commercial service bureaus from the National Bureau of Standards since the latter organization has limited availability to us due to U.S. defense requirements. Therefore, revisions are necessary in the authorized amounts for computer work in several of the organizations with which we deal. In oder to evaluate the revisions and keep track of the assigned amounts, the direct budget of \$70,000 for outside computer work needs to be split up.
- Thus far authorizations totalling \$55,000 have been made, \$50,000 to National Bureau of Standards (NBS) by letter of July 6, 1966 and \$5,000 to CEIR by letter of October 4, 1966. Allocations need to be made internally to cover expenditures at two other organizations to which specific authorizations have not been made by letter. These two organizations are IBMI which did not require an authorization amount prior to performing the work and which has already been reimbursed and the Control Data Corporation (CDC) which is performing under a general authorization (letter of October 19, 1966). To cover expenditures already made and expected to be made at CEIR in the near future, it is recommended that \$30,000 be authorized to that organization by way of the letter attached for your signature. A balance of approximately \$13,000 should remain uncommitted at this time.
- Following is a summary to date of the authorizations and allocations of the \$70,000 of direct budget for computer funds:

| Date of author            |          | Organization   |          |           |           |                           |  |
|---------------------------|----------|--|----------|-----------|-----------|---------------------------|--|
| ization or                |          | A CONTRACTOR OF THE PROPERTY O |          |           | Un-       |                           |  |
| allocation                | NBS      | CEIR   | IBMI     | CDC       | committed | Total                     |  |
| July 6, 1966<br>Aug. 1966 | \$50,000 | (AU)   | 743 (AL) |           |           |                           |  |
| Oct. 4, 1966              |          | 5,000 (AU)   |          |           |           |                           |  |
| Feb. 7, 1966 sub-total as | -30,000  | (AL)30,000(AU)   |          | 1,000(AL) |           | throat indicat acceptance |  |
| of Feb. 7, 1966           | 20,000   | 35,000   | 743      | 1,000     | 13,257    | 70,000                    |  |

(AU) = authorization by letter to organization.

(AL) = allocation made internally (i.e. at IBRD) only.

cc: Messrs. Kamarck de Vries King Johnston Reamy Fraser

Mr. Arthur E. Tiemann

Doreen Hedley and Joyce Bullock
External Debt Section - Statistics Division
Budget

You asked for specific suggestions on ways of reducing expenses connected with computer use.

The first suggestion is that we should concentrate on reducing the number and length of machine edits. These very inversely with the know-how of the statistical assistant responsible for the job. Know-how, in turn, depends on experience and instruction.

Retaining experienced people is a difficult problem unless the Bank is prepared to pay initial salaries sufficiently high to attract career-minded people.

On the matter of instruction, treatment and machine-processing methods have become extremely complex, but we do not yet have the instructions available as a whole in any one place. A manual of instructions would reduce the number of errors and necessary edits considerably. It would incidentally save supervisory time and would also serve to demonstrate the complexity of debt work.

It is true that with the formulation of a new system, the procedure will be changed somewhat. However, we anticipate that there will always be revisions of procedure and feel that this is as good a time as any to put instructions in writing.

- At the same time, this complexity ought to be reduced as far as possible. There are two ways in which this could be done:
- mer time, in the computer hours spent on assembling and debugging. At \$500 an hour we should confine our programs to what is useful to the Bank. As an instance of over-complexity, we quote the program for projecting service payments on IRRD loans. This ought to be a simple operation, and is not, mainly because we provide for currency break-downs and refined interest calculations. Currency break-downs of service payments have not been required for the last six years, to our knowledge. They are provided for because we were caught unprepared at the time of the 1949 devaluation, and we understand this was a traumatic experience. But surely this is taking preparedness too far. If devaluation occurs again, not too much of a problem is raised by IRRD loans. At least the data are in the Bank.

