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**INTEREST RATE GUIDELINES FOR FEDERAL
DECISIONMAKING**

HEARING
BEFORE THE
SUBCOMMITTEE ON ECONOMY IN GOVERNMENT
OF THE
JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES
NINETIETH CONGRESS
SECOND SESSION

JANUARY 29, 1968

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(III)

INTEREST RATE GUIDELINES FOR FEDERAL DECISIONMAKING

MONDAY, JANUARY 29, 1968

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON ECONOMY IN GOVERNMENT
OF THE JOINT ECONOMIC COMMITTEE,
Washington, D.C.

The Subcommittee on Economy in Government met, pursuant to notice, at 10 a.m., in room 1202, New Senate Office Building, Hon. William Proxmire (chairman of the subcommittee), presiding.

Present: Senators Proxmire, Symington, and Jordan.

Also present: John R. Stark, executive director.

Chairman PROXMIRE. The subcommittee will come to order.

This morning the Subcommittee on Economy in Government of the Joint Economic Committee continues its study of Federal expenditures, particularly methods of improving efficiency and reducing waste in the \$175 billion of Federal expenditures.

During this subcommittee's hearings last September on planning-programing-budgeting (PPB) systems, we heard three top economists testify that current Government policies favoring low discounting rates in cost-benefit analysis lead to gross overinvestment in certain sectors, and contributes to inflationary pressures and slower economic growth. To the extent that this is true, it involves waste of our resources.

At my request, agencies recalculated, at various higher discount rates, proposed public works projects; in many cases the higher discounting showed that project costs overwhelmed benefits, indicating that such planned investments were actually a drain from taxpayers' pockets.

An initial survey—the subject of today's hearing—was carried out by the General Accounting Office. The survey attempted to discover the extent and type of discounting practices now utilized by Federal agencies. Virtually every Government agency was covered in the study. The survey shows clearly that there are inconsistencies in current budgetary practices and points out the need for reform in discounting procedures.

We will include the complete survey report in the record at the close of today's proceedings.

(See p. 33.)

Senator PROXMIRE. However, before we hear from our witnesses, an important point should be made. While there is virtual agreement that Government discount rates are too low as compared to discounts used in the private sector, we are not asking that the Government institute one single unique and unchangeable rate to be applied to

every Government agency. Instead, we are more interested in the range of rates now utilized; our point is that the entire discounting structure should be adjusted upward to some parity with private rates, and that some degree of Government standardization be achieved.

I might say that it is encouraging to note that in his forthcoming budget, President Johnson called for increasing the interest rate used in evaluating water resources projects. The Budget says, and I quote:

The Water Resources Council is developing a more appropriate rate to be applied in formulating and evaluating water projects. The revised rate will be related to the average estimated current cost to the Treasury of long-term borrowing. It will be higher than the rate now in use for project evaluation. The new rate will be applied to future projects in order to assure the most effective use of Federal funds in the development of the Nation's water resources.

Hopefully the higher rate should reflect the results of the GAO study, which puts the cost of long-term borrowing around 7½ percent rather than just the current Treasury rate which is around 4.875 percent. It might also be advisable to apply the higher rate to current or just-started public works projects. If many of these projects showed negative present value, there would be a strong case for discontinuing them.

Of course, my own feeling is that opportunity costs are more relevant and the Stockfish report which was, as you know, a part of the hearings which we had last September, I think indicated that private industry was better than 10 percent on the average, manufacturing being around 15 percent of return on invested capital before taxes.

With this in mind, we are very happy to have as our witness the Honorable Elmer B. Staats, Comptroller General of the United States, and members of his staff.

At this point in the record we will include the announcement of this hearing.

(Announcement follows:)

JANUARY 20, 1968.

CONGRESS OF THE UNITED STATES, JOINT ECONOMIC COMMITTEE, SUBCOMMITTEE ON
ECONOMY IN GOVERNMENT

Senator William Proxmire (D-Wis.), Chairman of the Joint Economic Committee, said Sunday the results of a General Accounting Office probe into serious inconsistencies in the Government's system for determining spending priorities will be disclosed at a hearing, Monday, January 29th.

The Wisconsin Senator was joined in announcing the hearings, to be conducted by the Subcommittee on Economy in Government, by Representative Thomas B. Curtis (R-Mo.), ranking minority member. Senator Proxmire is the subcommittee Chairman.

Senator Proxmire said: "Hearings conducted last September by the subcommittee showed virtual unanimity among economists in the view that discounting procedures used by the Federal Government in evaluating the benefits of proposed projects were economically irrational.

"No attempt is made in present practice to consider the rate of return that public investment might earn if employed elsewhere in either the public or private sectors and, worse still, there is not even any correspondence between rates used by different agencies, even for similar programs."

The Comptroller General of the United States, Mr. Elmer Staats, and his staff will testify at the January 29th hearing, which is scheduled for 10:00 a.m., in room 1202 of the New Senate Office Building.

Mr. Staats, before you proceed with your statement I will ask Senator Jordan if he has a statement?

Senator JORDAN. No; I have no statement.

STATEMENT OF HON. ELMER B. STAATS, COMPTROLLER GENERAL OF THE UNITED STATES; ACCOMPANIED BY ELLSWORTH H. MORSE, JR., DIRECTOR, OFFICE OF POLICY AND SPECIAL STUDIES; KEITH E. MARVIN, DEPUTY DIRECTOR FOR SYSTEMS ANALYSIS; DANIEL RATHBUN, FORMER DEPUTY DIRECTOR FOR SYSTEMS ANALYSIS, AND TED M. RABUN, STAFF MEMBER

Mr. STAATS. Thank you very much, Mr. Chairman. We are pleased to appear before your Subcommittee on Economy in Government to discuss the results of our recent survey of the use by Federal departments and agencies of the discounting technique in making evaluations of future programs. Our report on this survey is being submitted today to your committee in accordance with your request of December 19, 1967.

We have noted with interest the work your committee is doing to establish a more effective basis for evaluation of the economics of Government programs. We welcomed the hearings you conducted in September 1967 on the subject of the planning-programing-budgeting system and we have read with great interest your statement on discounting in the report on those hearings. I would like to say, Mr. Chairman, I thought this was an excellent report. While our review of this subject goes back for quite some time, we particularly welcomed the kind of statement included in that report, and we feel that with the committee's report and, hopefully with our report, we will make progress in this area.

The General Accounting Office has also been interested in the subject of planning, programing, and budgeting and specifically the discounting technique. We recently conducted a survey of 23 selected Federal agencies to obtain information on the use made of the discounting technique in making evaluations of their future programs. I share your views that discounting is a matter of increasing importance as the use of PPB causes us to look further into the future at alternative programs. This is so because by the technique of discounting the amounts of estimated future costs and benefits are stated in terms that are comparable to present costs and benefits. The discounting technique does this by the application of a compounded rate reflecting the costs of money.

Federal agency programs generally involve a series of annual costs and a flow of benefits over time. Calculation of the present values of costs and benefits through discounting makes possible a comparison of alternative programs in terms of a ratio of benefits to costs, which gives consideration to the time periods in which benefits will be realized and costs incurred and the time value of money.

The discounting technique can be helpful to the decisionmaker even in those cases in which the benefits associated with programs cannot be measured in dollars. Here, the present values of the costs of the programs can be presented to the decisionmaker for his decision as to whether the perhaps dimly perceived benefits are worth their costs.

Before commenting on the specific aspects of our survey, I would

like to discuss our conclusions at this time so you may consider them in the light of what our survey has shown. Many Federal agencies have made good use of the discounting technique in evaluating individual projects. By applying the discounting technique to alternatives within a single program, the agencies have been in a better position to select the most economical alternative.

In our opinion, however, there is even a greater need for a consistent discounting policy when decisionmakers must choose from many competing projects, either within an agency or among agencies. This calls for a common standard, with justifications for variations only in special circumstances. Although some agencies indicated that the discount rate is viewed as an aid in choosing between programs within an agency, there appears to be little recognition in practice that this kind of evaluation of Federal programs calls for a common yardstick for use by all agencies.

Our study brings out the significant impact on benefit-cost ratios of discount rate variations. For example, a proposed program showing a benefit-cost ratio of 2:0 without discounting might have a benefit-cost ratio of only 1:1 if costs and benefits were discounted at a 10-percent rate. Our survey has disclosed variation in the discounts ranging from about 3 to 12 percent. This sort of reduction in benefit-cost ratios as a result of discounting would be characteristic of many programs because the high initial investment costs are not reduced and, therefore, become greater in relation to the future annual costs and annual benefits.

In our opinion, the general acceptance of the technique of discounting by Federal agencies should be supplemented with improvements necessary to bring about consistency in and among agencies in the discounting rates used, and in the techniques and underlying concepts employed. We believe such improvements are needed if this aid is to be of most effective use to the agencies, the Bureau of the Budget, and to the Congress in its evaluation of executive agency programs submitted for consideration.

We believe that improvement in the direction suggested will still require a substantial amount of additional study. We have received statements from several Federal agencies in which they express recognition of the need for standardization and offer to work with us on further studies.

With these conclusions in mind, I would now like to describe the highlights of our survey.

Our survey of 23 Federal agencies disclosed that there is a variety of policies and practices for the use of the discounting technique.

Ten of the 23 agencies used the discounting technique in evaluating their fiscal year 1969 programs.

Eight of the 23 agencies did not use the technique for evaluating 1969 programs but plan to do so in the future.

Five of the agencies do not use discounting and did not state that they plan to do so in the future.

The 10 agencies that use the discounting technique cite a variety of rationales as support for the discount rates they use, which vary from about 3 to 12 percent. As an example, the Office of Economic Opportunity has used rates of both 3 and 5 percent to evaluate its Job Corps and Upward Bound programs and has used a rate of 5 per-

cent for the family planning program. The stated rationale for selecting these rates was that they were safely on the conservative side for estimates of this type and gave consideration to the secular growth in the price of quality-constant labor.

The General Services Administration used a rate of 4.5 percent in its analyses leading to the decision to request funds to buy sites for additional buildings for its fiscal year 1969 facilities program. The 4.5 percent was selected as an estimate of the long-term productivity of capital.

We were advised by the Department of Transportation that for fiscal year 1969 programs discounting was used only in the consideration of three investment programs of the Federal Aviation Administration: facilities and basic systems, radar components, and en route automation. A rate of 4.2 percent was chosen because this was approximately the discount rate (4.25 percent) of the Federal Reserve Board at the time the studies were undertaken. The Department acknowledged that some of its other programs may appropriately be suitable for discounting. The Department stated that complete analytical studies are made on a selective basis and discounting was considered relevant only for the investment programs mentioned above.

The Agency for International Development uses discount rates which vary depending on the type of project, the opportunity cost in the particular country, foreign exchange scarcity, and other factors. In a recent evaluation of a powerplant project, a discount rate of 8 percent was used as representative of the opportunity cost of money in the country concerned. In evaluating highway projects in other countries, discount rates of 8, 10, and 12 percent were used.

The Department of the Interior uses several different discount rates in its evaluation of programs. The interest rate specified by Senate Document 97, which is the one to which you referred, Mr. Chairman, in your opening remarks as being modified in the President's budget message, which was $3\frac{1}{8}$ percent, was used to evaluate long-term Federal investment programs in water and land resources. In utility-type programs 6 percent was used as representative of such programs where the risk is considered to be relatively low. A 12-percent rate has been used by the Department of the Interior in its evaluation of certain research and development programs, such as energy and mineral resources, where exploitation, production, and processing is considered to be a private rather than a public function.

The Atomic Energy Commission reported that it used several rates. For its analysis of fiscal year 1969 production of special nuclear materials activities, the discount rate used was 5 percent; however, analyses were also made using rates of 7.5 and 10 percent to test the sensitivity of the analyses to the discount rate. The 5-percent rate was selected because it was a conservative estimate of the cost of long-term borrowing by the Department of the Treasury. In the Commission's reactor development studies, discount rates of 5, 7, and 9 percent were used since rates of 6 to 7 percent are typical of those used by investor-owned utilities.

Mr. Chairman, I believe these examples bring out rather clearly the variety of discounting rates and rationales used by individual Federal agencies in evaluating their programs. Our report summarizes more complete the information that we obtained from the 23 departments and agencies.

On the basis of our survey, it is evident that there is little agreement among the agencies as to the rationale that should be used to determine an appropriate discount rate. There has been no central guidance to the agencies on this matter and, except for those programs which concern water and related land resources projects, the agencies have been free to choose whatever discount rate or rationale they considered appropriate. The rationales described to us and the variety of rates used clearly do not evidence a common understanding by Federal agencies of the applicability of the technique to Federal programs.

In those agencies that did not use discounting in their analysis of fiscal year 1969 programs, there is also a lack of agreement. At one extreme is the view taken by the Department of Labor that its manpower development assistance program could be evaluated in terms of a 1-year horizon even though program benefits are expected to continue for 5 to 20 years, depending on occupations for which training is carried on. The implication here is that a very high discount rate is applicable since benefits beyond the first year are ignored.

At the other extreme is the practice of making evaluations on the basis of total undiscounted costs and benefits over the life of a program. This procedure implies a zero discount rate since the dollar costs and benefits estimated for future years are given the same importance as current costs and benefits. The National Aeronautics and Space Administration, the Department of Housing and Urban Development, and the Department of Commerce are among the important agencies that did not use discounting in their evaluations of fiscal year 1969 programs. As noted in our report, 13 of the 23 agencies we surveyed did not use discounting.

The fact that 18 of the agencies included in our survey either use or plan to use discounting is, we believe, an indication that the technique is receiving increasing acceptance in Federal agencies as an important aspect of the decisionmaking process. Several of the agencies advised us that one reason they have not used discounting in the past was that their analyses were not developed sufficiently to permit discounting. Presumably, they will use discounting in the future.

There are several schools of thought followed by the various agencies in determining their particular discount rate. Two of these schools of thought appear to be predominant although there are various interpretations in actual practice.

One school of thought holds that the rate should be determined by and be equal to the rate paid by the Treasury in borrowing money. A second school of thought holds that the rate should be determined by what is foregone; namely, the return that could have been earned in the private sector of the economy when the decision is made to commit resources to the public sector.

Neither school of thought provides clear guidance on the specific discount rate which should be used. Cost to the Treasury, for example, will vary depending upon the definition applied, from 3 to 8 percent or more. The average rate of return in the private sector also varies depending upon historical periods selected and upon the weighting of the various segments of the private sector which are used in computing an average.

A discount rate of slightly over 3 percent is the cost to the Treasury, if based upon the average rate payable on outstanding U.S. securities having maturity of 15 years or more, as prescribed by Senate Docu-

ment 97 which relates to land and water resources. The rate determined by the procedure prescribed in Senate Document 97 is at the low end of the range of rates in use by the agencies and therefore may be an overly conservative estimate of interest costs on Government borrowing.

