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Discount Rate

This is a position paper prepared by the Association of State Floodplain Managers, (ASFPM), a non-profit professional organization dedicated to the reduction of flood losses in the United States.

This position paper builds upon the discount rate section of the “Use of Benefit/Cost Analysis for FEMA Programs” white paper available on ASFPM’s website.

INTRODUCTION

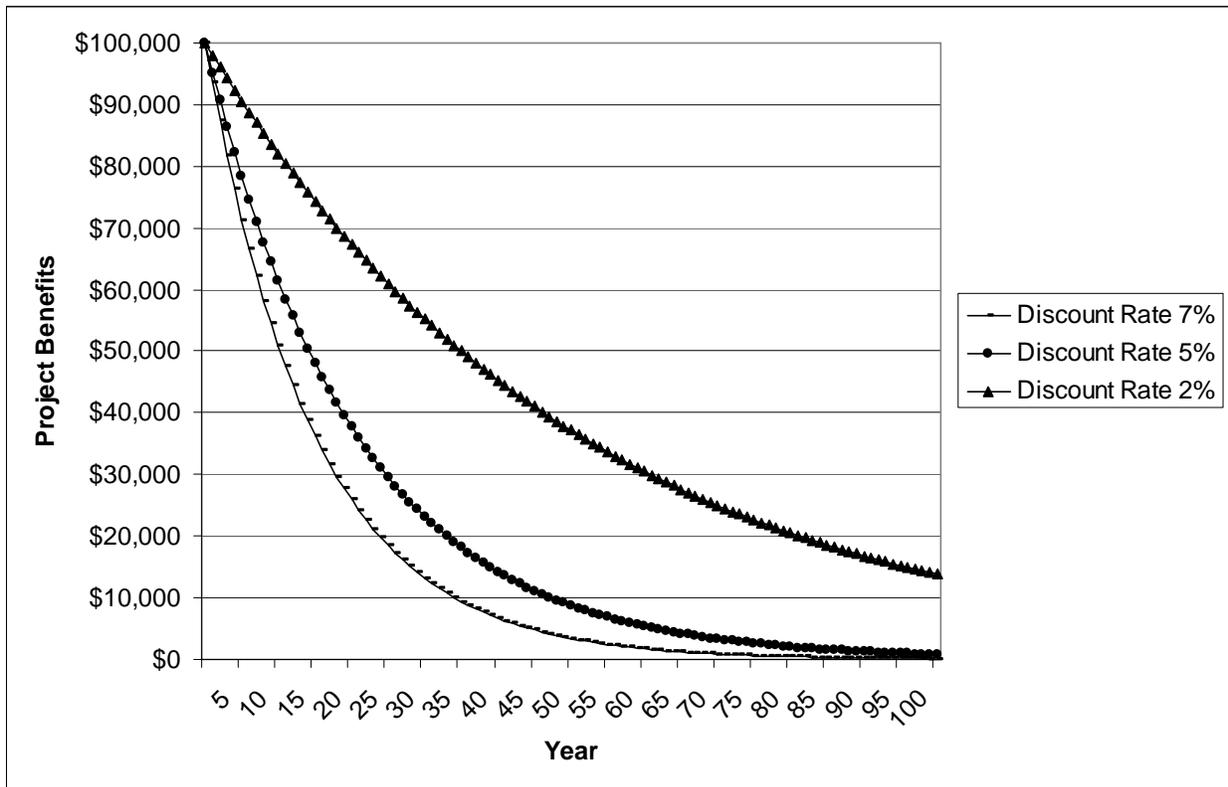
When it comes to stemming the tide of ever-mounting losses from natural disasters in the United States, there is no more valuable option than mitigation. However, since all FEMA-funded mitigation projects are required to meet certain cost-effectiveness guidelines, there is a chance that the true economic benefit of mitigation is being misrepresented to Congress if economic assumptions used in the economic models are questionable. At the top of the list of questionable economic assumptions used in mitigation project applications is the discount rate. This is an important issue because if the discount rate is too high, there is the danger that some good mitigation projects are failing to make the cut for approval. Likewise, there is the potential that benefit-cost analyses are not returning as much benefits as they could with a justifiably lower discount rate – which could have an impact on policy decisions for future funding. Indeed, in the past, some federal budget policy groups have been critical of the benefit-cost analysis (BCA) process.¹ Since the primary method for determining the cost-effectiveness of FEMA’s mitigation programs is the BCA required for each project, the statistics calculated using FEMA’s Benefit-Cost Analysis Module are what is reported to Congress. This means that if a lower discount rate is more reasonable, the economic benefit of hazard mitigation being reported to Congress could be substantially understated. This paper promotes the idea that the 7% discount rate mandated by the Office of Management and Budget’s (OMB) Circular A-94, Section 8.b.1 is questionable and that it should be reviewed by OMB or a panel of economic experts.