Similarly, the refirment of applying several interest rates to one IBRD loan (whenever the rate for sales and participation differs from that for the IBRD-held portion) seems unnecessary. We are, after all, only

Mr. Arthur E. Tiemann -2 - February 7, 1967

aiming at "Estimated contractual service payments", and interest is inaccurate anyway because of its dependence on rate of disbursement, which we have to assume.

2. The work of editing, done by the computer, could be reduced by eliminating those checks which are rarely useful. Not only would this reduce machine time directly, but it would be far less confusing to the statistical assistant responsible (and therefore less conducive to error) if he knew that all edit messages from the machine warranted investigation. We can prepare a list of error messages which we regard as redundant or of limited value, whenever you wish.

oc: Mr. Goor Mrs. B. B. King Mrs. Paulson Mr. John R. Crowley

Charles O. Goor

Reimbursement for mileage in connection with business use of car for Bank business by Patrick T. Woodburn.

Mr. Patrick T. Woodburn has been authorized to receive reimbursement for mileage in connection with business use of his car for Bank business. When these arrangements were first made, Mr. Fraser in his memo of September 1, 1965 to Mr. Twining recommended that parking privileges be accorded in the garage, and that any net additional cost be at the Bank's expense. Subsequently, these arrangements were made for Mr. David. It is requested that similar arrangements be made for Mr. Woodburn since the cost of his parking would have been \$12.00 per month rather than \$15.00 as chapged by the Bankis garage.

co: Messrs. Kemarck King CGGoor/ms Mr. Edward J. Donovan

Charles G. Goor

Reimbursement for mileage in connection with business use of car for Bank business by Patrick T. Woodburn.

This is to certify that Patrick T. Woodburn used his car on Bank business for the period January 5 through January 26, 1967, for a total of 60 miles. At 12¢ a mile, this amounts to \$7.20. I would appreciate it if you would please reimburse him.

CGCoor/ms

Do Dept. act.

Confidential

Pebruary 3, 1967

Mr. Andrew M. Kemarck

Charles G. Goor

Computer Costs, FY 1967

liminary cost estimates for January, 1967.

In my memo of January 1), 1967 to Mr. King I stated that our computer costs would exceed our budget for the current fiscal year if our computer usage continued at the expected rate based on data through Dec. 1966. The principal reason for the deficit was that the commercial service bureaus we are now using, charge higher rates than the National Bureau of Standards, and that the latter organisation has limited availability to us because of U.S. defense requirements. The cost of computer work has increased further according to the pre-

As a safety measure to cover the contingencies that additional funds are not going to be requested, or our request is not granted, I am setting up a control system which will permit me to screen out some requests for computer work and stretch out others so that we can live within our budget. This action has further implications which I should like to bring to your attention.

By turning down requests now, we run the risk of decreasing interest in computers for the long run and thus of jeopardizing our capability of making full use of a Bank computer when it is installed. The showdown in operations and deferral of projects means that programmers will have fewer opportunities to program, with a resultant loss of morale and possible resignations of hard-to-get personnel. Also, as the computer is no longer peripheral in much of our work but an integral part of operations, the work of a large portion of the statistical staff will be slowed down and delayed with a consequent loss of morale. Our recent major effort to bring, and keep, our debt work up-to-date will be jeopardized.

A fair and efficient centrol system can be effective only if I or Mr. Tiemann take time to review computer requests in advance so that the lower priority requests can be screened out.

Since under the circumstances requests for work may be delayed, turned down or at the least questioned, some departments may raise questions with you on this matter. The above facts are brought to your attention to assist you in answering these questions.

In summary, the restrictions necessary to operate within the existing budget are so serious and far-reaching in their effects that it is, in my opinion, imperative that additional funds be obtained either by a budget supplement or by transfer from computer users.

oc: Mesers. de Vries King Mrs. Angel Africa Department Economists

January 26, 1967

Harold Larsen

Jan. 23/67

- 1. You may be interested in the attached memoranda describing a computer program for debt exercise.
- 2. In view of the existing pressure of computer work within the Bank and the fact that it is at this time being performed by commercial rental of equipment, any suggestions for utilizing this program should be discussed with myself or Mr. Edelman before being sent to the Statistics Division of Economics Department.

