ORIGINAL RESEARCH:

Application of value for money methodology to evaluate a public-private partnership road project

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Abstract

A value for money (VFM) assessment allows public policy makers to determine which procurement, between traditional or public-private partnerships, is better to procure for a specific project. Although the government of Vietnam has established a large number of PPP projects since first announcing its desire for private participation in 1993, the government has never carried out an evaluation of the "economy, efficiency and effectiveness" of PPPs over traditional public procurement. This paper proposes a value for money methodology to evaluate whether decisions to pursue a PPP creates good value for the Vietnamese government. A case study in Vietnam (Phu My project) is applied to examine the reliability of the method. The result of research reveals that there is a 84.9 % confidence level that a PPP model may not be a better option for procurement in the Phu My project. In addition, vehicle tolls and the inflation from 2016-2034 have had the largest impact on the case's value for money.

Keywords: Value for money (VFM), Public-private partnership (PPP), Public sector comparator (PSC), Shadow bid price (SBP).

Introduction

During the past two decades, public-private partnership (PPP) has become an important alternative to traditional procurement to develop new road projects in Vietnam. One of the reasons the government of Vietnam pursues PPP to provide road infrastructure is due to budget constraints to finance such projects, where state resources are not enough to satisfy demand. The term PPP has been identified in accordance with different approaches to defining PPP. PPP could be defined as a range of possible relationships among public and private entities in the context of infrastructure and other services (Asian Development Bank, henceforth, ADB 2008).

Paralleling with development of PPP projects, several evaluation tools to support PPPs decision-making have been investigated, such as the cost-benefit analysis (CBA), the Computable General Equilibrium (CGE) and the value for money assessment. According to Contreras (2014), "CBA and CGE techniques try to answer the question of whether there are better uses for public resources, but they do not look at the different ways of procuring a given project. By contrast, Value for Money (VFM) analysis tries to find the optimal way to supply a given service, once it has been decided that the service must be provided either directly by the public sector or through a PPP scheme" (Contreras 2014, p. 94). According to U.S Department of Transportation (2012, p. 1-2), value for money is defined as "the optimum combination of whole-of-life costs and quality (or fitness for purpose) of the good or service to meet the user's requirements". Given the definition, as well as previous studies, there are two kinds of VFM approaches that include quantitative and qualitative VFM assessment. The first involves comparing the whole cost of a project if conducted as PPP procurement and traditional procurement (World Bank 2013; Murray 2006; Infrastructure Ontario 2007; D. Marollas et al 2009). The second is associated with checking the fitness of procurements through evaluation criteria (WB 2013; C. Contreras 2014, KDI 2010; D.Morallos et all. 2009). However, for the last decade, quantitative value for money analysis has been utilized more widely as an efficient evaluation method of PPPs in many countries around the world, for example UK, US, Australia, Korea, and Canada among others.

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Since first announcing its desire to encourage private participation in 1993, more than 53 projects were developed under PPP in Vietnam, but application of VFM assessment in Vietnam to support PPP decision making is unlikely to be mentioned. Moreover, recently 6 PPP projects among 53 have been reverting from the private sector to the public sector despite the concession term still being active, accounting for about 11% of total projects. This figure is not large, but it is high time for the Vietnamese government to consider and evaluate the efficiency of PPPs, because failure of a PPP project could have a negative impact on both economics as well as society. One of the most pressing concerns of the Vietnamese government is how to encourage private participation and how much investment capital could be mobilized from the private sector in the absence of assessing whether a PPP model is appropriate to procure public projects.

The aim of this research is to cover the quantitative VFM approach to evaluate a PPP model via studying the case of a particular project in Vietnam. The paper begins with a summary of quantitative VFM methodology, including definition and structure. The second part describes the case study to be applied for the research. Third, the paper discusses the main findings from the results. Lastly, it provides some recommendations on the selection of the most suitable forms of procurement to finance the case study.

Review of quantitative value for money methodology

Quantitative VFM definition

World Bank (2013) defined quantitative VFM as that which "involves comparing the value for money of a proposed PPP (or actual bids received) with a 'Public Sector Comparator' (PSC)—that is, a model of the project if implemented through traditional public procurement" (WB 2013, p. 14). Once again, D. Marollas et al. (2009, p. 30) emphasized, "the quantitative VFM component includes all project factors that can be valued in monetary terms. It features a methodology that compares the PPP bid with a hypothetical scenario called the public-sector comparator (PSC)".

According to the above definitions, quantitative VFM can be understand as the comparison of the costs of a project via the public sector and via a PPP, which can be illustrated by *Figure 1*.

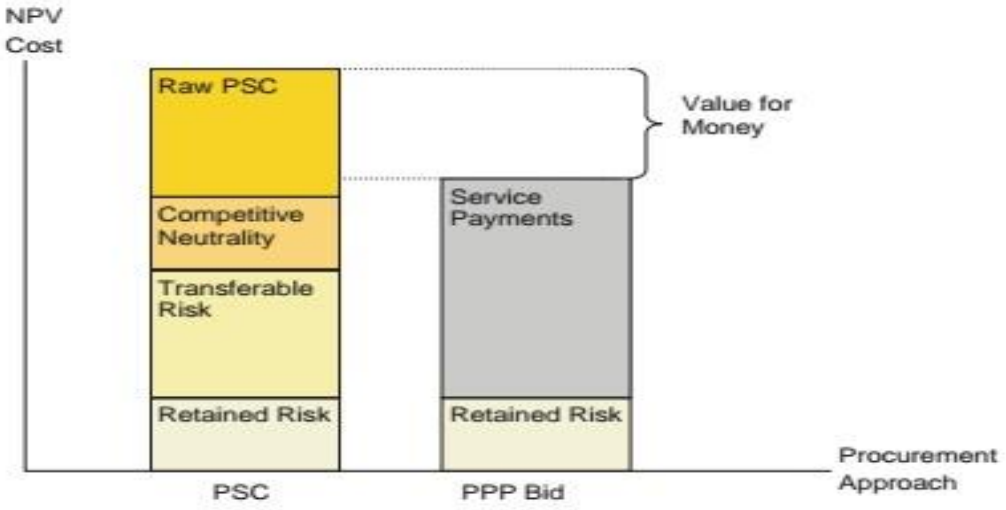

Figure 1: Comparison of PSC and PPP bids (Adapted from D. Marollas et al. 2009)

VFM is produced when the value of PSC is larger than the value of a PPP. In the other words, if quantitative VFM is positive, private investors should carry out the project. In contrast, the project should be conducted by the public sector if the indicator is negative. Actually, VFM is to compare the governments' spending between PPP schemes and conventional procurement.