Background

As George Bernard Shaw once said, “If all the economists were laid end to end, they’d never reach a conclusion”. That quote most definitely holds true for the discount rate for federal (public) projects. Over the years, not only has there been divisive debate over whether a discount rate should be used at all², but, assuming one should be used, debate has raged for decades about the logic and technique for their different approaches.

In general, the function of a discount rate is to measure the “opportunity costs” of withdrawing resources from private use to be used instead in the public sector. Because government programs typically occur over a long period of time (50 - 100 years), the problem becomes identifying the appropriate rate which captures long-term social “opportunity costs”. One school of thought on how to measure these social “opportunity costs” uses assumptions for foregone private sector consumption and investment rates of return. Another school focuses upon a social rate of return, which takes into account intergenerational, as well as other issues. These are the two most common theories, but there are several others, as well.

If the discount rate were some trivial bit of information which had little impact on a BCA, it would not generate much discussion. However, since the choice of an appropriate discount rate has a gigantic impact on a BCA, and therefore carries great sway over which projects are deemed fiscally responsible, it is hardly a trivial issue. The chart below shows the impact of a sample project with all variables held the same except for the discount rate.



Even a casual glance at this graph shows that there are immense differences between the various discount rates. For example, assuming a project has \$100,000 in benefits; those benefits have been discounted to less than \$10,000 per year by year 35 at a 7% discount rate while that same project with a 2% discount rate is still generating \$50,000 of benefits in the same year! To summarize, the amount of benefits is an “area beneath the curve” integral (calculus function): the higher the discount rate, the lower the area and the lower the benefits.

Project applications for FEMA’s mitigation grant programs are required to analyze the future benefits of projects on a net-present value basis. To do this, a project’s benefits are multiplied by a

net present value coefficient, which is a set multiplier based on the known discount rate and project life. By keeping all other variables the same and only altering the discount rate, one is able to see the impact of the discount rate on the project's economic feasibility. The table below looks at discount rates from 7% down to 1% and assumes a standard 50-year project life. The net present value coefficient for that discount rate and project life is given. However, the most important column is the one showing how much higher the benefits would be if a lower discount rate were allowed. To say the least, the discount rate is very sensitive in a benefit-cost analysis.

Discount Rate	Net Present Value Coefficient	Increase in Benefits Over 7% Discount Rate (50 year Project Life)
7%	13.80	
6%	15.76	14.2%
5%	18.26	32.3%
4%	21.48	55.7%
3%	25.73	86.5%
2%	31.42	127.7%
1%	39.20	184.1%

DISCUSSION

There is no evidence that OMB has routinely reviewed and updated the discount rate for public investment

In OMB Circular A-94, Section 8.b.1, it states that,

“Significant changes in this rate will be reflected in future updates of this Circular.”

While OMB regularly reviews and updates the discount rate for budgeting purposes, there is no evidence that the discount rate for public investment purposes has been reviewed in the last 16 years. According to OMB’s website, Circular A-94 was last updated on October 29, 1992.³ In addition, prior to the 1992 update, the Circular was previously updated twenty years prior in 1972.⁴ The 1972 version had a discount rate of 10%, which was lowered to 7% in the 1992 version. A great deal has changed with the nation’s economy since 1992! At the very least, OMB should revisit its discount rate policy, as Circular A-94 states, with an eye for updating the discount rate for public investment purposes instead of just for budgeting purposes. Furthermore, OMB should revisit its discount rate policy for both purposes on a regular basis.

OMB has precedent for establishing new discount rate procedures

OMB changed its opinion on how the discount rate should be computed with its 1992 update. The 1972 version of Circular A-94 specified that the real discount rate of 10% was based on an estimate of before-tax rate of return to corporate investment contained in a book titled, “Measuring the Opportunity Cost of Government Investment” written by Jacob Stockfish in 1969.⁴ The 1992 version recommended using the United States Treasury borrowing rate. This change of procedure establishes precedent that OMB has the capability to change its discount rate policy using different methodologies.

Other federal economic oversight agencies allow lower or more flexible discount rates

Like the differing opinions of economists, the federal economic oversight agencies have clashing opinions of discount rates. The Congressional Budget Office (CBO) and Government Accountability Office (GAO) are both congressional agencies and have determined their own discount rate policies. CBO policy states that the discount rate for most analyses should be based on the real yield of Treasury debt. In 1990, this yield was estimated to be 2 percent real.⁵ No documentation could be found to say that this policy has changed.

