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Social discounting and the cost of public funds: problems with current global practice

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Abstract

Since the early days of social discounting, in the 1960s, three mutually inconsistent approaches have become globally embedded. All face significant analytical and/or practical problems. This essay reviews the issues, why the divisions persist, and the contexts in which the inconsistencies may contribute significantly to misleading analysis. It concludes that there may never be any broad global consensus on best practice, but identifies aspects where limited progress may sometimes be feasible.

1. Introduction

This essay, probably the author's last paper, follows many decades of practitioner experience with social discounting, as a private sector supplier to government, as a reformer, with others, within government, as an editor of government guidance, and then 25 years as a consultant and visiting academic, welcoming advances in the literature and coming to see more clearly how personal professional backgrounds and institutional histories can constrain how the issues are framed and applied.

The 1960s saw the introduction in advanced economies of "discounted cash flow" analysis for private sector investment appraisal, with many governments following suit. Three main, mutually inconsistent approaches emerged to framing and deriving a social discount rate (SDR). All three continue to be promoted, with no prospect of any wide professional consensus. All advanced economies with social discounting regimes apply one of them, or a combination.

The Financial Economists' approach, promoted by most financial economists with an interest in social discounting, proposes that the social cost of tax-funding is revealed by the expected rate of return to private sector equity and debt financing of a similar activity. The approach is rarely applied, but a few governments now add to a social time preference discount rate (as described below) a premium seen as analogous to the equity market risk premium.

The other two approaches, usually described as Social Opportunity Cost (SOC) and Social Time Preference (STP), are both widely applied.

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The SOC approach in its original form, as promoted mainly by Arnold Harberger, derives the SDR as a weighted average of the cost of government foreign borrowing and the opportunity cost of private sector investment and consumption displaced by marginal general taxation. Some administrations apply such a number. Some pragmatically adopt a discount rate similar to the real rate of return achieved by private sector investment. Real SOC discount rates in recent years have typically ranged from 5% to 9%.¹

The STP approach, developed by Kenneth Arrow and originally promoted largely by Martin Feldstein, sees taxation as fundamentally different from equity financing. Commercial equity investment is seen as specific to market enterprises and taxation as specific to public services that generally produce little or no revenue. The cost of equity financing is the expected financial return to investors in dividends and capital growth, while the social cost of marginal general taxation is the net present value (NPV) of the mostly negative impacts of marginal taxation on the economy.² For a commercial enterprise the discount rate for investment appraisal is generally determined in principle by its cost of capital. For government, in the STP approach, the discount rate is determined by society's time preference for marginal consumption. Real STP discount rates in recent years have typically ranged from 3% to 4%.³ The approach's handling of the cost of public funds is problematic.

Sections 2, 3 and 4 outline the strengths and weaknesses of the three approaches. Section 5 discusses why the main divisions seem unlikely to be resolved and contexts in which this may be important. Section 6 concludes and offers a few recommendations.

2. The Financial Economists' approach

2.1. Background

The Financial Economists' approach presumes that the social cost of public funding is revealed by the required financial rate of return to commercial debt and equity financing of a similar activity. This has powerful intuitive appeal. It can seem obvious that taxpayers should expect the state to provide as high a rate of return on tax revenue (in the consumption-equivalent value of public service benefits) as investors expect to receive on payments into their or their employers' pension portfolios, and that tax-funding and public service benefits should be discounted accordingly.

However there is no legal market analogue for taxation, the costs of which are almost wholly different in kind from those of equity financing.

The approach was promoted in the 1960s by Jack Hirshleifer (1966). Arrow and Lind (1970) responded with a paper showing that the cost of non-systematic risk in public

¹ Groom et al (2022) provides a good survey of global practice.

² That is the effects of removing wealth from the market economy and distortion of market prices. As briefly noted in section 4.3 below, these effects include but go well beyond the direct loss of consumer and producer surpluses in Harberger triangles.

