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**THE CASE FOR PUBLIC-PRIVATE PARTNERSHIPS IN  
INFRASTRUCTURE CAPITAL BUDGETING**

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**THE CASE FOR PUBLIC-PRIVATE PARTNERSHIPS IN  
INFRASTRUCTURE CAPITAL BUDGETING**

**by**

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**Report**

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## **Dedication**

To my parents: Sanoni Atanaziraba and Edinansi Nakisita

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## **Abstract**

# **THE CASE FOR PUBLIC-PRIVATE PARTNERSHIPS IN INFRASTRUCTURE CAPITAL BUDGETING**

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Civil Infrastructure is needed both in the developed world and in developing countries. However, governments alone can no longer deliver the much needed projects mainly because of lack of money, but also due to the lack of technical skills and a changing type of citizenry. In today's world, governments have to consult the market place to efficiently and optimally deliver the much needed infrastructure. The case for Public-Private Partnerships being better than the options of government run projects or fully privatized projects is that Public-Private Partnerships offer real advantages in three major areas: 1) risk benefits (financial, legal and project related benefits), 2) management and communication benefits (within the partnership but also importantly between both partners and the general public), and 3) the value addition to the public common good.

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## Introduction

There is need for new civil infrastructure in the developing countries like Uganda and an equal need for rebuilding the old infrastructure in some developed countries like the U.S.A. Bult-Spiering and Dewulf (34) divide infrastructure into two categories. 1) 'hard' or 'economic' infrastructure include: roads, transport systems, communications, water and sewerage, electricity, gas and ports. 2) 'soft' or 'social' infrastructure include: schools, universities, research facilities, military housing, prisons, hospitals, libraries, public buildings and parks. Civil Infrastructure is vital for economic production, distribution of economic output and for citizens' overall quality of life. Capital budgeting<sup>1</sup> for infrastructure is the process of evaluating which infrastructure project is feasibility and also how to go about getting the finances for the project.

Due to several factors, money being the primary one, governments can not fund massive infrastructure projects on their own. This has led to a paradigm shift in the relationship between government and the marketplace. According to Bult-Spiering and Dewulf, the public is now more interested in output and performance in its evaluation of government's role. Therefore, governments all over the world are increasingly finding creative ways to tap the potential inherent within the marketplace in order to deliver public goods. Public-Private Partnerships [PPPs] is one framework by which governments and private corporations are coming together to deliver infrastructure to the general public. Public-Private collaboration has a wide range of formulation as the spectrum in *Appendix A* shows, but for this paper I will consider two specific types: Concessions and Joint Ventures. Concessions involve the government transferring all rights to a private party, while Joint Ventures involve both the private entity and the

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<sup>1</sup> See Pg. 6 for details on capital budgeting.

government sharing all risks and responsibilities for the project. Concessions are usually project oriented while joint ventures are usually policy oriented (Bult-Spiering & Dewulf, 12).

PPPs are different from privatization because they involve the government and private sector sharing costs, revenues and responsibilities while in privatization, everything is transferred to private hands. Bult-Spiering and Dewulf (7) also differentiate PPP from other organizational structures like Alliances and Partnering. Alliances provide non-adversarial incentive arrangements for project coalition members on a single project with most risks allocated to either the public or the private party. Partnering refers to the formal arrangements between members of a project coalition under which they work together on a program of projects. Partnering is entirely based on principles of supply chain where one partner supplies something without being involved in the activities or execution of the overall project (Bult-Spiering & Dewulf, 7)

In this day and age, governments no longer hold absolute power in their effort to provide public infrastructure. The only exceptions to this rule are communist governments like China or North Korea. For such governments, when there is an infrastructure need, however massive or unpopular its implementation might be, the governments just dictate all the terms. A very good example of this is the Three Gorges Dam in China, in which the government forcefully uprooted millions of people from their homes because it had decided to build a power generating dam at any cost. The project also caused thousands of acres of land with archeological significance to be submerged by the ensuing reservoir lake. In non-communist democracies like Uganda or the U.S.A, it's in the government's best interest to solicit private involvement so that financial burden is transferred or shared. My paper uses the example of TxDOT's projects to explore the advantages of using PPPs in delivering public infrastructure.

## **Thesis Statement**

My objective in writing this report is to explore the best ways that public infrastructure can be delivered in the era of modern economics and liberal democracies. The report is exploring the issues surrounding the hybrid project procurement model called Public Private Partnership. I am investigating its advantages over traditional project procurement models, i.e government monopolies and purely privatized projects. Specifically, I am proposing the thesis that public infrastructure projects can best be procured when governments enter formal partnerships with private parties either by forming a Joint Venture or a concession. The Public Private Partnership formed ends up providing more value to society than either government or privatized firm would have done. My hypothesis in support of PPPs stems from the fact that each passing day, the citizenry is getting empowered financially and managerially. As a result, governments no longer have the monopoly of knowing, let alone being able to deliver, the best public civil infrastructure. Even if they do, by their bureaucratic nature, governments are oftentimes inefficient in delivering economically viable projects.

## **Methodology**

The nature of my research was primarily exploratory literature research (both library and online), complimented with input from two industry experts in the form of a questionnaire. However, the actual method of analysis was using Decision Tree Analysis and Monte Carlo Simulation to analyze a case study. The exploratory nature of my research involved me reading books and reports written about the subject of Public Private Partnerships and a few Testimonials or presentations about specific aspects of PPPs. The industry expert part of my research involved using a questionnaire that I sent to two Civil Engineering professionals with direct expertise in Civil Infrastructure Public-Private Partnerships.

The topic of PPPs has become very popular in many Industries and Countries, such that I am certain the limited nature of my research might not have done justice to it. Specifically, since the topic is of a dynamic nature, relying on old literature like I did might not uncover the most pressing current issues with PPPs. Also, one case study in one part of Texas does not do justice to a subject matter that is as varied as there are different firms and forms of public enterprises. A few more case studies would have greatly strengthened my research. Furthermore, to improve the quality of my research I could have included some field trips to actual PPP projects, I could have used more consultations with experts in different parts of the country/world, and lastly in the statistical and decision tree analyses section, I should have used a more robust probability encoding method for the raw data. I did not do these improvements for three main reasons. One, an elaborate research and analysis would have been overkill given that I have been doing this research on a part time basis. Two, improvements like field trips

would cost money, which I was not in a position to supply. Three, the requirement of a 30 page report may not merit such elaborate research.

## Capital Budgeting

Capital budgeting is the decision-making process of “making and managing expenditure on long-lived assets” (Ross, et al, 2). The process is used to find out if a potential project investment should be accepted or rejected. Since any public infrastructure by design will last a long time, there is a need to use capital budgeting methods in evaluating its feasibility and suitability both financially and socially/politically. There are Seven major methods of carrying out capital budgeting:

1. **Net Present Value (NPV):** A capital budgeting method which uses the net value of all future cash flows discounted to the present time.  $NPV = \frac{C_t}{(1+r)^t}$ , where  $C_t$  is cash flow at time  $t$ , and  $r$  is the appropriate discount rate. This is an easy and straight forward way to base investment decision on the fundamental financial rule or “a dollar today is worth more than a dollar tomorrow.” This method is the most common and it is the one I use in my analysis part. You accept a project if the NPV is  $\geq 0$ .
2. **Payback period:** This is a capital budget method which bases its decision on the amount of time it takes for an investment to recover the investment money. For example if a company chooses a payback period of 10 years, it rejects all projects whose payback period is more than 10 years and accepts the projects with the shortest payback period among those with less than 10 years.
3. **Discounted Payback Period:** This is similar to the above Payback Period Method except that all the cash flows are discounted, usually to the present time.
4. **The Average Accounting Return:** This is a capital budgeting method which uses the average return shown on the accounting records. “The average accounting



return is the average project earnings after taxes and depreciation, divided by the average book value of the investment during its life (Ross, et al, 2009).

5. **Internal Rate of Return (IRR):** This is the closest method to the ubiquitous NPV method. It uses the discounted cash flow when NPV equals Zero to calculate a rate of return without considering outside factors like inflation and financial interest rates. The rate is intrinsic to the project. If  $n$  is the period,  $N$  is the total number of periods and  $C_n$  is the cash flow, the internal rate of return,  $R$ , is when NPV equals 0 according to the following formula:

$$NPV = \sum_{n=0}^N \frac{C_n}{(1+r)^n} = 0$$

6. **The Profitability Index (PI):** This is a capital budgeting method which employs the ratio of the present value of the future expected cash flows after initial investment divided by the amount of the initial investment.  $PI = \frac{PVofFutureFlows}{PVofInitialInvestment}$ . You accept a project if the P I is  $>1$ .

7. **Modified Internal Rate of Return (MIRR):** This is a capital budgeting method which corrects two of the major problems inherit in the IRR method: the fact that IRR does not correctly give answers to projects with alternative positive and negative cash flows, and the assumption by the IRR method that positive cash flows are reinvested at the same rate of return as the project that generated them.

The MIRR formula is:

$$MIRR = \sqrt[n]{\frac{-FV(\text{positive cash flows, reinvestment rate})}{PV(\text{negative cash flows, finance rate})}} - 1$$

Where  $n$  is the number of equal periods at the end of which the cash flows occur, PV is the present value at the beginning of the first period, while FV is the future value at the end of the last period (Wikipedia). Whereas the IRR method assumes

that reinvestment occurs at the IRR rate, MIRR corrects this shortcoming by using the rate at which a company borrows capital –the WACC<sup>2</sup>—to evaluate projects.

8. **Equivalent Annual Cost (EAC):** This is a capital budgeting method which uses the discounted cost per year of owning and operating an asset. You calculate it by the formula:  $EAC = \frac{NPV}{A, t, r}$  A,t,r is annuity ‘A’ at the rate ‘r’ for ‘t’ time periods.

It is worth noting that all the above capital budgeting methods only consider financial aspects of making a decision on which project to invest in. But any good decision maker should not make an investment capital budgeting decision solely based on financial issues. Therefore in evaluating whether the government or private firms or a PPP would be best for project development, I use the NPV capital budgeting method –the commonest method- but in tandem with intangible benefits/costs like social and environmental issues and public opposition.

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<sup>2</sup> Weighted Average Cost of Capital: this is the minimum rate that a company has to repay all the people and entities that have invested capital in the company, e.g creditors and owners.

## Case Study: The Central Texas Turnpike System



*(Photo Source: [www.sh130.com](http://www.sh130.com))*

Figure 1: A portion of the SH 130

The Central Texas Turnpike System [CTTS] project is a massive 3.6 billion dollar undertaking by the Texas Department of Transportation [TxDOT]. The system was initiated in 2002. According to the project's website<sup>3</sup>, when finished, the project will add 65 miles to the central Texas roadway corridor that “will improve overall traffic mobility, facilitate access to regional services, and increase travel safety for Central Texas residents, workers, and visitors.” The system is divided into three phases, the 49 mile long SH 130 road project, the 13 mile long SH 45 North project, and the six lane Loop 1 divided highway which was finished in 2006. The total cost of the project includes

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<sup>3</sup> <http://www.centraltexasturnpike.org/ctts/>

money for design, construction, right of way acquisition, and financing costs (debt service, interest, insurance, etc).

The main portion of this system, the SH 130 project was divided into two parts: segments 1 to 4 and segments 5 & 6. The first part was handled by the Lone Star Infrastructure, a Joint Venture. Segments 5 & 6 have been made possible due to a PPP formed between the various governmental entities, led by TxDOT but also involving the city of Austin, surrounding counties and the Federal government and a private concessionaire. TxDOT has granted a 50 year concession of the project to Cintra/Zachry, a concessionaire led by the Spanish giant company *Cintra Concesiones de Infraestructura de Transporte, S.A* and the San Antonio based Zachry Construction Corporation, (See Appendix C for details of the concession).

One of the sources for my data concerning this project was Mr. Mike Walty, PE who worked on the SH 130 project as a Project Manager. Below is a sample of the information I was able to get from him. This is an email from October 19<sup>th</sup>, 2009.

Anyway, as for SH 130, Segments 5 & 6 (basically the portion of the corridor extending from SH 45SE / US 183 to IH-10) were originally part of the EDA ("Exclusive Development Agreement", later dubbed a "Comprehensive Development Agreement" to better describe the nature of the contract work as "comprehensive" in nature, e.g. design, build, and everything in between) that I was working on. However, the EDA had certain NTP<sup>4</sup> triggers, one of which was to grant LSI the green light to \*proceed\* with Segments 5 & 6. This NTP was never issued as a result of TxDOT's intent to let this work out as a concession.