Maraentok 1880

Attaclment

co: Messrs. Williams

Calika Edelman Goor

Africa Department Economists: Messrs. Golden

Maubouche
Hussein
Hansen
Fleming
Hammel
Scheltema
Dean
Khandker
Bruce
Krishna
Booz
Finzi
Bachmann
de Azcarate

The Dogst act.

Mr. J.E. Twining, Jr.

January 24, 1967

W.D.S. Fraser

### BUDGET FOR COMPUTER SERVICE BUREAU TIME

Mr. King mentioned that he was expecting some problems with the current budget for computer time, and that he was receiving no sympathy from Mr. Poore.

On December 31, there were \$55,000 left out of \$80,000 in the budget category concerned. However, this takes into account billings received only through September 1966. We know that recent billings from CEIR and CDC have aggregated about \$7,000 a month, so that if this rate of expenditure prevails in the 9 months October 1, 1966 - June 30, 1967 or \$63,000, there will be an overrun of \$8,000.

Mr. Goor tells me that he has been asked to do an analysis of expenditures, past and predicted, on computer time, and will send me a copy in due course.

cc: General Files WDSF:hh

Mr. Andrew M. Kamarck

Charles G. Goor

Computer Program for debt exercise

Jan 16/67

Please find attached a memorandum to me prepared by Mrs. H. Angel and describing a computer program that may be of interest to members of the Economics and Area departments.

In view of the increased cost of computer operations at service bureaus used by the Bank, some economy can be achieved by using this type of debugged operational program since it can be run at much lower cost than a special program specifically developed for a single purpose.

attachment.

co: Messrs. de Vries
King
Kalmanoff
Hawkins
Leon
Karaosmanoglu
Larsen
Edelman
Gilmertin
McDiarmid
Hablutsel
Thompson
van der Mel
Weiner
Wright
Mrs. Paulson

MasesHelley

Mr. Suto

Bullock

Mr. A. Karaosmanoglu

January 18, 1967

Huguette Angel

Computer programs and data available for cost of aid study.

At the occasion of the preparation of the Bank's annual report of 1966, we used a computer program to calculate the weighted average terms of repayment of debts. The data was provided by the current file of external debt cards (organized by country borrower).

A grant element was then computed as in the study:

Foreign Aid Policies Reconsidered by Goran Ohlin Development Center of the OECD, Paris 1966.

p.10h - simplified formula s = 
$$(q-i)$$
 (2.5 +  $\frac{\pi}{2}$ )(1 + 6)  
and  
p.103 - generalized formula s= $(1-\frac{i}{2})(1-\frac{e^{-9G^{-}}e^{-9T}}{9})^{\frac{1}{2}}$ 

The discount rate used was a flat rate for all loans.

A variation to this calculation (programmed but not yet used) consists of inserting, in the grant element formula, instead of a flat discount rate a weighted discount rate obtained by using for each lender the yield on long term government bonds.

Note that the 'Ohlin' calculations do not take into consideration disbursements and assume equal principal payments.

We also calculated a grant element by projecting debts from issue date to maturity and discounting (at a flat rate) disbursements and total service payments. The condition of our punched card file and computer programs is such that at present we can only apply this technique to debts incurred in the period that is being processed for regular debt tables.

Please find attached a memo by Mrs. Slappey giving her comments about the data that we have available for weighted average terms and grant element calculations.

Attachment.

HAngel/ms

Mr. Charles G. Goor

Huguette Angel

### Computer Program for Debt Exercise

The Programming Section of the Statistical Services Division of the Economics Department has written a computer program to calculate the amounts of new loans that need be authorized each year to achieve, each year, a given level of net aid. The new loans will be disbursed according to given annual percentages. The program provides for the new loans being divided among lenders by fixed percentages and for several sets of repayment terms within each lender.

The input consists of the following:
A title that will appear as a heading of the output tables.

The number of lenders and the initial date (year) of projection.

For each lender:

The number of lending schemes (corresponding to various sets of repayment terms).