³ There is also a significant consensus that STP declines over the very long term, falling after 100 years to levels far below those typically set for a standard STP rate (Drupp et al, 2018).

service benefits (i.e. fluctuations *not* correlated with income) is generally negligible with tax-funding. Unfortunately these papers were written just before great advances in understanding of equity market risk, including the Capital Asset Pricing Model (CAPM), became widely known in the 1970s. These showed that non-systematic risk in the value of individual stocks (i.e. fluctuations *not* correlated with those of the total equity market) is also generally negligible. The main argument in Arrow and Lind (1970) therefore did not identify a significant difference between the costs of equity market finance and tax-funding.

Arrow and Lind (1970) is still rightly criticised by financial economists (Lucas, 2014). However it is now rarely if ever controversial that there is often positive correlation of public service benefits with income. It is also uncontroversial that, applying a plausible neoclassical value for relative risk aversion, the cost of this risk in public service benefits is generally trivial.⁴

Fifteen years after Arrow and Lind it became widely recognised (Mehra and Prescott, 1985) that the equity market risk premium over the risk-free rate is typically an order of magnitude greater than would be estimated by a neoclassical index.⁵ Though described as a “puzzle” this is intuitively unsurprising. Eugene Fama has noted that “[*historical data suggest*] that getting a positive equity premium (of any size) is highly likely only for holding periods of 35 years (an investment lifetime) or more. Given this result the historical equity premium does not seem too high.” (Fama and French, 2009).⁶ For active investors shorter term fluctuations can also be costly.

Meanwhile Kahneman and Tversky (1979) had published “Prospect Theory: An Analysis of Decision Under Risk”, the last and most influential of their joint works pioneering behavioural economics. Equity market returns well fit the criteria for risks towards which people tend to be especially averse.

2.2. The equity premium puzzle and social time preference

Mehra (2006) published an 80-page review of the numerous attempts, since Mehra and Prescott (1985), to derive an empirically based, quantitative explanation of the puzzle. It seems likely that very many factors contribute. This may well include a significant contribution from *non-risk* characteristics of equity markets, well assessed by Mehra. However two risk-based proposals, that are often cited and could in principle be

⁴ A distinguished promoter of adding to STP discount rates a premium for income-correlated risk in public service benefits comments that “*considering such a small systematic risk premium looks very counterintuitive because doing so makes the riskiness of projects nearly irrelevant to their evaluation*” (Christian Gollier in Gollier and Hammitt, 2014). This view appears to arise from the magnitude of the equity market risk premium, attributed to the very large fluctuations and perhaps other characteristics of equity markets. But, as discussed in sections 2.2 and 2.3, there is no evident reason for this to have any material relevance to the cost of marginal general taxation.

⁵ Application of a neoclassical index measures the effect of a declining/increasing welfare impact of a marginal change in income as the level of income increases/decreases.

⁶ This reflects the objectives of most financial investment, in maintaining the financial portfolios of individual or institutional pension funds, other endowments and insurance companies.

relevant to social time preference, are Epstein and Zin (1991) and Barro (2006, 2009). We here summarise Mehra's assessments of these proposals.

Epstein and Zin demonstrate that a recursive specification for utility as a function of consumption over time separates *risk aversion at a point in time* from *risk aversion over time* with expected growth in income. Mehra notes that empirical assessment of the model is tricky because it depends upon unobservable variables. Epstein and Zin handle this by using the market portfolio as a proxy for the individual's total wealth portfolio. Mehra feels this overstates the correlation between asset returns and the wealth portfolio and hence the claim that the model offers a solution to the equity premium puzzle. At a more pragmatic level, while the Epstein and Zin model is an important advance it does not establish that there is generally a material difference between preferences for marginal income over time and at a point in time. Nor does it establish why such a difference should apply to equity markets but not to bond markets or to very long term assets (Giglio et al, 2015).⁷

Barro (2006) presents a model of output growth as a random walk with drift and three types of shock. These are "normal shocks", jump shocks in which output [and equity markets] contract sharply but there is no concurrent default on debt, and jump shocks in which output [and equity markets] contract sharply and default on debt ensues.

