A Framework for Determining the Viability of Public-Private Partnerships for Toll Road Projects in the Philippines

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Abstract: Charging for the use of toll roads consequently prices-out potential users whose willingness-to-pay is exceeded by toll fees that are charged. Therefore, economic gains such as travel time and vehicle operating cost savings will not be realized for those who have been priced-out. This reduction in the number of users may weaken the project's economic feasibility and financial viability. This presents a challenge to implementing projects though Public-Private-Partnership arrangements. A decision framework integrating objectives of the public sector and private proponent was proposed and applied to a prospective bypass road project. The analysis showed that the project was not viable for PPP within the current limits to public contribution to PPP projects. However, this test application demonstrated that it is possible, using a joint analysis of economic viability of the project and financial viability for the private partner, to show the feasible range of arrangements suitable within Philippine conditions.

Keywords: *public-private partnerships, decision framework, toll roads,*

1. INTRODUCTION

The term "public–private partnership" describes a range of possible relationships among public and private entities in the context of infrastructure and other services. Other terms used for this type of activity include private sector participation (PSP) and privatization (ADB, 2008). PPP has been espoused as a method to involve the private sector in the delivery of public infrastructure or facilities, partly because of the limitations in the government budgets. Making use of the users-pays-principle (UPP), the private sector would be allowed to collect fees to defray the costs of establishing, operating and/or maintaining the infrastructure or facilities. Government would also contribute a certain amount of resources, usually, but not limited to, the acquisition of right-of-way (ROW) and construction.

The Philippines has instituted legal and institutional frameworks that provide the basis for putting together public-private partnerships (PPP) in a range of sectors providing public infrastructure (i.e. facilities or structures that would be used by the general public). However, a number of government officials hold the mistakenly narrow concept that these partnerships entail that the private sector, by itself, provides the public services or infrastructure.

Like other forms of infrastructure in the Philippines, roads suffer from low cost recovery. Efficient pricing has not been the norm, mainly because of political intervention, with tariffs based on social and political considerations instead of commercial ones (World Bank, 2005). This situation shows that the quality of institutions and how they interact with one another is

of utmost importance in assuring that good infrastructure is put in place. The main issue with regard to this is that the market demand for the use of such facilities or services may not always be appropriate (e.g. insufficient number of possible users, low willingness-to-pay) to provide sufficient income to cover all the costs of establishing, operating and maintaining said facility or service. Therefore the application of the users-pay-principle will not always be feasible. On the other hand, government has limited funds and would like to leverage private sector investment. If the economic benefits are substantial enough, a certain amount of government investment – together with a private proponent's share – may be justified. This range between purely private investment and purely government investment needs to be explored further.

2. OBJECTIVES OF THE PAPER

This paper has the following objectives:

- To examine and discuss the issues facing PPPs in road infrastructure projects in the Philippines
- To describe a framework for determining if a PPP arrangement for a road project is viable, considering the setting of toll fee levels and the amount of government contribution.
- To apply the proposed framework to a case study and discuss the implications of the results of the test application.

3. ISSUES FACING PPP IN ROAD INFRASTRUCTURE PROJECTS

3.1 Differing Objectives of PPP partners

In the simplest of terms, the government, acting as the promoter of public welfare (i.e. economic welfare) seeks to encourage the establishment of road projects to bring about the usual associated benefits, such as travel cost savings and travel time savings. At the same time, negative effects, such as pollution, noise, and community severance would be minimized or mitigated, thereby delivering positive net economic benefits. It should be noted that in order to realize the benefits, there must be a sufficient number of users to enjoy the said benefits – and it is the aggregation of these instances of benefit-taking that are construed as the total benefit. However, the by the nature of the private sector's involvement, PPP projects almost invariably the private sector partner will seek to recover costs, such as by charging toll fees. The act of charging users for the use of infrastructure facilities, such as toll roads, means that potential users, whose willingness-to-pay is exceeded by the toll fees that are charged, will choose *not* to use the facility. As a result, the total economic benefits may be significantly reduced. In the worst case, this may make the project economically *unviable*.