Long-term rates show no sign of returning to the level of 10 or 15 years ago. Furthermore, the legal restriction on long-term interest rates has forced a substantial amount of refinancing of the public debt through the sale of higher yield short-term securities. It, therefore, appears to us that the current average yield rate reported in the Treasury Bulletin is a better basis than Senate Document 97 for determining interest costs. In this connection, we have noted with interest that your committee has requested the views of the Water Resources Council on the propriety of the discount rate determined under Senate Document 97. This is a little bit out of date because, as you noted in your opening remarks, the budget being submitted to the Congress today calls for an increase in the discount rate.

A variation, which we believe has considerable merit, on the pure interest school of thought is to include the effect of forgone Federal taxes which would be collected from the private sector of the same funds were invested there.

As brought out in our report, if the full costs of borrowing, including an estimate of forgone taxes from the private sector, are considered, the difference between the various schools of thought is narrowed substantially. If this concept is accepted, it would appear that there is a good possibility of a satisfactory reconciliation of varying points of view regarding the rate to be used.

To conclude, Mr. Chairman, we believe that the results of our survey of Federal agency practices suggest that the case for discounting is being accepted, but that there are significant differences of opinion in the agencies over the appropriate discount rates to be used. Because of the wide variation in discount rates and techniques being used by the executive agencies to evaluate and justify their programs and because there is strong impetus to use of the discounting technique provided by Federal agency adoption of planning-programing-budgeting systems, we believe that centralized guidance is needed. The Congress itself may wish to provide guidance to the executive agencies on this important topic.

This concludes my statement, Mr. Chairman.

I have with me here this morning, at my left, Dr. Rathbun, who has been with us and did a great deal of the work involved in the report, and who has now left us and is at the University of Pittsburgh. He has returned today for this reading.

And also, to my left, is Mr. Morse, who is the head of our Office of Policy and Special Studies which had the responsibility for this report, and Keith Marvin, who has replaced Mr. Rathbun as head of the systems analysis group in Mr. Morse's office. Mr. Ted Rabun is on his staff.

I would like to also add we received on Friday a short notice from the Bureau of the Budget indicating that they were considering the possibility of central guidance in this area. This, of course, we would welcome and we believe it is in line with the general recommendations we are making.

Chairman PROXMIRE. Thank you very much.

I have had a chance to go over—very quickly, of course, because we just received it this morning—your excellent report to this committee on the survey of the use by Federal agencies of the discounting technique in evaluating future programs; and at the suggestion of John Stark, our staff director, I think it is a good suggestion, we will send this to key Members of Congress, at least those Members of Congress who seem to be interested in this kind of proposal, and I think might take some action on the basis of it. I think it is a most significant and convincing presentation of the importance of achieving some consistency, and of extending as much as we can the use of the benefit/cost system.

Let me ask you, Mr. Staats, without the benefit/cost system analyses, without discounting, without using a discount rate, how can an agency possibly evaluate with any objectivity its investment program?

Mr. STAATS. Well, I think the answer is that there has to be some evaluation of benefits and costs in any judgment that is involved in a budgetary process. The question is whether or not it is a good judgment or a bad judgment. The question of whether or not you are making decisions erroneously in terms of priorities depends heavily upon the use of some analysis of this kind.

As suggested in your committee report, the danger may well be that we are spending money in some areas which will yield far less in terms of return for our tax dollar than we would if we invested in some other areas, and this, of course, is the great danger.

Chairman PROXMIRE. Isn't it true also that, in terms of economic growth, if we take from the private economy funds that will yield a return of 10 percent and invest those funds in a Federal project at $3\frac{1}{8}$ percent it represents a misallocation of resources?

Mr. STAATS. That is correct.

I don't see how you can avoid that conclusion.

Chairman PROXMIRE. And it slows down the growth of the economy?

Mr. STAATS. There has been much good work done, Mr. Chairman, in this area. It is a highly controversial area, as you know, but without some statement of policy in this area, cost effectiveness studies which are an inherent part of the planning-programing-budgeting system will not be effective. You can get not only misallocation in an agency but misallocation in other agencies, particularly when they work in similar fields. The water resources and land area is a good illustration. Research projects which involve several agencies or manpower training are other examples. There has to be some consistency in approach used. If there are variations there ought to be some good rationale or good basis for making a change.

Chairman PROXMIRE. Recognizing the limitations which you properly recognize in your report—since all of us recognize the discounting process is no substitute for intuition, job evaluation, and all that goes into making these decisions—it would seem to me if the Congress and the administration are going to have any effective priority system, discounting would be most helpful to us. I remember late last year when we were so desperately anxious to reduce spending, some of us were in a very, very difficult position because the President—I am sure, with great sincerity—said it was awfully hard for him to

cut spending. Members of the Appropriations Committee—and I am a member—were very much aware of this, concerned as to where we could cut properly. It was obvious that an across-the-board cut of 2 percent or 5 percent or 10 percent was most unsatisfactory. If we had had a much greater knowledge of the comparisons such as we could get from using the discount ratio in developing benefit-cost studies, I think we would have been in a far better position to approve those programs that had a higher yield and, perhaps, to postpone some of those programs that had a lower yield. Not that that would have been the only consideration, but it would have been a very helpful one. It would have been an objective criteria that everybody could recognize as objective and we could have proceeded with much greater order and there would have been a more productive Government investment tool.

Mr. STAATS. I agree, Mr. Chairman.

I wonder if it would be helpful to ask Mr. Rathbun to comment a little further.

Chairman PROXMIRE. Yes, I wish Mr. Rathbun would comment.

Mr. STAATS. In that connection, I believe it is of particular interest that appendix I of this report brings out perhaps even more sharply than my testimony, the variations and the differences in the practices followed by the different agencies.

Chairman PROXMIRE. I was struck by page 10, too, of the survey, and I want to ask about this in a few minutes, showing the agencies that did not use any discounting technique for the 1969 budget and five of which, as you say, don't plan to use discounting in the future.

Mr. STAATS. That is correct.

Chairman PROXMIRE. Mr. Rathbun, do you want to comment?

Mr. RATHBUN. Yes, Mr. Chairman.

I will make several observations.

First, it seems to me that there is a clear and present danger that the mixture of practices which we have today may give us poorer results than we would have in the absence of discounting. It is possible, of course, for agencies to evaluate undiscounted costs and benefits. They could simply sum the total costs and benefits, and it is not clear to me that the present mixture of practices will give us a better result than we would get under conditions in which no one discounted.

Chairman PROXMIRE. May I interrupt at that point and say however, within the broad category, for instance on the reclamation programs, isn't it of some benefit to the Congress and budget and to all of us to have $3\frac{1}{8}$ percent apply, although I think it is a much too low rate, nevertheless it is better to have that than nothing. If we didn't have anything here it would seem to me you would have almost a pure—well, not completely, but a very large political effort on the part of powerful Members of the House and powerful Members of the Senate, those situated as chairmen of the appropriate subcommittees, the Appropriations Committees would be in a very strong position to push projects that had, even with a $3\frac{1}{8}$ -percent discount, a negative cost ratio. Whereas if you had a program that had a 4 to 1, 5 to 1, or 6 to 1 benefit-cost ratio it is a pretty good argument for it even if you don't have any political push behind it, whereas if its benefit-cost ratio is unity it is a little easier to oppose it.

Mr. RATHBUN. Well, I agree that use of the $3\frac{1}{8}$ percent in these important water resources areas probably is helpful but I am disturbed by the thought that in other areas, an agency using 12 percent, for example, may be rejecting projects which are really much more attractive—

Chairman PROXMIRE. I think it is an excellent point. The same agency—Interior, as you pointed out—uses 12 percent on those projects which are competitive or comparable to private industry, and $3\frac{1}{8}$ on some of their other projects.

Mr. RATHBUN. A second observation, it seems to me, is that the stage is set for substantial progress.

Chairman PROXMIRE. The what?

Mr. RATHBUN. The stage is set for substantial progress. In our discussions with the agencies in connection with their response to the questionnaire on this subject, we detected a rather widespread acknowledgement that the differences between the opportunity costs school and the cost to the Treasury or borrowing school are not terribly important, are not as important as they were thought to be a few years ago, because when you approach the cost to the Treasury of borrowing in a realistic way and include taxes foregone—

Chairman PROXMIRE. I think it is a very interesting contribution, very, very good. That comes to about $7\frac{1}{2}$, 8 percent as compared to maybe 10 percent for a strict opportunity cost application.

Mr. Stockfisch was going a little higher than 10 percent, he wanted 10 to 20, but I think this is an excellent conception because, as you say, it reconciles differences of opinion between the cost of the Treasury, the realistic cost, and the foregone opportunity cost.

Mr. STAATS. It doesn't close the gap, but it approaches the opportunity cost figure of 10 percent as a recognized figure. You are within a 2- or $2\frac{1}{2}$ -percent difference.

Chairman PROXMIRE. Especially the way interest rates are going.

Mr. STAATS. Yes.

Chairman PROXMIRE. It won't be long before they will be what we think are consistent.

Mr. RATHBUN. When you couple this recognition fact that the rates advocated by the two schools are drawing together with the widespread acceptance of the notion of discounting, I think you have the stage set for rather substantial progress.

A third observation is that a good deal of additional work remains to be done even after the agencies move up to a higher discount level and agreement is secured on the use of this level. I think of some work going on in the General Accounting Office now on the evaluation of benefits. For years and years the benefits associated with reclamation projects have been based—the calculation has been carried out—on the assumption that all of the power produced by these projects could be sold at going rates. To an increasing extent this is not true and there is going to have to be a lot of additional work on the evaluation of these benefits.

Similarly in the case of Senate Document 97, where you do have the discount rate spelled out rather clearly, the various agencies use quite different practices in, for example, treating the benefits associated with the enhancement of the value of shorelands.

So my point is, agreements are going to have to be secured not only on a higher rate, but on the procedures to be followed in evaluating the benefits and measuring the costs.

Chairman PROXMIRE. Thank you very much.

I would like to ask Mr. Staats, you said in your statement that some of these agencies that plan during the future to use discounting techniques, have not done so yet—he said their analysis has not developed sufficiently to warrant the use of discounting techniques. This just seems to be incomprehensible to me. Does this mean these agencies don't know what the benefits of the investments are, don't know what their costs are? It would just appear offhand that if an agency comes into the Bureau of the Budget with an investment program and says "We are not sure what our costs are or we know our costs, but we don't know what we will get by making the investment," it would be very easy for the Budget Bureau to say, "No; find out what your benefits are or we are not going to spend this money," especially now with the pressure all of us feel to keep spending down.

Mr. STAATS. Of course, a part of it has been, I think, obvious lack of central guidance in this area. But in part, I think, it reflects the difficulty of measurement, particularly in some of the programs in the social welfare area—the Great Society type programs. Mr. Rathbun has had conversations with some of these agencies on this point.

Chairman PROXMIRE. Well, Health, Education, and Welfare is using a discounting technique for the 1969 program. I don't know how extensive is their use of it, but they are using it. The space program doesn't use it at all. The Post Office Department didn't use it at all; the Department of Labor, the Peace Corps, the National Science Foundation, the Federal Power Commission, some of these agencies have very small investment programs and are primarily operating agencies, but to the extent they have any investment programs it seems to me, and the Post Office Department has a big investment program, they ought to know what their benefits are going to be, what they are going to get for their investment and also know what their costs are.

Mr. STAATS. I would like to read a paragraph from the reply we had from the National Aeronautics and Space Administration which has a very major capital investment program.

Chairman PROXMIRE. Yes, indeed.

Mr. STAATS. They reply along these lines; they say:

The evaluation of alternatives and priorities within NASA is accomplished principally through the agency's programing and budget process and within the framework of the Bureau of the Budget PPB system. Although this is the first year we have submitted our budget request under the requirements of PPBS, NASA has since its inception used comparable techniques in development and evaluation of budget submissions. Among other things, our programing system permits us to consider the total cost implications in future years of on-going programs and of proposed new programs, and is directly tied in to the preparation of our annual budget estimates and to our annual operating plan. We use a standard practice, advanced analytical methods in the consideration of alternatives. Trade-off type studies relating to performance, costs, schedule and other pertinent factors are used in project planning and management, and in the planning and conduct of individual missions. We have not, however, applied specific discount rates. That is to say we have not attempted to express in terms of percentage discounts, the effect of future costs and benefits, although these economic factors are implicit in our consideration of alternative programs and assessment of priorities. Frankly, we find it extremely difficult to quantify such elusive economic considerations as they affect research and development efforts in the space environment.

I cite this as one kind of situation where they are not using discount rates. They say it is implicit. This may or may not be true.

Unless they have some more systematic approach to it it seems to me it would be very difficult to say in a case of this type that it is implicit in all of these decisions.

Chairman PROXMIRE. My time is up. But I would just say that if it is implicit, let's make it explicit. After all if they can say they don't know what the benefits of space exploration are then maybe we had better forget about it. They should be able to make an attempt at quantification. If we don't have some kind of objective measurement in these areas, it just means we are pushing money out in the hope that maybe it will do some good. We don't know what good it will do and we can't even make an estimate.

If the Defense Department, with all of the great problems involved there, and the enormous amount of money, in determining cost effectiveness and so forth can do it as widely as they do it, it seems to me that space and other agencies that make investment programs should do it, that they should certainly make their implicit findings explicit so that we know what we are doing.

Senator Jordan?

Senator JORDAN. Thank you, Mr. Chairman.

Mr. Staats, you have made a very fine presentation of a complicated subject here this morning and, as you pointed out, and rightly so, there are a variety of systems in use in implementing a discount rate by some agencies, and other agencies use none whatever.

In your report you mentioned explicit and implicit discount rates. Can you point out the difference between the two? You have touched on it here in your exchange with the chairman but I think we need to understand that a little more fully. Will you elaborate on that?

Mr. STAATS. If I may, Senator Jordan, turn to Mr. Rathbun on this question. He is far more familiar with this, and I am sure he can give you a better answer.

Mr. RATHBUN. With respect to the implicit rate, there are a couple of points that are completely clear. One is that if an agency does not discount in any sense but simply adds up the total costs and total benefits, the implicit rate is zero. They are not discounting in any way, shape, or form.

At the other extreme, if an agency makes a decision on the basis of costs in the first year, makes decisions on the basis of costs and benefits in the first year, then the implicit discount rate is 100 percent, because this agency is ignoring all future costs and benefits.

In between these two extremes we have, of course, a host of implicit rates, and the implicit rate in this middle ground is the rate that makes the present value of costs and benefits over the full life of the program equal to the costs and benefits over the period used by the agency in making a decision. In other words, if an agency makes decisions on a weapons system, for example, that has an actual life of 20 years, but the agency makes the decision and evaluates the weapons system on the basis of 5-year costs, that is, on the basis of what happens during the first 5 years, then the implicit discount rate is the rate that would make the present value of costs and benefits over the 20 years equal to the costs and benefits over the 5-year period used by the agency in evaluating the program.

