The Private Financing Component in Public-Private Partnerships

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Many policy-makers and public-private partnership (PPP) practitioners view access to private financing as the main motivation for developing infrastructure projects through PPP contracts. Instead of using public money—which may or may not be available— to build a road or power plant, for example, using private money to finance infrastructure projects allows projects to be implemented without delays, possibly freeing up public resources for other projects. Particularly, since the 2008 financial crisis, many governments face serious budget restrictions and/or (self-imposed) public debt constraints, which limit the amount of public resources available for infrastructure development. Under such conditions, leveraging private capital through PPPs to develop much-needed infrastructure can be an attractive alternative.

However, the role of private financing is only half of the story behind PPPs. The other, and arguably more important, half is what we call value for money (VFM). A well-structured PPP has the potential to cost less and bring more value to the public than a conventionally delivered project. To understand how PPP projects generate VFM, we need to understand the value drivers in PPPs. A typical PPP structure is based on a reallocation of risks and responsibilities between the government

and concessionaire over a project's lifecycle. If we assume a well-structured PPP arrangement, competitive pressure in combination with a performance-based payment mechanism is likely to result in life cycle cost-efficiencies and better performance. Moreover, the use of output-based specifications in PPPs allows for innovative solutions, further improving VFM. Through these value drivers, the private sector is encouraged to deliver solutions that are more cost-effective and can achieve a higher level of service than would have been realized under conventional procurement.

Fortunately, these two arguments for PPPs can work hand-in-hand: using private financing when public financing or funding is limited or not available can be combined with creating more value for society by intelligently structuring the project and transaction. However, public decision-makers often neglect the VFM argument, which can lead to suboptimal deal structuring. Furthermore, the focus on access to private financing instead of VFM raises the question of whether private financing is really such a good idea given its perceived high cost. In order to answer that question, the actual cost of private financing will be assessed in the next section.

1. Private financing: An expensive source of finance?

When a commercial bank lends money to a PPP infrastructure project such as a toll road, it will usually expect a higher interest rate than the government's borrowing rate. Furthermore, as equity investors typically assume more risk than lenders, they will expect a return commensurate with the risks they face. In order to price these risks and determine the required return on investment, financiers examine the risk profile of the project's expected future cash flows. Because of the higher returns that equity investors and lenders expect, the weighted average cost of capital (WACC) for a PPP toll road project will typically be significantly higher than the government's borrowing rate for conventionally procured projects. As a result, people often conclude that private financing is (much) more expensive than public financing.

However, this analysis ignores the implicit guarantees that governments provide under public financing for conventionally procured projects. For example, government agencies are typically liable for construction cost overruns under a conventional construction contract. In the United States, even for design-build contracts, cost overruns tend to be higher than for PPPs (U.S. Department of Transportation, 2007). Furthermore, higher than expected operating costs under a conventional project delivery may create additional public liabilities down the road. The risks of project cost overruns and delays are not incorporated in public borrowing rates. Instead, public borrowing rates are predominantly determined by the risk of a government defaulting on its outstanding debt. In order to make a fair comparison between the cost of private and public financing, the implicit government guarantees in public financing need to be acknowledged and priced.

Given the existing differential in public and private borrowing rates, the remainder of this paper will analyze whether and to what extent PPPs can leverage the lower interest rates associated with public financing to create more VFM.

2. PPP = 100 per cent private financing?

The emphasis on access to private financing in PPPs has prompted many public officials to assume that PPPs need to be financed with 100 per cent private financing. However, from a VFM perspective, the goal should not be to obtain 100 per cent private financing, but to obtain sufficient private financing to effectively transfer risks and provide the concessionaire with sufficient incentives to perform. Using this model, PPPs in many countries are financed using both private and public sources. For example, in the Netherlands and Canada, large milestone payments at substantial completion replace a significant proportion of the private financing in PPP highway projects (Farrell, 2013). In the United States, the Federal Highway Administration provides low-interest long-term debt to PPP transportation projects through its Transportation Infrastructure Finance and Innovation Act program, thereby partially replacing private financing sources. Emerging economies such as India follow a similar approach, where PPP projects have been financed through private financing in combination with multilateral agency loans and government grants, including viability gap funding.[1] As the above examples show, PPP projects do not in fact always rely on 100 per cent private financing.

