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# APPLES WITH APPLES: COMPARING THE COST OF CAPITAL



There is no point in debating the merits of public private partnerships, argues John Quiggin of the University of Queensland, since there is no alternative. In a mixed economy, any activity undertaken by government inevitably requires inputs from the private sector, and vice versa. It is a true comparison of the cost of capital that must be considered.

In current parlance the term 'public private partnership' (PPP) refers to a fairly specific set of arrangements, in which privately-owned capital infrastructure is used to deliver public services. Consideration of the appropriateness of such arrangements must include a comparison between the cost of capital in PPP arrangements and in traditional or modernised systems of public procurement, in which ownership of the project is allocated to the public sector, either at the outset or on completion of the construction phase.

In considering the relative cost of capital, it is necessary to avoid some confusions between capital costs and cash flows. In some cases, projects receive implicit or explicit guarantees from the government. Such guarantees are more common in traditional

public procurement, but have also been given in a number of PPP arrangements. The best way of dealing with such guarantees in project evaluation is not to adjust the cost of capital but to deduct an appropriate estimate of the value of payments made under such guarantees from the project's anticipated cash flows. In the remainder of this article, attention will be focused on cases where the cost of guarantees has been explicitly netted out before evaluation is undertaken.

## THE EQUIVALENCE PROPOSITION

In any consideration of the allocation of ownership between the public and private sectors, it is useful to begin with what may be called the equivalence proposition. This states that, in the absence of market and government failures associated with transaction and agency costs, the ownership of capital assets and the source of labour inputs will make no difference to the costs and benefits of the project in which the associated labour and capital is employed.<sup>1</sup>

One part of the equivalence proposition is the Modigliani–Miller theorem.<sup>2</sup> In the absence of transactions costs generated by market and government failures, the value of a project is independent of the capital structure used to finance it. Conversely, the cost of capital for a project depends only on the risk characteristics of the income stream it generates and not on ownership or financial structure.

Some commentators have relied on the Modigliani–Miller theorem to argue that the appropriate cost of capital for public sector investments is the rate that would be charged by a private investor. However, the conditions that yield the equivalence proposition apply equally to capital and to other factors such as labour. Hence, under these conditions, the equivalence result implies that the social cost of a project is unaffected by its ownership. It follows that private provision of public infrastructure yields neither benefits nor costs.

This point may be stated in terms of the standard prescription that 'risk should be allocated to the party best able to bear or manage it.' Under the conditions of the equivalence proposition, all risks are perfectly tradeable and the initial allocation of risk is a matter of indifference. Conversely, the question of risk allocation is of interest precisely when the conditions for the equivalence proposition are not satisfied.

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A more realistic analysis begins with the observation that, because of the existence of agency problems and other transactions costs, the allocation of risk matters. To take a standard example, since the enterprise responsible for construction generally has more information about and more capacity to control the costs of the project, the risk associated with such costs should be borne by the construction enterprise.

The productivity of labour may be affected by the presence of agency problems or, more generally, transactions costs. It has been argued that the discipline exerted on managers by capital markets means that these agency problems are less severe in private enterprises than in government departments or government business enterprises. Empirical studies comparing labour productivity in public and private enterprises tends to support this conclusion, though there are numerous instances where the opposite finding predominates, most notably in the water supply sector.<sup>3</sup>

Turning to the cost of capital, two crucial observations must be made. First, although the range of financial instruments that can be traded in capital markets is impressive, it falls far short of the comprehensive set of state-contingent markets required for the Modigliani-Miller component of the equivalence proposition. In particular, there is a large gap between the return to savings available for most individuals and the rate at which they can borrow. This gap is exacerbated, in some cases, by tax distortions, but it exists even with neutral tax treatment. Equally important is the fact that it is difficult or impossible for individuals to insure themselves against income risk associated with macroeconomic or industry-level fluctuations over which they have no control.

The fact that these market failures are not directly associated with equity markets has led many analysts to assume that they must have little or no effect in the determination of asset prices and returns in those markets. However, this partial equilibrium thinking is as invalid in the context of financial markets as would be the suggestion that tariffs on imported consumer goods can have no effect on the agricultural sector.

## THE EQUITY PREMIUM AND ITS IMPLICATIONS

The first step in assessing the likely importance of capital market failures is to compare the asset prices and returns observed in capital markets with those that would be generated under the standard assumptions that yield the Modigliani-Miller theorem and the

equivalence theorem, along with plausible assumptions about risk aversion and the variability of aggregate consumption.