Quantitative VFM structure

Public-Sector Comparator cost

"PSC estimates the hypothetical risk-adjusted cost if a project were to be financed, owned and implemented solely by the public agency" (Partnerships Victoria 2001, p. 6). Although most countries create PSC-PPP comparisons in their own way, components of PSC seem to be similar. According to the Australian style PSC-PPP comparison, the components of PSC include raw cost, transferable risk, retained risk, and competitive neutrality. Meanwhile, PSC in the Canadian style PSC-PPP comparison consists of capital cost, operating cost, risk, tax and optimism bias. However, raw cost of Australian PSC can be similar to capital cost and operating cost of the Canadian PSC. Likewise, competitive neutrality in PSC of Australia is considered as tax in PSC of Canada. Transferable risk, retained risk in Australia, means risk and optimism bias in Canada. Basically, there are four main components in PSC, including: retained risks, transferable risks, competitive neutrality, and raw PSC.

Raw PSC means that whole life cycle costs of a public project, including direct cost and indirect cost relevant to construction, operation and maintenance. Competitive neutrality is to remove any net competitive advantages that accrue to a government business by virtue of its public ownership (Victoria department of Treasury 2001). Transferable risks means risks that would transfer from the public sector to the selected private investors (Infrastructure Ontario 2007). "The value of transferable risks in a PSC measures the cost the government could expect to pay for that risk over the term of the project in a public procurement scenario" (D. Morallos et al 2009, p. 31). Retained risks means that an evaluation of the cost of risks that government expects to retain if the project is conducted under PPP (Grimsey, D & Lewis, M. K 2005)

Valuing risk

Basically, the risks in PSC are often valuated before classification into transferable and retained risks (D. Morallos et al. 2009). Generally, the process of risk valuation in VFM comprises four main steps, which is illustrated by *Figure 2* below.

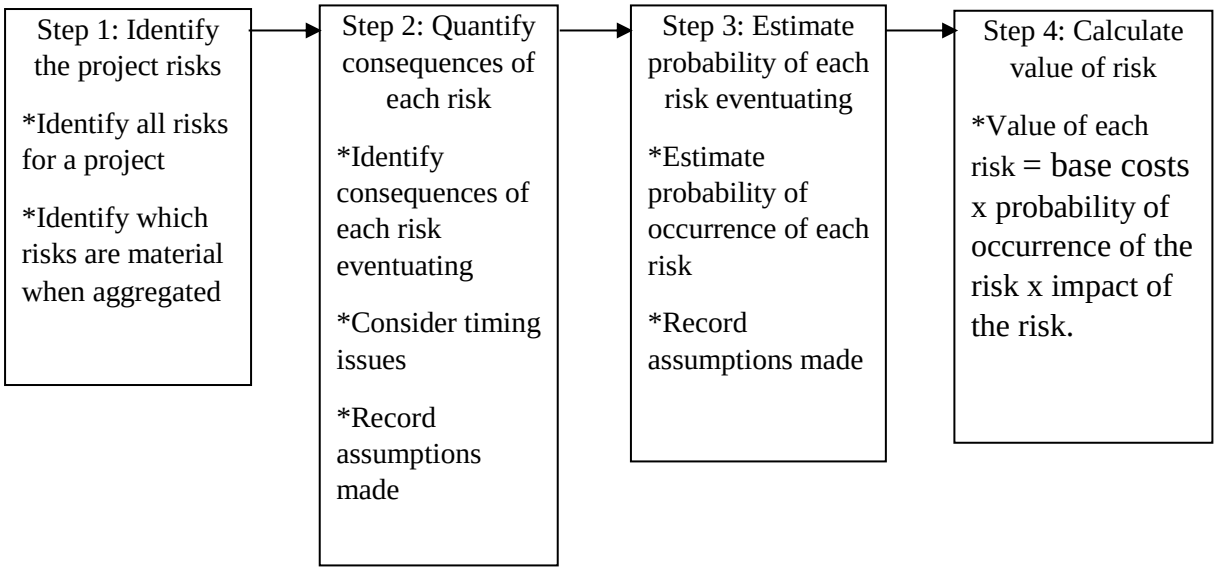

Figure 2: Steps to risk valuation (Adapted from Victoria department of Treasury. 2001; Infrastructure Ontario. 2007)

Discount rate

When computing the whole life-cycle cost of a project, it is necessary to compare revenue and costs in different times. “A discount rate is used to convert projected cash flows into a present value to enable comparison of competing options for which the cash flows reflect differences in PPP timing and amounts” (Infrastructure Australia 2013, p. 8). “A discounted cash flow (DCF) analysis allows a public agency to develop a net present value (NPV) for revenues and costs (including costs of risks) that are not expected to occur until far into the future” (US department of transport 2012, p. 3-1). There are three common kinds of approaches to calculate discount rate including (1) Capital Asset Pricing Model (CAPM) (2) Risk-Free Rate (3) A single discount rate.

CAPM: “the cost of capital reflects the return required by an investor to undertake or invest in a particular project. The required return is equal to the risk-free rate, plus a risk premium for the systematic risks retained by the investor” (Partnership Victoria 2003, p. 2).