The nature of a concession agreement is fairly different than the CDA model, that is, because the concessionaire brings their own equity to the table and takes on some operational risk. In addition, there is no on-going maintenance requirement, unlike the CDA that also obligates LSI in Segments 1 - 4 to keep a certain level of quality to the roadway running surface (amongst other incidental facilities). In essence, the concessionaire may opt to build a dirt road in Segments 5 & 6, but market forces would likely expose that risk, which remains with the contractor.

The end result is that the road gets constructed far faster than if let traditionally by

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<sup>4</sup> NTP: Notice To Proceed.

TxDOT and, unlike the previous CDA for the work, some operational risks are transferred to the contractor. There are, of course, some very natural political issues involved in such a deal, the extents of which I won't get into in this email.

From the financial summary table in Appendix C, you can see that majority of the money for the project came from the 2002 bond issued by the TxDOT. There was also money contribution from TIFIA<sup>5</sup> and local contributions for Rights of Way. According to the law HB 3588 that established the Comprehensive Development Agreements (CDA)<sup>6</sup> in May 2003, CDAs have three main models: Design-Build or Design-Build-Maintain, Strategic Business Partnerships and Concession (Smith, 7). There are two main procurement methods based on CDAs, the CTTS projects uses the first one called Solicited Procurement, whereby TxDOT solicits bids from respective parties. Five steps are involved in the procurement, “Issue RFQ, Evaluate and short-list teams, Issue Request for Detailed Proposals to short-listed teams, Evaluate detailed proposals and select apparent best value, and Limited negotiations and award” (Smith, 9).

From all the information I gathered from Mr. Watry and from the documents on the Project website, I was able to extract financial data that allowed me to perform a decision tree analysis and a Monte Carlo simulation model to analyze the three project delivery alternatives for SH 130 segments 5 & 6.

## **DECISION TREE ANALYSIS FOR SH 130 PHASE 5 & 6**

In order to verify the decision making process by TxDOT in regard to choosing a project delivery method for SH 130 phases 5 & 6, I used PrecisionTree software to model

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<sup>5</sup> Transportation Infrastructure Financing and Innovation Act was enacted by Congress in 1998 to provide lines of credit and loans for transportation projects that have national or regional significance.

<sup>6</sup> CDA is an agreement with one entity (the developer) to design, develop, construct, finance, acquire, operate and/or maintain certain kinds of facilities (Smith, 5).

the alternatives that TxDOT had. The following table shows the financial estimates for segments 5 & 6.

<b>SH 130 SEGMENTS 5 &amp; 6</b>			
	<b>Contract Amount</b>	<b>Design</b>	<b>Costs ROW, Util</b>
<b>Estimate</b>	1,510	1,206	304
<b>Final</b>	<b>1,370</b>		

Table 1: SH 130 Segments 5 & 6 Financials.

According to the TxDOT testimony of July 22, 2008 (Russell, P.E), TxDOT had four alternatives available to construct segments 5 & 6, see table below.

<b>ALTERNATIVES FOR SH 130 SEGMENTS 5 &amp; 6</b>							
		<b>Contract amount</b>	<b>Design</b>	<b>ROW, Utilities</b>	<b>Others, R</b>	<b>Contribution</b>	<b>NPV</b>
1	Government pay as you go	1,370	NA	N.A	N.A		N.A
2	Government munical bond program*	1,370	-1,030	-340			0
3	Private (competitive CDA)						
	If private company contributes	1,370				break-even	0
	No contribution and higher ROW & Utilities**	1,370				-304	-304
4	PPP (Cintra/Zachry concession)***						
	Upfront						
	25						
	Project NPV						
	750	1,370				775	400

Table 2: Alternatives for SH 130 Segments 5 & 6

- Alternative 1 was not financially feasible, so there are no monetary values given.
- \*Alternative 2 was not chosen because according to Mr. Russell, it involved an extra cost of 700MM over the cost of a Comprehensive Development Agreement (CDA).
- \*\* Alternative 3, the competitive CDA would only be feasible if at least TxDOT broke even financially, i.e if there was an NPV of Zero. However, due to the fact that TxDOT would not be helping out with ROW acquisition and utilities

relocation in terms of eminent domain<sup>7</sup> or statutory condemnation, the private firm would incur greater expenses which it would pass onto the public or TxDOT. According to Mr. Selden<sup>8</sup>, some parcel owners for ROW acquisition should have been paid 2 or 3 times the amount of money that TxDOT was offering. I estimated a low end value equal to cost overrun of ROW acquisition, which came to be 304 MM. The private firm would have to pass this cost back to TxDOT or the public.

- \*\*\*Alternative 4 is the concession by Cintra/Zachry. According to TxDOT's Frank Holzmann, P.E, this alternative leads to an NPV of 750 MM which would be shared between the concessionaire and TxDOT. Over the lifespan of 50 years, TxDOT share would increase until it was 50% i.e 375, but there was a 25MM down payment by the concessionaire to TxDOT, which brings the total cash inflow to 400MM.

I extracted the following probability values from the literature to model my decision in precision tree.

<b>PROBABILITY VALUES</b>	
Synergistic private involvement	60%
Unsynergistic private involvement	40%
Favorable PPP	50%
Unfavorable PPP	50%
Synergistic given favorable	70%
Unsynergistic given favorable	30%
Synergistic given unfavorable	40%
Unsynergistic given unfavorable	60%

Table 3: Probability Values

<sup>7</sup> Eminent Domain: the right by a government entity to deprive private people of their property by legally grabbing the property at market or below market price.

<sup>8</sup> A reporter with CorridorNews.com

The base decision tree is given below. R stands for the intangible cost associated with public opposition to the project and also overrun costs due to ROW acquisition and utility relocations without government help. It is very important to quantify public opposition because it could be the difference between abandonment and a project going forward. For example, the mother of the CTTS project, the 800 mile project called the Trans-Texas Corridor (for which Cintra/Zachry was participating) got abandoned due to extreme public opposition that led TxDOT to adopt the “No Build” option (www.tollroadnews.com). For my analysis, I use an R value of Zero, but later on I do a sensitivity analysis on how the NPV value changes with changing values for R. All values are in millions of dollars, I omit the six zeros for easier write-up.

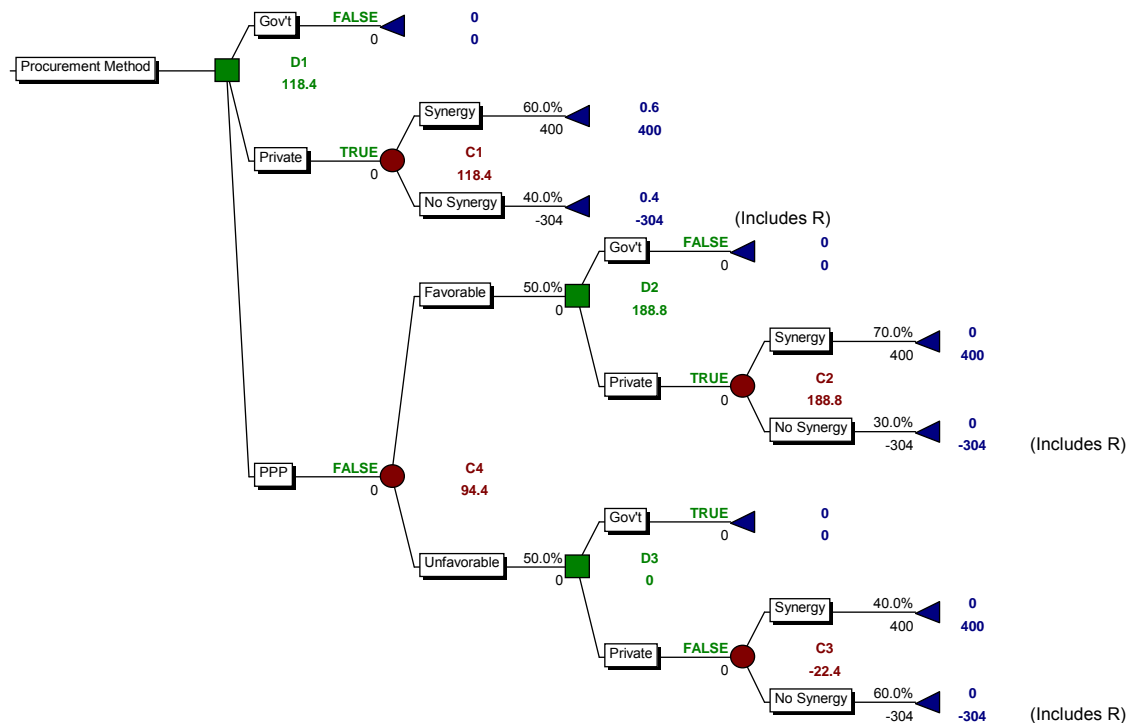


Figure 2: Base decision tree



### Calculating the Equations of Expected Monetary Values incorporating R

The EMV at C1 =  $0.6 (400) + 0.4 (-304 - R) = 118.4 - 0.4 R$

The EMV at C2 =  $0.7 (400) + 0.3 (-304 - R) = 188.8 - 0.3R$

The EMV at C3 =  $0.4 (400) + 0.6 (-304 - R) = -22.4 - 0.6 R$

The EMV at D2 depends on which option is greater.

$$0 = 188.8 - 0.3R, R = 629.33 ,$$

For  $R \geq 629.33$ , D2 EMV = 0 , i.e Choose government option

For  $R \leq 629.33$ , D2 EMV =  $188.8 - 0.3 R$  , i.e Choose private option

The EMV at D3 depends on which option is greater.

$$0 = -22.4 - 0.6R, R = -37.33,$$

For  $R \geq -37.33$ , D3 EMV = 0 , i.e Choose government option

For  $R \leq -37.33$ , D3 EMV =  $-22.4 - 0.6 R$  , i.e Choose private option

The EMV at C4 depends on the value of R.

For  $R \geq 629.33$ , C4 EMV =  $0.5 (0) + 0.5 (0) = 0$ ,

For  $-37.33 \leq R \leq 629.33$ , C4 EMV =  $0.5 (188.8 - 0.3 R) + 0.5 (0)$   
 $= 94.4 - 0.15 R$

For  $R \leq -37.33$ , C4 EMV =  $0.5 (188.8 - 0.3 R) + 0.5 (-22.4 - 0.6R)$ ,  
 $= 83.2 - 0.45 R$

The EMV at D1 depends on the value of R.

For  $R \geq 629.33$ , e.g 700, Choose government option

For  $-37.33 \leq R \leq 629.33$ , first compare C1 to C4

$$118.4 - 0.4R = 94.4 - 0.15 R, R = 96$$

Therefore for  $96 \leq R \leq 629.33$ , choose PPP

Otherwise, for  $-37.33 \leq R \leq 96$ , choose private

For  $-37.33 \leq R \leq 629.33$ , second compare C1 to 0 (gov't)

$$118.4 - 0.4 R = 0, R = 296$$

Therefore for  $96 \leq R \leq 296$ , choose PPP, but private is better than gov't.

Otherwise, for  $296 \leq R \leq 629.33$ , choose PPP, but gov't is better than private.

For  $R \leq -37.33$ , equate C1 to C4

$$118.4 - 0.4 R = 83.2 - 0.45 R, R = -704,$$

Therefore for  $-704 \leq R \leq -37.33$ , choose private

Otherwise, for  $R \leq -704$ , choose PPP

**Final recommendation:** Based on the above calculations whose results are shown in Figure 3, TxDOT should make the following decisions.

If  $R \geq 629.33$ , TxDOT should choose the traditional government bonds method.

If  $96 \leq R \leq 629.33$ , TxDOT should research and if it finds that there is synergy with a private firm, it should choose the PPP option. If no synergy, choose the private firm option if  $96 \leq R \leq 296$ , but for  $296 \leq R \leq 629.33$  choose gov't.

If  $-704 \leq R \leq 96$ , TxDOT should choose the Private option

If  $R \leq -704$ , TxDOT should choose the PPP option.

The above recommendations go beyond mere capital budgeting methodology — which considers only financial values—to include the intangible costs, R.

