

application of a cost-benefit ratio in the one instance of a cost-effectiveness ratio in the other instance, neither is an exact science?

Mr. HOFFMAN. Yes, sir. I would say that they both present useful information, but they do not exhaust the story. There are other factors that need to be considered as well.

Senator JORDAN. Explain to me, please, what you mean by opportunity costs.

Mr. HOFFMAN. The opportunity cost of a particular use of a given resource is the value of that resource in its best alternative use. That is, in the particular case of public investment funds, the opportunity cost of those funds is the value of the investments and the consumption that will not take place in the private sector because those funds have been withdrawn from the private sector and spent in the public sector.

Senator JORDAN. In effect, then, you take into account the foregone income tax receipts that might accrue to the Federal Government and the private development.

Mr. HOFFMAN. On that, sir, it seems to me that one wants to take into account the total decrease in productivity in the private sector. Part of that decrease will be foregone income tax; part of it would have remained in the private sector. But both components together represent the opportunity cost.

Senator JORDAN. You suggest that if an element of risk is present, it might be possible to compute that element of risk and translate it into a cost that would be, a rate that would be, supplemental, added to your basic rate?

Mr. HOFFMAN. Not quite, sir, as I understand you. Risk is used in two senses. Let me talk about a very simple example, the one I used in the paper. Suppose you have a 50-50 chance of getting nothing, or a thousand dollars. Now, that in itself is a risk. If you were thinking of making 10,000 such bets, then I would argue that the proper procedure for you would be to evaluate that bet at \$500. If somebody said, you give me \$500 and I will toss the die and give you either zero or \$1,000, I would argue you ought to accept it, or at least you should not care whether you accepted it or not. If, however, you are going to do it once, and only once, then I think it is widely accepted that most people behave as though that opportunity is worth less than \$500, and this represents a specific allowance for risk or risk-aversion in the value of that opportunity.

Now, I would argue that Government projects have a similar character. When you look at the benefits in a given year, you might say they may be as large as \$1 million or they may be as large as \$5 million in that year, with some spread in between. If the odds were even, one thing you might do is to say the average value, the expected value, is \$3 million; now, should I value that bet at \$3 million?

On the principle that you are not going to do this project 10,000 times, some people would argue that you ought to evaluate it at, say, \$2.5 million. Similarly, for costs, where costs vary, you might want to raise the value from the expected value.

This is a procedure about which it is very difficult to say anything quantitative. We all know that the phenomenon exists, but it is hard to measure. I would argue that it is better to express explicitly in the costs and benefits what we mean by that kind of risk allowance than to