To ensure that no VFM is lost through partial public financing, the key is to maintain a similar risk allocation as under full private financing. In other words, the private financing component should absorb most of the project's risk, whereas the public financing component should ideally be virtually risk-free. That way, lower than expected revenues or cost overruns would negatively affect the private sector returns but leave the public financing component untouched. As a result, PPP projects may be able to take advantage of the lower cost of public financing while maintaining the right incentives and without creating a significant implicit public liability for revenue shortfalls or cost overruns. The following sections will discuss whether this approach to structuring PPPs is theoretically sound and can be applied in practice to create VFM.

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[1] Viability gap funding is a capital subsidy to make an economically important project financially viable.

3. Modigliani-Miller theorem applied to PPP project finance

As shown above, PPP projects are often financed by combining both public and private sources of finance. However, as the public financing component can be structured in such a way that leaves it virtually risk-free, shouldn't this mean that the private financing component has become more risky? If that is the case, the expected return on the private financing component should increase, which may leave the project's WACC unchanged. The above argument is similar to the Modigliani-Miller theorem on capital structure, which states that—under competitive markets and in the absence of taxes, bankruptcy costs, agency costs, transaction costs and asymmetric information—the value of a firm is unaffected by how it is financed (Modigliani & Miller, 1958). Or, in other words, a project's capital structure is irrelevant, and the average cost of capital simply reflects the risk profile of the considered project. Whether or not the above-listed conditions required for the Modigliani-Miller theorem to hold are respected in practice will be discussed later in this paper.

Other theories on capital structure either agree with Modigliani and Miller that the capital structure is irrelevant (net operating income approach to capital structure) or disagree and argue that an optimal capital structure can be achieved, either through maximum leverage (net income approach) or through an optimally balanced debt to equity ratio (traditional approach) (Jain, 1999). As the predominant capital structure theory in finance, this paper will use the Modigliani-Miller theorem to analyze whether and how an optimal capital structure can be created in PPPs.

The easiest way to understand how the Modigliani-Miller theorem can be applied to a PPP project is through a practical example (see text box 1).

Text Box 1: Example of Modigliani-Miller theorem applied to PPP financing

The government of XYZ decides to develop a new highway as an availability payment PPP. The total project cost (capital expenditure) is $500 million. The 25-year availability payment contract will start in 2016, with a maximum annual availability payment of $60 million. Annual penalties for unavailability are expected to be on average 5 per cent of the maximum annual availability payment, which equals $3 million per year. Penalties exceeding 15 per cent (or $9 million) are highly unlikely. The annual operating and maintenance costs are expected to be $10 million. Major maintenance is carried out after 10 and 20 years for a value of $50 million in both years. The risks to the project financiers are long-term performance and revenue volatility, which are related.[2] A possible breach of contract by the procuring agency is not considered in this example, as we assume that the procuring agency would compensate the concessionaire appropriately if that were to occur.

If we assume that the project will be financed with 100 per cent private financing (equity and debt combined), the project's expected real pre-tax internal rate of return based on the above assumptions is approximately 7 per cent.[3] Figure 1 shows the cash flows for this scenario with 100 per cent private financing.
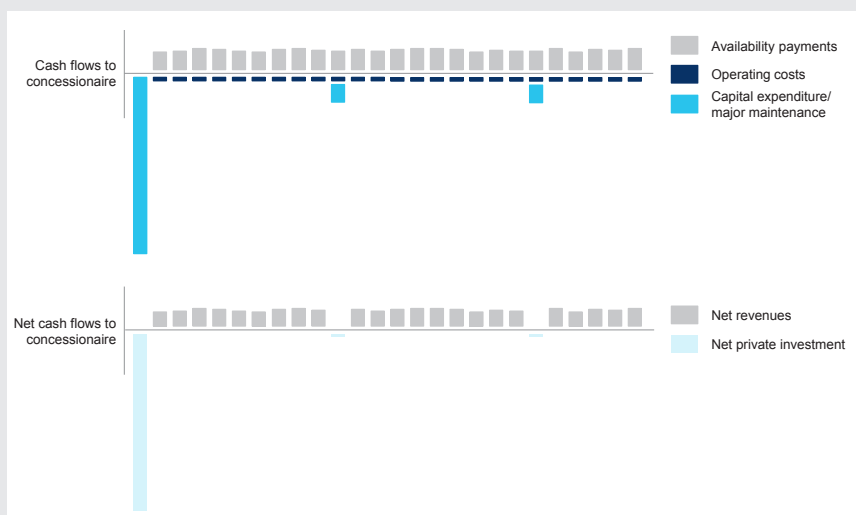
Figure 1: Cash flows under 100 per cent private financing