Risk-Free Rate: “This approach uses the public sector's long-term borrowing rate if the project risks are reflected in the project cash flows”. (US department of transport 2012, p.3-3)

A single discount rate: “which may be project or sector specific, could be used for PPP the PSC and the PPP without adjusting for the risks a public sector would acquire in the PSC (traditional procurement) option” (D. Morallos 2009, p. 30)

Basically, according to the traditional approach, PSC is the total net present value of four components, including raw PSC, competitive neutrality, transferred risk, and retained risk. However, the potential weakness of the PSC accounting approach is lack of explicit inclusion of the cost consideration. According to Tsukada (2015, p. 8), “allocation of government funds to an infrastructure project entails opportunity costs to nations because these funds would no longer be available for other purposes”. Therefore, cost of financing should be reflected in the PSC calculation. The revised formula of the PSC is identified, as follows (Tsukada 2015):

PSC = transferable risks + retained risks + competitive neutrality + financing cost + raw project - Future revenue

PPP cost

Adjusted Shadow Bidding (ASB) represents the cost of a project if implemented by PPPs, which is the PPP bid. According to traditional accounting, ASB is comprised of opex, capex, financing cost, and retained risks. However, ignoring the return on investment computation in the ASB could lead to misguided decision-making when selecting the best procurement form. In addition, Tsukada (2015) questioned the validity of including the retained risk in the cost of PPP shadow biding practices. The basic assertion of Tsukada (2015) is that a bid price should be estimated by a shadow bid price in accordance with the practices likely to be adopted by the private sector. It should be noted that the private sector does not incorporate retained risk in their formation of a bid price. The modified formula of the shadow bid price (SBP) for a PPP project is as follows (Tsukada 2015):

SBP = Capital expenditure + operating expense + financing cost + return on investment (profit) - future revenue

Sensitivity analysis

This research uses sensitivity analysis to compute simulations of project’s VFM due to the effect of changes in cost components. There are two kinds of sensitivity analysis implemented in this research, including simple sensitivity analysis and advanced sensitivity analysis. Simple sensitivity analysis is to compute effects of movements of PSC cost components on the quantitative VFM through the point estimation. Meanwhile, advanced sensitivity analysis is to measure random uncertainty of cost components influence on VFM of the project. Monte Carlo simulation is applied to generate distributions of simulation VFM.

Case study application of quantitative VFM assessment

The proposed quantitative VFM approach is applied to Phu My bridge in Vietnam. Phu My is one of the PPP projects being criticized strongly in Vietnam because of its inefficiency. The project was planned for completion in 2005 with a concession time of 29 years. However, after a short time of operation the project was reverted again to the public sector in 2014. According to the concessioners, one of the reasons leading to the inefficiency of the project was that the construction cost was over the forecast. Meanwhile, the actual revenue from the operation of the project was lower than the forecast, which did not cover the expenses. The main argument for this problem centers on whether the project should have been pursued through a PPP scheme as originally planned, or if it should have been repossessed back to the public sector as the Vietnamese government has done.

Background of the project

The Phu My Bridge is located in Ho Chi Minh City, and spans across the Saigon River. Its length is 2.4 km and its width is 27.5 m with 6 lanes, linking District 2 and District 7 of the city. The objective of the project is to eliminate traffic congestion and travel time on roads in corridor 2, and congestion in urban areas of Ho Chi Minh City. In addition to this, the bridge is expected to contribute to the development of the economy in District 2, District 9, District 7, and other neighborhood districts. The project was planned to start in December 2005 and be operational by January 2009. It was to be transferred to the government of Vietnam in 2034.

The Vietnam Road Administration, on behalf of the Ministry of Transportation, monitors the quality of the construction and implementation. The People's Committee of Ho Chi Minh City (local government) acts on behalf of the Vietnamese Government to sign contracts with the Phu My PPP Company (PMC), which is called a special purpose vehicle (SPV). The Ministry of Finance has become a guarantor for long-term loans from financial organizations, including BIDV, Sacombank and Société Générale. The PMC is responsible for coordinating between private investors and banks, besides, collecting tolls from users.

The key features of the Phu My case are as follows:

Location: Ho Chi Minh City

Length of bridge: 2.4 Km (4 lanes)

Owner's equity contributed investment is 30% of total capital.

Construction cost: 1,806,523 million VND (2005)

Construction duration: 4 years (2005 to 2009)

Operation period: 26 years (2009 to 2034)

Findings and discussions

Basic assumption for assessment

In order to carry out the quantitative VFM analysis, it is essential to identify two components, including PSC and SBP. PSC represents the whole cost of project according to the perspective of the government, while SBP is regarded as the whole cost of the project if implemented as a PPP scheme.

The government financing in PSC

It is hypothesized that the Phu My project could have been constructed by the public sector if the government issued government bonds to finance project. The financing cost is suggested to compute by applying the interest rate of long-term Vietnam national bonds. According to the Vietnamese Ministry of Finance (2005), the interest

rate of a fifteen-year government bond was 8.6%, so the same rate is utilized to compute the financing cost of PSC in the case study of the Phu My project. An 8.6% interest rate is assumed to be unchanged during the period of the concession.

Revenue in PSC

The estimate of revenue of the PSC would be based on the user fees, which depends on the traffic demand and level of toll fees. Due to the lack of information on revenue leakage, and other relevant data, the traffic volume of the PSC is assumed to be equal with the PPP case. The level of the project toll depends on the Circular No 90/2004/TT-BTC of the Vietnamese Ministry of Finance.

Setting discount rates

Discount rates play an important role in quantitative VFM assessments. In order to calculate the net present cost of the project followed by traditional procurement, a 8.6% interest rate of long-term government bonds would be used to discount the cash flow of the whole life. Regarding discounting cash flow of SBP, the discount rate is considered by applying WACC. Once again, the impact of inflation of each component in PSC and SBP should to be considered in order to change from the real price of cash flows to a nominal price when computing the present value of PSC and SBP. In this research, actual domestic inflation, which is applied for the project from 2005-2015 based on the World Economic Outlook Database of IMF (2015) and a forecasted at 5% inflation rate, is applied for this project from 2016-2034 based on the forecast of the IMF (2015).

Quantification risk

In project procurement, there are many risks related either the public sector or private sector. Based on a review of the existing literature, there are three key groups: risks in development phase, risks in construction phase and risks in operation phase. More specifically, there are 17 factor-risks that affect projects. However, construction-cost-overrun risk and traffic-volume risk have the strongest impact on the cash flow of projects (Gil, 2013; Kim, 2008, Moneim, 2008, C.O Cruz, 2012). Once again, the studies of Luu V.T. et al (2009) conducing the survey from infrastructures experts demonstrated that construction overruns is one of the main risks that occurs frequently in the construction environment in Vietnam. Due to the historical observation of risks involving infrastructure projects as well as empirical studies regarding risks in Vietnam are very few, it is assumed that there are two kinds of risk associated with construction-cost-overrun risk and traffic-volume risk.