Thus, we see that the objectives of the government and the private sector may come into conflict when the private project proponent is expected to *make do* with toll fee collections. When these are insufficient, the private sector will simply choose not to undertake the project, resulting in unrealized economic gains. However, when the government is involved to a greater extent, it may choose to contribute a significant amount of resources (financial and otherwise) to the project. These resources may lower the required toll fees and result in making the infrastructure affordable to enough users, and in turn, making it economically

viable. At the same time, the private sector partner would be able to meet its financial obligations and satisfy its objective of making a profit.

3.2 Institutional Framework

Although many countries have accepted the need for PPPs to bridge the funding limitations that governments have. Of course, funding is not the only reason that the private sector is tapped. Other than financial capital, the government may also seek to gain access to technical expertise and managerial capital. The private partner would also be able to share part the project risk, thereby lessening the burden on government. Another possible benefit is increased access to newer, cheaper and cleaner technologies. At the same time, the private sector usually has stronger incentives for more efficient performance, especially since gaining profit is the motivation for entering into any undertaking. This may result in cost savings because of more efficient implementation as well as improved level of service which would help in the enhancement of revenues.

While a number of handbooks or guiding literature has been written by or for the World Bank, Asian Development Bank and the United Nations (to name a few), these are only able to outline general principles and present case studies on the experiences in some countries, the main determinant of the success or failure of partnerships is the quality of the institutional framework in the country where PPP is to be undertaken.

In the Philippines, a law called the "BOT Law" was passed by the Philippine Congress in 1990, with amendments made in 1993. In its declared policy, it sets out: (1) to recognize private sector as main engine for national growth and development; and (2) to provide the most appropriate incentives to mobilize private resources for BOT/variant projects. This law, although called the BOT (Build-Operate Transfer) law, recognizes several variants as follows:

- Build-and-Transfer (BT)
- Build-Lease-and-Transfer (BLT)
- Build-Operate-and-Transfer (BOT)
- Build-Own-and-Operate (BOO)
- Build-Transfer-and Operate (BTO)
- Contract-Add-and-Operate (CAO)
- Develop-Operate-and-Transfer (DOT)
- Rehabilitate-Operate-and-Transfer (ROT)
- Rehabilitate-Own-and-Operate (ROO)

Under the BOT Law, the following government agencies can enter into BOT and BOT-variant contracts: (1) all government *infrastructure* agencies; (2) government-owned and government-controlled corporations (GOCCs) that are authorized by their charters; and (3) local government units (LGU). This implies that there are multiple entry points for the private sector to get involved in the provision of public infrastructure.

Traditionally, the main government agency in charge of roads has been the Department of Public Works and Highways (DPWH), with the LGUs playing a secondary role. The DPWH has been largely responsible for planning, design, construction and maintenance of national roads. The DPWH has a specific office dedicated to the implementation of BOT projects. While the BOT Law provides a generally transparent process in this regard, other processes that relate to GOCCs are not offering a transparent process to the market, such that, potential

investors must be "in the know" to engage in a joint venture for a Toll Road Project (PEGR, 2007). This sets the backdrop for an unclear and inconsistent regulatory environment that can be expected to discourage the development of truly competitive toll road projects that would enable the private sector to make a reasonable profit (Benson, 2008). Past PPPs were mostly initiated through unsolicited proposals, which escape proper planning process and as a result may have a poor fit with development strategies. It has been proposed that project preparation should be shifted from private proponents to the relevant government planning agencies (KBR, 2008).

With respect to local governments (the governments of the provinces, towns and barangays[1]) the main problem being faced is the lack of in-house technical and institutional expertise for establishing a working road infrastructure PPP arrangement between the local government and potential private proponents.

The BOT law also defines how much government can contribute into the PPP arrangement, which is up to 50% of the project cost. This implies that that projects that require more than 50% contribution will automatically become a purely government undertaking. It may be hypothesized that a significant number of public infrastructure projects may fall into the range between 50% and 100% government contribution. But as a result of the limitations imposed by the BOT Law, these projects will never see the realization under PPP arrangements.

4. ECONOMIC-FINANCIAL DECISION FRAMEWORK FOR PPP IN ROAD INFRASTRUCTURE

This section describes a theoretical framework for deciding if a PPP arrangement is suitable for a proposed road project, considering the limits implied by Philippine laws or guidelines. In particular, this refers to a PPP arrangement wherein the proponent has a significant role in the design, financing, construction, operation and maintenance of the toll road project. Also, this framework is limited only to economic and financial considerations. Socio-political considerations are set aside for the moment in order to simplify the analysis.