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[2] Performance risk can lead to penalties and deductions, and ultimately to termination of the contract. In a well-structured PPP contract, the public agency is compensated if the contract is terminated as a result of the contractor defaulting. The compensation should be such that the agency is financially made whole. In other words, the agency's situation is no better but no worse than it was just before termination.

[3] The project's pre-tax returns are calculated using a simple Excel cash flow model that includes capital expenses, availability payments, penalties, operating costs and major maintenance.

Text Box 1: Example of Modigliani-Miller theorem applied to PPP financing (*continuted*)

We will now consider the same project, but using a combination of private and public financing. The public financing/funding component of PPP projects can take several forms. One option is a direct (senior) government loan to the project, possibly under concessional terms. Alternatively, the government could decide to pay a milestone payment at substantial completion to the concessionaire. As a third option, the government could provide a guarantee for a share of the availability payment. Although these government financing/funding options may appear to be very different, they have in fact a very similar overall financial impact on the project and the government.[4]

In our example, the government of XYZ now decides to provide a milestone payment of 50 per cent of the total project cost ($250 million) at substantial completion at the end of 2015. The government will finance this milestone payment through a loan with a tenor of 25 years and an annuity type payback at the risk-free borrowing rate of 4 per cent. To service the milestone payment loan, the government reduces the availability payment to the concessionaire by the required annual debt service amount ($16 million per year, resulting in an annual availability payment of $44 million).

The concession agreement's penalty regime in absolute terms doesn't change; the expected average annual penalty remains $3 million per year, whereas penalties of more than $9 million are still considered highly unlikely. Accordingly, the risks to the project have not changed. However, due to the lower private financing component, the relative volatility in the net cash flows to the concessionaire (after operating expenses and penalties, and allowing for the reduction in annual availability payments to service the public financing component) has significantly increased. In fact, the average penalty amount (which is a good proxy for the revenue volatility) now represents almost 10 per cent of net cash flows, as opposed to about 6 per cent under full private financing.[5] The project is therefore more risky from the private financier's perspective. Figure 2 shows the cash flows for this scenario with both public and private financing.
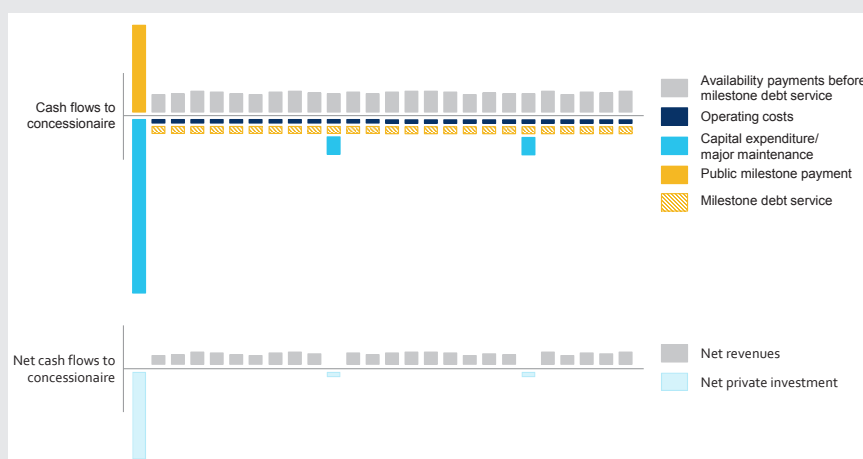

Figure 2: Cash flows under partial private financing

As a result of the higher relative exposure to revenue fluctuations, the private financiers would expect a higher return if the Modigliani-Miller theorem holds true for PPP project finance. More precisely, the weighted average return for private lenders and investors combined would have to be about 10 per cent for the value of the total project and the overall average cost of capital to remain equal. This higher weighted average return can be achieved either through lower leverage (more equity will increase the cost of capital, as equity is a more expensive source of financing) or through higher interest rates and expected equity returns.