Construction overrun cost risk

The value of construction cost overrun risk is estimated by applying the mean of construction cost overrun, probability of occurrence of risk and construction cost of the project. Identifying the probability distribution function (PDF) of construction cost overrun requires a large raw source of data. Regarding the probability distribution function, having run 167 road projects in general, the results of Sailing K.B (2008) justified that Gamma distribution fit well for costs overrun. Therefore, the research hypothesizes probability distribution of construction cost overrun of Vietnamese road projects follows Gamma distribution. Through the historical data from projects completed from 2003 to 2015 in Vietnam, the mean value of construction cost overrun is estimated at 11.66%, standard deviation is 6.64%.

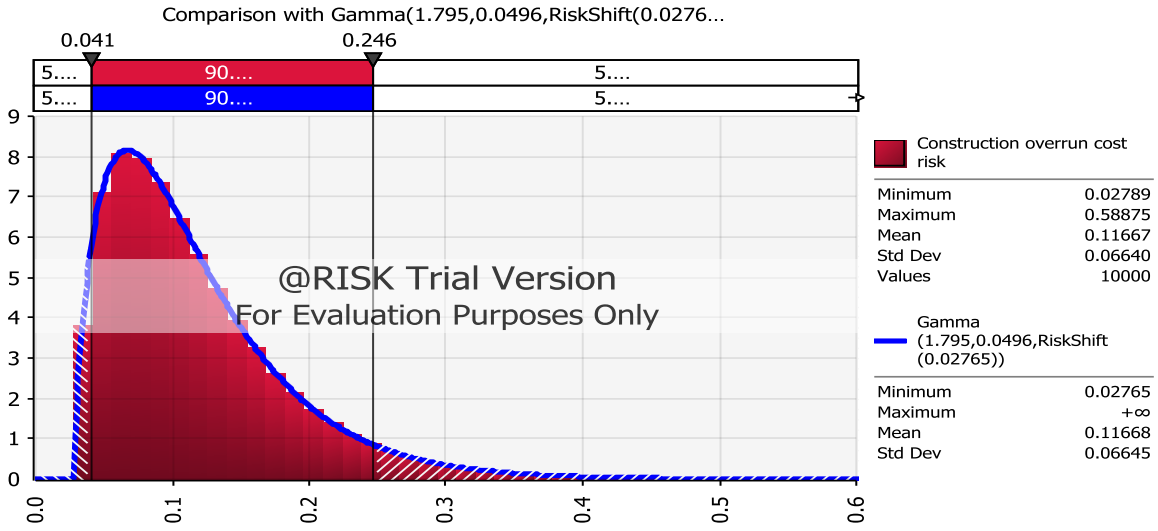

Figure 3: The Probability Distribution Function (PDF) for construction cost overrun ratio

Traffic risk

In terms of the traffic volume, value of risk is calculated by applying the mean of traffic volume, probability of occurrence of risk and first-year revenue in the period of operation of the project. Through running 183 road projects in general, Sailling K.B (2008) demonstrated that Pert distribution fit well for traffic volume risk. Based on the historical data from road projects operated from 2010 to 2015 in Vietnam and application of Pert distribution, the traffic volume inaccuracy of road projects in Vietnam is -12,17% with standard deviation of 24,28%

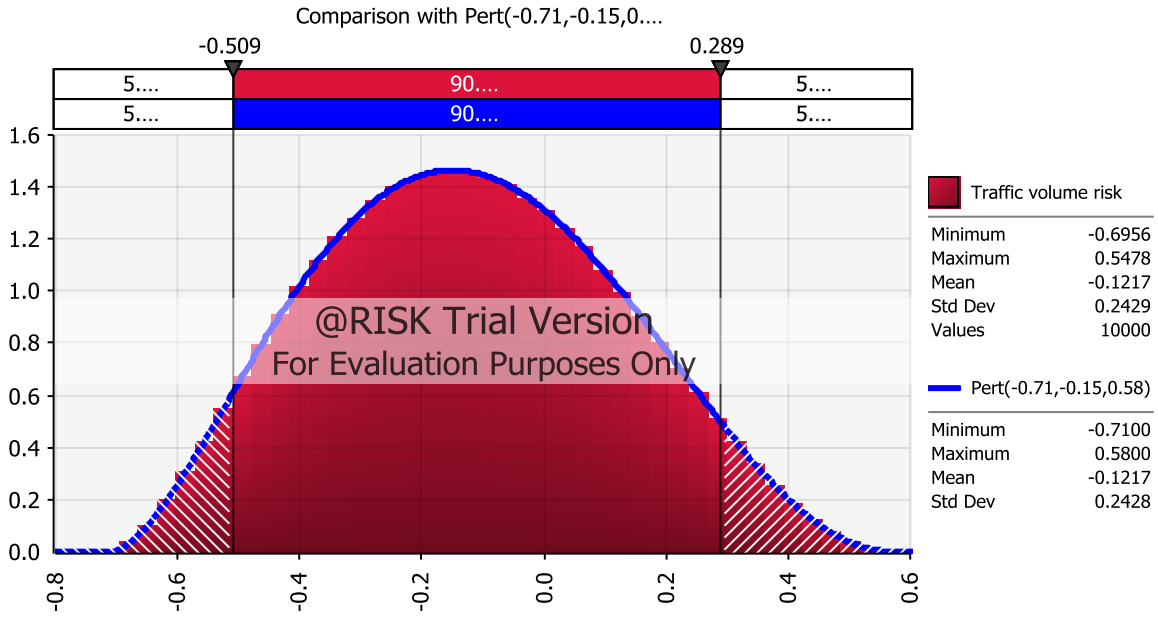

Figure 4: The Probability Distribution Function (PDF) for traffic volume

Calculation of shadow bid price (SBP)