As you may have noted, there is a table presented in the report which shows the approximate implicit rates under various conditions.

Senator JORDAN. I can appreciate the problem that is created here because frequently the benefits are quite difficult to define. I can understand with respect to a water resources project that costs allocable, we will say, to power or to flood control or irrigation can be determined quite accurately and definitely by people experienced in the field. But frequently we find allocation of nonreimbursable costs on hard to define intangibles such as recreation or enhancement of fish and wildlife. We find if a benefit/cost ratio is not as favorable as it should be there is an inclination to transfer some of the costs from the reimbursable, compensable area over into an area more nebulous for the public good, one hard to define and intangible.

Mr. STAATS. What you are saying is quite true and, of course, there have been efforts to quantify and put in dollar terms many of these benefits which are virtually impossible to quantify.

Yet, on the other hand, a judgment has to be made and the plea we are making is that those judgments should, to the extent possible, be consistent both within the agency and among the agencies if the budget is to reflect the priorities which are based on a total assessment of all benefits and all costs. This is as true in other fields, more true, perhaps, than it is in the water resources field, where we have been employing benefit/cost ratios to determine these projects that go into the budget for a great many years.

It goes back well beyond, as you know, the issuance of Senate Document 97.

Senator JORDAN. Yes.

Mr. STAATS. It is about the only area where, until the PPB system was initiated, we have had this kind of test to evaluate proposed programs.

But even the Corps of Engineers follows, as you know, somewhat different practices in assessment of benefits than the Bureau of Reclamation.

Senator JORDAN. Yes.

Mr. STAATS. Sometimes in the same river valley. This is the kind of inconsistency that we would like to see removed.

To go back to your question on implicit versus explicit rates, if you have a copy of our report, on the bottom of page 14 is brought out fairly graphically an illustration showing how this affects the Veterans' Administration as against the Department of Commerce program. (See p. 51, this volume.)

I would like to ask Mr. Rathbun if he would elaborate on this. Here is a case where they are both talking about structures and the capital outlays and they are using different practices, so that you obviously are going to come out with different benefits/cost ratios.

Mr. RATHBUN. Well, as pointed out there, in the case of the VA, the discount rate is 20 percent, whereas the Department of Commerce practice involves the use of an implicit rate of only 8 percent. Obviously this is most unsatisfactory. If the two programs are of equal merit, the one in the VA would be rejected out of hand because of this use of a very short period of time in evaluating the program, and the associated implicit rate of 20 percent. Whereas the same stream of cost and benefits would yield a much higher benefit/cost ratio in the De-

partment of Commerce because they have chosen to use a form of analysis that involves a much lower implicit rate.

Senator JORDAN. This is a good example and it does point out that developments of equal merit, if used under the application of a different type of discount rate or process of establishing a different kind of discount rate, might find themselves discriminated against or coming out one against the other unfavorably.

Mr. RATHBUN. Mr. Jordan, I would like also to say, and this is pointed out in the report that there are undoubtedly cases where the benefits can't be quantified, but even here it would seem helpful to use a reasonable discount rate and apply it to the costs and present to the decisionmaker the present value of the costs of these two programs and let him use his judgment in placing a value on these hard to quantify benefits.

Senator JORDAN. Would it be your recommendation then that all programs should have some kind of discount rate applied to them, even if they are intangible and hard to define?

Mr. STAATS. Yes; I think that would be our view.

The point I would like to emphasize, and which Mr. Rathbun has already made, is that we are not suggesting a hard and fast formula to be applied in every case.

Senator JORDAN. Yes.

Mr. STAATS. What we are suggesting is a need at least on the cost side to apply a common policy in developing one of the essential pieces of information that the Congress and the executive branch ought to have in arriving at their judgment. It is the kind of information that any prudent businessman would rely on for any new investments he is making whether he is talking about hardware, research and development, or welfare programs for his employees. We are saying as a minimum it ought to be the cost of money plus a factor for taxes foregone. There may be variations from that, depending upon the individual program, but at least it would give you a benchmark of policy which could be applied consistently throughout the executive branch.

Senator JORDAN. What you are saying is that as these agencies compete for the taxpayer's dollar for development we ought to use a common yardstick insofar as possible?

Mr. STAATS. That is right.

Senator JORDAN. In evaluating their merits?

Mr. STAATS. Otherwise we may be spending more than we are going to get back. We will be making an investment in a poor venture. That is the danger, and that is the reason private industry makes these kinds of analyses.

Senator JORDAN. Do you think the skill in evaluating programs is improving as more and more people become conscious of the need for establishing some kind of priority in spending?

Mr. STAATS. Yes; I think so. In my own experience going back in the budget field for a good many years it seems to me we are making progress in how to do this. It is never going to be perfect. There are always going to be disagreements among people who are for or against a given program. But the fact that we have now developed central staffs in the Bureau of the Budget and in the other agencies in the executive departments, who are making this a special concern

is a useful step forward, and the fact that the Congress more and more has been asking for these kinds of justification when agencies present their authorization requests and their budget requests is also a hopeful sign. In general terms, I think there has been progress but we have a long way to go.

Senator JORDAN. Thank you. My time is up.

Chairman PROXMIRE. I notice on page 10 of your report you have a list of the agencies with which you made your inquiries, and we find here that, as I said before, in a number of them, they did not use any discounting technique in 1969, and five indicate they have no plans to use discounting techniques in the future, to wit, the Interstate Commerce Commission, the Export-Import Bank, the Veterans' Administration, the Department of the Treasury, the Department of Commerce.

Now, especially when you come to the latter three, Veterans' Administration, Department of the Treasury, and Department of Commerce, they all have substantial investments. How can they justify the assertion that they have no intention of using discounting techniques. Certainly the Treasury, where they originated the formulas that we have used, certainly ought to have an acute notion of the future compared with the present value of the dollar. The Treasury should recognize the importance of discounting. What kind of responses did these agencies give to you when you asked them?

Mr. STAATS. Of course, the table on page 10 does not fully state the views of the agencies. There is a more detailed statement in appendix I but let me, if I may, Mr. Chairman, read a more recent letter that came from the Department of Commerce, which states in part:

While we do not now use discount techniques in our programs universally and do not have definite plans for the use of these techniques in the future, we are considering the use of discount analysis for the evaluation of some programs, such as capital outlays. We agree, therefore, that a standardized concept should be adopted for Government-wide use. While we have not reviewed the matter in depth we believe that the second alternative appears to be more practical; namely, that of recognizing that the cost of Treasury borrowing as a cost of investment in the public sector.

They do not make an unqualified statement that they would not do it. They are first seeking central guidance and second they are——

Chairman PROXMIRE. If the Department of Commerce recognizes the cost of Treasury borrowing as the, what do they say, opportunity costs?

Mr. STAATS. No; Treasury borrowing.

Chairman PROXMIRE. The cost of Treasury borrowing on this realistic basis of foregone taxes and makes it $7\frac{1}{2}$ and 8 percent, what does it really mean unless they say they have a way of calculating what their benefits are and then what their costs are and use the discount system to come up with a basis for a decision? Simply the awareness that the costs foregone are $7\frac{1}{2}$ or 8 percent, it seems to me, isn't a very good guide unless they tell us what they do with this.

Mr. STAATS. That is, of course, true for most of these agencies that were referred to, which have a sizable capital outlay.

Chairman PROXMIRE. The Veterans' Administration and Department of Commerce especially, but, of course, the Post Office Department does, too. They indicate that they plan to use it sometime in the future. How about these other agencies that did not use it in 1969 but

plan in the future to use it, when—I don't mean to ask you in detail on each one, but what was the general feeling? That they would be able to move in 1970, 1971, 1972, or soon?

Mr. RATHBUN. First, let me refer back to the Department of Commerce and the Veterans' Administration, the two agencies that stated they did not use discount rates. It should be recognized that in the case of the Veterans' Administration they do evaluate programs in terms of cost and benefits over a 5-year period.

Chairman PROXMIRE. Yes; you gave an example of that.

Mr. RATHBUN. So they are using a high implicit rate.

Furthermore, there are elements within the Department of Commerce that do essentially the same thing. In one case they have used what happens over the first 7 years for programs having an estimated life of 11 years.

Chairman PROXMIRE. So this statement on page 10 is not—I don't mean it is misleading, but unless you read it in connection with what Mr. Rathbun just told us, you get a misconception. It says discounting techniques not used and no intention of using it. This isn't true. They use it but they use it in a way which is not standardized and not related to what other departments are doing and it goes right back to your initial skepticism, Mr. Rathbun, this inconsistency is almost worse than not having a system at all.

Mr. RATHBUN. It may very well be.

Chairman PROXMIRE. It may well be in some cases.

Mr. RATHBUN. Now, with respect to your question about when these agencies will get underway, I can't recall a single case in which some time was specified. In talking to the people some of them seem to feel they are going to be in a position to do this right away, in the next year or so. Others are somewhat more undecided, and I suspect it will be 2 or 3 years.

Chairman PROXMIRE. Well now, that brings me to what I think is the most encouraging statement we have heard this morning and that was your statement that you think we may be on the verge of a breakthrough, you said something like that, you said we may be on the verge of making this much more universally applicable and much more effective. What can we do as Members of the Congress? Do you recommend any legislation that we can adopt, Mr. Staats or Mr. Rathbun, that would be helpful here or is this something where our inquiry and your inquiry and publication of it and the welcome position the President has taken this morning in his budget on the water resources projects indicates this is coming along well and indicates we have to pursue our inquiry and let other Members of Congress know, but it doesn't need legislation?

Mr. STAATS. I haven't pursued the matter to the point of coming to a conclusion—

Chairman PROXMIRE. We would like to hurry it up.

Mr. STAATS. Whether legislation as such would be necessary, I would say that unless we can show more visible progress than we have had, some further action on the part of the legislative branch would certainly be in order.

It had been our hope that this report, together with the report of the Joint Economic Committee in December might result—

Chairman PROXMIRE. This report ought to shock Congress. I think it indicates, as you say, a terrific disparity; a number of agencies, about

half of them, that don't use it, didn't use it in the budget; and without discounting techniques there is no objective basis on which you can evaluate investment programs and establish any kind of objective criteria.

Mr. STAATS. Plus the fact that there is continuing through most of the replies that we received from the agencies, an indication of recognition of the need for it.

Chairman PROXMIRE. So we know they are misallocating resources within the Government and misallocating resources that should be available in the private sector.

Mr. STAATS. If I may make a suggestion, Mr. Chairman, possibly this committee might consider referring this report to some of the agencies as well as to the interested committees of the Congress, with a view to possible later hearings after they have had a chance to review the report. Our report was completed, as you know, only in the last few days.

Chairman PROXMIRE. I think it is an excellent suggestion.

Mr. STAATS. While we have given the agencies the benefit of the replies we have had, they have not had access to our completed report.

Chairman PROXMIRE. I know it is awfully hard to give us, on the basis of this inquiry especially, but could you or Mr. Rathbun or Mr. Marvin, any of you gentlemen, give us an estimate of the percentage of Government investment programs that now use the discount technique, and the percentage that don't?

Mr. STAATS. I don't believe we made any—

Chairman PROXMIRE. You can't even make a rough approximation, whether there are half of them? We have to do this, of course, within the definition that Mr. Rathbun has suggested because there is an implicit discounting, but it would be helpful, I think, to know how much of this enormous amount we are investing, billions and billions of dollars a year, is based on a discounting technique that enables you to apply objective criteria and how much is not based on it as well as to know the very important discrepancies between the systems used.

Mr. STAATS. It might be useful and meaningful.

Chairman PROXMIRE. It would help if it were not only in terms of percentage, but in terms of dollars.

Mr. STAATS. Yes.

Mr. RATHBUN. I think it is clear at this time it is probably well above half.

Chairman PROXMIRE. Probably what?

Mr. RATHBUN. Well above half.

Chairman PROXMIRE. Well above half that use the discounting?

Mr. RATHBUN. Right, I say this because partly the Defense Department with its very, very large expenditures does use the discount rate, but I would agree with Mr. Staats that a detailed—

Chairman PROXMIRE. How about the consistency within the Defense Department?

Mr. RATHBUN. It is consistent. It is 10 percent.

Chairman PROXMIRE. Ten percent, is that right?

Mr. RATHBUN. I think the Defense Department has gone through to a very considerable extent what some of these agencies are going to go through. Three or four years ago in the Defense Department there was a great controversy about the propriety of discounting these differences of opinion were eliminated and then there was controversy

on over just what the rate should be. At the present time there are no questions raised about the propriety of discounting and 10 percent is used on an across-the-board basis.

Chairman PROXMIRE. I imagine the fact that the Defense Department now uses a 10-percent discount, uses it on an across-the-board basis on the enormous amount of investment they make, made a great difference in their expenditures. If they had not been using that, but using instead a 3 percent or $3\frac{1}{8}$ which has been used by Interior or Corps of Engineers the expenditures would have been a great deal more. You can argue this has saved the taxpayer billions of dollars, without any exaggeration, for years.

Mr. STAATS. In a very recent letter which we received from the Defense Department they first say they agree on the desirability of a greater degree of standardization of Government practice. Then they also say that:

Our discount rates correspond closely to the opportunity cost concept, but in arriving at our rates we did not use exactly the opportunity cost concept as you describe it.

Incidentally, the Department's regulations, are fairly recent, about 2 years old. The Department's letter goes on:

Since our reasoning led to what I believe to be the same end result, I doubt that the differences are worth noting.

My staff would be glad to discuss this matter in more detail with your staff if you wish. I doubt that the cost of Treasury borrowing is the relevant rate for the type of problems with which we are concerned. The data we gave on the projects where discounting was used and the analysis considerably understates the use of these practices. The 73 projects mentioned are those where the discount calculation actually appeared in the budget submission. There must be hundreds of other investments decisions in which discounting techniques are used, but which do not show up in the data because they involve amounts that are not large enough to require individual consideration in the budget or because the discounting techniques showed the project was not sufficiently attractive to warrant submission. Moreover, discounting concepts are used on lease or buy decisions and we did not include these in the list. For example, the recent Air Force decision regarding its Phase II computers with which I think you are familiar, was based on data that included an analysis that calculated the implicit interest cost of leasing for a year.

Chairman PROXMIRE. I think that is a most helpful response, and it suggests we ought to give more consideration to opportunity cost as well as Treasury costs of borrowing although they are coming together. Mr. Rathbun estimated much more than half of investments by the Government is subject to discounting techniques because of the Defense Department, excluding the Defense Department, I take it on the basis of these very big agencies that have big investments programs but don't use discounting techniques that it is very possible that substantially less than half of the nondefense sector of our budget is subject to discount.

