

Analysis of Risk Transfer in Public-Private Partnerships (P3s)



TABLE OF CONTENTS

INTRODUCTION.....	3
BACKGROUND.....	3
METHOD.....	4
RESULTS.....	5
CONCLUSION.....	7
REFERENCES.....	8

INTRODUCTION

A Public-Private Partnership (P3) is a project delivery model that is employed for projects with a capital cost greater than \$100 million or projects that involve complex factors and significant risk. In Ontario, the P3 delivery model is enabled by Infrastructure Ontario (IO), which works to partner public sector project owners to private sector partners. In the construction field, where schedule delay and cost overruns have become common occurrence, the P3 model administered by IO has led to favorable outcomes, with 95% of projects coming in on budget, and 69% of projects being delivered on-time¹ (where the definition of on-time delivery is within one month of the substantial completion date).

In cases where on-time project delivery was not achieved, the private sector retained full or shared responsibility for the delay in many cases. The P3 structure effectively limits the public sector's exposure to financial risks and encourages efficient performance from the private sector.

By establishing the amount of risk transferred, retained or shared, and quantifying it by assigning dollar values in accordance with best practices, the value of the risk transfer can be defined and considered when valuating the benefit of a change in project delivery model. An analysis of risk transfer in P3s is undertaken within this document with the aim of:

- 1 Establishing the market guideline for risk transfers within the Province of Ontario;
- 2 Understanding the range of VFM achieved by benchmarking P3 projects; and
- 3 Clarifying the methods typically used for risk assessment in IO's VFM methodology.

BACKGROUND

Value for Money (VFM) is the quantitative measure that involves a combination of quantity, quality, features and price over the project's life cycle². VFM is said to be achieved if delivering a project through the P3 delivery model is found to have a lower total cost than delivery through traditional means (referred to as the Public Sector Comparator, or PSC). For a project to proceed under the P3 delivery model in the Province of Ontario, VFM must be demonstrated through IO's standard VFM methodology and is typically undertaken by an external advisory firm.

Risk is a major driver for determining VFM for projects. Risk is defined as "the probability that the actual outcome will deviate from the expected (estimated) outcome³. By leveraging IO's methodology, risks are identified with a range of potential costs quantified through workshops. Risk matrices have been developed as a starting point for the risk assessment process, but it should be noted that risks vary depending on project-specific aspects and specific delivery models. There are four steps identified in IO's VFM methodology to incorporate project specific risk⁴:

- 1 Identify the project specific risks;
- 2 Allocate these risks to the party best able to manage the risk;
- 3 Estimate probability of occurrence of these risks and the resulting cost impact ranges; and
- 4 Run statistical analysis to quantify the total risks retained by the public sector.

¹ <https://www.infrastructureontario.ca/WorkArea/DownloadAsset.aspx?id=36507222863>

² <https://www.infrastructureontario.ca/Value-For-Money/>

³ <http://www.oecd.org/governance/budgeting/49070709.pdf>

⁴ <https://www.infrastructureontario.ca/Value-For-Money/>

Statistical simulation uses a parametric model where the cost of risk is a function of the risk impacts for all identified risks. Random inputs within the defined range are used for each risk, and then the model is evaluated at a minimum of 10,000 times with varying random inputs. The distribution of results is statistically analyzed, and the mean cost of risk is used.

By leveraging the above steps, project risk is incorporated into the VFM assessment, quantifying benefits obtained by the public sector through the transition to a P3 model. In previous analyses completed by WSP, this methodology was repeated for different common delivery models to provide the client with an understanding of the risk advantages that would be obtained from selecting them. In the following sections, risk-related trends observed in P3 procurement and the methodology used to analyze these trends is provided.

METHOD

The method used to analyze risk transfers in P3s included a review of VFM reports for projects delivered under this alternative delivery model. Within the Province of Ontario, VFM reports are published by IO and released to the public after financial close, with the aim of providing a basis for the decision to proceed with the P3 model to the public.