4.1 Economic Feasibility

There are a number of considerations that come into play when determining if a project should be implemented at all. As in other countries, public works projects in the Philippines such as road projects are subjected to economic feasibility studies. Analyzed on a "total project" basis, all the costs should be imputed into the analysis to reflect the overall economic viability of the project. The basic assessment that is made is whether the cost of this capital is exceeded by the benefits from the project, in which case the project is desirable and therefore should be undertaken. It should be noted that inability to implement, such as due to budget constraints does not mean that the project is economically infeasible.

[1] Barangays are the smallest political governance unit with elected officials in the Philippines. Cities and Municipalities are composed of a number of these barangays.

4.2 Financial Viability

4.2.1 Project implemented by government only

Government implements projects that are assessed to be economically feasible, subject to the availability and nature of the funds. These funds may come from the national treasury or from loans such as from Official Development Assistance (ODA). It is noted that the Philippines has relied heavily on aid agencies since there are relatively few local entities that would be able to invest in large projects such as road projects.

For most road projects, the government does not charge for the use of the road, since these funds that are used to fund these projects, whether by loan or from direct funds are ultimately paid out of taxes collected from citizens. For as long as the project is economically viable and funds are available, a project may implemented by the government.

4.2.2 Projects implemented through PPP

Due to the overall limitation of the financial resources that are available to the government, the total number of projects that can actually be implemented may be less than the number of identified economically desirable projects. In response, the government may want to encourage the private sector to invest in the implementation, operation and maintenance of some of the other economically viable projects which could not be covered by the regular government budget. Naturally, it is understood that the private sector would expect to make a profit from its investment.

The main concern would be that the expectable minimum level of profit should be equal to or greater than a certain level. The private proponent may gain their return from direct revenue collection or from an amortized payment by the government for the capital and operational expenditures. However, what constitutes "reasonable rate of return" may not necessarily be the same for the private sector as for the government. This difference in understanding is one of the stumbling blocks to encouraging greater private sector participation.

4.3 Framework for Identifying Viable PPP Arrangement

For the purposes of this paper, the objectives of the partners are stated as follows:

- Government – implementation of economically viable projects within budget constraints
- Private Sector Proponent – implementation of projects which are financially viable with respect to their investment.

Considering the difference between the objectives of the government and that of the private sector proponent, it is anticipated that not all projects will satisfy the requirements of both sectors. That is to say, only a project that satisfies both objectives would be suitable for a PPP arrangement. Thus, in order to assure that a given project would be successful under a PPP arrangement, it is necessary to determine, *a priori*, the suitability of a given project.

Figure 1 shows a proposed framework for the joint decision-making to be made by the government and the private sector partner(s). It considers the PPP "arrangement" to be

described mainly by two points. First is the amount of government contribution which implies that the balance will be borne by the private sector proponent. Second is the fare level that will be the basis for direct toll fee collections. For simplicity, the cases of "shadow tolls" payments by the government to the toll road operators, or vignette systems used in European countries are not being considered in this paper, since these cost-recovery mechanisms (for the private proponent) have a less direct correspondence between price and demand for toll road usage.

Using the proposed toll fee level as a starting point, it would be possible to forecast or estimate demand as a function of the fare level and the toll road users' willingness-to-pay. Then, using the proposed corresponding level of government contribution, it would be possible (together with other analytical inputs that are subsumed into the respective feasibility analyses) to model the economic and financial outcomes from the respective perspectives of public welfare and the private sector partner. In case the evaluation result is that the project is economically viable *and* financially viable (for the private sector partner), then it would be concluded that it is appropriate to enter into the proposed PPP arrangement.