GAO also has an official discount rate policy dating back to May 1991.⁶ While their policy outlines the various procedures that could be used to determine an appropriate discount rate, it generally shies away from identifying a specific number. Instead, GAO uses the yield of United States Treasury debt with a maturity of the projected length of the project. According to Appendix C (Revised January 2007) of OMB Circular A-94, Real Interest Rate on Treasury Notes and Bonds of Specified Maturities, the 30-Year interest rate is 3.0%.⁷ As it will be discussed below, the project life for most hazard mitigation projects is higher than 30 years. Appendix C states that, “Programs with durations longer than 30 years may use the 30-year interest rate.” This means that a 3% discount rate could be used according to GAO guidance. Confounding discussion of multiple discount rates for multiple congressional agencies in the United States, other countries also have differing discount rates for public projects. For example, the British government uses a real rate of 3.5% as a discount rate for benefit-cost analysis⁸. Other countries use fixed rates while others use a market-based approach, which rises and falls according to the economic conditions of those countries.

It must be noted that OMB does offer government agencies flexibility in the discount rates used in their analyses. However, OMB does not spell out in its guidance what is acceptable. Therefore, since there is already a great deal of subjectivity in determining a proper discount rate, agencies most likely use the 7% discount rate rather than risk the bad press of government economic accountability which might ensue if their assumptions are deemed infeasible by OMB.

Hazard mitigation projects offer intergenerational benefits

An argument for a higher discount rate is that benefits for mitigation projects accrue to the current generation, and therefore should be discounted rapidly using a higher rate. On the other hand, a discount rate for a project with “Intergenerational benefits,” or benefits which accrue to future generations, is generally allowed to be lower since benefits will accrue over a period long enough to be experienced by more than one generation.

Even though there are examples of mitigation projects with useful lives of less than five years (i.e., vegetation management, pumps and generators for drainage and stormwater projects, etc), there is ample evidence to show that FEMA’s mitigation programs offer benefits for future generations. First, in order to be minimally eligible for funding, a project must, “Contribute, to the extent practicable, to a long-term solution it is intended to address” (44 CFR §206.434 (c)(5)(iv)). “Long-term” is not defined in statute; however, it is generally assumed that the federal government will only address a problem once. Therefore, long-term or permanent solutions are the only ones which will be approved.

Another example of the long-term nature of mitigation projects is taken from FEMA’s 2006 BCA Guidance available on Mitigation BCA Toolkit v. 3.0. According to this guidance (*FEMA BCA Checklist*, page 26), the standard recognized useful life for selected types of mitigation projects is shown in the table below.

Type of Project	Useful Life (Standard Value – Years)
Acquisition/Relocation	100
Elevation – Residential/Non-residential Buildings	30/25
Elevation – Public and Historic Buildings	50
Structural Retrofit – Residential/Non-residential	30/25
Tornado Shelter	30
Major infrastructure projects (dams, levees)	50
Major Utility Projects	50
Heavy Equipment	30
Hurricane Storm Shutters	15
Vegetation Management	2

How long is a “generation”? Unfortunately, there is no clear definition since researched sources indicated a range of 20 to 40 years. Using an average of 30 years for one generation, the above guidance information clearly shows that most mitigation projects create benefits longer than one generation. Furthermore, for acquisition and relocation projects, not only are there a wealth of uncountable indirect benefits of open space, but these benefits also accrue for perpetuity. (It must be noted that OMB Circular A-94 and the Stafford Act currently do not allow these “indirect benefits” to be included in a BCA.) For projects like these, a 7% discount rate is particularly questionable. The National Center for Environmental Decision-Making Research says a valid intergenerational discount rate would be 1.5 to 3%⁹.

Hazard mitigation projects have a social component

Since hazard mitigation projects reduce vulnerability and future payments of federal disaster assistance, they have a clear impact on social welfare. 44 CFR §206.434 (c)(5)(i) includes the requirement that a proposed project must, “Address a problem that has been repetitive, or a problem that poses a significant risk to public health and safety if left unsolved”. This means that a social discount rate (often called the consumption discount rate) should be deemed acceptable. The social approach attempts to take into account the impact of taxpayer funds on social welfare and promotes decision making rather than benefits to the government as its primary objective. OMB’s current discount rate policy views government as a separate entity of society while a social discount rate attempts to account for the effect of public policies on society.¹⁰

A social discount rate also differs from previously-discussed rates in that they are very low. For example, GAO recommends the use of a very low discount rate (effective real discount rate close to zero) when analyzing policies with large intergenerational effects involving human life⁶ (page 11).