Mehra reviews the detailed argument but the dominant criticism is that five stock exchange failure (in Germany, France, Mexico and the Communist take-overs of Russia and China) "*demonstrate that in times of financial crisis bonds are as likely to lose value as stocks*". So the equity premium over returns to government bonds is not affected. Intuitively it is perhaps in any case unlikely that active investors in today's developed economies are concerned enough about equity and/or bond market failure for this to materially affect their required rates of return.⁸

2.3. Commercial rates of return and the cost of public funds

The financial economics literature appears never to refer to the distortionary costs of taxation. By implication they appear to be seen as mostly additional costs of taxation to add, alongside the use of a commercial social discount rate.⁹

Since there is no useful analogue to the equity market in the public sector it is not clear why the equity market risk premium should have any relevance to the cost tax funding.

⁷ Barro (2009), addressed in the next paragraph, cites Epstein and Zin but does not draw upon it. However a subsequent paper (Barro, 2009) draws upon it heavily.

⁸ Although catastrophic risk seems unlikely to be a significant contributor to the equity risk premium it prompts the question of whether the social discount should reflect the frequency of major failures in the delivery of public services. The conventional academic view is that this should be allowed for in forecast cost, benefits and timescales before discounting, but in practice major, largely or wholly overlooked failures are common. Many STP discount rates might be criticised for not sufficiently reflecting such risk.

⁹ The author has been advised, in a friendly exchange with a distinguished financial economist, that while it seems reasonable to include such costs as an extra cost of public spending, this is not included in the financial economics literature because it is "outside financial economics".

However the argument is often expressed not in terms of the cost funds, but in terms of the income-correlated risk faced by public service beneficiaries.

The welfare impact of public service benefits is of course reduced, as noted by Arrow and Lind (1970, p 373), if they are positively correlated with income, but the market analogue of this is not returns to shareholders. The market analogue is the cost to commercial customers of income-correlated risk in the value of their purchases. For that risk neoclassical valuation would again seem to be generally appropriate, if this cost were of academic or policy interest.

However it remains the case that returns to equity are anomalously high and meeting the assertion that this anomaly may apply to tax funding needs some exploration of why the anomaly should be specific to equity markets. Some of the non-risk factors assessed by Mehra (2006) probably contribute and they are all equity market specific. However the most substantial contribution may be that stressed subjectively by Fama. Analysis of this view falls to behavioural finance, which Mehra examines under the heading of Prospect Theories.

Mehra describes Barberis et al (2001) as the major reference and refers also to Barberis and Huang (2008). After a detailed examination Mehra confirms the relevance and quality of the work, but holds back from endorsing it, saying that *“Loss aversion/narrow framing is an appealing idea, and Barberis et al. (2001) analyze its equilibrium asset pricing implications in a careful and thorough way. There is, however, a sense in which their study is premature. In particular, we as yet lack choice theoretic underpinnings and the aggregation properties are as yet unconfirmed”*.

In a later paper Barberis (2015) outlines behavioural finance as follows.

*“in behavioral finance, we are trying to build psychologically realistic models of financial markets – e.g. models that allow for less than fully rational thinking. This means more realistic models of **beliefs** – over-extrapolation, representativeness, law of small numbers – overconfidence – conservatism, belief perseverance, confirmation bias, ... And more realistic models of **preferences** – prospect theory– ambiguity aversion ...”*
(underlining added)

Mehra’s qualification may stem largely from the difficulty of integrating behavioural analysis, which is usually narrow-framed, into a comprehensive financial framework which will generally be otherwise based on “fully rational” maximisation of expected utility.

However, notwithstanding the lack of a complete explanation of the equity premium puzzle, there does not appear to be any persuasive intuitive or analytical argument or evidence that the puzzle is materially relevant to the cost of taxation or income-correlated risk in public service benefits. Raising tax revenue imposes a marginal excess tax burden (METB), discussed in Section 4 below, that includes many costs that do not

apply to commercial equity financing.¹⁰ The equity risk premium is a cost that applies to equity finance but, on current evidence, not to tax-funding.¹¹

The Financial Economists' approach is rarely if ever applied by governments in its pure form. However in recent decades a much simpler variant has emerged. This variant applies a fixed premium, of perhaps one percentage point, added to STP discount rates. This is a severe simplification of the mainstream Financial Economists' approach, that advocates premiums that are project-specific and generally larger. However the new variant is simple to present and apply and has traction in some government contexts.¹²

The Financial Economists' approach appears always to be based upon belief that financial markets reveal social cost of public funding. Markets do broadly reveal the social cost of public debt, but there is no legal market analogue to taxation. Equity markets evolved as a means of financing market enterprises, for whom taxation is not an option. For government, taxation is an essential option and cheaper to the fundraiser than the equity market. Taxation imposes costs on the wider economy which are generally expressed as a shadow price (≥ 1) relative to consumption. We return to this in section 4.3 below. However there is no evident reason why costs specific to equity market financing should be materially relevant to the quite different costs of tax funding.