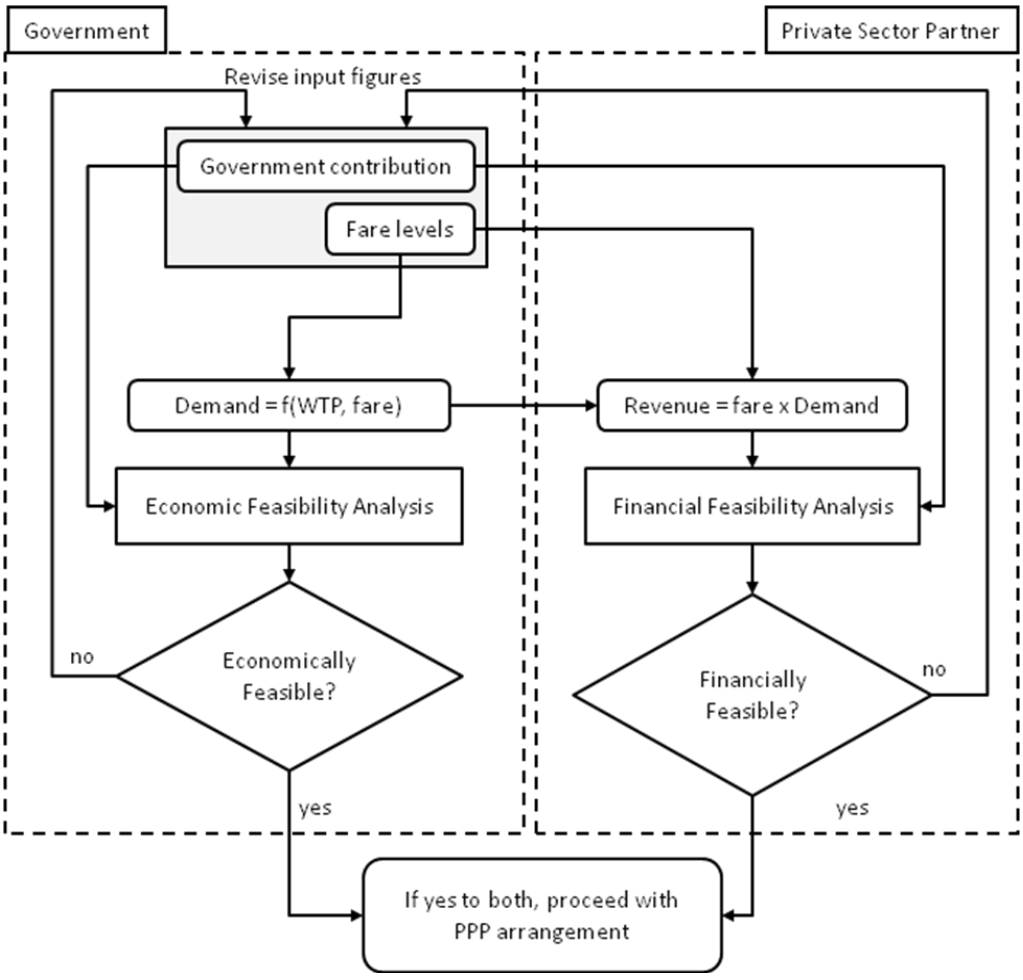

Figure 1. Conceptual framework of decision-making for PPP projects

If the result is not viable from either viewpoint, then a feedback is made by changing the toll fee levels and/or the level of government contribution. Various combinations of government contribution and fee levels may be tested within the range of possible values (as determined

by convention or by law). Through this approach, a suitable combination might be found and the PPP arrangement would be drawn up to follow this. However, it may also be found that, after testing the legally feasible range of values for toll fee and for government contribution, no favourable combination exists and therefore the project should not be conducted as a PPP.

5. CASE STUDY ANALYSIS OF PPP POTENTIAL

5.1 Basic Analytical Approach

Several possible arrangements for the project are examined. These arrangements are basically described by different combinations of government contribution and toll fee levels. The ranges of these and other analytical variables are determined using available information and relevant guidelines or legal references. The Economic and Financial viability indicators are then calculated for each combination or arrangement and examined in relation to their corresponding hurdle rates. If any of the combinations have favourable indicators for both Economic and the Financial viability, then a project may be said to be suitable for PPP. In the case of multiple scenarios indicating suitability of PPP, the government may seek to realize the scenario that corresponds to maximized Economic Viability (i.e. highest net benefit). If none of the scenarios indicate viability of the PPP option, the project would be recommended to be taken out of consideration for PPP until such time that any of the conditions described by these variables have changed significantly enough.