A national discussion is needed – and required

The United States Treasury Department annually sets the discount rate used by the U.S. Army Corps of Engineers (USACE) as the, “Average yield on interest-bearing marketable securities of the United States having 15 or more years to maturity” (USACE EGM 08-01). FEMA’s discount rate

is set by OMB and appears to have not been formally reviewed in many years. There are differences in what the two agencies include as flood damage reduction benefits, but basically they are trying to measure similar benefits. Although the scope of many USACE water projects is typically much larger than a FEMA flood mitigation project, it is not clear why the principals and guidelines are not consistent among federal agencies. There is a need to convene a national panel of economic experts to discuss current the broader issues of benefit-cost analysis policies within the Corps of Engineers, FEMA, and other federal water and natural resources agencies.¹¹ Within this context, the discount rate policy would be one issue for discussion. If the result of this discussion shows that the current policies are adequate, then no further action is necessary. However, if the discussion shows that there is a need to update policies of federal agencies, then OMB should take such action.

A national discussion is also required. The *Economic and Environmental Principals and Guidelines for Water and Related Land Resources Implementation Studies* document was authorized by Congress in Section 103 of the Water Resources Planning Act (42 U.S.C. 1962a-2). “Principals & Guidelines,” for which it is better known, was developed by experts from a variety of professions and members of the public to produce the best currently available methods for calculating the benefits and costs of water resources development projects. In Section 2031 of the Water Resources Development Act (WRDA) of 2007, Congress has now charged the Secretary of the Army to review and update the Principals & Guidelines within two years – and to do so in consultation with other federal agencies and the public. This provides an excellent chance for States, locals, and other interest groups to express input on important aspects of the economics of national policy. Additionally, this will be an opportunity to convene a group of economic experts to have a national discussion about water resource project policies – including the discount rate.

Conclusion

Choosing an appropriate discount rate for public projects has been a long and often heated debate. Making the selection of an appropriate discount rate more difficult is the need for the discount rate policy to be relatively simple to implement since FEMA’s mitigation project applications are completed by people who have a broad range of professional capabilities. However, a discount rate which is too high unnecessarily punishes the applicant based on nothing more than rhetorical principles and reasoning instead of concrete facts and real-world scenarios. As required by federal law, mitigation projects funded with federal funds appropriated through FEMA are required to show that the net present value of a project’s benefits exceed the costs of that project. Using the required discount rate of 7%, Congress and the public may be receiving a distorted picture of the true benefits of hazard mitigation projects.

This paper provides arguments that the current 7% discount rate is questionable, that there is a wide range of consensus for an appropriate rate, and that OMB has the capability to revise its official discount rate policy. As a result, ASFPFPM believes that FEMA should:

- Approach OMB to seek a reassessment of the regulations governing benefit-cost analyses
- In conjunction with OMB, convene a task force of national economic experts to discuss national benefit-cost analysis policies

The Association of State Floodplain Managers stands ready to offer additional comments on this issue.

Sources

- ¹ For more information, see these GAO publications:
<http://www.gao.gov/archive/1998/rc98067t.pdf>
<http://www.gao.gov/archive/1999/rc99106t.pdf>
<http://www.gao.gov/archive/1999/rc99274t.pdf>
<http://www.gao.gov/archive/1999/rc99236.pdf>
- ² F.P. Ramsey. *A Mathematical Theory of Saving*. 38 Econ J 543.543 (1928).
Though old, this author's reasoning is often cited in economic policy and research today.
- ³ <http://www.whitehouse.gov/omb/circulars/a094/a094.html>
- ⁴ http://findarticles.com/p/articles/mi_qa3621/is_199807/ai_n8799084
<http://www.ciesin.org/docs/010-291/010-291.html>
- ⁵ *Seeking a Number: A Case Study of CBO's Search for a Discount Rate Policy*. Journal of Environmental Economics and Management, Vol. 18 (1990).
- ⁶ <http://archive.gao.gov/f0102/144181.pdf>
- ⁷ http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html
- ⁸ <http://greenbook.treasury.gov.uk/chapter05.htm#discounting>
- ⁹ <http://www.ncedr.org/tools/othertools/costbenefit/module4.htm>
- ¹⁰ Harvard Law School. 2006. *Briefing Paper No. 29: Selecting Discount Rates for Budgetary Purposes*. http://www.law.harvard.edu/faculty/hjackson/DiscountRates_29.pdf
- ¹¹ National Flood Programs and Policies in Review – 2007. Association of State Floodplain Managers, page 27.