For each lending scheme:

The percentage of total authorisation amount that it represents and the repayment terms:

interest rate

length of term to maturity

length of grace period

repayment type (equal principal, equal level payment, other ...)

frequency of repayments

The number of years of disbursements and the percentage disbursed in each year for new authorizations.

The length of the projection period and the total amount of net aid desired each year.

The projection period may be broken down into two, each with different sets of repayment terms.

The disbursements and total service payments on existing debt for each year of the projection period.

The output consists of tables giving for each year of the projection period:

new authorisations disbursed amounts debt servicing (principal, interest and total) net aid flow debt outstanding at the end of the year

A table is produced for each lender, for each lending scheme (within each lender) and for grand total.

This program was first used for the exercise on India's external debt, as requested by Messrs. Stanley Katz and David Dunn, Asia Dept., (Dec. 1966). HAngel/ms

Mr. Charles G. Goor

January 11, 1967

Huguette Angel V.A

### Computer costs

Our computer expenses have been increasing drastically from onth to month since the beginning of the fiscal year and I expect they will keep on increasing. Here are some of the reasons:

- l) The demand has been increasing. The bulk of our work, as before, is the debt work but instead of running mostly routine debt tables, we are being asked more and more often to run special tables. Also there is a definite increase in demand for new programs in subjects other than external debt (tabulations such as those for the Central American Mission, models such as the Livestock development model, country model, etc.).
- 2) Since October 1, 1966 we have been forced to run less and less programs at the National Bureau of Standards and more and more at commercial service bureaus where costs are twice (or more) as high. The reason is that starting October 1, 1966, the NBS computer which has been owned by the Defense Department for some time, has been reserved for Defense Department work except at night. Indeed the turnaround time has been lengthened to 24 and up to 72 hrs. On top of that, service at NBS has deteriorated, and because of the restriction of the computer area, we have lost contact with the computer operators making up for a greater frequency in technical errors and an additional loss of time until correct results are obtained.

Thus we shifted an ever increasingly part of our work load to a commercial outfit. After careful consideration, we decided to turn to CEIR. It is expensive but having a computer very similar to the one at NES, we had the least amount of reprogramming to do. Their turnaround here is usually short and their location makes them within easy reach. The only other single commercial outfit which may compare with it is CDC. They may be slightly cheaper but their location is out of our reach and we have so far avoided using them for that reason.

We gave deep thought to running at other government service bureaus but those in this area are being equipped with/360 computers which would require a serious amount of peprogramming. Moreover most of these installations are too new to be trusted - or if not (USDA), the turnaround time is very large. Besides as our experience has shown, we always get pushed around at a service bureau and more so at a government one.

3) Our expenses will be far greater because the OECD/IERD reporting system is now effective. This will require additional punching (that may have to be done partly outside); a special program for OECD (to produce a tape and/or tables), a program to convert the cards to debt form and edit, a program to produce tables for participants.

Ec Dopt Bet

Mr. Charles G. Goor

January 9, 1967

Huguette Angel H.A.

Rental of IRM equipment.

I have prepared some notes explaining why we cannot approve the billsesent by IEE. I have also prepared a list of the equipment we now have in our unit and of the equipment that was in our machine room previously but has been removed from it.

Mr. Edward J. Donovan

December 27, 1966

Charles G. Goor Chief, Statistics Division Reimbursement for mileage in connection with business use of car for Bank business by Patrick T. Woodburn.

This is to certify that Patrick T. Woodburn used his car on Bank business for the period November 30 through December 16, 1966, for a total of 68 miles. At 12¢ a mile, this amounts to \$8.16. I would appreciate it if you would please reimburse him.

CGGoor/ms

Ec. Dept Cast

## FILE COPY

Mr. Joseph C. Reamy

November 9, 1966

J. E. Twining, Jr.

Mileage Reimbursement in Connection with Business Use of Car by Mr. Patrick Woodburn, Economics Department

This is to authorize Mr. Patrick Woodburn, Economics Department, to park his car in the Bank Garage effective December 1, 1966, for which he will be charged normal garage rent, and to be reimbursed 12 cents a mile for all travel on official business, which amount shall be paid out of petty cash.