5.2 Analytical Variables

Users' Willingness-to-Pay – data from a WTP survey conducted as part of study for the Manila North Tollways Corporation (MNTC) by the UP-Planades in 2003 indicated that a 900% increase in toll fees would result in a 1/3 reduction in traffic numbers, especially for shorter trips. Based on this, a simple, straight-line diversion curve is constructed, wherein the maximum amount of traffic corresponds to a zero toll fee condition. On the other hand, the toll fee corresponding to 5.584 pesos per km for a Type 1 Vehicle (Type 1 corresponds to cars and small-sized vehicles; Type 2 corresponds to passenger buses; Type 3 corresponds trucks) to would result in zero traffic. The traffic share within this range would be interpolated on this straight-line. Figure 2 shows this approximated demand (WTP) curve. The x-axis is the share of the maximum possible traffic, which is the traffic under the zero toll fee condition.

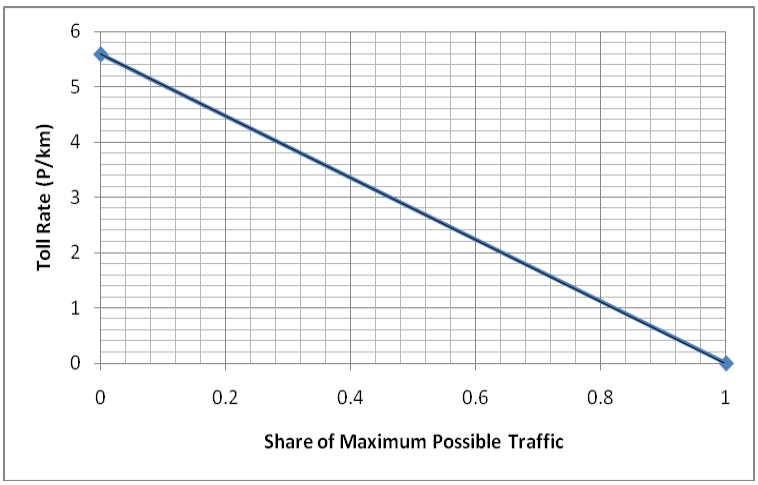

Figure 2. Approximated WTP function for Type 1 vehicle

This WTP curve is a very strong assumption and may not be exactly realistic for other project cases, since it is based on only one example of WTP in a location with its own peculiar road network and socio-economic condition. Also, this approximation does not necessarily account for the variation of WTP with the length or purpose of the trip. If better data becomes available, it will be easy to replace the values. The main reason for using this data is that it was derived from a project with similar characteristic – that of a proposed toll road with an existing parallel road that may be alternatively used by motorists. Thus, it is adopted to operationalize the analysis.

Toll Fees – Toll fees are tested within the range indicated by the WTP curve. For simplicity, the weighted average toll fees are taken at the ends of 6 equal intervals. The weighted average toll fees is based on the vehicle composition of the forecasted traffic.

Reasonable Rate of Return - Interviews with officials from various private and commercial firms indicates that the private sector expects at least 20% per annum as reasonable rate of return. Initially, it was intended that this rate would be applied to the financial analysis from the viewpoint of the Private Sector Proponent. However, it was observed that this assumption would be in conflict with the provisions of the Public Service Act, an old law that governs some key aspects of undertakings of a "public service" nature. This law specifies that in no case shall this exceed 12% return on rate base. Thus, 12% was used in the calculation of the Financial Net Present Value of the Project (FNPV) from the viewpoint of the private proponent.

Opportunity Cost of Capital - The National Economic and Development Authority (NEDA) currently uses fifteen percent (15%) as the hurdle rate in the economic analysis of government projects. This rate is adopted for the economic analyses in this paper.

Government Contribution - By BOT Law, the government may not finance more than 50% of the project cost, through the General Appropriations Act (GAA) or ODA. This figure is contrasted to only 20% in India, which refers to the contribution as Viability Gap Funding (VGF). For comparison purposes, in calculating the values of Economic Net Present Value (ENPV) of the project and FNPV from the private proponent's viewpoint, the Government Contribution ranging from 0% to 100% was evaluated.