As we will see in the next section, in practice we do not observe the increase in private financing costs that we would expect to see under the Modigliani-Miller theorem.

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[4] To demonstrate how these funding/financing options are similar, consider the publicly funded milestone payment at substantial completion of the project used in the example above. The government could decide to finance this milestone payment through a treasury bond at a risk-free interest rate. Financing the milestone payment this way would be very similar to a direct (senior) government loan to the project to be repaid using the availability payments. As long as the bonds and loans are structured in such a way that they are (virtually) risk-free, they will have the same financial impact on both the government and the concessionaire. Similarly, if the government were to guarantee a share of the availability payment, the concessionaire would be able to obtain financing at the risk-free rate for that share of the availability payment, which again has essentially the same effect as a direct government loan to the project at the risk-free rate.

[5] Net cash flows = availability payments – penalties – operating expenses. Net cash flows under 100 per cent private financing are $47 million per year ($60 million – $3 million – $10 million = $47 million). Net cash flows under a financing structure with a 50 per cent milestone payment are $31 million per year ($44 million – $3 million – $10 million = $31 million).

To determine whether the Modigliani-Miller theorem holds true in reality, we would need to compare similar PPP infrastructure transactions under different financing structures and see whether the cost of the private financing component is indeed significantly more expensive when the project is partially financed through public financing. Or, more specifically, is the decrease in the WACC caused by the use of lower-cost public financing offset by an increase in return expectations from the private financing component, as private investment has become more risky?

Before we answer this question, it is important to note that the logic behind the practical example above remains the same for other PPP transaction structures. For example, if instead of providing a milestone payment at substantial completion, the procuring agency chooses to provide a senior (and virtually risk-free) direct loan to the project, the result would be the same. The overall project revenue risk profile would not be affected by the public funding component, but the relative revenue volatility from the private financiers' perspective would increase. Again, under the Modigliani-Miller theorem this would result in a commensurate increase in the cost of private financing. Similarly, instead of providing a virtually risk-free loan, a government could decide to guarantee a part of the availability payment, which would allow the concessionaire to obtain lower-cost financing for that part of the financing. So, whether the public financing component is provided through a virtually risk-free loan, a guaranteed availability payment or a milestone payment at substantial completion, the application of the Modigliani-Miller theorem remains the same.

The next section will assess whether the Modigliani-Miller theorem actually holds up in practice.

4. The capital structure does affect the cost of capital

The private financing conditions of PPP deals, such as interest rates, required debt service coverage ratios, leverage and required equity returns, are typically confidential. It is therefore impossible to analyze a large set of financing data on PPP transactions in order to derive statistically valid conclusions on the Modigliani-Miller theorem

applied to PPP project finance. Furthermore, project specifics may make comparison of financing structures challenging in the first place.

However, based on discussions with industry experts and confidential transaction information, we can make the following observations. Private debt financiers analyze the financial robustness of projects using sensitivity analysis to determine whether key debt coverage ratios are being met. As long as these key ratios are met, private debt financiers have more or less standardized expectations in terms of gearing (debt-to-equity ratio) and interest rates for certain project types (for example, availability payment highway projects). Industry experts confirm that the interest rates and gearing for the private financing component typically do not significantly change between similar PPP projects that have 100 per cent private financing and those that combine public funding/financing and private financing.

This observation is particularly dramatic for availability payment transactions with milestone payments. The observed gearing and interest rates of an availability payment transaction with a 50 per cent milestone payment at substantial completion are not significantly different from those of an availability payment transaction without a milestone payment. So, although the relative exposure of the private financiers is much higher under a combination of public and private financing, the debt-to-equity ratio requirements and the average cost of financing of the private financing component do not change significantly.