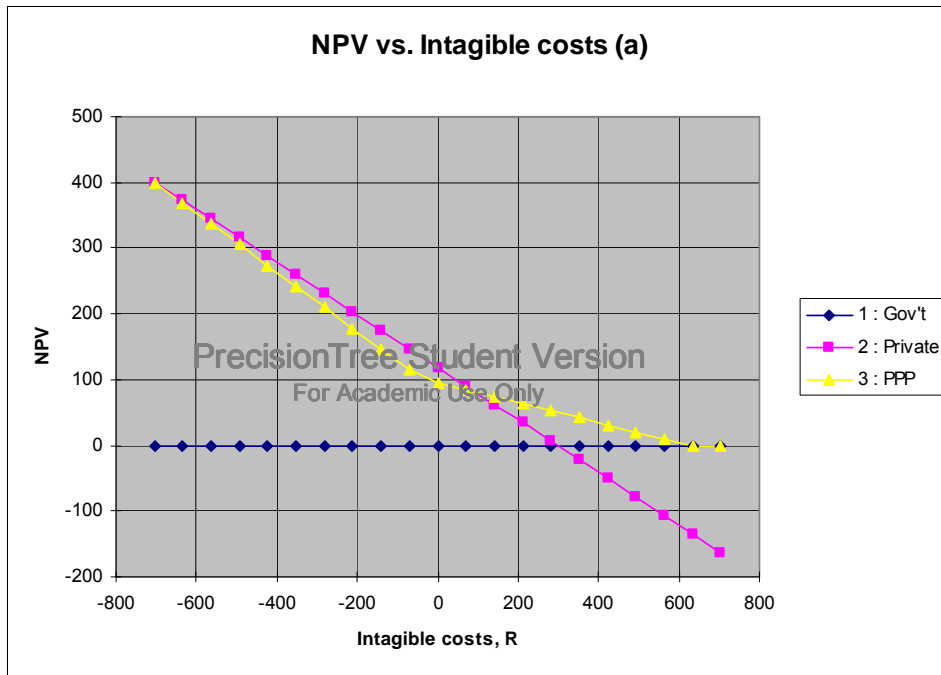


Figure 3a. Sensitivity graph of NPV to the Intangible Cost (a)

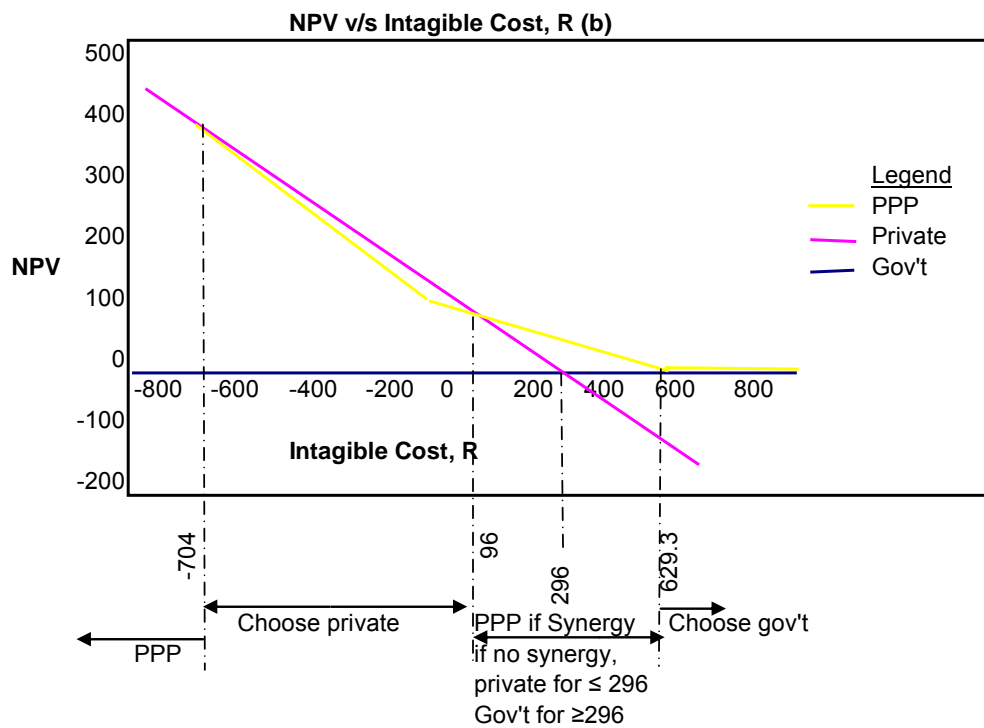


Figure 3b. Sensitivity graph of NPV to the Intangible Cost (b)

I also performed an analysis on the value of information concerning whether there would be synergy between the government and a private firm getting involved in the project. Without any information at all, the decision tree is as shown in Figure 4.

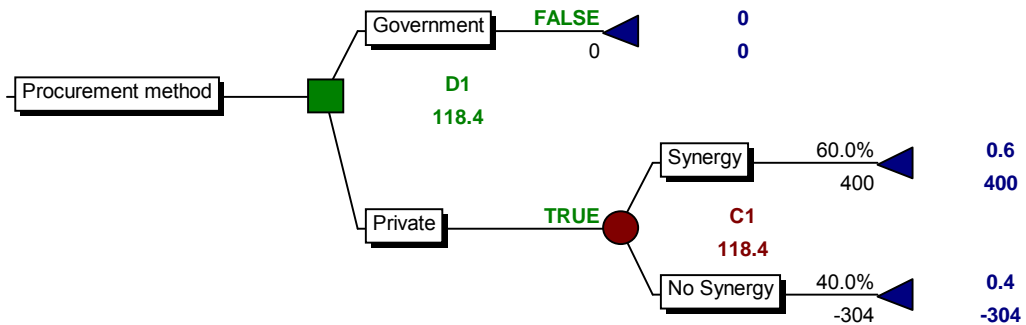


Figure 4: Base decision tree without any information

When perfect information about synergy is available, the decision tree looks like Figure 5 below,

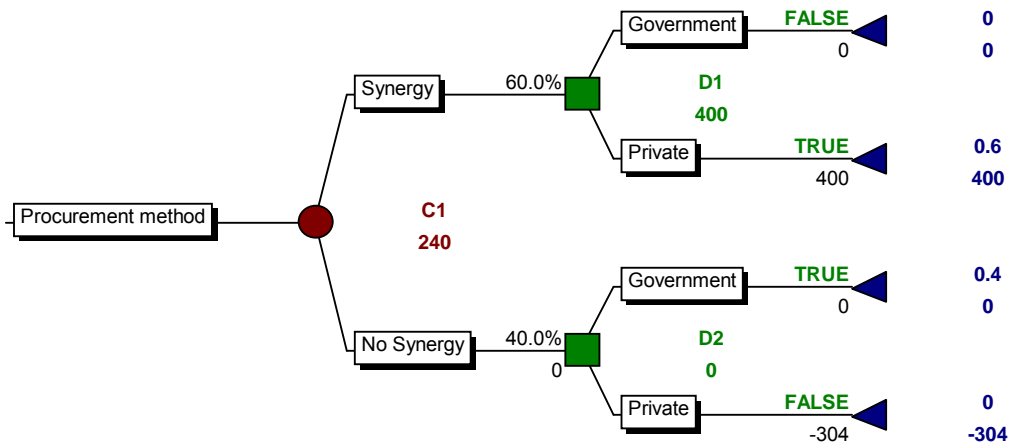


Figure 5: Decision tree with perfect information

The expected value of perfect information (EVPI) is the difference between the EMV of Figure 5 and EMV of Figure 4. That is  $240 - 118.4 = 121.6$ . This means that

TxDOT can spend up to \$121,600,000 to gather perfect information about whether there would be synergy if the private firm partners with TxDOT. This EVPI value can also be calculated by finding the weighted average of the VPI for each of the perfect information. That is, the VPI when the information is that there is synergy will be zero because this information would lead TxDOT to choose the private option which is what it would have chosen without any information. Hence,  $VPI(\text{Synergy}) = 0$ . However, if the information is that there is no synergy, this scenario would result in choosing the government option over the private option, so there is value in this information.  $VPI(\text{No Synergy}) = 0 - (-304) = 304$ . The EVPI would be  $0.6(0) + 0.4(304) = 121.6$  (i.e. \$121,600,000).

The expected value of sample information (EVSI) is the difference between the decision tree when you are researching the PPP option, Figure 2 (when  $R=0$ ) and the decision tree when no information is available, Figure 4.  $EVSI = 118.4 - 118.4 = 0$ . This is the value that TxDOT should spend to get a little amount of information regarding the possibility of there being synergy between TxDOT and private firm involvement. Note that this value ranges from 0 to the EVPI value. For any given positive value of  $R$ , Figure 2's EMV would decrease, making the EVSI increase accordingly. But the EVSI value can never exceed the EVPI value. Depending on  $R$  value, TxDOT can spend money on researching the synergy involved with a PPP, but this expense will max out at \$121.6 MM (the EVPI), after which it is not financially justified to spend money.

I also carried out an analysis on the value of perfect control over the situation. That is, what can TxDOT spend in order to fix the synergy involved with a PPP, e.g. in terms of legislating that would force certain scenarios. Figure 6 below shows the decision tree of perfectly controlling the idea of there being synergy between private involvement and TxDOT.

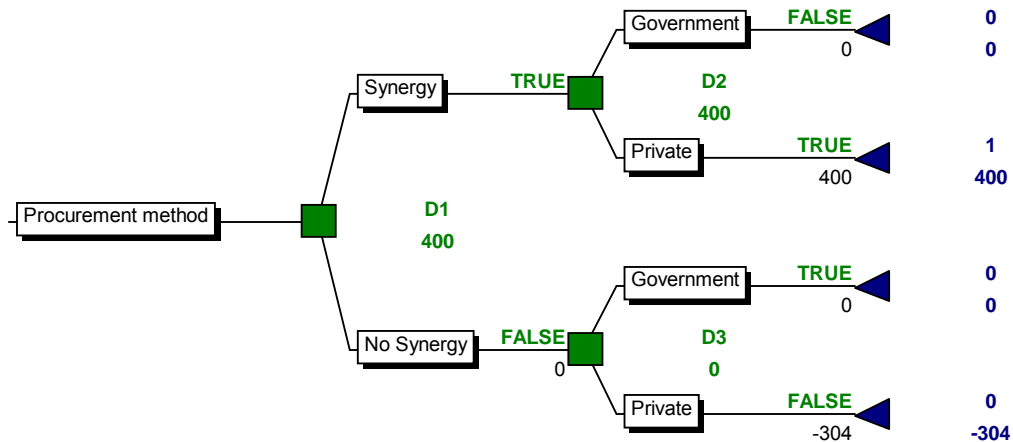


Figure 6: Decision tree showing perfect control.

The expected value of perfect control (EVPC) is the difference between Figure 6 and the base decision tree Figure 2.  $EVPC = 400 - 118.4 = 281.6$ , i.e. \$281,600,000. This is the value that TxDOT should spend in order to perfectly control there being synergy when a private firm gets involved with the project.

### MONTE CARLO SIMULATION ANALYSIS FOR SH 130 SEGMENTS 5 & 6

I performed a Monte Carlo simulation model of the three alternatives using @Risk. I used a simulation run of 1000 iterations. The table below shows the three input values I used for each alternative and the NPV output value. I used a triangular distribution for all input values.

**MONTE CARLO SIMULATION MODEL**

		Contract \$	Costs \$	Inflow \$	NPV \$
1	Government Option	1370	-2013		-643
2	Private Company Option	1370	-1355		15
3	PPP Option	1370	-1322	400	448

NOTE: All values are in millions of dollars.