Project Term – The BOT Law allows contracts that last up to a maximum of 50 years. The project term applied was 30 years which is based on the original feasibility examination of the project which was conducted by the DPWH.

5.3 Project Analyzed as a Case Study

The Calamba-Los Baños Bypass project is being considered by the DPWH as having potential for PPP. This is subjected to an indicative assessment to confirm the viability of a PPP arrangement. For this analysis, data is culled from the JBIC Special Assistance for Project Formation (SAPROF) for Road Network Capacity Expansion (Bypass) Project, a study conducted with assistance from Japan Bank of International Cooperation in 2003. The proposed project has a road length of 13.4 kilometers, with 2 lanes. The road being bypassed is 17.51 kilometers long. The existing road passes through a busy part of the town of Calamba.

Table 1 summarizes the cost-benefit flows for the project for years 2004 up to 2030, as the SAPROF study evaluated them. The total project cost was estimated by the study to reach 2,454 million pesos. The economic costs and benefits were discounted using a rate of 15% per annum.

The result was that the project was viable with economic indicators as follows:

- Economic Net Present Value (ENPV): 4,729.75 million pesos
- B/C Ratio: 4.860
- Economic Internal Rate of Return (EIRR): 38.5%

Table 1 Summary of Benefit – Cost Flows for Calamba-Los Baños Bypass Project

Year	Project Cost								Benefits	
	Detailed Design	ROW Acquisition	Assist in Tender	Civil Works	Construction Supervision	Maintenance	Total Cost	Total Discounted Cost	Economic Benefit	Discounted Benefit
2004	10.113						10.113	8.794		
2005	50.563	159.396					209.959	158.759		
2006		382.552	4.295				386.847	254.358		
2007		223.155	6.014	179.516	20.307		428.992	245.278		
2008				430.838	48.737		479.575	238.434		
2009				430.838	48.737		479.575	207.334		
2010				251.322	28.43	1.22	280.972	105.628	467.547	175.768
2011						2.928	2.928	0.957	1324.259	432.903
2012						2.928	2.928	0.832	1596.326	453.775
2013						2.928	2.928	0.724	2013.816	497.785
2014						2.928	2.928	0.629	2141.701	460.344
2015						2.928	2.928	0.547	2291.144	428.231
2016						2.928	2.928	0.476	2486.405	404.110
2017						2.928	2.928	0.414	2775.065	392.196
2018						2.928	2.928	0.360	3235.897	397.674
2019						2.928	2.928	0.313	3433.181	366.886
2020						2.928	2.928	0.272	3567.517	331.515
2021						2.928	2.928	0.237	3670.103	296.563
2022						2.928	2.928	0.206	3664.773	257.506
2023						2.928	2.928	0.179	3693.468	225.672
2024						2.928	2.928	0.156	3766.864	200.136
2025						2.928	2.928	0.135	3704.782	171.163
2026						2.928	2.928	0.118	3630.948	145.871
2027						2.928	2.928	0.102	3398.249	118.715
2028						2.928	2.928	0.089	2838.343	86.222
2029						2.928	2.928	0.077	2565.840	67.778
2030						2.928	2.928	0.067	1933.727	44.417

Note: Values in Million Pesos

The evaluation considered the reduction in vehicle operating costs (VOC) for the "with project" case versus the "without project" case. Table 1 shows that the undiscounted benefits initially increase but begin to drop starting in 2026. These numbers reflect the trend of traffic congestion. Initially, the diversion to the new road is expected to decongest *both* the bypass as well as the existing road, and thus the evaluation considers the total VOC of traffic

that uses both roads. Because the additional capacity is substantial, the total VOC savings is expected to increase with the normal increase of traffic. However, by 2026, the traffic is expected to grow to a level wherein additional volume will significantly reduce travel speeds and thus increase the VOC costs for the "with project" case. In total, these economic benefits are expected to substantially exceed the costs. Since it may be possible for the project's net present value to remain positive, even if some reduction should occur because of toll fees being collected. For this reason, this project is considered in this paper as a candidate for PPP.