Mr. STAATS. That would be my guess. If you exclude the Defense Department it would be substantially less than half.

Chairman PROXMIRE. I think you answered another question I had in mind. I was going to ask you what sort of discounting method the comptroller sees as most feasible. Is there a difference between standardization in form and so on? I think you dealt with that unless you wanted to comment further.

I would like to ask, have you made any estimate of the misallocation costs of the Government, of one agency using explicit rates, one using

implicit rates, or one using discounting and one not applying discounting?

Mr. STAATS. I don't think we have done anything beyond pointing out the possibility or likelihood that this has happened. We have not actually gone beyond that point, that is to say we have not actually examined the Appropriations Acts from the standpoint of those items which were excluded or included on the basis of higher or lower use of discount rates. I suppose this would be possible, but our main purpose in this report was to bring out sharply the differences in practices among the different agencies and, therefore, the need for a more common policy concerned.

Chairman PROXMIRE. Then you can properly conclude on the basis of this study that the Federal Government has been engaged in practices which do inevitably result in a substantial amount of misallocation of resources. We know that. You are not giving us an estimate, but my own estimate is that it would be in the billions of dollars a year as compared with the kind of investments we would make if we had a standard system which was used throughout Government—and not rigidly, still permitting value judgment, intuition and going ahead with low yield programs if there were other reasons for doing so—if we had this criteria, a basis for the Congress and President making a decision.

Mr. STAATS. This certainly could be a proper conclusion. I think unless a decisionmaker has this kind of information before him, certainly the opportunity is there for errors of judgment, and I think it would be almost certain that this does occur in the absence of this kind of—

Chairman PROXMIRE. You showed a dramatic example of comparing the Department of Commerce and the Veterans' Administration with respect to a building, one 5 years and one over a period of, a greater period of years, 8-percent discount compared to 20-percent implicit discount.

Mr. STAATS. Of course, as you know—

Chairman PROXMIRE. Of course, where you have the Defense Department investing on a 10-percent basis, and by and large the water projects, and so forth, on a 3-percent, three and a fraction percent basis, we know there is a misallocation there.

Mr. STAATS. We used this particular illustration because they are both in the nature of construction type programs, I think at the same time though we would have to recognize they are in noncompeting areas. This problem that we are talking about comes up most sharply where you have agencies who are in a sense in competing programs. The land and water resources field is a good case in point, where you have Agriculture, Interior, TVA, and the Public Health Service, all concerned with investments in water supply or water improvement. It also comes up dramatically in any other areas where you have a number of agencies that are concerned with carrying out common objectives, common programs on a Government-wide basis, and similarly as in the example we brought out here in the Interior Department, even within a department. If you put the Department of Interior budget together, all of these programs in some sense or other are related, so that you need a common policy to assure even within a given department that they are following a common policy.

Chairman PROXMIRE. I want to come back, but my time is up.

Senator Jordan?

Senator JORDAN. Mr. Staats, you note that agencies do not evidence a clear understanding of the discount rate technique?

Would you expand on that a little bit? Is it because they lack the staff capability to implement it or are they unwilling to face up to the rigors of the discipline required? How do you explain it?

Mr. STAATS. I would like to hear from my colleagues here on this point also. But my own personal feeling would be that it is not so much opposition as that there hasn't been adequate staff who understood and knew how to employ these techniques. I think it has been more in that category than in the resistance to the idea. Would you care to comment, Mr. Rathbun?

Mr. RATHBUN. I would simply add that in many cases they have never been asked to do this. The Bureau of the Budget has, of course, asked them to think of discounting in the case of some projects, but many, many agencies have never been requested to give any serious thought to discounting, and as a result they have not given the requisite time and attention to this.

Senator JORDAN. Were you going to say something?

Mr. STAATS. I was going to add that it is only fairly recently, within the last 3 years, that the executive branch has formally extended its cost-effectiveness concept on a Government-wide basis, and that has brought this problem more sharply into focus. I think that without cost-effectiveness studies being made on these major programs there hasn't been too much reason for employing a discount rate. But in the water resources field, where we have come to understand and use this technique over many years, you do have pretty highly refined techniques within those agencies now because they are required to use it as a basis for any project before it is authorized and again before appropriations are made. The answer varies a great deal depending upon whether or not there has been a formal program which requires the use of these types of cost-effectiveness techniques.

Senator JORDAN. I would be interested, Mr. Staats, in what the Post Office Department has to say about it. They are listed here in your table on page 10 as being in the category of "Discounting not used but plans to use discounting in the future." Do you have any particular comment with respect to the Post Office Department? What has been their attitude and how effective would you think discounting techniques would be in the Post Office Department?

Mr. STAATS. I would think, Senator Jordan, so far as their *capital* investments programs particularly are concerned, such as facilities or buildings, this type of technique would be very relevant. It would be perhaps easier to employ there than almost anywhere.

Senator JORDAN. The third line from the bottom on page 10 is where they are listed in the table.

Mr. STAATS. In their formal letter to us the Department stated that, "The Post Office did not use discount rates in analyzing fiscal year 1969 programs. However, in certain instances discounts are applied to individual projects. For example, in evaluating whether to abandon a Federal building for a new leased facility or to extend and modernize it by using plant and equipment funds, the rent stream for a 40-year period is estimated. The present worth of the rent stream is then determined by applying a 4-percent rate factor. The 4 percent has been

applied for several years and does not take into account the current high interest rates. The examination of the two choices leads to the preferred alternative. The Post Office Department also used discount rates in certain reports required by the Congress. For example, Public Law 90-15 requires reports on those leased buildings which exceed 20,000 square feet of gross interior space. A comparison is made between the annual cost of leasing and the annual cost of the proposed facility if it were constructed for Federal ownership. The total cost of the project is developed and then converted to an annual cost by using a 4½-percent rate for the period of time of proposed usage by the Government. Depending upon the project this period of time may be from 15 to 40 years at 4½-percent interest. This annual cost of construction for Federal ownership is then compared against the annual cost of leasing as a basis for choosing the preferred alternative." Then they outline further studies which they are making with the purpose and intent of extending this concept to other parts of the Post Office Department.

I think here again it comes back to the point we were discussing a minute ago and that is the fact that this is still in the process of being extended and employed in different programs with the agencies. But again they are doing it without central policy or guidance.

Senator JORDAN. That part of any agency or Department's budget that relates exclusively to services wouldn't be adapted to the application of this kind of technique, would it?

Mr. STAATS. Well, now, they do indicate that they are taking further steps to try to improve the studies that they have been making. They say, for example, the Department is generating standardized guidelines which will stress the use of discount rates in comparative investment decisions. They further indicate that they are developing a methodology for major facility projects including an illustrative example of alternative life cycle costs and state further that the discounting adjustment is applied to the current dollar estimates to convert the expenditures to a present value basis. This correction enables a uniform comparison of investment outlays even though they are made in different years.

This is indicative of the further studies which they are making with the intent of applying this on a more extensive basis in the Department.

Senator JORDAN. If I may turn now to the Department of the Interior and the various rates that are used there in discounting, will you tell us, Mr. Staats, what is the average maturity rate of Federal long-term obligations now, do you know?

Mr. STAATS. Those held by the Treasury?

Senator JORDAN. Yes.

Mr. STAATS. Already issued?

Senator JORDAN. Yes.

Mr. STAATS. The average has been coming down because of the recent experience that I referred to in my statement. More and more of issues are on a shorter-term basis. We can supply more specific information for the record.

(The following material was subsequently supplied:)

Current information concerning the average time until maturity of Federal long-term obligations can be found in the December 1967 Treasury Bulletin. The following table is taken directly, or is computed from data on page 31 of that issue of the Treasury Bulletin:

MATURITY DISTRIBUTION AND AVERAGE LENGTH OF MARKETABLE INTEREST-BEARING PUBLIC DEBT

End of fiscal year or month	Total amount outstanding (millions)	Percentage in maturity classes					Average length (years)
		Within 1 year	1-5 years	5-10 years	10-20 years	20 years and over	
1958.....	166,675	40.7	25.5	12.9	16.6	4.3	5 $\frac{3}{12}$
1959.....	178,027	41.0	32.8	9.6	12.1	4.5	4 $\frac{7}{12}$
1963.....	203,508	41.9	28.5	18.4	4.1	7.1	5 $\frac{1}{12}$
1967-June.....	210,672	42.6	33.9	11.5	4.0	8.0	4 $\frac{7}{12}$
1967-November....	226,081	45.2	34.2	9.5	3.7	7.4	4 $\frac{3}{12}$

The average length of both short- and long-term obligations is shown in this table. It is clear that the average has declined mainly because of the decrease in 10-20 year maturities and the increase in under 5-year maturities, relative to the total. In fact, most of the \$60 billion increase in the total has been in maturities under 5 years.

Senator JORDAN. This is the point I wanted to lead up to, the fact that the maturity time of outstanding so-called long-term Federal borrowings is growing shorter and shorter because more of the debt, as it matures, is being financed on a short-term basis.

Mr. STAATS. Correct.

Senator JORDAN. And, therefore, a rate of 3 $\frac{1}{4}$ percent which has been calculated and used by some agencies, some agencies of the Department of the Interior, is an unrealistic rate in the context of the present interest costs. Is that a fair statement?

Mr. STAATS. That is correct.

Senator JORDAN. And it is not at all likely to be an effective or realistic rate in the very near future.

Mr. STAATS. I would agree.

Senator JORDAN. There was a time when it was set up, no doubt, that it did represent a meaningful cost of money because they used an average rate of long-term borrowings. But since, in the last 10 years, interest rates have been escalating at a rather rapid rate, any rate based on earlier prognostications of what the total maturity of all investments is would be outmoded in the present rate structure of interest in the cost of money.

Mr. STAATS. Yes. And I think the statement from the budget message that the chairman read reflects agreement on this point now.

Senator JORDAN. Before we get through with this, do you expect that we will be able to draft legislation that would give us some guidelines that would help establish those uniformities?

Mr. STAATS. I would not want to rule this out of the picture. It would be my reaction, however, that it may not be necessary or, perhaps even desirable right at this moment because the subject needs more debate, it seems to me. There needs to be certain exploration of the possibility of reconciling the opportunity cost concept which practically all economists would argue for, to the idea that we are suggesting in our report—of taking in addition to the yield rate on the long-term issues a taxes foregone factor which would bring you within two to two and a half percent of the figure which most of the opportunity cost advocates would support, which is around 10 percent.

Senator JORDAN. Most of the agencies that are using this device now, that are using this kind of technique, are doing it because of administrative direction rather than by legislation.

Mr. STAATS. That is correct; yes. So far as I know there is no legislation on the statute books which governs the discount rate on any program.

Senator JORDAN. Except for the statutes having to do with water resources development.

Mr. STAATS. Of course, that is not a statute. That was an executive branch action, and it was incorporated in a Senate report or Senate-issued document.

I think you could correctly interpret that as having the agreement of the Senate Interior Committee. But it was not a legislative action on the part of Congress as a whole.

Senator JORDAN. I think it is important to bring out that such implementation of the technique of discounting as is presently done is wholly by administrative order and without being based on legislation.

Mr. STAATS. To the best of my knowledge there is no legislation on the subject.

Senator JORDAN. In your opinion, the wisest course to follow is to see if we can get some voluntary compliance before we even start talking about legislation.

Mr. STAATS. I think the danger would be to try to enact into law a specific fixed rate. I think there would have to be room for flexibility.

Senator JORDAN. Yes.

Mr. STAATS. You could not, it seems to me, specify a fixed rate.

If the concept could be written into a law which would still recognize the need for variations in individual situations, that should be done.

Senator JORDAN. Which would still permit the flexibility that the system would require in its application by the several departments.

Mr. STAATS. Yes. I think this would be the area where you would have difficulty at this point in time, that is in being very specific about what flexibility under what circumstances, you would permit in given programs. That would be the problem.

Senator JORDAN. Thank you, sir.

Chairman PROXMIRE. I would like to ask you, Mr. Staats, something that I think can give us part of the answer to this difficulty we have in the Federal Government with its great divergency in applying the discount factor.

Why, of all of the subagencies of the Defense Department is the Corps of Engineers the only one that has this $3\frac{1}{4}$ percent or $3\frac{1}{8}$ discount rate, meaning a return of $3\frac{1}{8}$ percent on the investment in that area, where all the rest of the Defense Department has 10 percent, virtually all the rest?

Mr. STAATS. Well, I think—

Chairman PROXMIRE. After all, the Defense Department knows what it is doing; it has pioneered in this area and has a clear rationale for applying opportunity costs.

They made a fine response, and yet in the Corps of Engineers they have an exception.

Mr. STAATS. The Corps of Engineers follows a different rate because it was agreed on for all the water resource development programs in 1962.

The purpose was to get the consistency of the discount rate to be employed by the Interior Department, the TVA, the Corps of Engi-

neers—all of the agencies concerned with water resources development.

Chairman PROXMIRE. In other words, what you are saying is that the President, with the acquiescence of the Congress, a little more than acquiescence in view of Senate Document 97, and the Government decided that they are going to give preference and a very decisive preference to water projects over other projects of the Defense Department, and they are going to do it by having a discount factor which tells people that a project will yield a benefit higher than its cost in a way that is self-deceptive.

If you applied the 10-percent discount factor instead of the 3-percent discount factor, I think most of the water projects never would have been funded.

Mr. STAATS. It certainly would have ruled out a great many, no question about it.

Chairman PROXMIRE. A great many. And on the basis of reports that I have had where I have had where I have inquired about them, I find that most of them would have a less than unity benefit-cost ratio. It is a policy on the part of the Congress to favor the water projects.

This may be a good policy, but I think Congress should do it more with its eyes open, and we would be better off if we had a uniform system and said, "All right, we are going to fund the water projects if the benefit is half the cost."

Mr. STAATS. But to state the other side of the issue a bit, there are those also who would argue that they have consistently underestimated the benefits.

Chairman PROXMIRE. That is possible. It is very possible. But I think it is important, if that is the case, that the benefits should be more realistically appraised rather than fooling around with the discount factor, and having this clear discrimination.

Mr. STAATS. I believe from personal experience—

Chairman PROXMIRE. This is why I differ a little bit in your reply to Senator Jordan when you said there is a danger in a fixed rate. I am not so sure that we should rule that out, because I think a fixed rate might have its benefits; or at least if not a fixed rate, an assertion of the determination on the part of the Congress, determination on the part of the Government, to have a standardized system throughout.

You might want to vary the rate to everybody for reasons, as interest rates go up or for various other reasons.