- i Government Option Costs = RiskTriang (-3970, -1720, -350)
- ii Private Company Option Costs = RiskTriang(-2474, -1322, -270)
- iii PPP Option Costs = RiskTriang(-1674, -1322, -970)
- iv PPP Option Inflow = RiskTriang(300,400,500)
- v Outputs (NPV) = RiskOutput()+(Contract \$ + Costs \$ + Inflow \$)

Table 4: Monte Carlo Simulation Model

The modeling produced the following results:

**MONTE CARLO SIMULATIN RESULTS**

	Name	Minimum	Mean	Maximum	x1	p1	x2	p2	x2-x1	p2-p1	Errors
Output 1	Government Option / NPV \$	-2521	-643	1008	-1967	5%	520	95%	2487	90%	0
Output 2	Private Company Option / NPV \$	-1057	15	1080	-751	5%	758	95%	1509	90%	0
Output 3	PPP Option / NPV \$	61	448	824	199	5%	701	95%	503	90%	0
Input 1	Government Option / Costs \$	-3891	-2013	-362	-3337	5%	-850	95%	2487	90%	0
Input 2	Private Company Option / Costs \$	-2427	-1355	-290	-2121	5%	-612	95%	1509	90%	0
Input 3	PPP Option / Costs \$	-1669	-1322	-984	-1563	5%	-1081	95%	481	90%	0
Input 4	PPP Option / Inflow \$	304	400	496	331	5%	468	95%	137	90%	0

Table 5: Monte Carlo Simulation results table

The actually graphical outputs of the three alternatives are given below.

### Simulation Results for Government Option / NPV \$ / H37

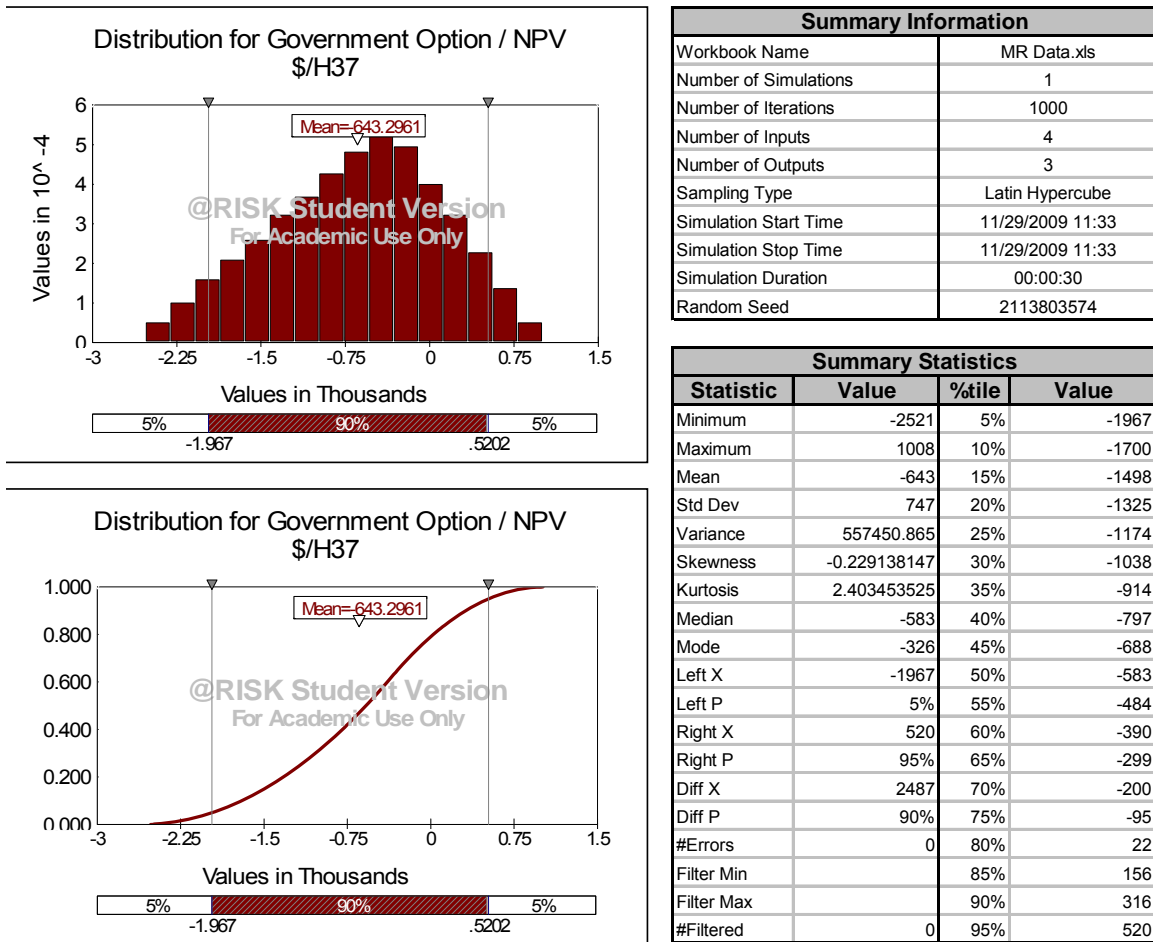


Figure 7: Statistical results for the Government Option

From the histogram above you can see that the probability of a negative NPV is 79.1%. The 95% Confidence Interval (C.I) is obtained by the following statistical calculations.

Sample Mean = -643, Sample Std. Dev = 747, n = 1000 ,  $\mu = ?$

2.5 percentile = -2157 , 97.5 percentile = 662

$$95\% \text{ C.I} = P \left( -643 - 1.96 \frac{747}{\sqrt{1000}} \leq \mu \leq -643 + 1.96 \frac{747}{\sqrt{1000}} \right)$$



$$= P(-643 - 46.3 \leq \mu \leq -643 + 46.3)$$

$$= P(-689.3 \leq \mu \leq -596.7)$$

According to my analysis, there is a 95% statistical confidence that the mean of the Government option is between \$-689,300,000 and \$-596,700,000. This is very close to the TxDOT projection that this option would result in a -\$700,000,000 NPV

### Simulation Results for Private Company Option / NPV \$ / H38

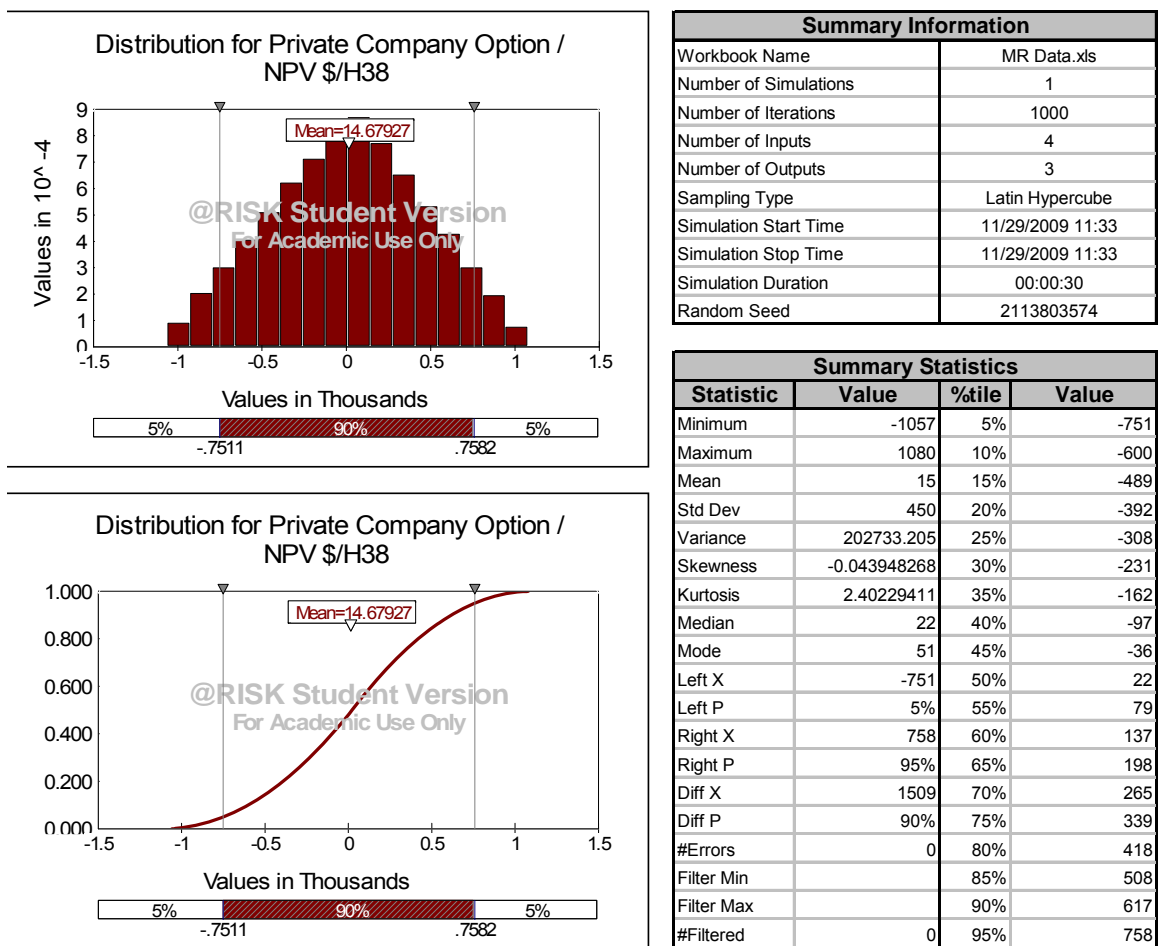


Figure 8: Statistical results for the Private Option

From the histogram above you can see that the probability of a negative NPV is 48.1%. The 95% Confidence Interval (C.I) is obtained by the following statistical calculations.

Sample Mean = 15, Sample Std. Dev = 450, n = 1000,  $\mu = ?$

2.5 percentile = -856 , 97.5 percentile = 859

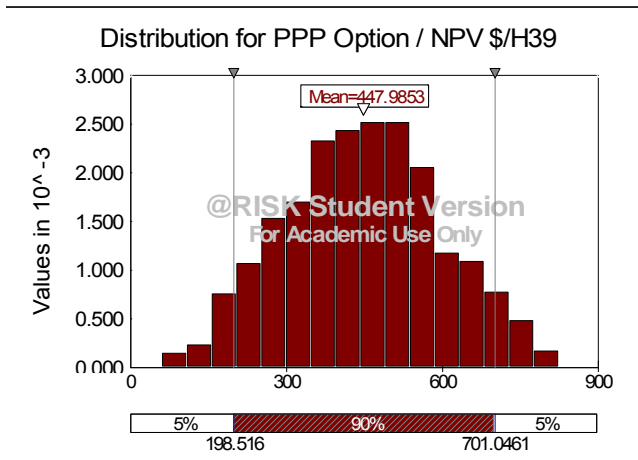
$$95\% \text{ C.I} = P \left( 15 - 1.96 \frac{450}{\sqrt{1000}} \leq \mu \leq 15 + 1.96 \frac{450}{\sqrt{1000}} \right)$$

$$= P (15 - 27.9 \leq \mu \leq 15 + 27.9)$$

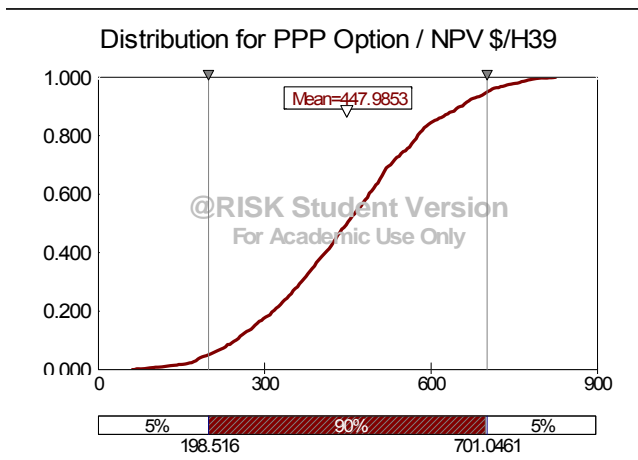
$$= P (-12.9 \leq \mu \leq 42.9)$$

According to my analysis, there is a 95% statistical confidence that the mean of the Private option is between \$-12,900,000 and \$42,900,000.