3. The Social Opportunity Cost (SOC) approach

The SOC approach, as developed in the 1960s and beyond by Harberger, frames the social cost of public funding as if the government were a commercial enterprise estimating its weighted average cost of capital as a rate of return (Harberger, 1972). Finance is assumed to be from taxation displacing private sector investment and consumption and from foreign borrowing. Some governments, in the 1960s and subsequently, have taken the simpler, pragmatic approach of adopting a rate of return similar to that obtained in the private sector.

The SOC approach is simple to present and to apply and is widely used. With a discount rate of about 7% it may be broadly satisfactory for many cost-benefit analyses (comparing public spending dollars with benefits valued in consumption-equivalent dollars) with an expected lifetime of a decade or two, but not much longer. It does however present other analytical problems.

As noted in Section 2 above, the equity risk premium, which is a large element of returns to equity, is not a net social benefit but an *equity-specific cost*, mainly

¹⁰ METB is the terminology used by the US Office of Management and Budget (OMB). The shadow price nature of the METB (as distinct from a rate of return) explains why internal rates of return are rarely used in government.

¹¹ It is sometimes suggested that, if tax funding were not subject to the equity risk premium, then tax funding would be used for all investment, but this overlooks METB costs of tax funding and also the incentive effects of equity financing. Taxation works for non-revenue raising public services. Equity finance works for competitive markets.

¹² Notably in France and in the 2023 revision of the US OMB guidance, although in the latter case it raised the rate from an analytically implausibly low value to a more plausible 3.1%.

compensating investors for equity market risk. Its displacement by taxation is thus not an opportunity cost.

More seriously, the social cost of taxation, in contrast to most commercial financing, does not in practice depend on how long it takes to be “repaid” in social benefits.¹³ This means that, in contrast to commercial financing, it does not fall on the economy as a rate of return. It is the NPV of the social cost of the dollars taken from the private sector plus the marginal excess tax burden (METB), which is the cost of all the other impacts on the economy of extra taxation. $1 + \text{METB}$ is the factor (≥ 1) by which the cost or value of public spending dollars exceeds that of consumption dollars.¹⁴

One counterintuitive consequence of this is that in cost-*effectiveness* analysis (CEA: comparing alternative streams of public spending for a given benefit), as in much engineering design and many other applications, the cost of public funds applies equally to spending costs and to expenditure saving benefits. This generally makes the cost of public funding unimportant in prioritising CEA options.¹⁵ The SOC approach thus applies to CEA a time preference rate that is generally much too high.

4. The Social Time Preference (STP) approach

4.1. Overview

In the 1960s Kenneth Arrow recognised that the social costs of taxation, collected to subsidise public services, are different in kind from the costs of money invested in market enterprises by investors expecting a financial return. As noted in Section 3 above, the social cost of public funding dollars falls not as a rate of return but as a shadow price ($1 + \text{METB}$) relative to consumption.

The STP discount rate is derived as society’s time preference for marginal consumption.

This approach is in principle analytically rigorous and variants of it are widely applied. However the separation of time preference and the cost of funds makes it more complex and less intuitive than the simpler SOC approach. It also faces practical problems.

¹³ It is unfortunate that the social discount rate is still often described as a “cost of capital”. This is true of commercial financing, which is generally repaid by revenue from sales of enterprise’s products or other assets. For government, the distinction between capital and current spending is important in financial planning, and may influence the boundary between immediate taxation and government borrowing serviced by later taxation. However, public funds allocated to spending agencies are generally paid from a single consolidated fund for both current and capital budgets.