Mr. STAATS. I think my response would be a little different if we were thinking in terms of a minimum or floor, and then go higher for such factors as obsolescence, the difficulties of estimating the benefits and the costs, and risk factors. Even a fixed rate—

Chairman PROXMIRE. But, you see, my argument is that this should not be a substitute for decision. This is a guide to decision, a help to decision. In other words, all this would do would give you what the discount factor develops in terms of the mathematical formula. Then you have to use your own value judgment.

Then you have to step in and make your own decision, and it would seem to me if you have a uniform system then you are in a much better position to make a clear-cut decision based on these other factors. You know what you are working with.

Senator SYMINGTON. Would the chairman yield?

Chairman PROXMIRE. Yes.

Senator SYMINGTON. It would appear we get more benefit from water development than from some other aspects of the Federal budget. Correct me if I am wrong.

For example, in my State we had a close question on a certain project when it came to cost-benefit ratio. As a result, we finally built a dam; and whereas nearly every rural county in Missouri has lost population and lost income, this particular group of counties, as a result of this dam, has had a tremendously increased economic gain, to the point where bank deposits are now over 300 percent more than they were a few years ago.

This, of course, creates a much-needed additional tax base, not only for the State but for the Federal Government.

It is my experience that when you develop water on a proper economic basis it is a big help to any economy; which I would not think true of some other investments made on other Federal programs.

Chairman PROXMIRE. If the Senator would yield on that point—

Senator SYMINGTON. Perhaps I misunderstood.

Chairman PROXMIRE. No; I think it is a very excellent point. It comes right to the crux of the problem.

I think the difficulties, however, are that the benefits may very well have been underestimated for water projects, in which case I think we should do a better job of estimating the indirect as well as the direct benefits. Then you are in a position to make your evaluation.

The Senator from Missouri has far greater experience in private enterprise than virtually any other Member of the Senate. I think you would agree that any businessman, in making an investment, would want to know his rate of return, and would want to have it standardized so that regardless of whether he was investing in something that was close to his heart or somebody else's heart, he would have the facts, the figures, uniformly applied, and then he makes his decision.

Senator SYMINGTON. Well, I say to my chairman that the penalty for being late is probably expressed by my observations.

Chairman PROXMIRE. No, they are very good.

Senator SYMINGTON. I am sorry I could not have been here all the time.

Mr. STAATS. If I might comment on what you and Senator Symington have been saying here, I think we would all agree that an effort to relate benefits and costs on any investment-type program is a desirable thing. This is like being for home and motherhood. I think this is an invaluable kind of technique.

The real problem is in terms of how good are our estimates of what the benefits and costs are going to be for the future, and we are projecting ahead a good many years. In water resource projects, for example, we have had the reclamation law on the statute books since 1902, and we had Corps of Engineers programs long, long before that.

I think the Congress and the Executive would both be in difficulty if we do not have some kind of a cost-and-benefit analysis in connection with these water projects, because it not only affects the decision of whether you are going to build at all or not, but in terms of what combination of benefits. Are you going to put recreation in? Are you going to put power in? Or are you just going to have flood control? Are you going to have reclamation as well?

Now, this same principle carries over into other programs as well. It is just that we have not developed these techniques as far in some of these other programs as we have in the water resource field.

Chairman PROXMIRE. A lot of people feel discounting may apply to water projects and also to Defense Department investment, but it does not apply to human resources. We had very excellent testimony from the Assistant Secretary of HEW, Mr. Gorham, who did a fine job, I thought, of showing where they applied discounting and cost-benefit study to their studies in the National Institutes of Health, and found that they can have an excellent guide to their decision on the basis of carefully figuring the benefits and the costs and finding out that some programs have a far quicker and better payoff in saving lives, and so forth, than others.

So that I think we are underestimating the value of this across the board in a very great number of areas where it is just beginning.

There has been some pioneering in the Defense Department and elsewhere, but this is the kind of technique that can be most helpful to the Congress, it seems to me.

Mr. STAATS. It is, of course, more difficult in these types of programs administered by HEW. We are faced in the General Accounting Office with a very tough problem at the moment growing out of the recently enacted poverty authorization, the authorization for the Office of Economic Opportunity, where we have been given the task of evaluating the effectiveness of our programs administered under that act.

This is extremely difficult in such programs as Head Start, the Neighborhood Youth Corps, and the community action programs.

Chairman PROXMIRE. But the very fact you are forced to think hard about the benefits of the program, you are forced to determine where you can get the most for your dollar, even in an antipoverty program, it seems to me, is a good, wholesome requirement. It means that you are going to invest that money more carefully. It means you are going to find ways of economizing, it means you can close down the less efficient operations that have a lower payoff.

Recently the President announced, I guess just over the weekend, the closing down of some of the Job Corps camps. One of them was in my State, and I regretted it very, very much.

But I must say they applied criteria which had some basis of objectivity, and they had a good method for determining this. I may have disagreed with his decision, but it was done on a basis, as announced, and without political pressure, and this is most helpful in the economy to a truer sense, that is getting more for your dollar.

Mr. STAATS. As the budget becomes tighter and the people become more and more concerned about the growth of Government expenditures, it seems to me it only makes good, commonsense to apply criteria where we are making an effort to relate the payoff to the investment that we are making.

Chairman PROXMIRE. May I ask you and Mr. Rathbun and also Mr. Marvin, if you would like to comment, if you do not feel that this technique has the potentiality and can be applied more widely, much more widely, in the future than in the past, and by doing so will give the Congress and the administration a far better notion of how to invest these tax dollars and spend them more wisely?

Mr. STAATS. I would like to have Mr. Rathbun answer.

Mr. RATHBUN. I believe it is a mistake to view discounting as something applicable to only an investment project. I think it is applicable to all projects, whether they involve investments or flow of services, because they do involve a flow of costs and benefits over time.

Discounting is fully as useful in, say, the evaluation of some program involving services as in and out-and-out investment program.

Chairman PROXMIRE. Thank you very much.

Do you want to comment?

Mr. STAATS. I think it would be of interest to hear what the Department of Health, Education, and Welfare has to say on the—

Chairman PROXMIRE. Mr. Gardner, I notice, had some different views and Mr. Gorham modified—

Mr. STAATS. The letter indicates that:

"You have expressed concern"—that is the GAO—"that wide disparity among agency practices and rates may produce an inferior pattern of resource allocation. Standard discount rates are important when we are choosing among alternative programs with the same or similar objectives." This is the point we made a while ago.

In these cases, proper estimation of costs and benefits could lead to a useful ranking of projects to maximize the returns from available dollars. But where the benefits of public programs are diverse or intangible, frequently affecting different age groups and regions, a common discount rate, whatever the level, may not be helpful in determining the best allocation of Government resources.

In the present state of the art, no amount of analysis is going to reveal whether the Nation benefits more from sending a slum child to preschool, providing medical care to an old man, or constructing a large water resources project. Currently the decisions of how much health, education, and so forth, and which groups in the population shall benefit, are largely based on value judgments and politics. With respect to the basis of discount rates, we believe they should reflect the opportunity costs of the funds utilized by the project.

It seems equally clear that there is a wide difference of professional opinion—reflected in the results of your survey—as to the appropriate rate.

This concludes the substance of the letter.

Chairman PROXMIRE. I thought it was a very intelligent observation, and I think, of course, he is right. Value judgments have to be the main basis for these things, and I think the example he gives is a good one. Once again, however, I do not understand why this is not a helpful guide under all circumstances.

I understand that the use of the discount technique in evaluating education programs shows education to be a fine investment, excellent investment, and that it is something that you can use quite well.

Mr. STAATS. I think the caution needs to be—

Chairman PROXMIRE. There is, I think, a feeling of hesitance on the part of people because they think it is a little rough and unthinking and unfeeling and mechanical, and that your human resources programs are going to suffer. But I think they could not be more wrong. I think that these are the programs where there is a real payoff and where you are going to get encouragement if they are good programs.

Once again it means you are going to evaluate these programs with a hard head, too, and save money where there is waste, and if you can expose waste and you can keep constantly asking, insisting, that the programs justify itself, and show that there is a payoff.

This is true even in the programs like Head Start that we all feel in our heart, everybody wants to help every little child, but even some of these programs may be wasteful. To the extent that they are, we ought to correct them and improve them.

I am sorry. I have gone over my time, Senator Symington. I would like to yield to you.

Senator SYMINGTON. I would ask one question, Mr. Chairman. When you take a water project where you have flood control, reclamation, and power—I think those would normally be the three main interests—from the standpoint of what you might call good business management under sound accounting principles, you would be willing to have a closer rate normally for flood control than for power creation, would you not?

Mr. STAATS. This is one of the kinds of cases that I had in mind when I referred to the need for some flexibility.

Senator SYMINGTON. If you have a flood, there is disaster, and generally there is no way that can be prevented by private enterprise investment.

Leaving reclamation and its intriguing appeal from the standpoint of obtaining jobs where companies want to move and have happy employees, going from flood control over to power, you often have disagreement with private power interests as to whether it is to the benefit of the community and the country to put in any public power, do you not?

Mr. STAATS. That is true.

I would still feel that an analysis in connection with flood control, though, is a highly useful analysis in terms of both location of the project and the extent to which you can deal with the problem through upstream measures as against the large dams which we have gotten so used to.

Senator SYMINGTON. I agree. I only meant you would be willing to put a lesser cost ratio and percentage estimate on a flood control project, in the development of the overall project, than you would re the cost of power development in the particular dam in question.

I was not disputing, in any way, the necessity for flood control. I was in the executive branch when we tried to get adequate flood protection for Kansas City, which protection would have cost about \$200 million. In the 1950-51 flood around Kansas City we lost \$1 billion. So we lost five times more in 1 year, in that heavy flood, than the total cost of flood protection would have been.

So I was trying to figure if it was not logical to have a closer return-estimate cost ratio—lower would be better than closer—on the flood control aspect of a water development than on a power development included as a component part of the same water development.

Mr. STAATS. I would answer that in two ways. One is I think that you might have a basis for differentiating on the use of discount for a power project as against a nonpower project where you do have opportunities for private investment as well as public investment.

But I would think also that while we are talking about discount rates and cost-effectiveness studies, it is important that we also make a proper estimate of benefits.

My own personal experience with the Kansas City flood situation was that there had not been adequate analysis given to the benefits, or that project would have been built earlier.

There are many arguments involved, including the dislocation of businesses and farms, and so forth, in the area, and whatnot. But it was not an adequate assessment of the benefits in that particular case, in my opinion.

Senator SYMINGTON. At that time I was handling the relief in question in the executive branch.

Mr. STAATS. I would like to say one thing further, Mr. Chairman, mostly by way of emphasis. I think cost-effectiveness studies, including the discount rate, are most useful when we are talking about a common type program. It is not too useful in comparing, say, guided missiles with job training. They are most useful when we are talking about ways in which you can accomplish a given object in the least cost terms, and while we have talked a great deal here this morning about flood control and water development, one of the things which has not been given adequate attention in the area, in my opinion, has been the possibility of flood-plain zoning as one of the ways in which you can achieve the same objectives at much lower costs, and this is because we have not—

Senator SYMINGTON. What was that?

Mr. STAATS. Zoning in the flood plain where you have an established, known flood area, which you can zone to use for different purposes than otherwise it might be used.

Maybe it can be used for a park or maybe it can be used for one purpose or another that does not suffer severe damage from floods.

Now, this is a subject which is getting a lot more attention now as a result of the executive branch report put out about a year ago.

In many cases it would be much cheaper to control the situation before it develops, in effect, rather than having to build expensive structures to protect them after they are once built up.

Now, this is better for the future situation, and it does not really solve the problem if you already have that development in place.

Chairman PROXMIRE. Senator Jordan?

Senator JORDAN. Just one more question in defense of flexibility. The Department of Defense has many varied activities. We mentioned a good deal about flood control and navigation, even improvement of water quality, a proper function of some water project, and these are benefits and costs to which you apply one set of criteria. But how do we evaluate those prioritywise as against an expenditure of the same Department of Defense which it will make for a missile or a silo which we hope we will never have to use?

Mr. STAATS. Well, I do not believe that any of the techniques of cost-effectiveness is going to give you an answer to that question, in my opinion.

I do believe that it is important if you are considering the anti-ballistic missile program that you have a careful analysis made of any other way in which you could accomplish the same objective. I think that is what we are really saying here.

Senator JORDAN. I only bring this out in defense of your recommendation of flexibility, with which I fully agree. I do not think you could establish one overall rate that would be applicable even in one department of Government, the Defense Department.

Mr. STAATS. I think there can be some statement of principles, and I think there can be far greater consistency than we now have.

Senator JORDAN. Yes. Thank you.

Chairman PROXMIRE. Thank you.

I have just one other question, and that is whether or not you have any indication of how many programs are calculated at more than just one discount rate?

Mr. STAATS. Some of the agencies indicated to us that they use more than one discount rate in a given program, to test the effect of different rates of discounts.

Chairman PROXMIRE. When they make a presentation to Congress, however, they come down with one, or do they take the one that helps them the most?

Mr. STAATS. It might be useful; but we do not have this information.

Chairman PROXMIRE. Well, it is obvious that there is a tremendous need for development and improvement in the executive branch with respect to evaluation of programs, and also a great need to develop them so that Congress can have a better understanding of these techniques and uses so we can evaluate the proposed spending programs better than we do.

It is my intention to pursue this matter during this year with agency heads for the purpose of achieving a greater effectiveness in public expenditures, and I think, as you suggested or implied, it would be a good idea for us to have hearings and have these agency heads come up at a later time.

We might be tied up in this committee for several months now with a very heavy schedule, but later on in the year we hope to pursue this further because I think that this is a most constructive report which gives promise, I think, of saving enormous amounts of money in the future, plus providing a much better, sharper kind of investment program.

Senator SYMINGTON. Mr. Chairman, may I ask one question?

Chairman PROXMIRE. Yes, indeed. I am happy to yield to Senator Symington.

Senator SYMINGTON. Mr. Comptroller General, I noticed in your report that the average annual return rate in the private sector of companies regulated by Government—State or Federal—has heavy variation, from around 4 percent up to 15 percent.

The other day a public utility executive wrote me protesting about Government regulation, or lack of regulation, of the television industry. He said television was also a Government utility, that the channels—wavelengths—were owned by the people through the Government, and licenses were renewed for each station periodically by the Government. But he said there was no supervision of profit as against investment in the television industry, and that there was growing resentment among other regulated utilities about the condition in question.

Was his comment accurate about regulation?

Mr. STAATS. I do not believe I could answer that question.

Senator SYMINGTON. I would like to answer my constituent.

Mr. STAATS. I have not personally heard the question framed in those terms.

Senator SYMINGTON. There is an aspect to Comsat, private and public, a semi-Government agency. I presume all cable income returns are regulated.

I did not have any answers, and wondered if you did.

Mr. STAATS. I want to look it up.