### Simulation Results for PPP Option / NPV \$ / H39



Summary Information	
Workbook Name	MR Data.xls
Number of Simulations	1
Number of Iterations	1000
Number of Inputs	4
Number of Outputs	3
Sampling Type	Latin Hypercube
Simulation Start Time	11/29/2009 11:33
Simulation Stop Time	11/29/2009 11:33
Simulation Duration	00:00:30
Random Seed	2113803574



Summary Statistics			
Statistic	Value	%tile	Value
Minimum	61.35314941	5%	198.5159607
Maximum	824.4714355	10%	248.1976624
Mean	447.9852913	15%	281.05896
Std Dev	150.052816	20%	315.4344482
Variance	22515.84758	25%	342.7839355
Skewness	0.019633458	30%	365.8458252
Kurtosis	2.5429237	35%	387.3262024
Median	447.9014587	40%	408.6166992
Mode	486.7930634	45%	428.2390747
Left X	198.5159607	50%	447.9014587
Left P	5%	55%	470.1437683
Right X	701.0460815	60%	487.5565796
Right P	95%	65%	506.6828003
Diff X	502.5301208	70%	524.6653442
Diff P	90%	75%	554.7658081
#Errors	0	80%	575.5440674
Filter Min		85%	603.6399536
Filter Max		90%	651.3557739
#Filtered	0	95%	701.0460815

Figure 9: Statistical results for the PPP Option

From the histogram above you can see that the probability of a negative NPV is 0. The 95% Confidence Interval (C.I) is obtained by the following statistical calculations

Sample Mean = 448, Sample Std. Dev = 150, n = 1000 ,  $\mu = ?$

2.5 percentile = 171, 97.5 percentile = 739

$$95\% \text{ C.I} = P \left( 448 - 1.96 \frac{150}{\sqrt{1000}} \leq \mu \leq 448 + 1.96 \frac{150}{\sqrt{1000}} \right)$$

$$= P (448 - 9.28 \leq \mu \leq 448 + 9.28)$$

$$= P(438.73 \leq \mu \leq 457.28)$$

According to my analysis, there is a 95% statistical confidence that the mean of the PPP option is between \$438,730,000 and \$457,280,000. This is in agreement with TxDOT's Concession contract which projects that the profit sharing will be \$400 MM. Just like the results from the decision tree analysis, the PPP option offers the greatest possibility of attaining a high NPV value.

## **The Case for Public-Private Partnerships**

The case for Public-Private Partnerships explores how PPPs have numerous advantages over the two traditional models of project delivery: i.e government run projects and wholly privatized projects. Specifically, the advantages fall under three major categories: a) Risk benefits, b) Better management and communication, and c) Better value added to society. But first, I want to give a brief discussion of what PPPs are and their characteristics.

### **PPP BACKGROUND**

The modern PPP model started in the U.S.A in the 1950s when the federal government solicited private investment in order to stimulate inner city infrastructure development and regional economic development (Bult-Spiering & Dewulf, 7). But the model really took shape in the 1980s as evidenced by President Carter's Urban Development Action Grant<sup>9</sup> (UDAG). Pierre & Peters give a list of eight factors that contributed to the development of PPPs. The main instigator was the citizenry's interest shifting from government to governance issues. This meant that the public become more interested in efficiency and performance rather than the nature of government structure (Bult-Spiering & Dewulf, 1).

1. Shift from politics towards the market
2. Economic crises focused governments to consider their management intentions in perspective.
3. Economic and political globalization forced adjustment of management intentions and changes in public institutions at a national level.

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<sup>9</sup> This was a federal program enacted in the Jimmy Carter presidency (1977) with the purpose of loaning money to revitalize distressed urban centers by acting as an incentive for private sector investment.

4. Dissatisfaction with the government's performance led to more private sector involvement in the enforcement of public tasks.
5. Rise of "New Public Management" (NPM) and instruments as a counterpart to traditional, input-oriented management styles resulted in an increasing interest in output management, evaluations and separation of policy making and enforcement.
6. Increasing attention on citizen participation and environmental issues.
7. The increasing importance of sub-national and super-national institutions has resulted in a growing interest in multi-level governance.
8. The tension between several new forms of public management and coordination on the one hand, and the old traditions and instruments of public accountability on the other, resulted in the introduction of 'new' players (private parties, citizens, non-governmental organizations(NGOs)) in to the political process.

Even if the formal PPP structure was started in the U.S.A, it could not be wholly copied in Europe because of the differences in culture between European and American ideas of public-private frameworks. In the U.S.A, the partnership always constitutes private party autonomy while in Europe it relies on public autonomy. The U.K is in between these two extremes. In the U.S.A, private provision of services is subsidized through public subsidies or vouchers and the private sector has discretion in implementing public policies. In the European case represented by France and Germany, the public or government always has the upper hand in directing the nature and workings of the partnership with no autonomy by the private party.

As I mentioned in the Introduction, I will be concerned with two types of PPPs: Concessions and Joint Ventures. Concessions are the main type of PPP for civil infrastructure like roads and waste wastewater projects. Whereas Joint Ventures exist as separate corporate legal entities, Concessions have numerous legal structures. Joint ventures are sometimes called true PPP because they exist as an autonomous legal entity and the Public entity is both a shareholder and also the regulator. They also exhibit equal share of revenues, losses, and risks between the two parties. Concessions involve a

genuine transfer of risk usually from the public party to the private firm. They take on the general guideline of a concessionaire offering specific services during part of the life cycle of the project. For example a PFI (Public Financing Initiation) is a concession where a private firm provides all the money for a public project, DBFM (Design-Build-Finance-Maintain) is where the private firm designs, builds, finances and also maintains the project, BOT(Build-Operate-Transfer) is where the private firm builds and operates the projects for a lease term at the end of which ownership is transferred to the public entity, BTO(Build-Transfer-Operate) is where the private party builds and transfers ownerships to the government but straight away leases the project/facility in order to operate it, and DBFO (Design-Built-Finance-Operate) is where the private firm designs, builds, finances and also operates the project.

In theory, governments can delivery public goods without the help of private parties, but in practice, there are factors that work to prevent governments from delivering the best and most efficient public goods. The main reasons that conspire to prevent governments from delivering public goods in the best and most efficient way are “lack of competitive forces, no force of contract, ingrained institutional practices, procurement restriction (proven technology required), and risk avoidance” (Norment, 9). When an appropriate private firm is brought on board, performance standards in the contract together with the firm’s business efficiencies should result into a better service or project delivery.

It is important when setting up a PPP to realize that the public and private entities each have different interests that they are inclined to pursue. Therefore a good PPP contract will try to exploit the strengths from each party. According to Bult-Spiering & Dewulf (22,23) the public sector is usually interested in:

1. Legislation, regulations and authorities
2. Political opinion and political influence
3. Democratic decision-making processes.
4. Minimization of funds
5. Realization of a social goal

While the private sector is interested in:

1. Achieving returns on the invested funds
2. Taking business risks
3. Anticipating market and competitive developments
4. Realization of a corporate goal

Failure to recognize the inherent interests that lead each party to sign a PPP contract will frustrate the ability to reap the advantages that I discuss in the following sub-sections.

## **RISK ADVANTAGES**

PPPs as separate entities can absorb risks that would otherwise be a burden if undertaken solely by either a government or private party.

### Financial Risks

The first major financial risk that PPPs can absorb better is revenue-loss sharing. Many times, due to general economical turmoil, poor revenue projections or the onset of unforeseen circumstances, it is possible for the finished project to generate less money than initially projected. Another financial risk closely related to revenue-loss is credit risk, whereby a debtor is likely to default. The PPP has flexibility to use the government entity to either issue bonds or waiver taxes and other financial burdens, or on the other hand the private entity can use its knowledge of the financial markets to move investment around or innovate better financial management schemes. In the CTTS case study project, the Cintra/Zachry Concessionaire has been able to assemble an innovative and diverse



group which includes PriceWaterhouseCooper and JP Morgan Securities (See Appendix C for details). This group has been able to innovate financial mechanisms that streamline the collecting and managing of all the monies from the bonds program, TIFIA, TxDOT, and local jurisdiction contributions. For SH 130 segments 1 to 4, Lone Star Infrastructure successfully achieved the same financial benefits by exploiting TxDOT's Comprehensive Development Agreement. According to the project's website (<http://www.sh130.com/>), SH 130 was the first project to be "developed under a Comprehensive Development Agreement, [Which] allows the work of property acquisition, design and construction to be undertaken simultaneously." Lone Star Infrastructure was able to efficiently manage the financial aspects of the project and expeditiously design and finish constructing on a schedule that was years ahead of a traditional government led project delivery method.

Second, macro level risks or what economists call systematic risks might be too hard to be handled by one private firm. Akintoye, et al (37) define these risks as:

They concern changes in broad economic conditions that affect a whole market. This, for example, may relate to changes in asset values as a result of systematic environmental factors. Other examples of market risks include changes in consumer spending, level of Industrial output, interest rates, exchange rates, energy prices, high-impact weather effects, etc

Systematic risks can not completely be avoided but by having a private firm locked together with a government entity, the risks are efficiently redistributed around. For example, system risks like political changes or macro-economic changes can be absorbed best by governments. In third world countries, only the government has the leverage to maneuver over a tumultuous political landscape. In the case of exchange and interest rates, only the government has the ability to manipulate the financial landscape while the private party can concentrate on the micro details of executing the actual project.

Third, there is a tendency for government to undertake grandiose non-economic projects that might not delivery the necessary benefit to the public. This is partly due to political reasons, or personal egos (Savas, 240). It is not unheard of for a government entity to ignore conclusions of particular capital budgeting calculation, and instead make a ‘political reason’ to go ahead with project development. PPPs prevent this government tendency by bringing in professional private firms which are very experienced in identifying and efficiently selecting profit generating projects based on the appropriate capital budgeting mechanism. By involving private sponsors and experienced commercial lenders, in-depth review of the technical and financial feasibility of the project is assured (Savas, 240).

Fourth, private firms rely on high risk high return investment capital for their finances, while governments rely on low risk low return bonds to get financing. In these perpetually uncertain economic times, sometimes the market is more favorable for low risk investments while in other times, it is more favorable for high risk high return investments. PPPs are well positioned to manage this risk by having the option to either borrow money via the government party or via the private party or exploit their extensive financial background in all forms of capital budgeting to appropriately decide on the best mix of public and private funding source. For example, in the SH 130 case, Cintra/Zachry is providing some financing for operations while government entities are providing some money for ROW acquisition.

Fifth, since private firms are quick to adjust to changing economic times unlike government entities that are fraught with bureaucratic ways of doing business, a PPP is agile and well positioned to ride with the economic tide. The overwhelming positive NPV values from the Decision Tree analysis and Monte Carlo simulation validate the financial advantages of a synergistic relationship introduction by a PPP.

## Legal Risks

There are two main legal risks that a PPP is better situated to absorb than either a government entity or private entity going it all alone.

The first one is contractual risk. Since a PPP is an autonomous legal entity, it can absorb any risk resulting from contractual agreement without impacting the parent private firm or public party adversely. For the case of the CTTS project, there was a contractual innovation called the Comprehensive Development Agreement (CDA) which allowed for efficiency in the whole project life cycle because the same company is retained for design, construction, Right of Way acquisition, permitting and other aspects of the project.

Secondly, because governments are responsible for making laws and regulations, having a government entity on board helps a PPP avoid unforeseen risks emanating from new or intricate laws and regulations. Also, if a law or regulation would adversely affect a private firm or a public entity, having a PPP as a legal entity helps to channel risk from the target party to the other party. The result is that the intended party is spared the adverse impact of the regulation. Furthermore, the private party gains from the government having the regulatory prerogative to issue eminent domain to acquire land or legislate non-competitive zones whereby the private firm will have the economic advantage to participate in a certain economic area for a given length of time.

## Project Risks

There are three main benefits that a PPP can offer in regard to project risks.

First, project selection as far as procurement risks are concerned can be handled better with a concerted effort between private firms and public entities. Akintola et al (35) list five areas where procurement risks can arise: land acquisition for a project, design of building or facilities, construction of facilities, commissioning of projects or facilities, and management of facilities. In a PPP, the government entity can provide cheap access to policy frameworks to guide the project while the private entity participates in the detailed analysis using industry proven standards and techniques. Mr. Watry said that the move from a TxDOT-run CTTS project to the CDA mechanism cut a lot of red tape and led to the project starting a lot earlier than it would have started under traditional methods. Also, Mr. Russell's TxDOT testimonial lists 21 project risks that were either fully born by Cintra/Zachry to the relief of TxDOT (Russell, 4, 5)

Second, there is a big benefit to having a duo entity which can leverage its government connection in regard to risks involved with public codes, licensing and permitting. A solo private firm could face a lot of delay and more costs trying to dig through extensive public code or applying for permits and licenses. This benefit extends into avoiding other project risks like design risks, construction risks due to time and budget issues and change orders or field orders, and operation and maintenance risks due to issues that have to be handled during the maintenance period of a project. These benefits depend on the actual contractual delivery method of the PPP. As I mentioned in the above background sub-section, there are several contractual delivery methods of a PPP. If the delivery method is BOT (Build-Operate-Transfer), this is very advantageous in that the Concessionaire will operate the facility for the leased time ( 50 years for the SH 130 case study) during which it shoulders all the burdens that would have been incurred by the public entity or passed onto the general public.