Items	Value
Capex	1,806,523 million VND*
Opex	1,097,450 million VND*
Equity	30%
Debt	70%
Cost of debt	10 %
Cost of equity	7.25 %
Corporate tax	28 %
WACC	7.21 %
Concession term	29 years

Table 1: Financial indicators of Phu My case (Source: T.V Hoang & X.N. Thanh 2013)
*VND (Vietnamese Dong) = 0.00005 USD

Unit: million VNDs

Year	Capital expenditure	Operation expense	Financing cost	Return on investment	Revenue	SBP	
						Nominal price	NPV
2005	745,779		26,290			834,670	778,537.16
2006	446,955		72,212			593,034	515,951.96
2007	359,279		110,607			564,217	457,867.94
2008	254,510		141,617			537,242	406,657.81
2009		4,504	655,645	9,359	41,650	630,826	445,382.27
2010		5,093	224,830	9,359	47,097	196,319	129,285.51
2011		5,774	242,968	9,359	53,395	211,346	129,821.82
2012		15,618	262,327	9,359	144,438	163,884	93,897.40
2013		17,710	276,091	9,359	163,787	165,946	88,684.66
2014		20,141	289,611	9,359	186,265	165,131	82,314.43
2015		22,891	302,612	9,359	211,696	161,170	74,936.97
2016		26,394	314,812	9,359	244,096	153,799	66,700.84
2017		36,084	325,573	9,359	333,713	107,049	43,303.71
2018		41,031	330,085	9,359	379,464	86,336	32,576.10
2019		46,658	331,360	9,359	431,498	60,090	21,148.16
2020		53,058	328,591	9,359	490,685	27,407	8,996.84
2021		57,321	320,820	9,359	530,107	4,418	1,352.76
2022		57,321	309,206	9,359	530,107	3,021	862.88
2023		57,321	296,622	9,359	530,107	1,165	310.46
2024		57,321	282,986	9,359	530,107	-1,206	-299.68
2025		57,321	269,752	9,359	530,107	-2,612	-605.44
2026		57,321	255,591	9,359	530,107	-4,354	-941.28

2027		57,321	238,115	9,359	530,107	-8,790	-1,772.45
2028		57,321	217,896	9,359	530,107	-15,317	-2,880.85
2029		57,321	195,939	9,359	530,107	-22,897	-4,016.95
2030		57,321	172,093	9,359	530,107	-31,647	-5,178.70
2031		57,321	146,147	9,359	530,107	-41,743	-6,371.35
2032		57,321	118,073	9,359	530,107	-53,174	-7,570.29
2033		57,321	87,531	9,359	530,107	-66,241	-8,796.39
2034		57,321	58,783	9,359	530,107	-76,640	-9,492.90
Total	**1,806,523**	**1,097,450**	**7,204,785**	**243,339**	**10,149,282**	**4,342,449**	**3,330,663**

Table 2: Calculation SBP of the Phu My project, with a 7.21 % discount rate

Estimate of the PSC

Cost items	Value (million VNDs)
Project capital cost	
Design and Construction contract price	1,395,148
Acquisition of plant and equipment	45,247
Administration cost during the construction	154,486
Land acquisition	100,000
Contingency cost	111,642

Table 3: Basic assumptions applied to estimate PSC of the project (Source: T.V Hoang & X.N. Thanh 2013)

Unit: million VNDs

Year	Raw PSC					Transferred risk		PSC	
	Capital cost	Management cost	Maintenance cost	Financing cost	Revenue	Overrun cost	Traffic volume	Nominal price	NPV
2005	745,778			64,137		54,704		931,811	858,022
2006	446,955			38,438		42,268		608,515	515,954
2007	359,279			30,898		35,224		528,980	413,000
2008	254,510			21,888		14,336		439,798	316,180
2009		7,370	48	155,361	49,132		5,381	95,090	62,949
2010		8,338	48	155,361	55,587		5,381	79,601	48,522
2011		9,458	48	155,361	63,053		5,381	51,804	29,077
2012		10,697	48	155,361	71,312		5,381	25,910	13,392
2013		12,096	48	155,361	80,637		5,381	-2,447	-1,164
2014		13,721	48	155,361	91,471		5,381	-32,886	-14,412
2015		15,561	48	155,361	103,743		5,381	-64,778	-26,140
2016		17,934	9,648	155,361	119,560		5,381	-86,522	-32,149

2017		20,359	48	155,361	135,727		5,381	-167,075	-57,164
2018		23,108	48	155,361	154,053		5,381	-231,168	-72,830
2019		26,228	48	155,361	174,852		5,381	-307,661	-89,253
2020		29,770	48	155,361	198,464		5,381	-398,954	-106,573
2021		32,098	48	155,361	213,986		5,381	-473,702	-116,519
2022		32,098	48	155,361	213,986		5,381	-505,155	-114,416
2023		32,098	48	155,361	213,986		5,381	-538,181	-112,244
2024		32,098	9,648	155,361	213,986		5,381	-533,241	-102,406
2025		32,098	48	155,361	213,986		5,381	-609,269	-107,742
2026		32,098	48	155,361	213,986		5,381	-647,501	-105,435
2027		32,098	48	155,361	213,986		5,381	-687,644	-103,105
2028		32,098	48	155,361	213,986		5,381	-729,794	-100,759
2029		32,098	48	155,361	213,986		5,381	-774,052	-98,407
2030		32,098	48	155,361	213,986		5,381	-820,523	-96,054
2031		32,098	48	155,361	213,986		5,381	-869,317	-93,707
2032		32,098	9,648	155,361	213,986		5,381	-862,017	-85,562
2033		32,098	48	155,361	213,986		5,381	-974,346	-89,053
2034		32,098	48	155,361	213,986		5,381	-1,030,832	-86,755
Total	**1,806,522**	**644,009**	**30,048**	**4,194,744**	**4,293,390**	**146,532**	**139,916**	**-8,585,558**	**445,246**

Table 4: Net present value of PSC, with a 8.6% discount rate

Computation of quantitative VFM

Unit: million VNDs

Items	PSC (I)	SBP (II)
Outflow (A)	1,776,950	5,985,326
Inflow (B)	1,331,703	2,654,662
Net present of cash flow (A) – (B)	445,246	3,330,663
VFM (I) – (II)	**-2,885,417**	