These arrangements are necessary in order that Mr. Woodburn may use his car to transport tab cards in conjunction with computer operations.

It is my understanding that Mr. Woodburn's insurance covers the use of his car for these purposes and that no additional premium is involved.

These arrangements are authorized until June 1, 1967, at which time this situation will be reviewed again.

cc: Mr. Goor

Mr. Donovan

Mr. Crowley

JRCrowley:hm Te

ac Dept ant November 4, 1966 Manager of Contracts Washington Center C-E-I-R, Inc. 1200 Jefferson Davis Highway Arlington, Virginia Dear Sir: On behalf of the Projects Department of the International Bank for Reconstruction and Development I would like to request computer time up to a value of \$1,000.00 on your Washington D. C. 7090 computer with ancillary use of your 1401. Mr. Heinz Vergin has been authorized to make arrangements to use CEIR services within the above limits. Yours sincerely, Robert A. Sadove Economic Adviser Projects Department

HVergin: rm

cc: Mr. Sadove Mr. Laing

To Dept Gat.

Mr. Michael L. Lejeune

October 19, 1966

W.D.S. Fraser

## COMPUTERS

It appears that it is the custom of service bureaus to have clients give them the authority to bill for actual work performed. It is not a contract in the ordinary sense. I have checked with IMF who also have issued such letters to various service bureaus including CDC.

Up till now we have been relying mainly on National Bureau of Standards computers, but service on them is getting progressively harder to get. It is difficult now to get prime shift time and our work is often delayed by one or two days. This turnaround time is excessive for efficient operation, and the Bank (and IMF) are now looking to commercial service bureaus. We are sending work to CEIR for example.

The budget in this Fiscal Year for service bureau time is \$72,500. So far the Bureau of Standards has authority to bill us up to \$50,000, and CEIR up to \$5,000. I see no point in putting a figure in for CDC as control of expenditure is the Bank's concern, not CDC's. I have added the words "in accordance with your schedule of rates current at the time", which is normal language for letters of this kind. The letter is prepared for your signature rather than Twining's since work is waiting to be done.

It is noteworthy that the current rates for computer time on commercial service bureaus at about \$425 an hour is substantially higher than the preferential rate we have been getting at the Bureau of Standards at about \$180 an hour.

cc: General Files WDSF:hh

October 19, 1966

Mr. Dick Brindley Control Data Corporation 11h28 Rockville Pike Rockville, Mi.

Dear Sir,

Mrs. Haguette Angel of the Statistics Division of the Economics Department of the International Bank for Reconstruction and Development, has discussed with you the compilation and running of computer programs required in the Bank's work at Control Data Corporation.

ir. Charles G. Goor, Chief of the Statistics Division, or a mamber of his staff will be responsible for determining the scope of the work to be done and will arrange for its delivery. In this commection, you are hereby authorized to bill us for actual work performed for us on the computer at Control Data Corporation in accordance with your schedule of rates current at the time.

Sincerely yours,

(signed) Michael L. Lejeune

Michael L. Lejeune Director of Administration

WY

HAngel/hh

cc: Messrs. Kamarck

King

Johnston (2)

Goor Lejeune

PLANTIST WATER

Mr. Dick Brindley Control Date Corporation Lik28 Rockville Pike Rockville, Md.

tioner diam.

Ww. Magnette Angel of the Statistics Mivision of the Romanics Department of the International Hank for Recentraction and Development, has discussed with you the compilation and remains of computer programs required in the Hank's work at Control Sate Corporation.

if. Charles C. Char, Chief of the Statistics Hivision, or a member of his staff will be responsible for determining the scope of the work to be done and will carrenge for his delivery. In this commention, you are hereby authorized to bill as for actual work performed for us on the companies at Cambrol Bata Corporation in accordance with your schedule of rates current at the time.

