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Government's credit-rating concerns and the evaluation of public projects ☆

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ABSTRACT

Public projects typically generate both monetary revenue and social benefits that cannot be monetized. We show that a government concerned with the credit rating of its debt should put different discount rates on these two aspects. The credit rating reflects the probability of default on the government's debt and thus affects its financing costs. Monetary revenues, which can be used in financial distress to repay debt, improve the credit rating and thus carry an additional "credit-market value" compared to social benefits. However, informational problems – dynamic inconsistency and adverse selection – push the government to an excessive emphasis on social benefits, ignoring the external effect of monetary revenue on debtholders. Since the credit market anticipates this, the government's credit rating is adversely affected and it is thus unable to extract the full potential value of the projects. Privatization can sometimes alleviate these problems; However, the option to privatize has complex effects on the market's assessment of projects that remain in government's hands and thus might sometimes be harmful.

1. Introduction

Governments on all levels – national, state and local – turn to credit markets to finance a significant proportion of their activities. A government's cost of borrowing is determined by the credit market's confidence in its ability to repay its debt, which we dub *credit rating*. While the term is usually associated with the work of credit rating agencies, we refer in this paper to credit rating more loosely, as the credit market's perception of the borrower's default risk, as reflected by the interest rate premium relative to "safe" debt.[1] This premium can vary considerably between governments. For example, during the years 2009 and 2010 (i.e. even before the recent European debt crisis), the yield spread between Italian 10-year euro-denominated bonds and the equivalent German bonds has averaged about one percentage point. Or, at the state level, the yield spread between 18-year general-obligation bonds issued by the State of California and those issued by the State of Georgia was 1.16%.[2] The effect on a government's cost of borrowing is substantial. For example, in the case of Italy, with a debt-to-GDP ratio of over 100%, the lower credit rating is responsible for an additional annual borrowing cost of more than one percent of GDP.

The impact on its credit rating can be a major consideration in the government's decisions regarding investment in public projects. The additional debt taken on to finance a project negatively affects the credit rating. On the other hand, the addition of the project to the asset side of the government's balance sheet has a positive impact. Since these changes in the credit rating affect the cost of financing the government's debt, they should be included in the project's cost-benefit analysis. These considerations are important not only for large projects with a major impact on the government's credit rating, but also for projects that are small relative to the size of the entire government debt. While their impact on the credit rating is smaller, the associated change in the cost of financing the debt remains significant relative to their size.

While the effect of a project's financing cost on the credit rating is straightforward, understanding the effect of its benefits is more subtle and requires a closer look at the nature of public projects. Public projects typically generate both monetary revenue and social benefits that cannot be monetized. For example, a new highway will yield both toll income and social benefits in the form of driver surplus and reduced congestion on other roads. An oil field generates sales revenue, but also carries environmental risks (in this case, a negative social benefit). In Section 2 we develop a model that explains how the level of government debt and the composition of its assets affect the probability of default and the interest it pays on its debt. Monetary revenue can be used to prevent default in cases of financial distress—in contrast to social benefits that cannot be converted back into money. We derive a valuation formula for public projects that takes into account their mix of monetary and social benefits and serves as the main tool of the

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[1] While rating agencies' recommendation certainly have a significant role in the making of the credit market's perception, they are not its exclusive determinants. To avoid misunderstanding, we emphasize that this paper does not intend to model their evaluation process explicitly.

[2] Sources: Yahoo! Finance and municipalbonds.com (September 2010).

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subsequent analysis. According to the formula, monetary revenue has an added value relative to social benefits, which comes from two sources: the *option value* of avoiding the penalties associated with default, and the *credit market value*—the reduction in the cost of financing the government's debt due to the improved credit rating. Consequently, in the cost-benefit analysis of public projects, future monetary benefits should be discounted less than social benefits.

While the government's decisions regarding public projects should take into account the additional value of monetary benefits, this turns out to be the case only if the credit market observes the actual monetary revenue of projects (i.e., under complete information). Under incomplete information, the credit market value is fixed, and based on the market's (rational) expectations. Consequently, the government ignores it and gives monetary revenue insufficient weight. We identify two prevalent cases of such incomplete information. In the first, the government has private information regarding a prospective project's characteristics and its *choice* of projects is biased towards those with high social benefits and low monetary revenue. In the second, the mix of monetary and social benefits of a given project is decided on only after the credit market has priced the government's debt. Here, the government *operates* projects with an excessive emphasis on social benefits. In both cases, the government's lack of "credit market discipline" prevents it from harnessing the full revenue-generating potential of its assets to improve its credit rating.