Table 5: Comparison of the Vietnamese government's spending in the project of PPP scheme with traditional delivery

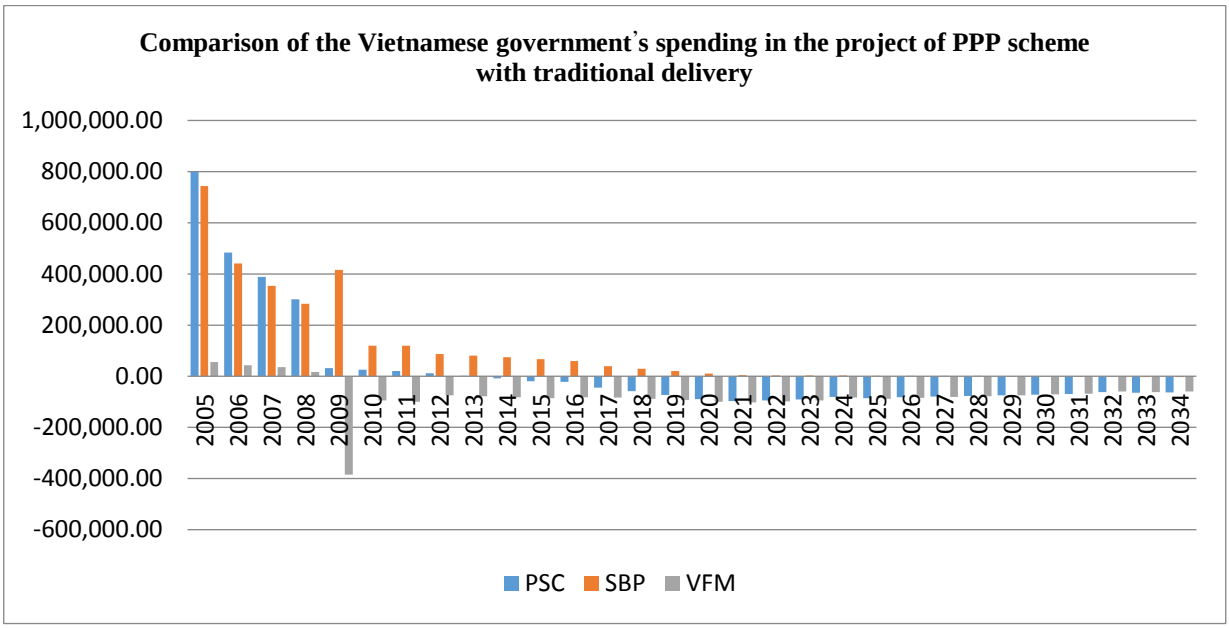

Figure 5: Comparison of the Vietnamese government's spending in the project of PPP scheme with traditional delivery

Figure 5 shows the spending of the government for the project under PPP and traditional procurement models. Conventional delivery is expected to have more spending savings for the government, especially from the years 2016 to 2034 of the project cycle. As a result, quantitative VFM of the PPP model compared with the traditional procurement is -2,885,417 million VNDs. It implies traditional procurement is preferred to the PPP scheme to finance the Phu My project.

Sensitivity analysis

In order to guarantee the assessment is realistic, sensitivity analysis should be applied to compute the impact of movement in components of PSC on VFM.

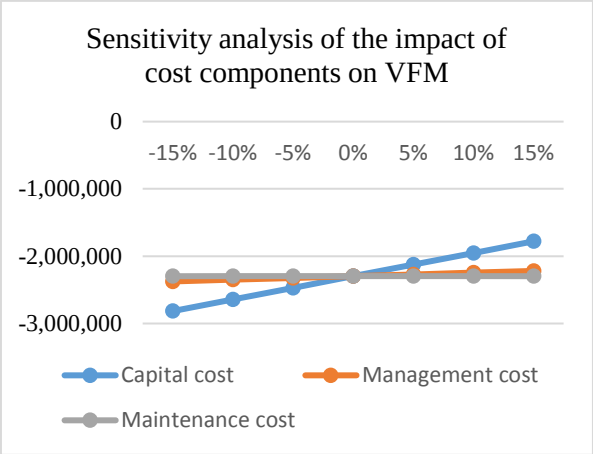

Figure 6: Sensitivity analysis of the impact of cost components on VFM

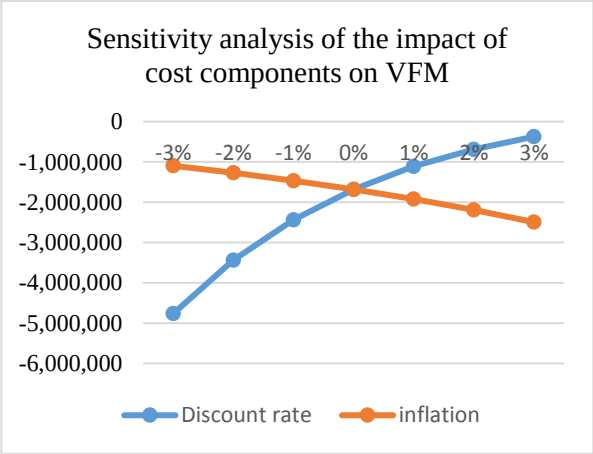

Figure 7: Sensitivity analysis of the impact of cost components on VFM

Simple sensitivity analysis

Figure 6 and *7* shows how movements in the cost components influence the project's VFM. As presented in *figure 6*, VFM is more sensitive to movements in the capital cost than to movements in the management cost and maintenance cost. For example, when the capital cost of PSC influences 1%, quantitative VFM would be changed by 162,492 million VNDs. Meanwhile, every 1% movement in the maintenance cost creates 55 million VNDs. It means that VFM of the project is not sensitive to fluctuation in the maintenance cost. In addition to this, assuming the capital cost of the project implemented by public sector increases 15%, quantitative VFM is still negative. Thus, PPP model could not be preferred to conventional delivery to finance the Phu My project regardless of a 15% extra capital cost. As can be seen in *figure 7*, VFM has a positive sensitivity to changes in the discount rate, while is negative sensitivity to changes in inflation.