Mincoraly yours,

(signed) Michael L. Lejeune

Michael L. Lajous Hiroctor of Administration

W

Mangel/hh
co: Manare. Manarck
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Johnston (2)
Geor
Lejoune

1966 OCT 20 MMII: 15

COMMUNICATIONS
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Es Dept . Bet .

Mr. Arnold F. Johnston

October 5, 1966

J. E. Twining, Jr.

ECONOMICS DEPARTMENT - COMPUTER TIME

Before signing the attached letter authorizing computer time on CEIR machines up to \$5000 for the balance of this fiscal year, I discussed the budget implications with Mr. Goor. I have approved this arrangement with CEIR on the understanding that if necessary part of the funds now allocated to an arrangement with the National Bureau of Standards (total amount \$50,000) will be earmarked to pay CEIR billings and in any case that the total budget allocation for outside computer time will not be exceeded by the Statistics Division.

Mr. Goor assures me that the amount of time provided by the National Bureau of Standards to the Bank will be much below that originally estimated and therefore there will be adequate savings in this allocation to pay for the CETR time.

Attachments: Copy of letter of October 4, 1966, to CEIR (2). Mr. Goor's memorandum to me of October 4.

General Files (without attachments)

JET:ian

Mr. James E. Twining, Jr.

Charles G. Goor

## Attached Letter of Authorization to CEIR

Because of changing work priorities at NBS for the remainder of the Fiscal Year, we find it very difficult to get our work done expeditionally on the prime shift and perhaps even with a considerable delay on other shifts. It is therefore necessary for us to establish back-up capability at other computer centers, such as CEIR (letter of authorisation attached) and probably later the U.S. Department of Agriculture Service Center and Control Data Service Center as we may need them.

We have authorized 350,000 at the NBS this Fiscal Tear. Under the present circumstances it appears likely that part of this authorization will not be used at NBS and thus could be utilized at other computer centers. However, the total expenditure for this activity will stay within our budget estimate.

CGGoor/ms

CC: Messrs. Kamarck King Johnson (2) Twining Manager of Centracts Washington Center, CEIR, Inc. 1200 Jefferson Davis Highway Arlington, Va. 22202

Dear Sire

As discussed with Mr. Jack Byrd of your organization we request machine time in your IBM 7090 computer installation. Mr. Charles G. Goor, Chief, Statistics Division of our Economics Department, will be responsible for all arrangements in this matter.

Accordingly, you are hereby authorized to bill us for actual work performed for us up to the amount of 35,000 through June 30, 1967.

Sincerely yours,

James E. Twining, Jr.

Deputy Director of Administration

COGoor/ms

co: Mesers. Kamarck

King

Johnson (2)

Goor

Twining

Ca Gat.

Mr. Edward J. Donovan

August 26, 1966

Charles G. Goor
Chief, Statistics Division
Reimbursement for mileage in connection with business
use of car for Bank business by Roy McDonald

This is to certify that Roy McDonald used his car on Bank business for the period August 16 through August 25, 1966, for a total of 170 miles. At 12¢ a mile, this amounts to \$20.40. I would appreciate if if you would please reimburse him.

CGoor/ms

E Dept Oct.

Files

August 10, 1966

Charles G. Goor

Overloading of Egypunching Facilities in Statistics Division

We have been requested to write programs recently for the processing of medium to large volumes of data. Such jobs include in particular a mass of data to be processed for the Central American Mission. We were informed that there would be more than 20,000 cards to be punched. Since our keypunch unit was unable to handle that portion of the work load which was required within the subsequent week, it was necessary to send some of our keypunching to a service bureau. The approximate cost of the job, which was sent to IBMI (Integrated Business Methods Inc.) on August 10th is estimated at approximately 3900.

IBMI did not request a letter of authorisation from the Bank. I discussed this project by telephone with Mr. Twining who authorised me to send the work to IBMI without dispatch of a letter of authorisation and requested that I write an internal memorandum to cover the case.