¹⁴ Governments also borrow, but in practice, in the context of microeconomic analysis, it is generally reasonable to assume that macroeconomic decisions on the distribution between aggregate taxation and aggregate borrowing are broadly optimal, so that the marginal social cost of tax and borrowing can be assumed to be the same.

¹⁵ This has been well established for more than 50 years (Feldstein, 1970; Arrow and Kurz, 1973, xxv), but it is widely overlooked or rejected as incomprehensible. This unimportance of the cost of public funds apply also to situations where publicly and privately funded impacts fall in broadly constant proportions over time. This might apply to, for example, long term impacts of climate change on GDP.

4.2. The STP rate

The STP rate for consumption is not well revealed by markets. Risk-free interest rates are largely set by governments, not according to STP for consumption, but to help manage business cycles, external macroeconomic shocks and inflation. In that role they can in most countries fluctuate rapidly and widely and also be negative in real terms for long periods. Averaged over several decades they are generally lower than rates based on direct estimates of social time preference.

In practice STP rates are often estimated from the Ramsey equation, which adds together two main elements. One element adjusts for a declining welfare of marginal income as per capita income increases over time. The other, usually smaller element adjusts for any declining concern for the marginal welfare of increasingly distant future populations and for any risk that would not be otherwise included in policy or project appraisal.

Both elements are subject to professional judgment. This means that, unfortunately but unavoidably, individual economists or institutions preferring a high/low discount rate tend in practice to shade their judgements towards the high/low end of the range of empirical uncertainty or philosophical opinion.

4.3. The cost of public funds

The marginal excess tax burden (METB) of public funds is important for comparisons of tax-funded dollars with consumption dollars. However no reliable way has emerged to comprehensively value the diverse and complex impacts of marginal general taxation. This is therefore another field where the STP approach can be vulnerable to personal or institutional bias. The METB is often overlooked. Some governments include it by multiplying dollars of public spending and revenue by an estimate of the factor $1 + \text{METB}$ to convert them to consumption dollars. The values applied are typically 1.2 to 1.3, which may be much too low.¹⁶ Feldstein (1997, 1999) believed that it was greater than 2.0. The OMB (2020) suggested that it should be 1.4 or 1.5.

The METB will vary across countries, and within countries over time and to some extent across programmes, partly because its implicit valuation, in setting the boundary of value-for-money of public spending, is ultimately political.¹⁷ Public spending or revenue dollars (before adjustment for the METB) and consumption dollars are different units. This means that they cannot be meaningfully added to or subtracted from each other. So, while both should be discounted at the STP rate, it is misleading to present the sum of their present values as a “net present value”. They can however be divided to

¹⁶ A downward bias might be expected for two reasons. One is that the case for such factors tends to be pressed by spending agencies rather than ministries of finance. The other is that reported estimates of the METB, which range from around 0.1 to 0.4 (Boardman, 2020), are confined to elements such as Harberger triangles for on which there are quantitative data. They will generally exclude impacts of tax changes on many decisions about, for example, personal and corporate location, pensions, conditions of employment, training and education and tax avoidance.

¹⁷ This political element certainly influences levels of public spending relative to GDP, but is not generally included in estimates of the cost of marginal taxation.

estimate “consumption benefit dollars per public spending dollar”, which is a good metric for ranking CBA options.

This opens the way to an analytically rigorous and practicable method of handling the METB without its explicit valuation. This needs a recognition that levels of taxation and spending are ultimately determined politically and that government agencies, when applying CBA, should be seeking best value for money (i.e. consumption dollars per public spending dollar) from their politically constrained budgets. This has proved to be workable and effective, but it may need strong agency or finance ministry economists to become established.¹⁸ It is disappointing that it has evolved in so few spending agencies and is not widely recognised in finance ministries.