Section 3 looks at the first problem, i.e. private information regarding the project's characteristics. Consider, for example, a government that develops a new oil field. Future oil revenue raises the probability that it will be able to repay its debt. An accurate prediction of the field's future output, however, is only available to the government, who has conducted the geological survey. Since the credit market does not possess this information, the credit rating will only reflect the expected oil output, based on publicly available information. Moreover, even the fact that the government found that developing the field is beneficial is not enough to guarantee that monetary revenue is high. The credit market may suspect that non-monetary considerations such as job creation or pressure from lobby groups (that are also government's private information) have influenced the decision. This gives rise to *adverse selection* in the government's decision whether or not to undertake a project. Relative to the complete information benchmark, the government's selection criterion is tilted in favor of social benefits. Since the uninformed credit market treats every project as one with an average income, the government is forced to forgo desirable income-intensive projects, whose positive effects on its credit worthiness are not fully appreciated. It also undertakes projects with ample social benefits but negative true net value, taking advantage of the market's inability to observe their below-average monetary income. However, since the credit market anticipates these choices, the revenue from projects undertaken in equilibrium is evaluated correctly on average and the overall effect on the government is, ex ante, negative.

In Section 4 we consider the second issue, i.e. the implementation decision in which the government chooses a project's mix of monetary revenue and social benefits. In the case of a toll road, for example, the main tradeoff between future operating profits and social benefits is determined by the toll level. A higher toll increases revenue at the expense of reduced driver surplus and increased congestion on alternative roads. During the construction stage, the government would like to assure the credit market of an eventual stream of significant toll revenue, but once the road is operational, the government, now free of credit rating considerations, has no reason to neglect social benefits and chooses a low toll. The credit market foresees this at the construction stage and downgrades the credit rating accordingly. The government thus faces a costly commitment problem.

As a natural application of our analysis we consider, in Section 5, the issue of privatization. Privatization is commonly viewed as a tool for governments to capitalize the future monetary income of public enterprises. In the case of a new project, the private operator shares the setup cost in exchange for future revenue. For an existing enterprise, privatization generates immediate revenue that can be used for other purposes. We show, however, that in the absence of the informational limitations described in Sections 3 and 4 (and abstracting from differences in efficiency), privatization is exactly equivalent to the alternative of maintaining ownership and raising the same amount of capital by issuing additional government debt. That is, privatization simply lowers both sides of the government's future balance sheet (debt and revenue) by the same amount.

Privatization becomes non-neutral when these informational problems are present. It then emerges as a way to overcome the adverse consequences of the government's bias towards social benefits. The dynamic inconsistency problem is solved since privatization delegates away the government's discretion over the implementation decision. However, unless the actions of the profit-maximizing private operator can be sufficiently restrained by a contract, it will utterly disregard the social benefits and shift the implementation to the other extreme. Thus, the government's decision whether to privatize an asset involves a comparison between two regimes – private versus government control – under which the respective modes of implementation are shifted away from the desired outcome in opposite directions. The results of the comparison are, in general, ambiguous.

Privatization also changes the nature of the adverse selection problem. Private entities who bid for the project invest in verifying its revenue prospects and thus the proceeds to the government from a privatized project equal the true monetary benefits (to the private operator). The government then tends to privatizes projects with above-average monetary revenue. But then, projects that remain under government operation are negatively affected: the fact that an option to privatize existed but was not exercised lowers the credit market's estimate of their monetary revenue. This has several non-trivial consequences: (1) A project may be privatized even though government operation is more efficient; (2) Some inefficient projects are no longer taken because privatization limits the scope for "cross-subsidization" between government operated projects; (3) Market failures (the dismissal of efficient projects due to adverse selection) may be aggravated once cross-subsidization is reduced. Thus, while the option to privatize a project is always beneficial on a "stand-alone" evaluation, a broader view implies that, for some types of projects, the government may be better off committing to never privatize them. Nevertheless, in one case the result is unambiguous: if private operation dominates government's operation – as in the case of projects that allow for full contracting over their operation – then all projects are efficiently privatized.

The paper is related to the "social discount rate" literature (see, for example: Marglin, 1963; Harberger, 1968; Sjaastad and Wisecarver, 1977), which is concerned with the appropriate discount rate to be used by the government in its cost-benefit analysis of prospective public projects. Most of this literature focuses on an economy that is isolated from external credit markets, and therefore government borrowing crowds out private investment. Our framework differs from the main stem of this literature in that the government can borrow in global credit markets and is small relative to them (a notable exception is Edwards (1986); we explore the relationship with that paper in Section 2.4). The contribution of our paper to this literature is the focus on the composition of benefits from public projects and the conclusion that the government should apply different discount rates to monetary and social benefits. Moreover, we highlight the relevance of the credit markets' expectations and the effect of informational asymmetries between the government and the credit market.

2. Credit rating and the valuation of public projects

In this section, we develop a minimalistic model that captures the effect of a government's balance sheet on its credit rating. The balance sheet includes, on the liabilities side, the debt and, on the asset side, the public projects that the government owns. The model highlights