CCGoor/ms oo: Mr. Twining Mr. Reamy

July 6, 1966

Dear Sir:

In continuation of our arrangements of last fiscal year we request some machine time on your "709h" computer. I understand that a reasonable amount of time will be made available to us as needed.

You are hereby authorised to bill us for actual work performed for us up to an amount of \$50,000 to June 30, 1967, to include "709h" time and "lhlo" time and assistance in programming when requested. Hr. Charles G. Goor, Chief of the Statistics Division of the Economics Department, will arrange necessary details with your office for handling the work.

Sincerely yours,

James E. Twining, Jr. Deputy Director of Administration

Mr. E. W. Gennon Chief, Applied Mathematics Division National Bureau of Standards Washington 25, D.C.

cc: Mr. Kamarck

Mr. de Vries

Mr. Johnston (2)

Mr. Goor

Mr. Twining

CGGoor/ra

July 1, 1966

Mr. James C. Hetrick Arthur D. Little, Inc., Acorn Park, Cambridge, Mass. O2140

Dear Mr. Hetrick:

May I remind you at this time that I am still interested in receiving the literature and/or references on cash flow calculations that you promised to send me after your lecture at the "Modern Analytic Methods" course, on May 2h, 1966.

Since our programming staff is finally being increased, we will very soon be able to devote some time to the study of cash flow projection methods and subsequent programming.

Sincerely yours,

Huguette Angel Statistics Division Economics Department

HA/pam A.

Supplers + Egrip

Mr. Joseph C. Rearry

June 21, 1966

J. E. Twining, Jr

Parking and Mileage Reimbursement in Connection with Business Use of Cars by Economics Department Staff

1. On December 30, 1965, I authorized for a three-month period, special arrangements for providing parking privileges and mileage reimbursements to Rogelio David and Roy McDonald of the Economics Department for use of their cars in transporting tab cards in conjunction with computer operations.

Specifically Mr. David and Mr. McDonald were to be provided space on the "G" Street parking lot, with any net additional cost to them from these arrangements being absorbed by the Bank. In addition Mr. David and Mr. McDonald were to be allowed a mileage allowance of 12¢ a mile for all travel on official business, which amount would be paid out of petty cash. Finally, it was agreed that Mr. David was to be reimbursed for any additional insurance premiums he had to pay as a result of using his car for official business. (Mr. McDonald is not obliged to pay any additional premium.)

- 2. We have reappraised this situation and find it still necessary to continue these arrangements. Accordingly, this is to authorize extension of these arrangements to August 1, 1966, at which time we will reappraise this situation.
- 3. In addition, where required for official purposes, the Economics Department is authorized to be reimbursed for additional taxi and messenger costs required in connection with the transportation of punch cards and other materials relating to machine and computer work.
- 4. By copy of this memo, I am asking Mr. Goor to have Mr. David formally request reimbursement for any additional insurance premiums for this period.

ce: Mr. Goor Mr. Donovan

JRCrowley:hm

· gre

Sup o againstor June 2, 1966 Mr. J. R. Crowley Arthur E. Tiemann Parking and Mileage Reimbursement in Connection with Business Use of Cars On December 27, 1965, Mr. Goor requested an extension of parking arrangement in connection with the business use of cars for Mesers. David and McDonald. I understand that this extension was granted. It is now requested that Mr. Patrick T. Woodburn be included in the same arrangements that were made for Messrs. David and McDonald. Mr. Woodburn ourrently has a parking lot permit so that the arrangements for access to the lot on 1819 G St. should be set up with the net additional cost to be at the Bank's expense. It is important that Mr. Woodburn be provided this access to the more convenient parking lot because of the increased requirement in connection with transportation of punched cards and other materials relating to our machine and computer work. The current arrangements with Mr. Roy McDonald are expected to be terminated on August 31, 1966 in view of the fact that he will be leaving the Bank on that time. /ma Mesers. Kamark King Donovan Mrs. Angel

Data Proc

Mr. Armold F. Johnston

May 5, 1966

Bargad A. de Vries



Estimates of computer costs (contractor services) for April - June, 1966 and for Piscal Year 1967.