The following method was followed to review projects in this analysis:

- 1 For transparency of analysis, IO’s P3 project list was used as the main point of reference, and VFM reports were obtained from this site, where available, and for projects at or beyond financial close;
- 2 VFM for all projects delivered under the Design-Build (DB), Design-Bid-Build (DBB), Design-Build-Finance (DBF), Design-Build-Finance-Maintain (DBFM) and Design-Build-Finance-Operate-Maintain (DBFOM) were analyzed, to provide concise and observable conclusions; and
- 3 Where public information is withheld by IO or the public owner, additional research to ascertain VFM information was not completed.

Using the above criteria, the VFM reports for 42 P3 projects were reviewed for this analysis. A summary of project value and sector for these projects is shown in **Figure 1**.

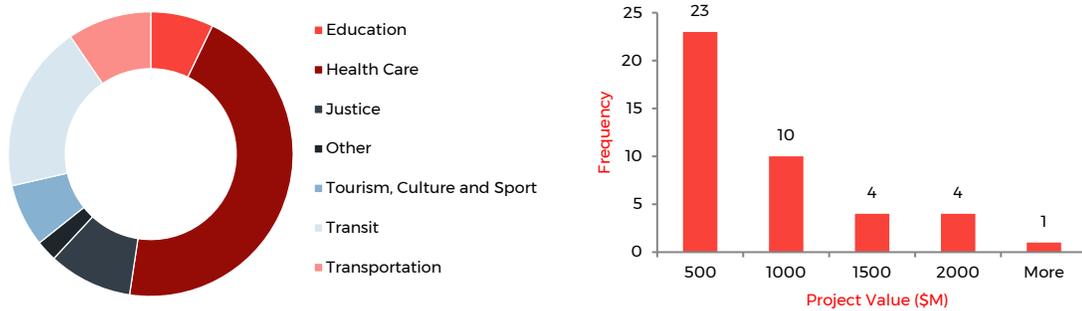


Figure 1: Summary of Reviewed Projects

To quantify the amount of risk transfer on a comparable basis between projects, the percentage of total cost that retained risk accounts for in the PSC and P3 models, then taking the difference between them. As an example, if the retained risk in the PSC model accounts for 40% of the total project cost, and in the P3 model, it accounts for

20% of total project cost, then the amount of “risk transfer” would be 20%. Recall that VFM is the difference between the PSC and P3 model costs, and can be expressed in terms of percentage as well by subtracting the P3 total project costs from the PSC and dividing it by the same PSC cost. It should also be noted that although all delivery models mentioned in the method were reviewed, only DBF and DBFM projects had publicly available VFM data and were beyond financial close.

RESULTS

By using the above method, the following insights were obtained.

RETAINED RISK IS A LARGE PROJECT COST

Recalling that projects must either be greater than \$100M in project cost or involve complex risks to be considered for P3, the retained risk by the public sector is a huge part of the total project cost. This can largely be offset by transitioning to the P3 model. **Figure 2**, below, shows the percentage of total costs that are accounted for by retained risk, on average, by delivery model.