Chairman PROXMIRE. I want to thank you very, very much, Mr. Staats, for your usual extremely competent testimony that you and the members of your staff have given. It was a most constructive morning.

The committee will stand adjourned, subject to subsequent hearings we will have during the year.

Mr. STAATS. Thank you very much.

(Thereupon, at 12 noon, the subcommittee adjourned.)

[The General Accounting Office report to the Joint Economic Committee, on which this hearing was based, follows:]



***REPORT TO
JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES***

**Survey Of Use By Federal
Agencies Of The Discounting
Technique In Evaluating
Future Programs** B-162719

***BY THE COMPTROLLER GENERAL
OF THE UNITED STATES***

JAN. 29, 1968



COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-162719

Dear Mr. Chairman:

In accordance with your request of December 19, 1967, we are submitting our report on the results of our survey of use by Federal agencies of the discounting technique in evaluating future programs. Discounting is a technique which reduces the dollar value of future program costs and benefits by a compounded rate reflecting the cost of money. The discounting of future costs and benefits makes them comparable to present costs and benefits, i.e., comparable in terms of their present value.

In October 1967 we sent a list of questions concerning discounting practices to the heads of 23 Federal agencies. The agencies' replies to these questions are summarized in appendixes of this report. On the basis of the responses of the agencies, the following points are clear:

Although some Federal agencies do not use and do not plan to use discounting, the great majority of agencies view discounting as an increasingly important aid to decisionmaking.

Whether based on Treasury borrowing costs or other considerations, discount rates used in evaluating programs vary over an extremely wide range (3 to 12 percent).

It is possible that the wide disparity in agency practices and discount rates may produce a more serious misallocation of resources than would exist in the absence of discounting. In our opinion, the general acceptance of the technique of discounting by Federal agencies should be supplemented with improvements necessary to bring about consistency in and among agencies in discounting rates, techniques, and underlying concepts.

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With respect to the discount rate, one school of thought holds that the rate should be determined by and be equal to the rate paid by the Department of the Treasury for borrowed money. Another school of thought holds that the rate should be determined by what is foregone, namely, the return that could have been earned in the private sector of the economy when the decision is made to commit resources to the public sector. Our survey revealed that some Federal agencies rely on their own interpretation of these schools of thought while others employ different criteria, including the Federal Reserve Board rediscount rate and agency borrowing cost.

The results of the survey, as shown in appendixes I and II, have been sent to the agencies for their consideration. A substantial amount of further study of specific problems and discussion of the problems with the agencies will be necessary if general guidelines establishing a standardized basis for discounting are to be promulgated.

This report also points out that, if the full costs of borrowing, including foregone taxes from the private sector, are considered, the difference between the various schools of thought is narrowed substantially. It therefore appears that there is a possibility of a satisfactory reconciliation of varying points of view regarding the rate or rates to be used. The report emphasizes that the important matter disclosed by our study is the inconsistency of present practices.

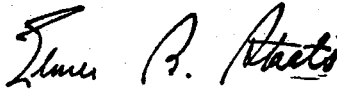
Because of the extreme variation in discount rates and techniques being used by the executive agencies for evaluating and justifying their programs and because there is strong impetus toward the use of the discounting technique by Federal agency adoption of planning-programming-budgeting systems, the Congress may wish to provide guidance to the executive agencies on this important topic.

We have prepared this report for the use of the Congress because of our belief that some measure of standardization regarding the use of

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the discounting technique is needed to enhance the quality and consistency of information concerning Federal programs which is presented to the Congress for its consideration.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "James B. Acheson". The signature is fluid and cursive, with the first name "James" and last name "Acheson" clearly legible, and "B." in the middle.

Comptroller General
of the United States

The Honorable William Proxmire, Chairman
Joint Economic Committee
Congress of the United States

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INTRODUCTION

The General Accounting Office has made a survey of the use by 23 selected Federal agencies of the technique of discounting in making evaluations of future programs. The nature of the discounting technique is described in the background section of this report.

Our survey was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67). The survey was performed in Washington, D.C., and was completed in December 1967.

We undertook this survey because of our belief that the rapid growth in program expenditures by the Government and the increasing complexity of Federal programs point up the need for responsible officials in the Government to make effective use of objective aids to decisionmaking. This report discusses one such aid--the technique of discounting--and describes its use by the Federal agencies included in our survey.

Our survey was directed primarily toward determining the extent to which the discounting technique is presently employed by Federal agencies and the extent to which those agencies not employing this technique plan to do so and toward identifying the discount rates currently in use by the agencies. We did not evaluate the appropriateness of the agencies' stated policies and practices as they were revealed to us, neither did we examine into the actual discounting techniques and practices followed by the agencies or into other policies and practices used by them when evaluating Federal programs.

An illustrative copy of a request for information concerning discounting sent to each of the selected agencies is attached as appendix IV. Our request for information and our survey did not cover information concerning water and related land resources programs for which recognition of uniform agency practice is contained in Senate Document 97 (see discussion on p. 8) or programs that come within the purview of Bureau of the Budget Circular A-76 entitled "Policies for Acquiring Commercial or Industrial Products and Services for Government Use."

BACKGROUND

The theory underlying the discounting technique is that benefits from Federal programs to be realized in the near future are valued more highly than benefits to be realized in the more distant future and that costs which must be incurred in the near future loom larger than costs that will be incurred in the more distant future. The discounting of future benefits and costs makes them comparable to present benefits and costs, i.e., to the present values of benefits and costs. The numerical standard used in making these intertemporal comparisons is called the discount rate.

Federal agency programs, like other programs, generally involve a series of annual costs and a flow of benefits over time. Calculation of the present values of costs and benefits through discounting makes possible a comparison of costs and benefits, usually expressed in terms of a ratio of benefits to costs, which gives consideration to the time periods in which benefits will be realized and costs incurred. Such comparisons (or ratios) are useful in evaluating programs and in choosing between alternative programs. Furthermore, the discounting technique can be helpful to the decisionmaker in those cases in which the benefits associated with programs cannot be measured in dollars. Here, the present values of the costs of the programs can be presented to the decisionmaker for his decision as to whether the perhaps dimly perceived benefits are worth their costs. The technique can also be helpful in making comparisons of the costs of programs that have equal benefits.

The present values of program benefits and costs will not usually be the only information decisionmakers need concerning benefits and costs. For example, there may often be value in tables which show the time-phased undiscounted costs and benefits in a manner that enables the decisionmakers to see the full impact of benefits and costs in each fiscal year.

EXPLICIT AND IMPLICIT DISCOUNT RATES

Discount rates are often explicit but in some cases they may be implicit. An explicit discount rate is a rate which is identified and used to calculate the present values of future benefits and costs. However, if in an analysis the assumed life of the program is different from the more probable life expected on the basis of experience or studies, then an implicit discount rate is actually being used.

The meaning of such an implicit discount rate can be illustrated by the following example in which a 10-year program life is used in an evaluation study but the most probable program life is 20 years. In order for the evaluation study based on 10 years to lead to the same conclusion as one based on 20 years, the present values must be equal in both cases.

In this example the net annual program benefits will continue beyond the 10-year program life assumed in the study. Since the net annual benefits in the eleventh year through the twentieth year are not recognized in the 10-year study an implicit discount rate is being used. In column A of the following table the total undiscounted values of program costs and benefits are shown for the assumed program life of 10 years. In column B the program costs and benefits for the most probable program life of 20 years are shown discounted at 8 percent--the discount rate that is required to equate the benefit-cost ratios in columns A and B. The implicit discount rate in this analysis which uses an assumed program life of 10 years (column A) is thus 8 percent.

	Undiscounted amounts	Present values (B)	
		(A) Assumed 10-year life	Most probable program life--20 years
		(millions)	
Implicit discount rate			8.0%
Initial investment	\$10	\$10.0	\$10.0
Annual operating costs	1	10.0	9.82
Annual benefits	3	30.0	29.45
Ratio of present value of benefits to present value of total costs (benefit- cost ratio), rounded		1.5	1.5

Shown in the table below are the approximate discount rates, for a range of the most probable program lives, that would be implied by analyses in which explicit discounting is not used but in which the assumed program lives are shorter than the most probable program lives. The implicit discount rates in an actual case may be somewhat different, depending on the form of the cost or benefit streams over time.

Implicit Discount Rates in Percent

Most probable program life (years)	Assumed program life (years)					
	<u>1</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>
1	-	-	-	-	-	-
5	100	-	-	-	-	-
10	100	15	-	-	-	-
15	100	18	6	-	-	-
20	100	19	8	3	-	-
25	100	20	9	4	2	-

Benefit-cost ratios may be very sensitive to the explicit discount rate used in calculating the present value of costs and benefits. As shown in the following example, which involves a program with a probable life of 25 years that requires an initial investment of \$50 million, changes in the rate can turn what would appear to be an attractive program into an unattractive program and vice versa.

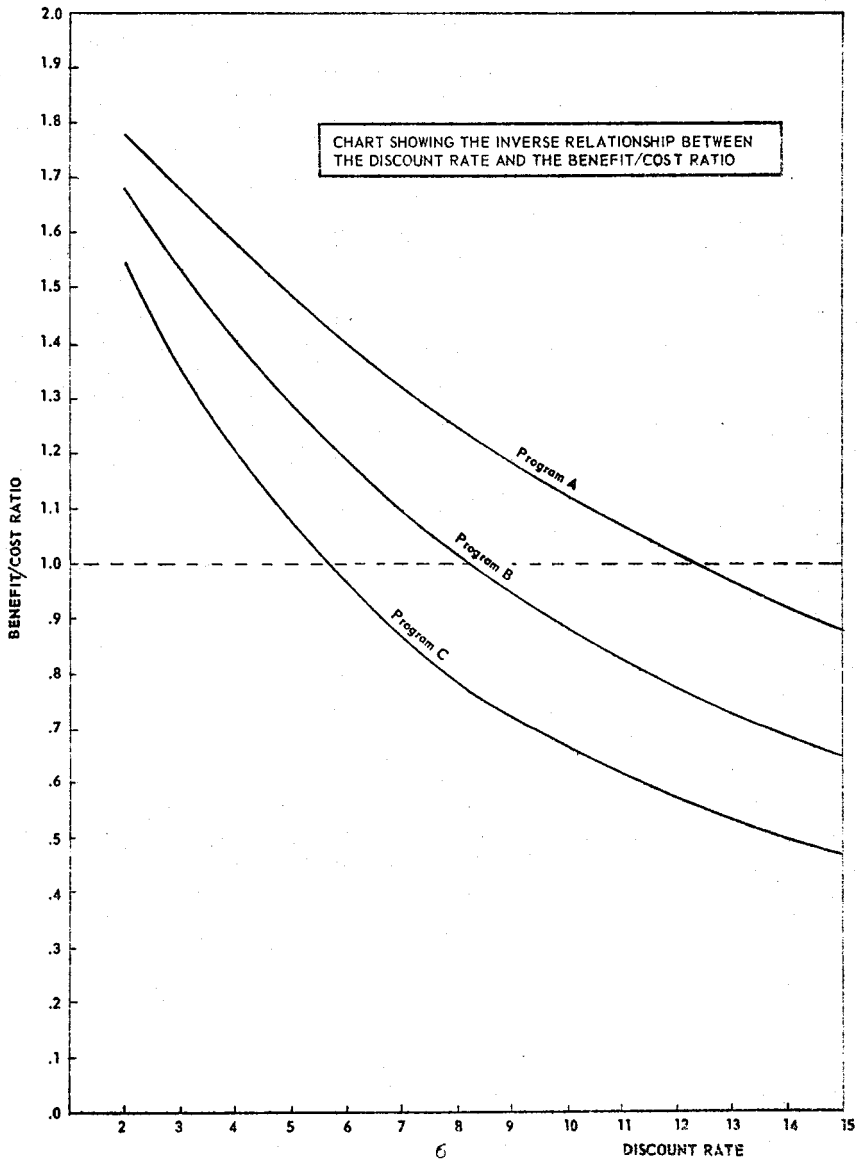
Initial invest- ment	Annual operating costs	Annual benefits	<u>Ratios of benefits to cost</u>		
			Undis- counted	Dis- counted	Dis- counted
				<u>3 percent</u>	<u>7 percent</u>
(millions)					
\$50	\$12	\$16	1.14	1.08	0.98

EFFECT OF CHANGES IN DISCOUNT
RATES ON BENEFIT-COST RATIOS

The chart on page 6 shows the inverse relationship between discount rates (shown on the horizontal axis) and benefit-cost ratios (shown on the vertical axis) for three different programs which have constant annual benefits and constant annual operating costs. The three curves illustrate the effect of discounting on the benefit-cost ratios of the three hypothetical programs with differing lives, each of which, if undiscounted, would reflect a benefit-cost ratio of 2; that is, total undiscounted benefits for each program would be double the total undiscounted costs. With discounting, the favorable benefit-cost ratios deteriorate as higher discount rates are applied. For example, Program A has a benefit-cost ratio of about 1.7 at 3 percent, but only about 1.1 at 10 percent.

The curves drawn for these three hypothetical programs are probably typical of such curves for many programs; however, the curve for any particular program may be different because of the behavior of the program's benefits and costs. Such behavior would depend in part upon the assumed life of the program and the amount of initial investment cost relative to annual benefits and annual costs.

The chart on page 6 also illustrates that changes in the higher discount rates have less relative effect on benefit-cost ratios than do changes in the lower discount rates. Therefore, a greater absolute error or wider range of uncertainty or variation may be tolerated in the higher discount rates than in the lower discount rates. For example, an increase in the discount rate from 3 to 6 percent reduces the program B benefit-cost ratio by about 23 percent; whereas, an increase from 10 to 13 percent reduces the benefit-cost ratio by about 17 percent.



DETERMINATION OF DISCOUNT RATE

With respect to determination of the rate, one school of thought holds that the rate should be determined by and be equal to the rate paid by the Treasury in borrowing money. Another school of thought holds that the rate should be determined by what is foregone, namely, the return that could have been earned in the private sector of the economy when the decision is made to commit resources to the public sector. Proponents of both views agree that the use of different discount rates has an effect on financial judgments which is similar to charging different prices for, say, identical labor in different programs.

Neither school of thought provides clear guidance on the specific discount rate that should be used. Cost to the Treasury, for example, will vary, depending upon the definition applied, from 3 to 8 percent or more. The average rate of return in the private sector also varies depending upon historical periods selected and upon the weighting of the various segments of the private sector which are used in computing an average.

A discount rate of about 3.2 percent is the cost to the Treasury, if based upon the average rate payable on outstanding United States securities having a maturity of 15 years or more, as prescribed by Senate Document 97 (discussed below).