Third, another crucial advantage that a PPP offers is the ability to exploit the flexibility needed to make real options. Real options are “the adjustments that a firm can make after a project is accepted”(Ross, et al, 284). The three major real options are: a) the option to expand, b) the option to abandon, c) timing options. A government run infrastructure project will not be flexible enough, due to its inherent bureaucratic nature, to make snap decisions needed in face of a new opportunity available to expand, abandon a project or start a particular project at a different time. For example in the case study, under a government run project, all segments 1 to 6 would have been designed, built and operated in the same way, but under a concessionary PPP, the PPP had the option to smoothly and quickly change the design and construction details of segments 5 and 6 to meet the prevailing market realities.

## **MANAGEMENT AND COMMUNICATION**

PPPs are very beneficial in that formal decision making about administration and project organization is shared as opposed to the task being a burden on a private firm or a public entity. For example, since government entities are used to democratic decision making, this habit can rub off well into the PPP management culture so that decisions are made by consensus or formal negotiation. This is very important because it prevents the tendency for a private firm going it alone and making draconian un-democratic decisions in regard to important issues that might adversely affect the general public.

Good communication is a fundamental benefit that PPPs provide. This is because communication is oftentimes the glue for any venture that involves people, tasks and responsibilities. Whereas risk evaluation and value analysis are important contributions of PPPs, communicating those issues and actually managing the intricate delicate relations between the private and public partners and also between the partners and the

general public are paramount to the final dividend that a project can reap from a PPP. For the CTTS case study, TxDOT failed in this very important respect when it went about the actual award of concession to Cintra/Zachry in a non-transparent fashion. According to Tollroad News:

A week ago at the very height of the gathering political storm over toll concessions in the state legislature, and just as veto-proof majorities were being registered for moratorium bills, Texas DOT (TxDOT) quietly signed the final concession agreement document for SH130/5&6 with Cintra Zachry. Newsworthy? You better believe it. But out of TxDOT, no press release, no statement, nothing.

This is a prime example of how an actual PPP might not go about doing businesses according to the ideal model. But such a shortcoming does not reflect adversely on the robustness of the PPP model.

PPPs are based on a network mechanism of economic activity. This mechanism is very different from the traditional two mechanisms of hierarchy and market, which are mainly governed by the transaction cost of the activity (Bult-Spiering & Dewulf, 25). For networks, the activities of the public and private entity overlap. According to Bult-Spiering and Dewulf, unlike the other two mechanisms, networks take into account personal relations, reputation and trust. For a successful PPP, the participants in the network have non-hierarchical long-lasting relations, even after the project is done. Network relations are activated for solving specific problems. For as long as the project is alive or under operation, the public and private network is alive. In this way, networks are therefore very dynamic: actors enter and depart, power positions change and different networks can come together, but the overall inter-connectedness remains. Because of the dynamic nature, the reputation of the actors is very important. Relations with a partner who has a negative reputation will not be activated to the same degree as a relation with another partner with positive reputation. Therefore, the PPP framework offers a conduit

in which the project stakeholders are in constant communication with all project stakeholders who also include the general public.

There is a lot of efficiency reaped by having a PPP manage the actual construction of the project. Whereas a private firm can “build more quickly and more cost effectively than government usually can, and therefore satisfies public needs more quickly at lower cost,” (Savas 240), this could turn into a disadvantage if government’s strict standards and codes are not well understood by the private firm. On the other hand, government building alone can not achieve the quickness of private firms because its inherent bureaucratic constraints and laborious procurement means translate into delayed project planning and schedule. A successful project managed through a PPP will have a private party handling procurement to eliminate bottlenecks, but have the government entity streamline the project vis-à-vis public code and regulations. This arrangement prevents wasting a lot of private capital to manage the regulatory side of operations.

## **VALUE ADDITION**

There are numerous ways that PPPs add more value to economic activities than a traditional market or hierarchy mechanism (government) will do. In the CTTS case study, the CDA procurement method is based on choosing a project partner using a “a best value selection process”. Best value is defined as price and other factors. These other factors are: “technical design/approach, innovation, qualifications, experience, key personnel, minimizing public impacts (i.e traffic maintenance), QA/QC approach, schedule” (Smith, 11). Without a PPP, the public or private entity can soon realize that it can not achieve its goals of adding value if it acts alone. Bult-Spiering and Dewulf (28) list four ways in which value is added:

1) Added value in content. This comes in the form of using an integrated creativity framework to solve problems and execute project functions. Cooperation by the planner, builder and operator naturally leads to more efficiency. Also, innovation in content is possible because of the diversity of input by different sources. The CTTS project achieved this benefit by bringing together diverse companies, diverse both in Industry and geography: The Spanish Ferrovia-Agroman, Earth Tech, PriceWaterhouseCooper, JP Morgan Securities, Bracewell and Patterson, Pate Engineers and Rodriguez Transportation Group headquartered in Madrid.

2) Added value in process. This is mainly achieved through synergy of both parties' expertise. The private party is usually better at knowing the market realities, executing the appropriate capital budgeting decision making and more efficient at managing finances. On the other hand, the public entity can help the private party by leveraging its knowledge and competencies of political procedures, legislation, and regulations. This synergy in process is what my decision tree analysis was mainly about.

3) Added value in Finances. This is achieved mainly through risk allocation and financing. It is very beneficial to know that certain financial risks are better handled either by the private party while others are better handled by the public party. For example, in volatile financial markets, interest rate based risk might be better managed by the public entity. On the other hand, private party might be better positioned to have more disposable finances at hand than the public entity at some given time. With the CTTS project Cintra/Zachry was able to inject \$25 million dollars upfront to help with mobilization and project start-up costs that TxDOT could not afford. Also, the Concession agreement has a buyback provision, which ensures that at any time during the 50 year lease period, TxDOT can buy back the project from Cintra/Zachry if it feels that



the general public is no longer receiving value—in terms of finances—from the project.

Mr Russell reports in his testimonial that:

We believe this [the buyback provision] protects the interest of the state and the taxpayers by ensuring TxDOT is not overpaying for the asset should it be determined it is within the best interest of the citizens to buyback the project during the lease. The possibility exists that locking into any specific and/or predetermined values could potentially lock the state into undesirable terms<sup>10</sup>.

4) External added value. For example, effects on proximate areas or industries and creation of jobs. When efficiently handled, a PPP project can positively affect surrounding peoples and property. By providing a public good in partnership with a government entity, the private party gets in the good books of the public. Also, the public entity reaps benefit from the fact that a private firm invests in an undesirable public space that would not have been developable had it not been for incentives it gave to the private party. This is what UDAG did for distressed urban area in 1977. In fact because of the infusion of money by the private firm, government could reap cash that it uses to create jobs or retire debts.

Besides the above four general ways that PPPs add value, there are eight specific ways that values is added.

First, there is added value to the relationship between both partners and the general public. It is important that the general public relate well with the parties delivering projects. There are two forms of relationships: economic and social. Economic relations come about because people want to exchange resources or because of external forces. Social relations come about because humans are social animals. For public projects, this translates into the general public wanting and having the right to know who is building what for them. The better the relationship, the better cooperation

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<sup>10</sup> TxDOT Testimony by Russell, Pg. 7

the public can give to the infrastructure provider. By having a private firm teaming up together with the government, the PPP formed is better placed to absorb any criticism or opposition from the general public. This criticism and opposition usually comes from two camps of people: those members of the public who distrust or hate government run projects, and on the other hand, those people who distrust or hate private firms engaging in public good delivery. Since the PPP is partly private and partly government, it has a lot of flexibility and opportunity to put on either face depending on what is better suited to hand any conflict with the public. For example, in case of public opposition to road tolls by a private firm owner, the government can regulate usage privileges by the poor (Kassens questionnaire answer).

Second, there is great benefit reaped by the natural cheap transfer of technology and skills between the government and private party. Without the PPP, government would have to pay exorbitant prices for private skills and technology. Along the same line of reasoning, without a PPP, the private party would have to laboriously lobby government for favorable legislation or regulation. By locking arms together, all the necessary transfers happen in-house within the PPP framework.

Third, there is tax benefit involved with PPPs that could be the difference between a project going forward and project abandonment. According to Savas (240) every dollar spent on a project by a private company translates into at least two dollars of tax revenue for the government. This is a lot of money. Unless a private firm is robust enough to discount such future tax expenditures, many firms would not be able to financially go ahead with a project that means heavy taxation. In a PPP, government can waive taxing a private party to ensure that projects are financially viable. Consequently, the general public benefits by getting infrastructure that it would otherwise never have gotten.

Fourth, having a government entity onboard helps with public opinion or political influences that can enable the project carry on smoothly. A private firm going it alone could face unnecessary negative public opinion or hostile political interferences. Sometimes public opposition to private ownership of facilities builds up because private firms reap exorbitant profits from public tolls. This is because public goods turn into a property to be enjoyed by the wealthy who can afford the tolls. Kassens (see questionnaire in Appendix B) says that governments can mitigate this shortcoming by regulating usage privileges for the poor in society.

Fifth, a PPP is best suited to deal with added social value because it can balance the opposing interests of the two parties. On one hand the government entity has a public role to add social value in whatever project it engages in, but a private firm's paramount interest is to make profits. Teaming up with a government entity means that an aggressive firm will be checked by the interests of the government entity which are usually pro social equity.

Sixth, by working more closely with private business, governments can benefit from private firm's use of market forces (Bult-Spiering & Dewulf, 35). Benefits like efficiency, knowledge and customer satisfaction are market strengths that are a staple of private businesses. When they are transferred to a government entity, its public sector performance and product delivery is greatly improved.

Seventh, PPPs stimulate the private sector to undertake life-cycle approaches that it would not have taken had it not partnered with a government party. Together with the fact that private firms are more efficient and better at supply chain management, PPPs work to improve the price/quality ratio of the actual project (Bult-Spiering & Dewulf, 35). Early private sector involvement in projects makes it more aware of the project's

long-term benefits to society. Good PPPs are not centered only on toll collection by the private party but “long term [operational] and maintenance agreements” (Norment, 8)

Lastly, PPPs can help in contributing to sustainability in infrastructure systems. Sustainability aims to balance social equity, economical viability and environmental stewardship. While the government involvement ensures that the project works to produce equity for the public, and the private firm contributes technical and financial tools that lead to economical viability, a PPP also directly contributes to environmental stewardships. Rouhani (2009) discusses how a private firm’s participation in transportation road systems usually involves the concessionaire levying tolls for public usage of the facility, which action helps to prevent congestion on roads and in turn reduces environmental externalities like pollution and accidents. Rouhani also discusses another innovation called a Credit Based Congestion Pricing (CBCP) which can help in decongestion on roads and also transfer money from the high-users to other sectors of society. For a CBCP, “drivers receive monthly travel credits in a revenue neutral approach. Users do not pay money unless they go beyond all of their travel credits. The travel credits can be in terms of money or can be traded and converted to money” (Rouhani, 99). This effectively restricts over-usage of the public good, and at the same time harvests money from heavy users, which money can be used in other sectors of society.

## **Limits to PPPs**

Although PPPs have tremendous benefits that I have stipulated in the above section, they are not the answer to all project undertakings. It is vital to know that there are six shortcomings with PPPs which should be analyzed and studied before you venture into a contract. These shortcomings come about mainly because the ideal cooperation model between the public and private entities is seldom achieved and the general public's opposition about a private firm delivering public goods is a real big hindrance.

First, the financial advantages could be eclipsed by the fact that transaction costs can increase due to a lengthy process of selecting the private entity (Bult-Spiering & Dewulf, 36). Other than Spain where PPPs have been streamlined to have extremely short procurement periods, the rest of the world is fraught with overdrawn-out PPP frameworks characterized by lengthy times for choosing among several companies and increased negotiation timeframes. Unless a PPP comes up with an innovative mechanism like CTTS' Comprehensive Development Agreement, suboptimal PPP procurement translates into increased contractual fees. Furthermore, the long-term contract periods granted to concessionaires could turn into a burden due to changes within the private firm over the years. Also, unless all the money is provided by the public entity because it can usually borrow money at low interests, it is hard to ignore the fact that when private firms contribute money, since it is coming in from high interest rate borrowings from capital markets, the cost is usually passed onto the consumer.