The METB is sometimes a source of confusion in government guidance. The US OMB guidance on federal spending in OMB Circular A-94 (1992) and regulation OMB Circular A-4 (2003)-appears to have been largely free from political influence, but to have been a compromise tolerable to influential economists from both SOC and STP schools.¹⁹ Circular A-94 said (section 8c(3)) that “*Using the shadow price of capital [1+MEB] to value benefits and costs is the analytically preferred means of capturing the effects of [public spending]*”; but this was qualified by a probably impossible requirement that “*the analyst must be able to compute [the METB]. OMB concurrence is required if this method is used in place of the base case discount rate [of 7%]*”. This is however inconsistent with a later statement (section 11a) that “*the presentation of results for [CBA/BCA] should include a supplementary analysis with a 25 percent [METB]*”, implying that the OMB approved of an METB value of 0.25.²⁰

Circular A-4 **was** associated with a proposal to increase the 0.25 to 0.40 or 0.50 (OMB, 2020). However the 2023 revision does not specify any METB for regulatory analysis. The consultation document implied that this guidance was in practice nearly always ignored or overlooked, at least for public spending on regulatory administration.

Current UK Treasury guidance on tax-burden costs in some places recommends the rigorous ‘value for money’ approach mentioned above. In others it recommends the use of NPVs with no adjustment for the METB, which is usually unimportant in CEA but mistaken for CBA.²¹

¹⁸ This procedure is discussed at slightly great length in Spackman (2024, Section 4).

¹⁹ These Circulars were revised in 2013, with a new, seemingly politically inspired derivation of an STP rate for social discounting. However much of the text and paragraph numbering is largely retained. In the A-94 paragraph cited here the requirement for a supplementary use of an METB of 0.25 is weakened from “should do” to “may do”.

²⁰ The guidance recognised that the METB is generally unimportant on cost effectiveness analysis (CEA). It did however recommend questionable proxies, based on government borrowing rates, for an STP discount rate.

²¹ The STP approach was established in the guidance in the 1980s, but with no mention of the METB. It was hoped that this would evolve naturally as spending agencies sought value for money in CBA. This did evolve in Transport, which then dominated the application of CBA, but very few other agencies followed suit.

5. Discussion

Economists will always differ for reasons of ideology, philosophy or managerial or analytical judgement, but the differences between the three schools of social discounting are more fundamental. The SOC approach may sometimes be chosen in full knowledge of its limitations because it is much simpler to present and apply than STP. However it is often believed to be analytically rigorous, as is the financial economists' approach. These differing perceptions appear to be sustained, as discussed in section 5.2 below, by experts framing the issues in ways which make it impossible to comprehend the counterintuitive implication of the differences between taxation and private sector financing.

It is thus not surprising that in the 1960s there emerged two commercial-analogue approaches to social discounting and a more complex first principles approach. Nor is it very surprising that in the 2020s some countries should still choose a simple, commercial-analogue SOC approach and others the more complex STP approach. It is however disappointing that, in STP regimes, the cost of public funds is so widely ignored or may be greatly undervalued. And that the SOC approach is still widely perceived as analytically rigorous, despite many of its limitations being clearly set out in the 1970s (Feldstein, 1973).

5.1. Some common ground

Communications between the three schools tend not to progress beyond descriptions of the correspondents' models, in terms that one side finds convincing, but the other does not. However, although views differ sharply on the relevance of the equity premium puzzle to the cost of taxation, there is wide agreement that the equity market risk premium is typically and order of magnitude greater than the very low costs that would be derived using a plausible neoclassical index of relative risk aversion. There is also wide agreement that impacts on marginal consumption should in principle be compared over time at an STP rate.

There have been two examples of some limited common understanding across the SOC and STP approaches.

One, discussed in Section 4, is in the drafting of US OMB guidance on federal spending and regulation in the 1990s, much of which has survived the 2013 revisions. It entailed in the early 1990s the coordination of inputs from SOC and STP advocates. The guidance recognised the distinction between CBA/BCA (comparing costs in public spending dollars with benefits in consumption dollars) and CEA (cost effectiveness analysis: comparing public spending profiles to achieve a given benefit). It specified an STP discount rate for comparing streams of public spending in CEA, and for comparing streams of consumption. Guidance, albeit inconsistent, was provided on the METB. Discount rates of 7% (based on historic real rates of return in the private sector) and 3% (based on historic Treasury real bond yields) were sometimes recommended for use in parallel. This all suggests a mutual understanding across the SOC/STP divide which, though limited, was unusual and perhaps unique.