The rate of return that can be earned in the private sector is estimated by most researchers to be significantly higher than the cost of Government borrowing based on Senate Document 97. According to one researcher, the average rate of return in the private sector amounted to 15.4 percent for manufacturing companies and 4.1 percent for railroads in the years 1961-65.¹ These and other estimates of the same researcher are shown in the following table.

¹Prepared statement of Jacob A. Stockfisch, Hearings before the Senate Subcommittee on Economy in Government of the Joint Economic Committee, Ninetieth Congress, on the Planning-Programming-Budgeting System: Progress and Potentials.

<u>Segment</u>	<u>Annual average rate of return 1961-65 (percent)</u>
Manufacturing	15.4
Electric utilities	9.3
Gas pipelines	8.6
Telephone	11.9
Railroads	4.1
Motor carriers (note a)	14.7
Oil pipelines	15.6
Airlines	8.2

^a Average for 1961-64 only.

Therefore, if Senate Document 97 is used as the basis for the cost of Government borrowing, the difference between the two schools of thought is quite significant. If, on the other hand, Treasury borrowing costs are calculated on the basis of total costs to the Government, including corporate and individual income taxes foregone as a result of borrowing by the Government to finance programs, an estimate of between 7 and 8 percent results. (See illustrative calculation in app. III.) Thus, if Government costs are calculated on this basis, the practical importance of the difference between the two schools of thought is greatly reduced.

DISCOUNT RATE FOR PLANNING WATER AND RELATED LAND RESOURCES PROJECTS

Senate Document 97 entitled "Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources" (87th Cong., 2d sess.), which provides congressional guidance on discount rates under certain circumstances, states that the discount rates "shall be based upon the average rate of interest payable by the Treasury on interest-bearing marketable securities of the United States outstanding at the end of the fiscal year preceding such computation, which upon original issue, had terms to maturity of 15 years or more."

The document also states that "This procedure shall be subject to adjustment when and if this is found desirable as a result of continuing analysis of all factors pertinent to selection of a discount rate for these purposes."

Senate Document 97 was developed by the Secretary of the Army; the Secretary of Agriculture; the Secretary of Health, Education, and Welfare; and the Secretary of the Interior, and it was approved by President Kennedy on May 15, 1962. As indicated in the title, the document relates only to water and related land resources.

RESULTS OF SURVEYSUMMARY OF AGENCY PRACTICES

In our survey of the use of the discounting technique, selected agencies were asked to respond to a questionnaire concerning the discount rates used, rationale for the rates chosen, and plans for future use by agencies which were not evaluating fiscal year 1969 programs on the basis of discounting.

The table below shows the agencies' plans for using the discounting technique.

Agency Plans for Using the Discounting Technique

<u>Agency</u>	<u>Discounting used in analysis of fiscal year 1969 programs</u>		<u>Discounting not used but plans are to use discounting in future</u>	
	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>No</u>
Tennessee Valley Authority	X			
General Services Administration	X			
Department of Agriculture	X			
Department of Defense	X			
Office of Economic Opportunity	X			
Department of Transportation (Federal Aviation Administration)	X			
Department of Health, Education, and Welfare	X			
Atomic Energy Commission	X			
Agency for International Development	X			
Department of the Interior	X			
Federal Communications Commission		X	X	
Department of Housing and Urban Development		X	X	
Interstate Commerce Commission		X		X
National Science Foundation		X	X	
Federal Power Commission		X	X	
Export-Import Bank of Washington		X		X
Department of Labor		X	X	
Peace Corps		X	X	
Veterans Administration		X		X
Department of the Treasury		X		X
Post Office Department		X	X	
National Aeronautics and Space Administration		X	X	
Department of Commerce		X		X

As shown in the table, 10 of the 23 agencies queried report that discounting is used in making decisions. An additional eight agencies do not now use discounting but report that they plan to do so in the future. The remaining five agencies do not use discounting at the present time and do not state that they plan to do so in the future. However, two--Department of Commerce and Veterans Administration-- of these five agencies reported that some programs are evaluated in terms of periods of time which are shorter than the probable actual life of the programs--a procedure which involves implicit discounting. (See discussion of implicit discounting which begins on p. 3.)

Details of rates used by the agencies which use the discounting technique appear in appendix I.

Explanations of the plans of agencies which do not use the discounting technique appear in appendix II.

DIVERGENT AGENCY VIEWS ON DISCOUNT RATES

A divergence of opinion on discounting is reflected in agency practices. Some agencies use the Treasury cost of borrowing money as the discount rate while others use a rate based on the return on investment in the private sector of the economy. Still others employ different criteria to determine the agency's discount rate including the Federal Reserve rediscount rate and agency borrowing cost. The agencies included in our survey use discount rates which vary over an extremely wide range--from about 3 percent to 12 percent.

Within each school of thought there are important differences of opinion. Of those agencies which tie the discount rate to Treasury borrowing costs, one uses the estimated cost of new money to the Treasury, another uses the average cost of money to the Treasury, others use the cost prescribed by Senate Document 97 (about 3.2 percent at the time of our review).

One of those agencies which would tie the discount rate to the rate of return in the private sector uses a rate of

return on a safe investment and a slightly higher rate (3 percent and 5 percent) while another uses for some programs the rate representative of average capital returns in the private sector (presumed to be 12 percent) and for some programs permits the analyst to determine the rate on the basis of his judgment as to the nature of the program and the kind of analysis considered most meaningful.

Views are equally disparate in those agencies which report that discounting was not used in their analyses of individual programs for support of their fiscal year 1969 budget decisions. At one extreme is the view that decisions on programs should be made on the basis of first year costs and benefits--a procedure which implies a discount rate of 100 percent, since the future is ignored. At the other extreme is the view that decisions should be based on total undiscounted costs and benefits--a procedure which implies a discount rate of zero, since costs and benefits applicable to, say, the 20th year are treated as being as important as current costs and benefits.

SIGNIFICANCE OF DIFFERING PRACTICES

The fact that some agencies use discounting and some do not will tend to affect adversely the quality of decisions. This is illustrated in the following (hypothetical) cases.

Case A involves a program in an agency that does use discounting. Estimated costs and benefits of this program over its 25-year life are:

Initial investment costs	\$12,000,000
Annual operating costs	2,000,000
Annual benefits	3,000,000
Present value of total costs discounted at 4.5 percent	41,656,000
Present value of total benefits discounted at 4.5 percent	44,484,000
Benefit-cost ratio	1.07

Case B involves a program in a different agency which does not use discounting. Estimated costs and benefits of this program over its 25-year life are:

Initial investment costs	\$16,000,000
Annual operating costs	1,500,000
Annual benefits	2,500,000
Total costs	53,500,000
Total benefits	62,500,000
Benefit-cost ratio	1.17

On the basis of the benefit-cost ratio, the net value of program A is marginal. To the extent that benefit-cost ratios are considered significant by the decisionmakers, there would be a tendency to prefer program B rather than program A because total undiscounted benefits exceed total costs by a relatively wide margin, even though if program B were subjected to the rate of discount (4.5 percent) used for program A it would be much less attractive than program A (benefit-cost ratio of 0.97 compared with 1.07). Thus, the benefit-cost analyses for programs A and B would, if only the program A analysis used discounting, tend to bring about

a misallocation of resources since the results of the analyses would favor program B.

In the above example, the tendency to misallocate will, of course, increase with higher discount rates. The following table illustrates this tendency as the discount rate increases from zero to 10 percent.

<u>Benefit-cost ratio</u>	<u>Pro-gram A</u>	<u>Pro-gram B</u>	<u>Differ-ence</u>
Undiscounted	1.21	1.17	.04
Discounted at 4-1/2 per- cent	1.07	.97	.10
Discounted at 10 percent	.90	.77	.13

Differences in discounting practices (see app. I) in and among the agencies which do use discounting will tend to produce the same kind of misallocation. For example, a power-production program in the Tennessee Valley Authority (TVA) (life of 50 years) may have a benefit-cost ratio of 1.14 (if discounted at 4.5 percent), while in the Department of the Interior the same flow of costs and benefits would yield a ratio of 0.96 (if discounted at 6 percent) or only 0.58 if the project were felt to be risky (and for this reason discounted at 12 percent). Thus, even though both agencies use discounting, the fact that different rates are used tends to favor programs of the agency using the lower discount rate and thus a misallocation of resources could be the result.

Similarly, interagency differences in implicit discount rates in agencies that do not use explicit discounting (see app. II) tend to produce misallocation. As shown in the table on page 4, the implicit discount rate increases as the difference between the most probable (longer) actual life of a program and the period of time considered in evaluating the program increases. The Veterans Administration (VA), for example, evaluates programs on the basis of a 5-year period, while the most probable life of, say, a hospital is about 25 years. Thus, the implicit discount rate is about 20 percent. The Department of Commerce, on the other hand, evaluates some programs having a

most probable life of at least 11 years in terms of a 7-year period--a procedure which implies a discount rate of about 8 percent. Under these conditions, the benefit-cost ratio for a given stream of benefits and costs will be higher in the Department of Commerce than in the VA. To the extent decisions turn on the relationship between costs and benefits, the VA will be inclined to reject projects which would be promoted under the standards employed in the Department of Commerce. Hence, resources will tend to flow from VA projects to Department of Commerce projects.

CONCLUSIONS

Federal agencies that use the explicit discounting technique may be making good use of this tool in evaluating individual projects. The analyst who examines a given project in detail, develops the discount rate which he considers appropriate, and calculates the present value of benefits and costs is in a better position to make defensible recommendations than if his analysis ignored the time periods over which benefits will be realized and costs incurred.

In our opinion, however, there is a greater value for the discounting technique when the decisionmaker must choose between many competing projects and this calls for a common standard with justification for variations in the discount rate which may be appropriate in special circumstances. Although some agencies indicate that the discount rate is viewed as an aid in choosing between programs within an agency, there appears to be little recognition that the evaluation of Federal programs calls for a common yardstick for use by all agencies.

In our opinion, the general acceptance of the technique of discounting by Federal agencies should be supplemented with improvements necessary to bring about consistency in and among agencies in discounting rates, techniques, and underlying concepts. We believe such improvements are needed if this aid is to be of most effective use to the agencies, the Bureau of the Budget, and the Congress in its evaluation of agency programs submitted for consideration.

Obstacles to reform in this important area are many and varied. For example, the specific nature of decisions that must be made needs to be examined in order that criteria for evaluating discounting techniques, discount rates, and underlying concepts can meet the needs of the various decisionmakers. It is clear to us that some measure of standardization is needed to enhance the quality and consistency of information presented to the various decisionmakers for their consideration.

MATTER FOR CONSIDERATION BY THE CONGRESS

Both the case for discounting and the choice of discount rates have been subjects of dispute for years. However, the results of our survey of Federal agency practices suggest that the case for discounting is being accepted but that there is a significant difference of opinion among the agencies over discount rates. Because of the extreme variation in discount rates and techniques being used by the executive agencies for evaluating and justifying their programs and because there is strong impetus toward the use of the discounting technique provided by Federal agency adoption of planning-programming-budgeting systems, the Congress may wish to provide guidance to the executive agencies on this important topic.

APPENDIXES

APPENDIX I Page 1

DISCOUNT RATES USED BY FEDERAL AGENCIES IN THE ANALYSIS OF INDIVIDUAL PROGRAMS IN FISCAL YEAR 1969

Agency	Programs	Rate (percent)	Rationale	
			Treasury borrowing cost	Other
Tennessee Valley Authority	Fertilizer munitions and development	4.5	X	
	Power supply and use	4.5 to 5.5		Cost of money to TVA (note 1)
General Services Administration	Facilities program	4.5		Estimated productivity of capital (note 2)
Department of Agriculture	Housing loans	4.875	X	(note 3)
	Water and sewer loans and grants	4.875	X	
	Rural electrification loans	4.875	X	
	Rural telephone loans	4.875	X	
	Rural renewal district loans	4.875	X	
	Rural conservation and development loans	4.875	X	
	Farm operating loans	4.875	X	
	Farm real estate loans	4.875	X	
	Production efficiency	5.0	X	
Office of Economic Opportunity	Job corps	3.0 and 5.0		"Rate of return on a safe investment and a slightly higher rate" (note 4)
	Upward bound	3.0 " 5.0		Same
	Family planning program	5.0		Do.
Department of Transportation (Federal Aviation Administration)	Facilities and basic systems	4.2		Federal Reserve rediscount rate
	Radar components	4.2		Same
	En route automation	4.2		Do.
Atomic Energy Commission	Enriched uranium production planning	5.0	X	
	Radioactive waste management planning	5.0	X	
	Value of special nuclear materials	5.0, 7.5, and 10.0	X	Use of 7.0 and 10.0 not explained
	Radiation pasteurization of meat	Government costs--5.0	X	
		Industry benefits--15.0		
	Reactor development	5.0 to 9.0		Rate used in industry 6.0 and 7.0 typical of rate used by private utilities; 9.0 used to introduce a risk factor (note 5)
Department of Defense	41 shipyard projects	10.0		Time preference for current vs. future money sacrifices in private sector (note 6)
	14 air stations	10.0		Same
	18 other stations	10.0		Do.

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DISCOUNT RATES USED BY FEDERAL AGENCIES IN THE
ANALYSIS OF INDIVIDUAL PROGRAMS IN FISCAL YEAR 1969 (continued)

<u>Agency</u>	<u>Programs</u>	<u>Rate (percent)</u>	<u>Rationale</u>	
			<u>Treasury borrowing cost</u>	<u>Other</u>
Agency for International Development	Power plant in Afghanistan	8.0 (cost only)		Opportunity cost of money (note 7)
	Highway in Bolivia	12.0		Development on foreign exchange scarcity, opportunity costs, and other factors (note 8)
	Roads in Guyana	10.0		Same
	Roads in British Guiana	8.0		Do.
Department of the Interior	Utility program: Low risk	6.0		Representative returns on investment (note 9)
	Average	12.0		Average return in private sector (note 9)
	Energy and mineral development programs in which exploitation is a private function	12.0		Same (note 9)
	Aquatic living resources	3.1 and 6.0		No special explanation (note 10)
	Indian reservation resources development	3.1	X	Related to water or land resources, so S.D. 97 applies (note 11)
Department of Health, Education, and Welfare	Human investment programs (adult education, vocational rehabilitation, work experience)	0-8.0		(note 12)
	Individual diseases (tuberculosis, cancer, syphilis, arthritis, motor vehicle injury)	0-10.0		(note 12)
	Cost of illness	4.0 and 6.0		(note 12)
	Cancer control	4.0 " 6.0		(note 12)

The notes to appendix I appear on page 21.