Second, Bult-Spiering & Dewulf (37) point out that despite the focus on better value for money and the benefits of innovation, especially in concession PPPs, it is a market reality that "low costs" are still used as the main selection criterion. This practice is a clear break from the ideal PPP model which calls for selections based on the total

package of what a contractor is offering. As a result, this tendency prevents selections based on “best value” where performance and costs are balanced, which is what PPPs are primarily for. Smith writes about how this limitation was handled in the SH 130 project by deliberately including “other factors” other than price: “technical design/approach, innovation, qualifications, experience, key personnel, minimizing public impacts (i.e traffic maintenance), QA/QC approach, schedule” (Smith, 11).

Third, the performance of a PPP will largely depend on the intangible factor of behavior by the parties and also the nature of the public interest (Bult-Spiering & Dewulf, 39). However well-formulated a PPP might be, if it is not aligned with the prevailing public interest, all effort to deliver services might be frustrated. Also, the parties’ willingness to cooperate or fitness for the job, determine the extent at which the PPP will be successful. For example if the private firm’s reputation is characterized by bad public relationships, its effort to be a good provider of a PPP public service might be met with a cynical or opposing public. Mr. Kiggundu’s strong critique of PPPs (See newspaper article in Appendix E) is based on evaluating PPP performance largely on “what can go wrong” as opposed to the ideal framework. Specifically, he emphasizes bad policies, unforeseen economic circumstances that call for changing the PPP framework but is unheeded, and the fact that many so-called “private parties” come into contract with ill-meaning interests based solely on profit maximization.

Fourth, many PPPs erroneously focus on maximizing profit alone, instead of the value to society or less quantifiable long-term benefits. In other words, there is a tendency for parties to form a PPP as if it were a for-profit venture. This prevents the attainment of the above benefits. There are intangible benefits like Environmental Sustainability and Social/Cultural benefits that should be put in mind when setting up PPPs. This limit is exacerbated when you realize that some PPPs operate and function

like a privatization scheme. It is very important to draw a distinction between privatization—a total transfer of ownership from the government to private firms—and a PPP.

Fifth, many people tend to approach PPP from a political perspective instead of a rational view. This leads to inefficient results from the joint venture or concession. From a political point of view, some public entities want to control the workings of a PPP, but they forget that oftentimes government does not have the technical and financial resources needed. An example of this practice is what happened in the Russian Federation when the government forced Shell to sell its majority share in Sakhalin 2 Oil project, which effectively made the Russian government take over ownership. It is paramount that you approach the formation of PPPs from a rational framework independent of the political/emotional sentiments that oftentimes sabotage good PPP implementation.

Lastly, there are also contract issues that arise from PPP formation. For example, a PPP contract might not have provisions to handle problems that arise when unforeseen issues like force majeure<sup>11</sup> occur. In such instances, since the public entity relies on legislature to get its money, oftentimes, the legislature might not approve extra money in such emergencies, or if it does, the monies might come too late. Consequently, the public party to a PPP could default on its contract obligations. Contract issues could also come from the fact that government workers fear for loss of their jobs and ask for unfair terms.

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<sup>11</sup> Force Majeure is a natural occurrence that can not be prevented by human actions.

## **Conclusion and Recommendation**

Civil Infrastructure is needed in every country of the world, both among developed countries and developing countries. However, governments alone can not manage to put up the money for building infrastructure, and also the complexity involved both financially and technically call for governments to seek help from the marketplace. Naturally, any private involvement in project delivery of infrastructure is met with opposition from the public, and given that many a private firm would only look out for the best interest of its shareholders, it is paramount that private firms' involvement in public good delivery should be in a form of formal partnership with the government entity. Presently, such formal partnerships take the form of Public-Private Partnerships. I have shown that these PPPs, specifically Concessions and Joint Ventures, have more synergistic benefits than either government run or fully privatized projects.

These synergistic benefits fall under three main categories: risk benefits (financial, legal and project based), management and communication benefits, and added value to society. There is a need to go beyond making decisions about a project based only on results from capital budgeting calculations. PPPs are best suited to go beyond purely capital budgeting analysis, to factor in non-economical factors. My decision tree analysis and Monte carol simulation model of the SH 130 project case study give quantitative support to all the benefits I discuss in the main part of this paper.

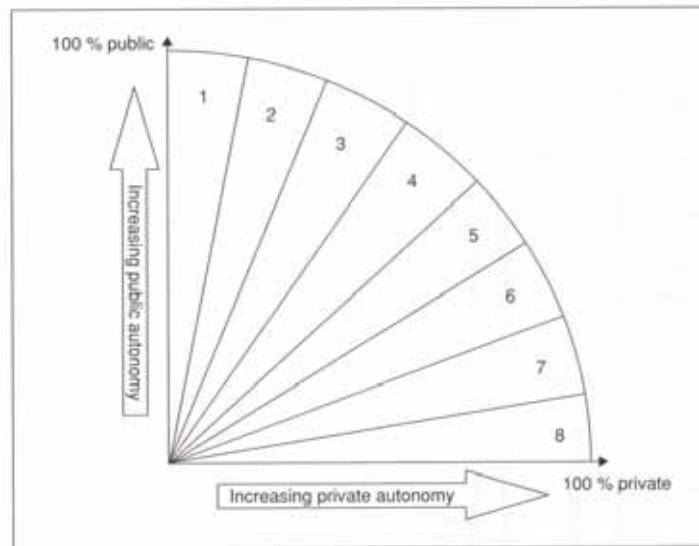
Nonetheless, there are limits to what PPPs can achieve. These limits come about due to failure to create the ideal PPP model and also inherit operational and managerial habits by the individual parties. But instead of concentrating on the shortcomings of particular PPPs, the analysis should be geared towards the PPP models themselves, and I



have shown, the PPP models offer far more advantages than the traditional procurement models.

To improve the research and analysis I have carried out herein, you need to gather more data on the actual performance of various PPPs as opposed to just one case study that I have used. Also, you need to factor in the cultural differences between peoples that might be affected by PPPs. While in the U.S.A there is generally a lot of public support for private involvement in Infrastructure projects, less liberal countries might have publics that vehemently oppose private participation at all costs.

## Appendix A: Spectrum of Public-Private Partnerships



**Figure 1.1** The public-private spectrum (Börzel & Risse, 2002). Reproduced with permission of Freie Universität, Berlin.

(Source: Bult-Spiering, M. & Dewulf, G.,3)

- 1) Public Regulation: no involvement of private parties
  - 2) Lobbying of public parties by private parties
  - 3) Consultation and co-option of private parties
  - 4) Co-regulation of public and private parties (e.g private parties as negotiation partners): joint decision making by public and private parties.
  - 5) Delegation of private parties (e.g standard setting): participation of public parties
  - 6) Private self-regulation in the shadow of hierarchy (e.g voluntary agreements): involvement of public parties.
  - 7) Public adoption of private regulation: output control by public parties
  - 8) Private self-regulation (purely private regimes): no public involvement
- Concessions and Joint Ventures fall between 3 and 6.

## Appendix B: Questionnaire

This is the Questionnaire I sent out to two professional experts (Eva Kassens, PhD and Mike Watry, P.E) who have worked with projects involving Public-Private Partnerships.

1. In your professional experience, what do you think is the future of public-private partnerships in infrastructure?
2. Have you found any tangible examples that show that privately owned roads fair better than publicly owned roads?
3. What are some of the major financial or other risks that you find in privately owned infrastructure systems?
4. What is the downside of having private companies own public goods?
5. What is the best way to satisfy the public opposition to private ownership of public infrastructure?
6. What is the best Public-Private partnership arrangement you know of or recommend?
7. Is it possible to achieve the benefits of private ownership without physically transferring the public infrastructure into private hands?
8. Why do some governments have reservations about putting public goods in private hands?

The filled-in questionnaire is as follows.

### QUESTIONNAIRE- EVA KASSENS, PhD

1. In your professional experience, what do you think is the future of public-private partnerships in infrastructure?  
*I think public-private partnerships are going to be the future for at least road transport. With funding cut short for public transport agencies by national governments, investments, private companies are willing to make, are more than welcome to advance urban and cross-country mobility.*
2. Have you found any tangible examples that show that privately owned roads fair better than publicly owned roads?

*The privately owned roads are usually better maintained and hence safer to drive on. Furthermore, they are not as crowded as publicly owned ones due to the pricing structure.*

3. What are some of the major financial or other risks that you find in privately owned infrastructure systems?

*The private investor does not take great risks. The road is paid for by the users and sometimes the investor even makes a profit. Usually the road is returned to the public after 30 years of usage. Thereafter, the public is responsible in maintaining the roads, then, when the roads start to need repairs.*

4. What is the downside of having private companies own public goods?

*The downside is the “only for profit” thinking. Private transport – as it is – usually appeals to the wealthier population, yet cars have become in most cities (except Boston, NYC, Chicago, San Fran and Washington) a necessity for all travelers. With roads being priced, this will burden the less-well-off in our society even more.*

5. What is the best way to satisfy the public opposition to private ownership of public infrastructure?

*Granting driving privileges/exemptions for the poor*

6. What is the best Public-Private partnership arrangement you know of or recommend?

*There are many good examples – it is a matter from which perspective. I do not believe there is a win-win solution for all.*

7. Is it possible to achieve the benefits of private ownership without physically transferring the public infrastructure into private hands?

*Yes lease or rent.....however, there is not much difference as far as I know whether the roads “belong” or do not belong to the public – the outcome for the user – pricing structure – remains the same.*

8. Why do some governments have reservations about putting public goods in private hands?

*I think they feel they are disadvantaging the poor. With no good public transit system in place, turning public roads into private hands results in segregation.*

## Appendix C: Central Texas Turnpike System Details

(Source: <http://www.centraltexasturnpike.org/ctts/>)

The Central Texas Turnpike System (CTTS) is a new transportation system that will improve overall traffic mobility, facilitate access to regional services, and increase travel safety for Central Texas residents, workers, and visitors. The system will initially consist of the 2002 Project, which includes three elements: SH 130 (49 miles), which begins north of Georgetown, Texas and runs to US 183 in southeast Travis County (extending to I-10 when funding becomes available); SH 45N (approximately 13 miles), from Ridgeline Blvd. west of US 183 to SH 130; and the Loop 1 Extension (approximately three miles), which runs from FM 734 (Parmer Lane) to SH 45N. The system will also include any future projects added to the system under the Texas Turnpike Act, as well as other roads, bridges, or other toll facilities for which the Texas Transportation Commission has responsibility and is collecting tolls. The project is being financed in part with the proceeds of bond obligations. Additional funding is provided through state, local, federal, and private sources from investment earnings.

The 2002 Project is providing 65 miles of new roadway to Central Texas. Total project financing is \$3.6 billion, including design, construction, right of way acquisition, and other financing costs (insurance, debt service, interest, etc). The 2002 Project will be completed almost 25 years sooner than conventional transportation construction projects due to the innovative financing (a combination of public, private, bond financing) and, in the case of SH 130, a new contractual arrangement referred to as a Comprehensive Development Agreement (CDA). Under the CDA, a single contractor or consortium of contractors is retained for design, construction, right of way, permitting and other aspects of project

### FINANCING/PROJECT SUMMARY

#### Central Texas Turnpike Project 2002 Project (as of August 29, 2002)

##### Estimated Initial Sources and Uses of Funds

(Source: <http://www.centraltexasturnpike.org/ctts/>)

<b>Source</b>	<b>Cost</b>
Proceeds from 2002 Bonds:	\$ 2,268 M
2002 TIFIA Bonds:	\$ 16 M
TxDOT Funding Obligation	\$ 700 M
Estimated Local Contribution for ROW	\$ 512 M
Interest	\$ 163 M

Total estimated sources for 2002 project	\$ 3,659 M
Estimated Uses	
<b>Uses</b>	<b>Cost</b>
Construction including engineering costs	\$ 2,247 M
ROW costs	\$ 695 M
Interest	\$ 527 M
Reserve Fund, Insurance and Issuance costs	\$ 190 M

Total estimated uses for 2002 project	\$ 3,659 M		
<b>Project</b>	<b>Construction &amp; Design</b>	<b>ROW &amp; Util. Relocation</b>	<b>Total</b>
Loop 1 & SH 45 North	\$1,041M	\$391M	\$1,432M
SH 130	\$1,206M	\$304M	\$1,510M
<b>Total</b>	<b>\$2,247M</b>	<b>\$695 M</b>	<b>\$2,942 M</b>

Blended interest rate: Approx. 5.4% on long term bonds

Project Elements

- SH 130 - from north of Georgetown to U.S. 183 south of Austin (49 miles)
- Loop 1 - from FM 734 (Parmer Lane) to SH 45 North (3 miles)
- SH 45 North - from Ridgeline Blvd West of U.S. 183 to SH 130 (13 miles)

This brief summary is subject to all terms, provisions and details relating to the bonds, project and system which are contained in the Official Statement dated Aug. 7, 2002. The Official Statement is available upon request from TxDOT upon payment of reasonable duplication cost.