Another striking, though short-lived conceptual coming together of the two approaches occurred when Arnold Harberger, after 40 years as the leading global exponent of the SOC approach, presented a conference paper (Harberger, 2007) advocating the addition of an “METB” to public revenue dollars before comparing them with consumption dollars. He had become concerned that, in the CBA of publicly funded commercial projects, such as a power station or a tolled road improvement, no account was taken of the extent to which the project generated government revenue. He concluded, correctly, that

The cleanest, most straightforward way to take tax financing and the excess burden associated with it into account is to apply an extra charge or benefit of λ to each and every cash outflow or cash inflow from and to the public treasury.

Harberger’s λ – an addition to the value of dollars flowing “from and to the public treasury” – is identical to the METB. But this framing of public revenue and spending is incompatible with the SOC approach, which frames the cost of any public funding as a rate of return. Unsurprisingly the proposal was never followed up. The paper remained on the conference host’s website for fifteen years but was then taken down.

5.2. Why are inconsistent approaches to social discounting are so strongly embedded?

The major difference on social discounting with the longest history is that between financial economists and advocates of STP discounting. Since the 1980s this has been a conflict mainly between academics and practitioners.

As discussed in Section 2 this had an unfortunately timed start in academia, just before transformative advances in financial economics became widely known in the 1970s. The divide was later reinforced by development in the late 1970s of the Consumption CAPM.²² Relevant advances in behavioural economics and identification and understanding of the ‘equity premium puzzle’ in the 1970s, 1980s and 2000s have fed fleetingly into the debate.

The issues are not in a conventional sense analytically difficult, but they are psychologically challenging because they entail radically different framings of situations about which experts can easily develop deep convictions which they will defend but can never question.²³

²² The CCAPM, which is about the correlation of equity stock returns with consumption; sounds more relevant to consumption-equivalent public service benefits than CAPM, which is about the correlation of stock return with the total stock market. However in both cases the cost of risk is that revealed by equity market returns, which is an order of magnitude greater that would be estimated with a plausible neoclassical index of risk aversion. As discussed in Section 2, there appears to be no plausible evidence to suggest that that this anomaly, which is unsurprising for equity markets, has any relevance to public service benefits.

²³ It is perhaps an extreme example of the psychological phenomenon described in English as “Maslow’s hammer”, or its specialised form described more elegantly in French as “déformation professionnelle”.

The ongoing difference between SOC and STP advocates is entrenched and enduring. It is unfortunate that that ever since the 1960s there has been much more academic interest in the SDR than in the cost of public funds. Work on the SDR, for example on the very long term and on estimating the elasticity of marginal utility, has been important.²⁴ However the limited interest in the cost of public funds, such as on (probably very incomplete) estimation METBs, may partly explain why cost of public funds underlies the main problems with both the SOC and STP approaches.

However the most serious barrier to any sustained SOC/STP consensus may be the conceptual leap, for an SOC advocate, from framing the cost of public as rate of return to framing it as a shadow price. This leap, to a framing in which the cost of public funds is generally unimportant in the comparison of streams of public spending, is very wide. So wide that it would be surprising to see an established SOC regime change its view. Any such change is likely to need several propitious circumstances, including a change of senior personnel.

Other reasons why change is so rare may include:

- i. Views on the choice between SOC and STP social discounting regimes tend to be shared, within a nation, across academic and government economists, with a small minority of explicit dissenters. So there is little academic pressure on governments for radical change.²⁵
- ii. The STP approach is more complicated and differs greatly from commercial conventions, limiting its political appeal.
- iii. Economics is a social science in which algebraic logic can often be countered by ingenious hypotheses about human preferences.

5.3. In what contexts do flawed approaches matter?

The SDR has less influence on government decisions than is often assumed in the literature. There is little if any evidence that its value influences the level of total public spending. Bad investment decisions arise mainly from political misjudgements or other serious errors in projections of costs and/or benefits. The most important contribution of CBA is that it obliges promoters to present a comprehensive, quantified justification for others to assess. The SDR can however, especially in CEA which is often free from political concerns, significantly affect the distribution of spending and regulatory impacts between the short, medium and long term.