In summary, compared to other cost variables, the fluctuation in the discount rate has a large effect on the VFM of the project, while the movement in the maintenance cost has a minimal impact on the VFM. If there is a 15% increase in the discount rate, the value of VFM is still negative. It supports the position that the decision to pursuit the PPP model is inappropriate regardless of a 15% extra discount rate or extra capital cost.

Advanced sensitivity analysis

The Monte Carlo simulation with an iteration of 10,000 times was performed to generate distributions of VFM for the project for the stochastic analysis. The @Risk 6.3 Palisade Software was used for running simulations. *Figure 8* presents the distribution of the project's VFM. The simulation result reveals that the mean of the VFM is -2,178,345 million VNDs and standard deviation is 1,366,517 million VNDs. In addition, the probability that quantitative VFM is negative is 95%. It implies that doing the project via PPP scheme is not a better solution than traditional government delivery.

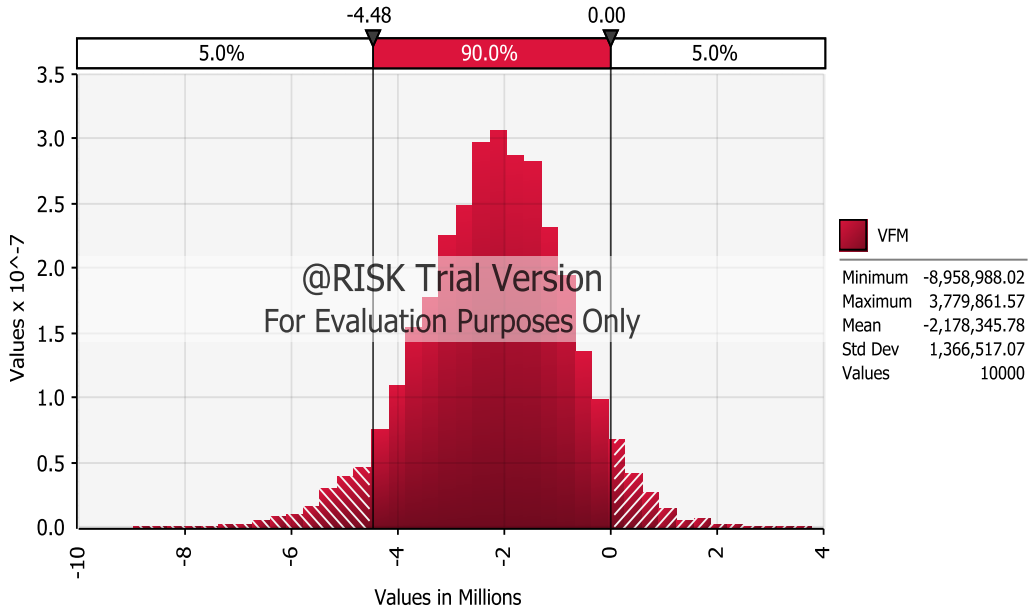

Figure 8: Distribution for the project's Value for money

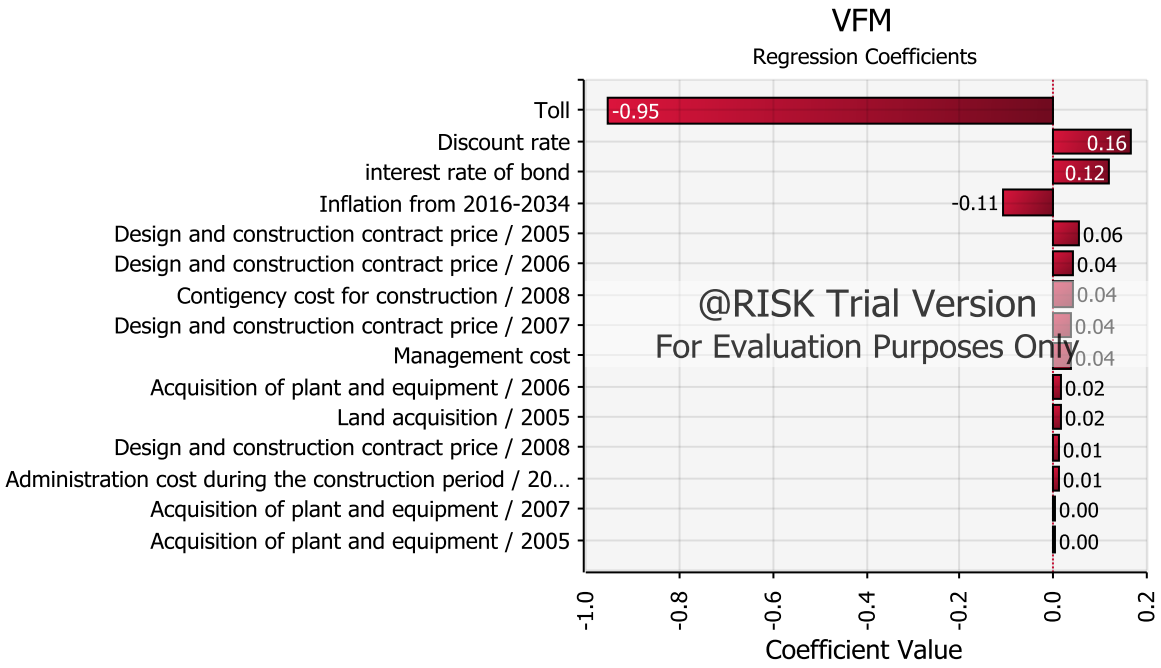

Figure 9: Sensitivity tornado graph for the VFM

Figure 9 shows the sensitivity tornado graph of the VFM. The larger the regression coefficient of an input variable, the more significant this variable impacts VFM. As shown in the graph, variables that have a larger impact on the value for money of the project are tolls, the inflation from 2016-2034, interest rates, and discount rates. In addition to this, all inputs except inflation from 2016-2034 and tolls have a positive influence on VFM. For example, a one standard deviation increase in toll would reduce VFM of the project by a 0.95 standard deviation, which correspondents to 1,301,846 million VNDs.