NOTES TO APPENDIX I

1. The Tennessee Valley Authority (TVA) stated that its Power Supply and Use Program rates "are based on the expected costs of money which TVA must pay over the period of the evaluation. Since the power program is currently financed from earnings from the sale of power and from the sale of revenue bonds, the future cost of money varies with the proportion acquired from the different sources utilized as well as from changes in interest rates."
2. The General Services Administration (GSA) stated that in its facilities program the costs of alternatives were discounted to present value at 4.5 percent for 50 years, the estimated life of the buildings. GSA stated that the 4.5 percent rate was selected "as an estimate of the long term productivity value of capital" and was applied on the assumption that "the relationship between the costs of alternatives would hold over the life of the project under examination."
3. The Department of Agriculture stated that its analysts "often prefer to calculate internal rates of return for comparing investment-type programs, rather than use a benefit/cost ratio analysis which depends upon discounting." The "internal rate of return" is analogous to the "yields" of an investment. The procedure is to find the "internal rate" (the rate of discount) that equates the present value of the proceeds from an investment with the present value of the outlays on the investment.
4. The Office of Economic Opportunity advised us that the rates of 3 and 5 percent "were safely on the conservative side for estimates of this type," and that they represented a "rate of return on a safe investment and a slightly higher rate." The agency also advised us that these rates gave consideration to the secular growth in the price of quality-constant labor.

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5. The Atomic Energy Commission stated that in its "reactor development studies, discount rates of 6 to 7 percent are illustrative of those used by investor-owned utilities. (Companion studies employ appropriate discount rates based on data from the Federal Power Commission applicable to public power systems.)" The 5 and 9 percent rates were used to determine the sensitivity of the reference value of 7 percent.
6. The Department of Defense stated that all the programs to which it applied the 10 percent discount rate were related to its military construction program. The discount rate was selected "to reflect the amount of time preference for current versus future money sacrifices that the public exhibits in nongovernmental transactions. The 10 percent rate is considered to be the most representative point within a range of plausible rates obtained from considering this public time preference."
7. The Agency for International Development stated that the cost of its Afghanistan power plant project was discounted at 8 percent, assumed to be the opportunity cost of money in that country. Benefits were not discounted since "it is assumed that the expected demand for power must be met." The computations were for a useful life of 39 years.
8. The Agency for International Development (AID) stated that the three Latin American roads projects were discounted for 20 years at the rates shown in the rate column of appendix I. Latin American roads projects, in general, are discounted to present value by AID at the opportunity cost of long-term capital "usually placed upwards of 8 percent and possibly ranging to 16 percent in some Latin American countries." AID analysts also compute the internal rate of return of such projects. The internal rate of return is described in note 3.
9. The Department of the Interior stated that no uniform or single discount rate had been applied in its major analyses outside the water and land resource area. The

selection of the discount rate generally had been left to the judgment of the analyst. But 6 percent, after taxes, is "considered to be representative of utility-type program in which risk is relatively low; 12 percent presumed to be representative of average capital returns in the private sector, etc." The time frame for analysis is varied from a long-term useful life concept to shorter periods of 20 years or less for programs oriented to the private sector or to short-term objectives. In the mineral resource area, the Department's general approach is to identify and compare internal rates of return as a means for ranking or establishing program priorities. The internal rate of return is described in note 3.

10. The Department of the Interior stated that in its aquatic resources programs "Alternative program levels and mixes were subjected to benefit-cost analysis using discount rates of 3-1/8 and 6 percent against benefit flows over 5, 10, and 15-year periods."
11. The Department of the Interior stated that, in its Indian-reservation resources development programs, comparative analyses of alternative programs "(irrigation, range development for livestock, dry-farming, timber production and industrial development) were based on an interest rate of 3-1/8 percent; however, the periods of analysis necessarily varied because of distinct program characteristics." This discount rate was selected in accordance with Senate Document 97 since the programs were related to water and land resources.
12. The Department of Health, Education, and Welfare stated that "We feel that discounting a future stream of dollars to present value is helpful, but we are uncertain what rate to set. We (use) several to see whether the difference is critical, for the specific purpose of the study. If it does not seriously disturb relative rankings we note this. If it does have a significant effect, we wish to inform the reader of the study of this."

APPENDIX II

FEDERAL AGENCIES NOT USING DISCOUNTING
IN THE ANALYSIS OF INDIVIDUAL PROGRAMS IN FISCAL YEAR 1969

Agency commentsA. Agencies that plan to use discounting in future

Department of Housing and Urban Development	Discounting used in appraisal of fiscal year 1968 programs, with the rate determined by then-current Treasury borrowing costs. Agency has a strong interest in the development of policies for measuring the costs and benefits applicable to Federal programs.
Federal Power Commission	Analyses of Federal Power Commission programs, other than those involving water resources, are still in a preliminary stage; decisions on appropriate discount rate must await completion.
Federal Communications Commission	Detailed cost-benefit analyses will be made in the future when additional staff capability is developed.
Peace Corps	The evolution of planning-programming-budgeting systems in the Peace Corps has not reached the stage where discount rates are applied to costs and benefits.
National Science Foundation	Analyses have not been so sophisticated as to require discounting.
National Aeronautics and Space Administration	Agency has not attempted to express in terms of percentage discounts, the effect of future (total) costs and benefits although these economic factors are implicit in consideration of alternative programs and the assessment of priorities.
Department of Labor	Agency has considered discounting at length. Would tend to use a projected rate of growth in Gross National Product as representing the opportunity cost of financing socio-economic programs, with sensitivity analysis to indicate the effects of different rates and different time horizons. Manpower development assistance program evaluated in terms of cost in the first year, while the program will continue for 5 to 20 years.
Post Office Department	Agency has used discounting in past in its facility modernization program and in its lease-purchase reports to the Congress. Currently studying the incorporation of discounting concepts and practices on a wider scale.

B. Agencies that have no stated plans to use discounting or had no comments on their plans

Interstate Commerce Commission	Interstate Commerce Commission has no programs which lend themselves to the use of discount rates in measuring costs and benefits.
Veterans Administration	Useful life span of programs cannot be estimated in terms of duration based on a known or foreseeable termination point. Most programs, therefore, are evaluated on a 5-year projection basis.
Department of the Treasury	Programs are, in the main, continuing ones, and problems of efficiency relate primarily to the cost side; usually alternative costs for the same objective. This kind of comparison does not require use of a discount rate to evaluate future benefit streams. In those cases where procurement of capital equipment is involved, the benefits are generally large enough so that a simple payout period is all that is necessary.
Export-Import Bank of Washington	No comment.
Department of Commerce	Agency procedures involve appraisals of programs in terms of periods which are shorter than the estimated useful lives of the programs. The Economic Development Administration currently evaluates programs with 11 years' minimum lives in terms of the fiscal year 1967-74 period. The Environmental Science Services Administration evaluates 10- to 30-year programs in terms of 5 years. The Bureau of Standards evaluates indefinite (continuing) programs in terms of 5 years.

ILLUSTRATION OF CALCULATION OF TOTAL COST
TO THE GOVERNMENT OF BORROWED FUNDSMETHOD I

The current interest cost of borrowing long-term money is approximately 5 percent. The moving average rate specified by Senate Document 97 is currently about 3.2 percent. Therefore, a rate of interest approximately halfway between 5.0 and 3.2 could be used for initial consideration as the Government cost of borrowed money.

4.0%

Add to this cost:

1. Corporate taxes foregone by the Government if the average corporate return on investment is 12 percent before taxes¹, if the fraction of dollars borrowed by the Government which would have gone into corporate investment is 65 percent², and if the marginal corporate tax rate is 40 percent.

(.12) (.65) (.4)

3.1%

2. Personal taxes foregone by the Government if the average return on proprietorship, personal income-producing investments, etc., is such that the remaining 35 percent of money borrowed by the Government would have earned a 10-percent return for the persons taxed, and if such return would be taxed at a composite marginal rate of 30 percent.³

(.1) (.35) (.3)

1.0%

3. (a) Taxes foregone by the Government on dividends that would have been received by individuals from corporations if the composite marginal tax rate applicable to individuals is 30 percent, if the taxable dividends payout is 40 percent of corporate

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profits after taxes, and if the assumptions as to corporate earnings and the marginal tax rate shown above under (1) are applicable. The marginal corporate tax rate is assumed to be 40 percent therefore 60 percent of corporate earnings is assumed available to the corporation for payment of dividends.

$$(.3) (.4) (.12) (.65) (.6) = .6\%$$

- (b) Personal taxes foregone by the Government if the corporate investment is financed by bonds rather than by corporate earnings, if corporate bonds carry an interest rate of 5 percent, if the fraction of dollars borrowed by the Government which would have gone into corporate investment is 65 percent, and if the composite marginal tax rate applicable to individuals is 30 percent.

$$(.05) (.65) (.3) = 1.0\%$$

- (c) Actual overall financing arrangements by corporations will generate tax revenues under both (a) and (b), therefore the cost to the Government may be assumed to be somewhere between .6 percent and 1.0 percent, say about

.8%

Subtract from this cost:

1. Income taxes collected on Government interest payments, if investment in bonds (see rate above of 4 percent) are divided between corporations and individuals in such a way that the tax rate is 35 percent.

$$(.04) (.35)$$

-1.4%

Cost to Government

7.5%

METHOD II

On an aggregate basis, a similar result may be computed assuming a composite corporate and personal marginal tax rate of 50 percent⁴ and a taxable return of 10 percent on any money not borrowed by the Government.

(.5) (.1)	5.0%
Cost of Government borrowing (see explanation under Method I)	4.0%
Less taxes on Government bond interest (.04) (.35) (see explanation under Method I)	-1.4%
Cost to Government	7.6%

¹Various economists have examined rates of return before taxes in the private sector. Stockfish (see footnote on page 7), arrives at an average of 13.5 percent. Stiegler, National Bureau of Standards, determines a rate of 14 percent. Variations in this estimate result from consideration of differing time periods, weighting, etc. Our estimate of 12 percent used for this appendix is somewhat conservative in comparison with the recent experience noted by these economists.

²See Raymond Goldsmith's "Flow of Capital Funds in the Post-war Economy," National Bureau of Economic Research, 1965, where a table of gross capital consumption by major segments of the economy is shown. We are interested here in capital consumption for purposes of productive investment. Most household borrowing can be excluded as investment in consumption which would also result from payments by the Government to labor involved in Government programs. State and local capital consumption can be left out of this consideration. The corporate share of the remainder is approximately 65 percent.

³A table of marginal tax rates for various income levels is contained in a study done by the Institute for Defense Analyses for the Office of Economic Opportunity, as

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summarized in "R-116, Federal Poverty Program, Assessment and Recommendations," January 1966. This document shows that the average marginal rate is approximately 30 percent for the higher income levels, from which personal income-producing investments tend to originate.

⁴This is a rough composite marginal rate for corporate and personal taxpayers that provides approximately for the separate estimates shown in 1, 2, and 3 for Method I.

Dear Mr. Secretary:

The General Accounting Office is making a study of the practices followed in the major Federal agencies in measuring the costs and benefits applicable to proposed Federal programs.

The examination of alternative means of achieving an agency's objectives is, of course, of central importance in the allocation of resources. Typically, the alternatives considered will differ with respect to the phasing of both costs and benefits over time. Determination of the relative merits of the alternatives, therefore, necessarily requires that costs and benefits be discounted.

It is clear that the choice of the preferred alternative turns to some extent on the explicit or implicit rate at which costs and benefits are discounted. It is equally clear that in the absence of general guidance on this subject a variety of quite different discounting practices have developed in the Federal agencies.

While different rates in different program areas may be appropriate, the absence of agreement on basic concepts, clearly reflected in the continuing disputes over basic policies, establishes a presumption that existing practices merit review.

It is with this thought in mind that we have prepared the enclosed questionnaire, which I ask you to complete and return by November 15, 1967. Cases involving water and related land resources are excluded, since these are handled under the rules set forth in Senate Document No. 97; similarly, cases involving make-or-buy decisions are excluded, since these are covered by Bureau of the Budget Circular No. A-76.

Any questions you may have should be addressed to Daniel B. Rathbun, Deputy Director for Systems Analysis, in our Office of Policy and Special Studies. (129-5309)

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My intent at this point in time is simply to develop comprehensive and accurate data on existing discounting practices. The results will be tabulated and copies sent to you. The results will also be discussed with the leaders in the executive and legislative branches who have shown increasing interest in this subject and who have asked if a greater degree of standardization in evaluative practices would be beneficial.

Your cooperation will be appreciated.

Sincerely yours,

/s/ Elmer B. Staats
Comptroller General
of the United States

The Honorable
The Secretary of Housing and
Urban Development

THE USE OF DISCOUNT RATES IN
EVALUATING FEDERAL PROGRAMS

Instructions:

- A. Exclude water and related land resource programs and programs involving the acquisition of commercial or industrial products and services.
 B. If discounting practices of organizational components differ, please complete separate questionnaires for each component.
 C. Please return the completed questionnaire(s) to the Comptroller General by November 15, 1967.

1. Did you use a discount rate or rates in the analysis of fiscal year 1969 programs?

YES ☐ NO ☐

2. If "yes" is checked, please identify (1) the fiscal year 1969 programs for which discount rates were used and (2) the rate or rates used in each case.

FISCAL YEAR 1969 PROGRAMS DISCOUNT RATE(S) USED

3. If "yes" is checked, please describe briefly the rationale employed in selecting rates.

4. If "no" in question No. 1 is checked, did your program evaluation procedures involve appraisals of alternative programs or systems in terms of periods which were shorter than the estimated useful lives of the programs or systems (e.g., a comparison of systems with estimated useful lives of 20 years on the basis of 5-year costs)?

YES ☐ NO ☐

5. If "yes" is checked, please identify the programs or systems, the time period used in evaluating alternatives, and the estimated useful lives of the programs or systems.

<u>PROGRAM</u> <u>(SYSTEM)</u>	<u>DURATION</u> <u>OF PERIOD</u>	<u>ESTIMATED USEFUL LIFE</u> <u>OF PROGRAM (SYSTEM)</u>
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APPENDIX V

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JOINT ECONOMIC COMMITTEE

(CREATED PURSUANT TO SEC. 6(a) OF PUBLIC LAW 80, 77TH CONGRESS)

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December 19, 1967

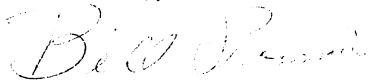
The Honorable Elmer B. Staats
 Comptroller General of the United States
 General Accounting Office
 Washington, D. C.

Dear Elmer:

It has been called to my attention that the General Accounting Office has undertaken an examination of the use that Federal agencies make of discount rates and an evaluation of such programs. As you know, this is a subject in which we have a continuing interest; the issue was examined in the recent hearings before the Subcommittee on Economy in Government of the Joint Economic Committee, 90th Congress, 1st Session.

Since this work deals with actual practices in the Federal agencies, it would complement the material presented in these hearings. I would, therefore, appreciate it if you would make the results of your work available to the Joint Economic Committee as soon as possible.

Sincerely,



William Proxmire
 Chairman