**Appendix D: Cintra Zackry Team Factsheet**

(Source: <http://www.corridorwatch.org/ttc/pdf/fact%20sheet%20-%20Cintra-Zachry%20-%20031105%20FINAL.pdf>)

A team led by Cintra Concesiones de Infraestructuras de Transporte, S.A. and Zachry Construction Corporation was selected by the Texas Department of Transportation (TxDOT) to develop the first phase of the Trans-Texas Corridor – a visionary transportation system for the future of the Lone Star State.

Cintra/Zachry represents a coalition of Texas, national and international transportation experts with decades of experience in financing, constructing, operating and managing major public and private roadway systems. The team also includes Ferrovial-Agroman, Earth Tech, Inc.; PriceWaterhouseCooper, LLP; JP Morgan Securities, Inc.; Bracewell and Patterson, Pate Engineers, Inc.; and Rodriguez Transportation Group. Headquartered in Madrid, Spain, with subsidiaries on three continents, Cintra is one of the world's largest private-sector developers of transport infrastructure, with committed equity investments of more than \$2.1 billion. Cintra is a publicly held company listed in Madrid's Stock Exchange. More than 60 percent of Cintra is held by the Madrid-based Grupo Ferrovial, founded as a construction company in 1952. Ferrovial is now a diversified and stable group that ranks among the top five construction groups by market capitalization in Europe. Its subsidiary, Ferrovial Agroman, has completed construction projects in more than 40 countries and forms, together with Zachry, the construction arm of the team.

Zachry Construction Corporation is a privately held company founded in 1924 and headquartered in San Antonio, Texas. The company provides a wide array of services including construction, project development, construction management and industrial maintenance to both domestic and international customers in the public and private sectors. Engineering News Record lists Zachry among the nation's top 25 construction companies. Zachry currently employs 13,000 people, and its construction projects can be found from coast to coast, with a concentration in Texas and the southeastern sector of the United States.

#### CINTRA/FERROVIAL BUSINESS BACKGROUND

- Cintra ([www.cintra.es](http://www.cintra.es)) is a publicly traded company based in Madrid, Spain. Cintra has a market capitalization of approximately \$5 billion. The company has years of successful transportation experience, including major investment and operating interests in the Chicago Skyway, the 407 ETR highway in Toronto, Canada, and highway investments in Spain, Ireland, Chile and Portugal. Cintra is also the leader in the parking lot business in Spain, currently managing more than 200,000 parking slots.
- Cintra's parent company, Grupo Ferrovial ([www.ferrovial.com](http://www.ferrovial.com)) is also publicly traded. Ferrovial was founded in 1952 and has a market capitalization of approximately \$6.7 billion. Ferrovial has 49,000 employees in 12 countries, including the US, Canada, UK, Australia, Ireland, Poland, Portugal, Italy, and Chile. Other significant investments of Ferrovial are in the Bristol and Belfast (UK) and Sydney (Australia) airports. Ferrovial, through its subsidiary Amey (UK) is also involved in the maintenance and management of the London Subway.

#### ZACHRY BUSINESS BACKGROUND

- Zachry Construction Corporation is comprised of five large business units: Heavy Construction, Building Construction, Power, Industrial Maintenance and Industrial Process with total current 2 contracts exceeding \$3 billion. The roots of the company lay in the construction of major transportation projects, with particular focus in the State of Texas. In fact, Zachry currently has more than \$1 billion in design-build highway and infrastructure construction contracts in Texas.
- Other representative projects include a three-year engineering, procurement and construction (EPC) contract with Freeport LNG Development, L.P., near Freeport, Texas; an EPC contract with Exxon Mobil Oil Corporation for the Beaumont Cogeneration Facility in Beaumont, Texas; and a three-year maintenance contract with Chevron Phillips for five of its domestic facilities in Cedar Bayou, Pasadena, Port Arthur, and Orange facilities in Texas as well as the St. James facility in St. James, Louisiana.
- Zachry's International division contracts are primarily for embassy construction for the Department of State. Current projects include embassy construction in Managua, Nicaragua and Phnom Penh, Cambodia; Zachry is the lead in a joint venture contract for the U.S. embassy in Beijing, China.

#### THE TEAM

- In addition to Cintra and Zachry, our team includes:
- Ferrovial-Agroman (Madrid, Spain)
- Earth Tech, Inc. (California/offices in Texas)
- Bracewell & Patterson, LLP (Texas)
- Rodriguez Transportation Group (Texas)
- Aguirre & Fields, LP (Texas)
- OTHON, Inc. (Texas)
- Pate Engineers (Texas)
- HRM Consultants, Inc. (Texas)
- P1 Resources (Texas)
- Southwestern Capital Markets Inc. (Texas)
- Railroad Industries Incorporated (Nevada)
- Amey, PLC (UK)
- Mercator Advisors, LLC (Pennsylvania and Washington, D.C)
- Public Resources Advisory Group (New York)
- PricewaterhouseCoopers, LLP (New York/offices in Texas)
- JP Morgan Securities, Inc. (New York)

#### THE TRANS-TEXAS CORRIDOR

- The vast majority of those working on Cintra/Zachry's Trans-Texas Corridor project –workers, sub-contractors, suppliers, etc. – will be Texans. Cintra,



Ferrovial Agroman and Zachry Construction will finance, design, build and operate TTC 35 in a manner in which Texas workers, sub-contractors and suppliers will be employed to get the job done. All of the project's construction work will be handled by Texans and Texas sub-contractors.

Estimates show this project will create more than 140,000 direct and indirect Texas jobs.

- The Cintra/Zachry team's Trans-Texas Corridor proposal is just the start of the CDA process and should not be viewed as a final plan. Cintra/Zachry will work with TxDOT to craft more detailed plans and proposals. The initial proposal may change significantly before final plans are approved as environmental approvals, community and traffic assessments and other detailed studies advance toward final determination.
- Cintra/Zachry looks forward to partnering with the Texas Department of Transportation on this important and innovative project.
- Our team will get needed roads built more quickly at very little cost to taxpayers and even expect to return money to the state. Our road projects utilize the latest design and construction techniques to help assure safety, environmental quality and convenience for motorists and surrounding communities.

#### ENVIRONMENTAL AND SOCIAL RESPONSIBILITY

- For the third consecutive year, Ferrovial has been confirmed in the Dow Jones Sustainability Indexes. As in 2003, it is the only Spanish construction group chosen to form part of both the world's and Europe's leading sustainability indexes. The DJ Sustainability indexes are one of the world's prime references for companies committed to criteria of sustainability.
- Cintra and Ferrovial have long records of environmental and social responsibility. In 1997, Ferrovial became the world's first construction company to implement a certified standards-compliant environmental management system.
- In 2002, Ferrovial became a member of The Global Compact, an initiative involving UN organizations, workers' associations, non-governmental organizations, and others committed to promoting and respecting nine universal principles in the field of human rights, labor and the environment.
- The Texas Department of Transportation (TxDOT) will oversee and ensure full compliance with the National Environmental Protection Act (NEPA), in concert with appropriate state and federal agencies. The Cintra/Zachry team will follow all rules set forth by TxDOT, the EPA and other key government agencies.

## **Appendix E: Private rail concessions not a viable transport policy**

(Source: Amin Tamale Kiggundu [www.monitor.co.ug](http://www.monitor.co.ug) Sept 29<sup>th</sup>, 2009)

Some local scribes have described East Africa's first private rail concession as a total failure. The Rift Valley Rail (RVR) concession was granted in 2006 for 25 years, aiming to attract private investment capital and modernise the rail systems in Kenya and Uganda. As a landlocked country with a poor export record, Uganda was forced to grant the above private rail concession because rail transport is extremely critical in reducing the cost of production and improving national economic competitiveness.

Experience from several East Asian countries however, shows that private rail concessions may not always be a viable transportation policy. In both Malaysia and the Philippines for example, private rail concessions were found by a 2004 World Bank study to be underperforming in part because of the unrealistic expectations of their designers and promoters.

Among the key unrealistic expectations was the assumption that the concessionaires would provide all the needed investment capital and avoid government funding. Due to the 1997 Asian financial debacle, the central governments in both Malaysia and the Philippines were forced to adopt several new transport policy interventions.

In Malaysia, the federal government spent about \$ 1.7 billion to rescue the two failing and financially troubled private light rail transit companies, Putra and Star. The two rail companies had failed to service their bank loans because of currency devaluation and general decline in economic activity. The World Bank study also revealed that in both Malaysia and the Philippines, private rail concessions failed to produce a viable and replicable funding model for rail transport.

Importantly, private rail concessions in the above two East Asian countries were not well structured and designed. For example, the investment risks were not efficiently allocated. Risks are allocated efficiently when they are allocated to the party best able to manage them. The practice in both Malaysia and the Philippines was to transfer all the investment risk to the private rail concessionaires.

Obviously, the private sector may not be able to carry out certain formidable tasks such as policy formulation and implementation, control and regulation of foreign currency markets as well as control of the inflation. Given the numerous investment risks associated with private rail concessions, it is critical that coherent and strategic partnerships between the government and the private sector are formed.

One area where public-private sector partnerships may be necessary and beneficial is the mobilisation of the investable funds. Under these partnerships the government may offer soft loans as a way of shielding the private rail concessionaires from the high interest rates associated with commercial bank loans.

It is also necessary to explore the possibility of using the opportunity offered by the emergence of China as a global economic power. With more than \$2 trillion of unencumbered foreign currency reserves, China would be more than willing to help in modernising our rail systems. Aside from the global politics, this will serve as a way of accessing key mineral resources such as gold, diamond and petroleum especially in Uganda and Congo.

Last but not least, since the existing rail system was built by the currently recession hit and seemingly broke Western countries, it would be appropriate to invite another group of rich countries from Asia to modernise it.

***Dr Kiggundu is a lecturer - Makerere University and executive director, Centre for Urban Studies & Research.***

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## Glossary

1. **CDA:** Comprehensive Development Agreement. This is a tool TxDOT uses to enable private development of and, in some cases, private investments in the Texas transportation system.
2. **Eminent Domain:** The right by a government entity to deprive private people of their property by legally grabbing the property at market or below market price.
3. **Equivalent Annual Cost (EAC):** is a capital budgeting method which uses the discounted cost per year of owning and operating an asset.
4. **Force Majeure:** A natural occurrence that can not be prevented by human actions.
5. **Internal Rate of Return:** A capital budgeting method which uses the discounted cash flow when NPV equals Zero, without considering outside factors like inflation and financial interest rates.
6. **Modified Internal Rate of Return (MIRR):** This is a capital budgeting method which corrects some of the problems inherit in the IRR. E.g the fact that IRR does not correctly give answers to project with alternative positive and negative cash flows.
7. **Net Present Value (NPV):** A capital budgeting method which uses the net value of all future cash flows discounted to the present time.
8. **NTP:** Notice To Proceed. A document that a constructor needs before it can begin constructing a project.
9. **TIFIA:** Transportation Infrastructure Financing and Innovation Act.
10. **TxDOT:** Texas Department of Transportation

11. **Real Option:** The adjustments that a firm can make after a project is underway.
12. **UDAG:** Urban Development Action Grant. This was a federal program enacted in the Jimmy Carter presidency (1977) with the purpose of loaning money to revitalize distressed urban centers by acting as an incentive for private sector investment.
13. **WACC:** Weighted Average Cost of Capital. The minimum rate that a company has to repay all the people and entities that have invested capital in the company, e.g creditors and owners.

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## **Vita**

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