This comparison was first made by Mehra and Prescott<sup>4</sup> in the early 1980s, and the results were striking. The analysis undertaken by Mehra and Prescott showed that, with efficient markets and standard assumptions about preferences, the difference between the rate of return on equity and the rate of interest on high-quality bonds ought to be no more than half a percentage point. The actual value of this difference, commonly referred to as the 'equity premium' or, more precisely as the 'risk premium for equity' is around six percentage points.

Mehra and Prescott christened their discovery the 'equity premium puzzle', and the problem of explaining the apparently anomalous equity premium remains unresolved.<sup>5</sup> However, it seems clear that explanations based solely on changing the parameters and functional forms used by Mehra and Prescott, while retaining the efficient markets hypothesis, are not adequate. At least in part, the equity premium is due to violations of the efficient markets hypothesis.

## THE COST OF CAPITAL FOR PUBLIC PROJECTS

If the risk premium for equity is due, at least in part, to the existence of capital market failures, the common presumption in favour of using the market rate of return as an estimate of the social cost of capital invested in public projects cannot be sustained. On the other hand, the fact that the market premium for risk is anomalously high does not imply that the social cost of risk is zero, and therefore does not justify the use of the riskless bond rate as an estimate of the social cost of capital.

In assessing this question, it is important to note that some forms of market failure are matched by corresponding failures. For example, if the absence of insurance against unemployment arising from recessions is primarily due to the adverse effects of such insurance on incentives to work (moral hazard), the same problems will apply to any publicly-provided substitute. By contrast, if the absence of insurance markets primarily reflects the existence of adverse selection problems, the government's power to tax can resolve the problem and ensure the full pooling of risks.<sup>6</sup>

A systematic survey of the main proposed explanations of the equity premium puzzle suggests

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Australia is now significantly above 1 per cent. This suggests that the observed real interest rate may not be far from the true social cost of capital.

Finally, it is necessary to take account of complementarity and substitution relationships between private and public investments. If private and public investments are complements (substitutes) an increase in the equity premium, which lowers the rate of private investment, will tend to reduce (increase) the social return to public investment.

Given the observation of large and systematic capital market failures, and the fact that the observed market risk premium for equity is significantly higher than would be expected in efficient markets, there is no reason to suppose that the apparent advantage in the cost of capital enjoyed by publicly-funded projects is illusory. In comparisons between private and public sector efficiency, it is typically necessary to balance private sector advantages in relation to operating costs against public sector advantages in relation to the cost of capital.

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that most such explanations do not imply the existence of a similar social cost associated with publicly financed projects.<sup>7</sup> There are, however, exceptions including explanations based on non-standard preferences.

Supposing for the moment that the government can achieve complete risk pooling through the tax system, the social cost of risk can be estimated using modelling approaches similar to those of Mehra and Prescott. As has already been observed, the resulting risk premium will normally add less than one percentage point to the social cost of capital, expressed as a rate of return.

However, another implication of the Mehra–Prescott analysis is that the real risk-free rate (which averaged 1 per cent in their 100-year sample) is lower than is socially optimal. After falling to negative values in the 1970s and 1980s the real risk free rate in

- 1 The first contributor to the Australian debate to make this point explicit appears to have been P. Forsyth (1993), 'Privatisation: private finances and public policy', 8–22 in K. Davis and I. Harper (ed.), *Privatisation: The Financial Implications*, Allen and Unwin, St. Leonards.
- 2 F. Modigliani and M. Miller (1958), 'The cost of capital, corporation finance and the theory of investment', *American Economic Review* 68(2), 261–97.
- 3 Bhattacharyya et al. (1995), 'Specification and estimation of the effect of ownership on the economic efficiency of the water utilities', *Regional Science and Urban Economics*, 25, 759–784.
- 4 R. Mehra and E. C. Prescott (1985), 'The equity premium: a puzzle', *Journal of Monetary Economics* 15(2), 145–61.
- 5 N. R. Kocherlakota (1996), 'The equity premium: it's still a puzzle', *Journal of Economic Literature* 34(1), 42–71.
- 6 S. Grant and J. Quiggin (2003), 'Public investment and the risk premium for equity', *Economica*, 70(February), 1–18.
- 7 Grant and Quiggin, 2003, 'The equity premium puzzle: Explanations and implications', Working Paper, University of Queensland.