The traffic forecasting that was done in the SAPROF study did not consider the possibility of implementing the identified by-pass roads as toll road projects. Therefore, the study's traffic forecast is adopted as the zero-toll scenario and that this corresponds to maximum possible traffic on the proposed bypass road. The estimated WTP curve is used to adjust the traffic level corresponding to different toll fee scenarios. In turn, the level of economic benefits that are potentially realized, under the assumption that this is proportionate to the traffic level, which in turn is a function of the toll fee level. The resulting traffic numbers are also multiplied by the corresponding toll fee to estimate the revenues.

5.4 Analysis of the Sensitivity of the Economic and Financial Indicators to Toll Fee Level

A sensitivity analysis is conducted considering the range of toll-fees from the zero-toll fee condition up to the zero-WTP condition (which corresponds to the WTP of the last willing user, above which no one would use the facility). Government contribution or share of the project cost is examined on a total project basis, meaning that all the project activities, from project planning to construction and then operations and maintenance are considered as an entire. The analysis does not concern itself with the other variants in the PPP wherein a part of the total project may be offered for concession (such as operation and maintenance only).

Table 2 summarizes the discounted economic benefits and discounted toll revenues using 15% and 12% respectively. These are the benefits and revenues that have been adjusted using the WTP demand curve and applied to all vehicle types. As shown here, the Economic Benefit is maximum at the zero-toll fee level and are reduced as the toll fee goes up. On the other hand, Toll Revenue is maximized at around the 3 pesos per vehicle-kilometer toll fee level for Type 1 vehicles. The toll revenue is calculated based on the weighted average toll fee, which considers the share of each vehicle type. Type 1 vehicles comprise about 93.04%, while Type 2 vehicles comprise 1.34% and Type 3 vehicles comprise 5.62% of the total number of vehicles.

Table 2. Summary of Discounted Economic Benefits and Toll Revenues

Weighted Average Toll Fee, All Types (Pesos/veh-km)	0.00	1.13	2.25	3.38	4.50	5.63	6.76
Discounted Economic Benefits (15%)	5,955.23	4,889.25	3,823.26	2,757.27	1,691.29	625.30	0
Economic Net Present Value (15%)	4,729.8	3,663.8	2,597.8	1,531.8	465.8	(600.2)	(1,225.5)
Discounted Toll Revenue (12%)	0.00	245.99	384.72	416.18	340.37	157.30	0

The project being considered is a bypass road, the effect of charging the toll is to reduce the total diverted traffic volume from the old road to the new road. The economic benefits that were considered in the "un-tolled" case included the benefits in the form of vehicle operating cost reductions on the "original" road" because of congestion reduction brought about by the diversion of traffic to the new bypass road. Therefore, the analysis did consider the effect on road congestion of the older road which the bypass provides an alternative to.

Table 3 shows the results for financial net present value of the project, from the viewpoint of the private proponent. Negative values are in parentheses. The gray-shaded portion of the table indicates the range of government contribution allowed by the BOT Law, 50% or less of the total project cost. Shown in the second column of from the left in Table 3 is the net present value of the amount of the project costs that the private proponent is assumed to shoulder and that the government contribution does not cover. In addition to the maintenance costs that were originally imputed for the bypass road, an additional expense of operating the facility as a tollway was estimated at almost 30 million pesos per year, and this item was included in the financial evaluation. The revenue stream for the private proponent only included toll fee collections, and it is assumed that these are used to defray the private proponent's project-related costs. No other revenue streams were imputed, although it is conceivable that the tollway operator may set up auxiliary land developments that may earn additional revenue.

Table 3. Sensitivity of Private Proponent's FNPV to Government Contribution and Toll Fee Level