As per your request, following are the estimates of computer costs (contractor services) to be incurred:

(a) Estimated expense /pril - June, 1966

\$20,000 (mostly National Bureau of Standards)

(b) Bulget for Fiscal Year 1967

372,500 (mostly Hetdonel Bureen of Stendards)

of which IND

\$70,000 bullot

receivables

\$ 5,500 from LDB

(c) In response to your question as to whether the 83,477 accrual for the Bureau of Labor Statistics is a walld accrual, the enever in yec.

cas Mr. Kemerok

Mr. King

Mr. Coor Mr. Adadag

Mac Peridae

Source - Reefleris & Egunjament February 16, 1966

Mr. Edward J. Donovan
Charles G. Goor

Reimbursement for mileage in connection with business use of car for Bank business by Roy McDonald

This is to certify that Rogelio G. David used his car on Bank business, as authorized, for the month ended February 15, 1966, for a total of 280 miles. At 12¢ per mile, this amounts to \$33.60. Please reimburse him.

CGGoor/pan

Mr. Edward J. Donovan

Charles G. Goor

## Reimbursement for mileage in connection with business use of car for Bank business by Rogelio G. David

This is to certify that Rogelio G. David used his car on Bank business, as authorized, for the month ended February 15, 1966, for a total of 150 miles. At 12¢ per mile, this amounts to \$18.00. Please reimburse him.

CGGoor/pam

admin Lavace - Seep. & February 3, 1966 File Fmanuel Levy Computer Requirements - meeting with Mrs. H. Angel The anticipated computer requirements of the Comparative Country Data Group in financial year 1966/67 were detailed in a memorandum sent to Mr. Coor on January 27. The object of today's meeting was to discuss probable requirements during the remaining part of the current financial year i.e. up to June 30, 1966. These requirements stem from the compilation program for World Tables 1 and 2 and the anticipated data demands of the forthcoming IBRD Annuel Report. (The work program of the Comparative Country Data Group calls for the completion and circulation of the World Tables by June-July 1966: The data for the Annual Report are required by roughly April-May 1966.) After checking through the outline Tables, Mrs. Angel expressed the view that the entire range of computations envisaged, including those in Table 1, should be computerized. To this end, the relevant annual data should be prepared and punched for all years 1950-1964, even though the final tables will include data, growth rates, etc. for selected years and periods only. In this way, it will be possible later to introduce alternative methods of computation without having to repunch the data. As regards the data requirements of the Annual Report (which will presumably cover some 20 countries), it was suggested that an ad-hoc program be worked out for these countries as soon as possible in conjunction with Mr. Kundu, so as to be able to meet the April-May deadline. A final program for the World Tables as a whole could be worked out later. I undertook to contact Mrs. Angel and Mr. Kundu in this connection as soon as a final agreement was reached with Mr. Kochav on actual requirements. The question of integrating the World Table program with that of the Scheduled Country Data files was also discussed. It was agreed that little could be done pending the completion and circulation of the Specimen Country Data File now in process of compilation. It was hoped to have this ready some time this month. E.Levy: ark. ec: Mr. B. B. King Mr. C. G. Goor

Mr. A. Kundu Mrs. H. Angel Mr. Edward J. Donovan

Reimbursement for mileage in connection with business use of car for Benk business by Roy McDoneld

This is to certify that Roy McDonald used his car on Rank business, as authorized, for the month ended January 14, 1966, for a total of 320 miles. At 12¢ per mile, this amounts to \$38.40. Please reimburse him.

CGGoor/pam

Supp + Egerpment

Mr. Edward J. Donovan
Charles G. Goor

Charles G. Goor

January 27, 1966

Reimbursement for mileage in connection with business use of car for Bank business by Rogelio G. David

This is to certify that Rogelio G. David used his car on Bank business, as authorized, for the month ended January 14, 1966, for a total of 183 miles. At 12¢ per mile, this amounts to \$21.96. Please reimburse him.

CGGoor/pam