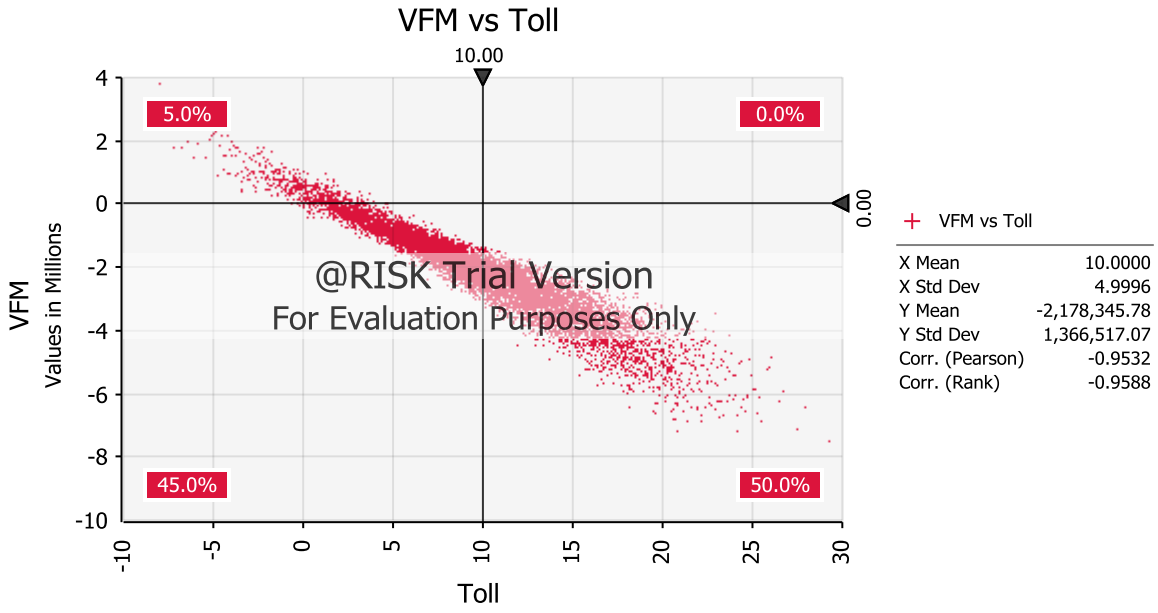

Figure 10: Scatter graph of VFM versus toll

Figure 10 shows the scatter graph of VFM and vehicle tolls. As can be seen, if the vehicle toll is less than 10,000 VNDs per PCU, there is only 5% confidence level that the PPP model could be more appropriate than conventional procurement. Alternatively, if the inflation from 2016-2034 is reduced from 5% to 1%, there is roughly a 2.7% chance that the PPP model could be better than the traditional government delivery (shown in *figure 11*)

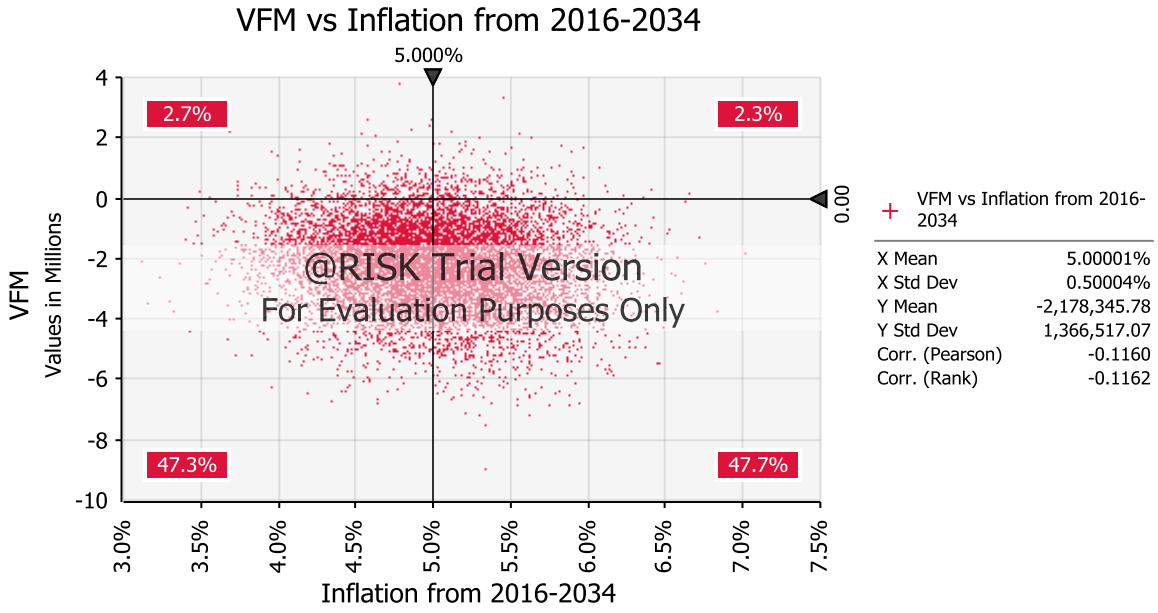

Figure 11: Scatter graph of VFM versus inflation

Conclusion

The PPP scheme is not expected to be a better option than traditional delivery for the Phu My project. This is especially true if there is stochastic fluctuation in input parameters of PSC (inflation from 2016-2034, the toll, interest rate, items of project capital cost). In that case the probability of negative quantitative VFM of this project would be 95%. This demonstrates that the PPP model could not offer good value for the government with regard to the Phu My project. The decision making of the Vietnamese government to return the Phu My project from private investors to the public sector is rational.

The case of the Phu My project could be a lesson for the Vietnamese government regarding the conduct of PPP projects. Without a VFM assessment before implementation, projects could lead to misguide decision-making in the development of road transportation infrastructure. Once again, PPP is actually considered as a better alternative to traditional procurement if public sector understands clearly what benefits and drawbacks negotiation exist for private investors. One should not think that using a PPP model is only way to reduce state budget burdens that take out from the balance sheet of governments. Also, one should not tend to have such optimistic expectations on a PPP model to finance public projects. In order to prove whether a PPP is suitable procurement to support a given project, it is essential to conduct a value for money test.

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