Government Contribution (%)	NPV(12%) of Implied Costs for Private Proponent	Weighted Average Toll Fee (Pesos/veh-km)						
		0.00	1.13	2.25	3.38	4.50	5.63	6.76
100%	0.0	0.0	**246.0**	**384.7**	**416.2**	**340.4**	**157.3**	0.0
90%	158.2	(158.2)	**87.7**	**226.5**	**257.9**	**182.1**	(0.9)	(158.2)
80%	316.5	(316.5)	(70.5)	**68.2**	**99.7**	**23.9**	(159.2)	(316.5)
70%	474.7	(474.7)	(228.7)	(90.0)	(58.6)	(134.4)	(317.4)	(474.7)
60%	633.0	(633.0)	(387.0)	(248.3)	(216.8)	(292.6)	(475.7)	(633.0)
50%	791.2	(791.2)	(545.2)	(406.5)	(375.1)	(450.9)	(633.9)	(791.2)
40%	949.5	(949.5)	(703.5)	(564.8)	(533.3)	(609.1)	(792.2)	(949.5)
30%	1,107.7	(1,107.7)	(861.7)	(723.0)	(691.5)	(767.3)	(950.4)	(1,107.7)
20%	1,266.0	(1,266.0)	(1,020.0)	(881.2)	(849.8)	(925.6)	(1,108.7)	(1,266.0)
10%	1,424.2	(1,424.2)	(1,178.2)	(1,039.5)	(1,008.0)	(1,083.8)	(1,266.9)	(1,424.2)
0%	1,582.5	(1,582.5)	(1,336.5)	(1,197.7)	(1,166.3)	(1,242.1)	(1,425.2)	(1,582.5)

Note: Values in Million Pesos

Taking the results in Table 2 and Table 3 together, there are only a limited number of scenarios that correspond to a *hypothetically* viable PPP arrangement (i.e. ENPV>0 and FNPV>0) for the whole project, under the condition of 80% government contribution level, with average weighted toll fees set between 2.25 and 4.5. At the 90% contribution level, the toll fees can range from 1.13 to 4.5 for a viable arrangement. Needless to say, at a 100% government contribution level, entering into a PPP arrangement is counterproductive since the private sector would essentially become a "free-rider". On the other hand, since the

government contributing 80% or more is not allowed by the BOT Law, therefore, it is concluded that this project (as it is packaged) is not viable under a PPP arrangement that would seek to cover all aspects of the project (i.e. including planning and design, financing, construction, operation and maintenance, etc.).

On the other hand, the analysis results do indicate a range of conditions for a both economic viability and financial viability (from the private sector proponent's perspective) to be met, there appears to be some potential, under a more limited scope for a PPP arrangement. This may take the form of an operate-and-maintain arrangement, wherein the collected toll fees would only cover the operation and maintenance expenses of the project. This kind of arrangement and other possible arrangements should be subjected to further analysis, as these are beyond the scope of this paper.

6. CONCLUSIONS

This paper demonstrated that the viability of a project as a PPP depends on the interaction between setting of the level of government contribution to the project and the toll fees levels. Since project user demand is affected by the chosen toll fee levels, this decision influences both the financial situation of the private proponent getting revenue through toll collections, as well as the economic viability of the project. The number of users multiplied by the collected toll per user equates to the revenue for the private proponent. The number of users multiplied by the average economic benefit (i.e. vehicle operating cost savings) derived from the project by each user equates to the most significant part of the total economic benefits.

To integrate this consideration of the demand and toll fees, the paper developed a framework for determining the conditions for toll fee level and government contribution required for a PPP arrangement to be viable. Applied to the Calamba-Los Baños bypass project, it was found that it may not be viable under a PPP that would cover the whole project, the analysis showing that the government would need to contribute at least 80%. However, the existence of a hypothetical match between ENPV of the project and FNPV from the private sector proponent's point of view indicates that other PPP variants may be considered and need to be further explored.

The case study and test application demonstrated that the proposed framework makes it possible to analyze whether or not a project viable under a PPP arrangement, using the set of defined parameters that reflect the decision making processes of the government and the private sector in the context of toll roads. It is hoped that the framework will be further refined for application by government agencies involved in road infrastructure in the Philippines to test the viability of alternative PPP arrangements for proposed road projects earlier in the planning stages. In turn it is hoped that this would lead to more strategic efforts to encourage private sector participation in the provision of much needed road infrastructure in the Philippines.

7. RECOMMENDATIONS

This paper recommends that further studies on user willingness-to-pay be conducted in the Philippines in order to establish more realistic willingness-to-pay figures under a wider range of local scenarios regarding toll road usage. Other studies may also consider the effects of

changing the project term on the viability of the project, since the BOT laws allows arrangements up to 50 years. Further studies may also be conducted to apply the proposed framework and to analyze other road projects, as well as projects for other types of infrastructure.

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