²⁴ Over many decades estimates of this elasticity (with its sign reversed) have declined to around 1.5 (Groom and Maddison, 2019). Economists and institutions preferring a 'low' discount rate tend to prefer a value of 1.0.

²⁵ In any case academic pressure on governments to change appraisal conventions tends to be effective only when it is subject to substantial current academic activity, as in the case of declining long term discount rates (and, in the UK, the change in method for estimating the cost of greenhouse gas emissions from marginal damage cost to the much more practical marginal abatement cost).

Useful, explicit quantification of the cumulative effects on decision making of using questionable discount rates or costs of public funds is probably impracticable, but some qualitative effects of the methodological flaws can be drawn out.

The main weakness of the STP approach is its generally dubious handling of the cost of public funds in CBA. The METB is often overlooked or, if explicitly valued, set at a value that may be much too low. As noted in section 4.3, this problem can be avoided by ranking CBA options by their value for money, but this is rarely applied. Undervaluation of public funding dollars will steer a public spending agency's CBAs towards sub-optimal value for money from its constrained public spending budgets.

The main weaknesses of the SOC approach are its specification of the cost of public funds as a rate of return and the associated use of a time preference rates usually far high than any plausible STP rate.

Costing public funds according to the time interval between the spending and consequent benefit is a severe approximation. As a very rough calculation, supposing an STP rate of 3.5%, an SOC rate of 7% and a 20 year interval between spending and 'repayment' would implicitly value a public spending dollar at about two consumption dollars. This is near the upper end of the plausible range, but suggests that a 7% SOC rate may be acceptable for comparing CBA options over a decade or two.

A more serious problem arises with CEA. The use of a time preference rate far above STP systematically and significantly favours sub-optimally low up-front costs and high operating and maintenance costs. The 2013 revision of the OMB Circular A-94 has retained the convention for CEA of discounting at a Treasury borrowing rate. This convention, or some other device for using a real rate well below 5% for CEA, is something that SOC regimes might consider.

6. Conclusion and recommendations

6.1. Conclusions

- 1) The financial economists' approach to social discounting does not recognise the profound differences between taxation and equity investment. Both raise revenue and both incur obligations on how the money raised is employed, but their social costs are profoundly different in kind. There is no legal market analogue for taxation. The equity market risk premium is irrelevant to the cost of taxation or the cost of income-correlated risk in public service benefits. The market analogue of this risk is the income-correlated risk faced by purchasers of marketed products.
- 2) The SOC approach sets aside society's time preference for marginal consumption. It also assumes that the cost of public spending depends, like commercial financing, upon when it is 'recovered' in social benefits, even though the cost of taxation does not depend on when any subsequent benefits accrue. One consequence is that SOC rates are generally much too high for comparing alternative streams of public spending in cost effectiveness analysis.

- 3) The STP approach is in principle rigorous, but in practice lacks a well established method for handling the social cost of marginal general taxation, even though a rigorous method is available.
- 4) Global support for all three approaches is now deeply entrenched, and likely to remain so indefinitely.

6.2.Recommendations

Recommendations 1 to 4 are addressed to practitioners. Recommendation 5 is a practitioner's plea to any receptive academic to encourage a critical view of these issues among the upcoming generations of economists.

- 1) General STP discount rates should not include any significant premium for income correlation in public service benefits.
- 2) CBA options should best be initially ranked, in STP discounting regimes, by their value for money – that is the ratios of net consumption benefit to net public spending from politically constrained budgets. This appears to be the only way to handle rigorously the cost of public funds.
- 3) Finance ministries or other bodies to whom spending proposals are submitted for approval, should require that, with STP discounting, CBA benefit cost ratios are defined as in recommendation (2).
- 4) SOC regimes should more widely recognise the distinction between CBA (appraising public spending to obtain consumption benefits) and cost effectiveness analysis (CEA - comparing expenditure options to achieve a given benefit). They should, if possible, consider adopting lower discount rates for CEA, as has been the case for thirty years in the US OMB guidance followed by the US EPA.
- 5) Teaching of public sector microeconomic appraisal techniques, whatever the institution's preferred approach, should encourage students to see the continuing global inconsistencies of practice in social discounting as an issue for concern.

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