This seems to contradict the Modigliani-Miller theorem, as under this theorem we would have expected the private financing component to be priced significantly higher (through a combination of lower leverage and higher interest rates and expected equity returns) to reflect the relative higher risk exposure.

To explain this result, we need to look at the assumptions underlying the Modigliani-Miller theorem. As mentioned earlier, the Modigliani-Miller theorem assumes competitive markets with no taxes, bankruptcy costs, agency costs, transaction costs or asymmetric information. These market imperfections will be discussed in text box 2.

Text Box 2: Modigliani-Miller theorem assumptions

Competitive markets

International financial markets are typically assumed to be competitive. This may be a less accurate description for certain emerging economies where international development banks play an outsized role in project finance compared to international and domestic commercial banks. The earlier observation that interest rates and gearing do not significantly change is predominantly based on transactions in developed economies, where financial markets are indeed believed to be highly competitive, which is in line with the Modigliani-Miller assumptions.

Absence of taxes

In real-life transactions, taxes play an important role. In fact, debt is typically treated more favourably than equity, as interest payments are tax deductible. Companies and projects can take advantage of this through leveraging. We would therefore expect the value of a project financed with only debt to be higher than that of a project financed with both debt and equity. Inclusion of tax does not help explain, however, why private lenders do not significantly change their financing conditions when virtually risk-free public financing is included. Based on the above, tax considerations cannot explain why the Modigliani-Miller theorem does not hold.

Absence of bankruptcy and agency costs

Bankruptcy costs are also ignored under Modigliani-Miller but do play a role and increase with higher leverage. When private debt financing is replaced by virtually risk-free public debt financing, potential bankruptcy costs are expected to drive up the remaining private financing component, as it is junior to the public debt. Similarly, agency costs would also be expected to increase the cost of the remaining private financing. If anything, bankruptcy and agency costs should amplify the increase in private financing costs under Modigliani-Miller and therefore cannot help explain why the Modigliani-Miller theorem does not hold in practice.

Absence of transaction costs and asymmetric information

As for transaction costs and asymmetric information, it is difficult to assess their effects, as they cannot easily be observed. However, based on our earlier observations, it seems that financiers' pricing does not necessarily reflect the exact risk profile of a project. Instead, financiers typically follow a rule-based approach under which a project in a specific industry under a given revenue structure is expected to meet certain requirements. This rule-based approach can help lower transaction costs. Furthermore, debt and equity providers may have other considerations beyond the narrowly defined project that can justify lower financing costs, such as financiers wanting to enter new strategic markets.

In conclusion, transaction costs and financiers' other considerations can help explain why the Modigliani-Miller theorem does not hold when private financing is partially replaced by virtually risk-free public financing.

As the Modigliani-Miller theorem does not hold for PPP transactions in practice, it would be efficient to combine public and private financing in a PPP project to reduce the overall cost of capital. This raises the question of what the optimal capital structure for a PPP project may look like. The next section will seek to answer that question.

5. What would be an optimal capital structure?

As demonstrated above, it is possible to lower the overall cost of finance for a PPP project by including a public financing component. However, there are two limitations to the share of public financing. The first limitation relates to the project's bankability. Replacing private financing with

virtually risk-free senior public debt means that the total free cash flow to private financiers is reduced. The lowest acceptable cost of finance is achieved when the private debt financiers' coverage ratios are satisfied while meeting the required gearing. When available cash flows are no longer sufficient to meet the private financiers' debt service coverage ratios under downside sensitivities, the required gearing needs to be adjusted, which leads to a more costly financing structure.

The second limitation relates to VFM. For an optimal financing structure, the concessionaire and private financiers must have sufficient exposure (in 't Veld & Ham, 2002). More specifically, it should at no point throughout the concession period be financially attractive for the
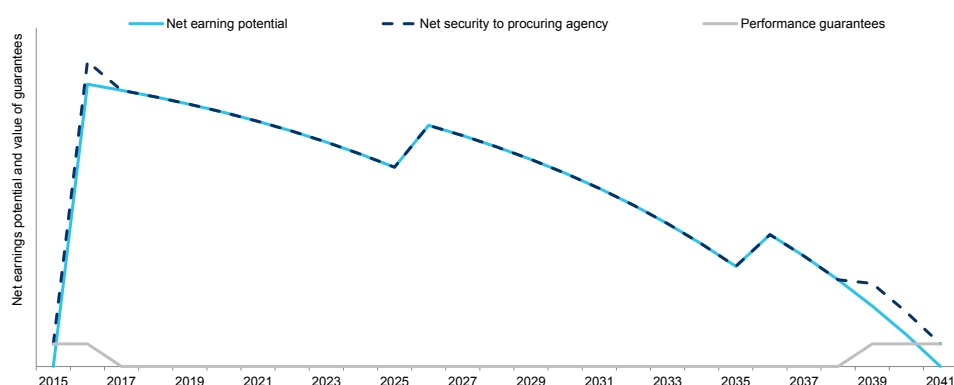
Figure 3: Earning potential to private financiers under PPP

concessionaire to walk away from the project. To ensure that the concessionaire indeed has an interest in fulfilling the contract requirements, the outstanding (availability) payments to be received by the concessionaire, or the project's earning potential, should always be larger than the expected required efforts,[6] with some margin to account for uncertainties in the calculations and special events. The net earning potential[7] is typically lowest just after financial close and right before the end of the concession period. Concession agreements therefore normally require performance guarantees to protect the public agency during these sensitive periods. Figure 3 provides a graphical interpretation of these concepts.

The graph shows that at any given moment, the net security[8] to the procuring agency is positive, with a significant margin. This indicates that the concessionaire has an interest in remaining engaged in the project throughout the entire concession period. If the net security to the procuring agency becomes too low or even negative, it means that the private financiers no longer have sufficient exposure, indicating that the private financing component is too small.

Minimizing the private financing component subject to the bankability and net security requirements yields the optimal project financing structure. This financing structure takes full advantage of the lower costs of public financing while also sufficiently incentivizing the

concessionaire to optimally deliver the project as per the concession agreement. As a result, a PPP project can create even more value to society by using an optimal financing structure combining both public and private debt financing.

This observation can be of particular interest to multilateral development banks and governments of developing countries. Partially replacing private financing with public financing/funding through, for example, a milestone payment can create a better deal for society. Whereas government and multilateral officials may sometimes conclude that PPPs do not require public financing, the consequence of such a PPP solution may in fact be a need for additional government borrowing. This borrowing could in turn be provided by the public arm of multilateral development banks, potentially giving them an important role to play in financing PPPs.

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[6] Expected required efforts is defined as net present value of future all operational and maintenance expenses.
[7] Net earning potential = earning potential – expected required efforts.
[8] Net security = net earning potential + performance guarantee provided by concessionaire.

6. Conclusions

In many countries, access to private financing, rather than VFM, is the key driver for PPP transactions. However, private financing is often believed to be more expensive than public financing, as the cost of public financing typically does not consider project risks. A fair comparison between public and private financing should acknowledge the implicit liabilities that come with public financing.

Because many public decision-makers see PPPs as synonymous with access to private financing, they often expect PPP projects to be financed through 100 per cent private financing. However, as demonstrated in many countries, including Canada, the Netherlands, the United States and a number of emerging markets, PPPs can effectively use both private and public financing. A logical question is then whether combining private and public financing can lead to an optimal financing structure that maximizes VFM.

According to the Modigliani-Miller theorem, a project's financial structure should have no impact on the total cost of capital, and therefore no impact on VFM. This paper demonstrates that in practice, financial engineering can create a more optimal financing structure that leverages the lower cost of public financing. As a result, including a public financing component can lower the WACC, resulting in a lower overall cost to society.

An optimal combination of public and private financing ensures sufficient incentives for the concessionaire to carry out its obligations throughout the concession period while reducing the overall cost of financing. As a result, intelligently structured PPPs combining public and private financing can generate additional VFM to society.

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