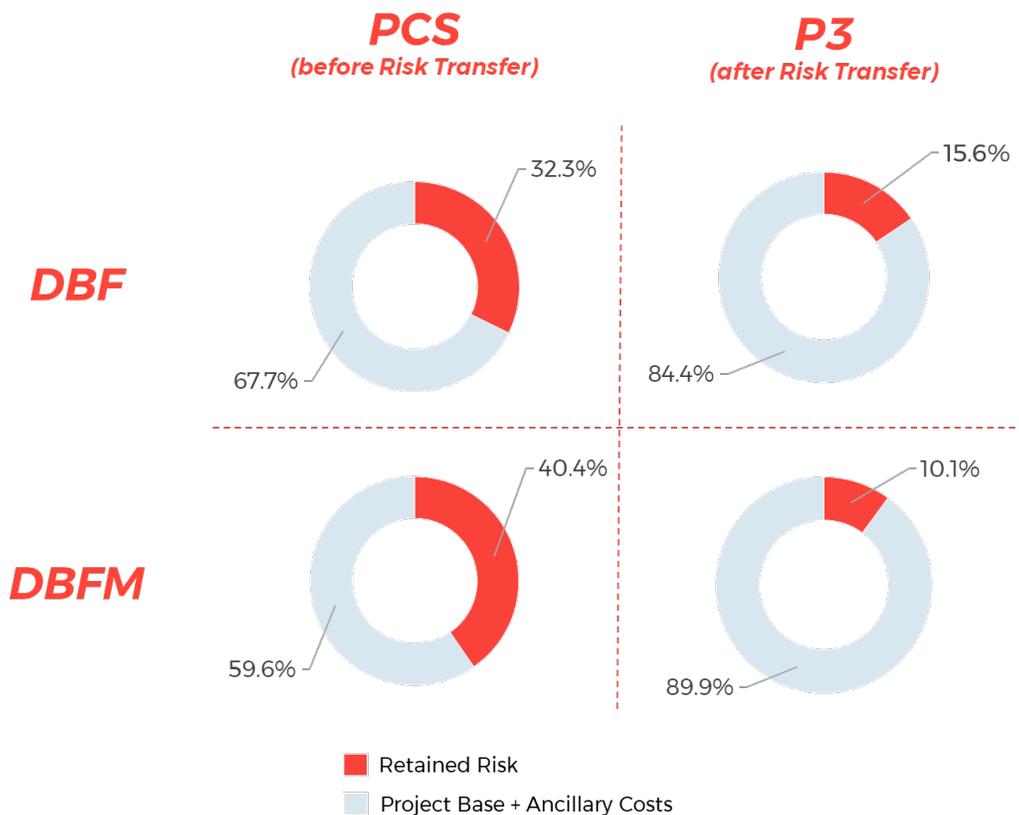


Figure 2 : Retained Risk in DBF, DBFM models (before and after Risk Transfer)

By sector, the average retained risk for PCS and P3 are shown in **Table 1**, but it should be noted that aside from the justice, transit, transportation and healthcare sectors, the results are given for a smaller sample size.

Table 1: Average Retained Risk (by Sector)

SECTOR	PCS RETAINED RISKS (% OF TOTAL COSTS)	P3 RETAINED RISKS (% OF TOTAL COSTS)
Education	28.9%	14.5%
Health care	39.5%	12.3%
Justice	38.8%	8.1%
Tourism, culture and sport	42.7%	21.8%
Transit	30.8%	12.2%
Transportation	40.1%	7.8%
Other	39.1%	7.5%

In the above table, it can be noted that in the PCS, the amount of total costs that retained risks account for is 37.3%, on average. By transitioning to the P3 model, this average amount decreases to 12.2% which, by using the method described in the previous section, represents an average risk transfer of 25.1%.

AMOUNT OF RISK TRANSFER VARIES BY SECTOR

Transportation projects (which are separate from transit projects) have the highest risk transfer percentage. This could be associated with the fact that these projects are mostly delivered under the DBFM model, which can transfer the maintenance risk to the private sector. Separating these by sector allows us to understand the sector-specific risks and infer how much risk transfer in each sector is reasonable. The amount of risk transfer for each sector is shown in **Table 2**. Standard deviation is provided to show the variation of results.

Table 2: Risk Transfer (by Sector)

SECTOR	RISK TRANSFERRED (% difference between PSC/P3)	STANDARD DEVIATION (% from mean)
Education	14.4%	8%
Health care	27.2%	10%
Justice	30.7%	2%
Tourism, culture and sport	20.9%	7%
Transit	18.5%	7%
Transportation	32.3%	3%
Other	31.6%	(one project only)

The amount of risk transfer clearly varies across sectors, and can be associated with the sector specific risks and the way that these specific risks can be shared or transferred.

DELIVERY MODEL IMPACTS RISK TRANSFER

A more intuitive insight is that delivery models that involve the transfer of maintenance risks over to the private party allows for higher average risk transfer. Projects delivered under the DBFM model had an average risk

transfer of 30.3%, and projects delivered under the DBF model had an average risk transfer of 16.6%, which represents a difference of 13.7%.

TYPICAL VALUE FOR MONEY IS RELATIVELY SIMILAR ACROSS SECTORS

The VFM obtained on P3 projects had a range between 6% to 24%. **Figure 3** shows the VFM obtained in projects that were reviewed for this project. The average VFM was 15.2%.

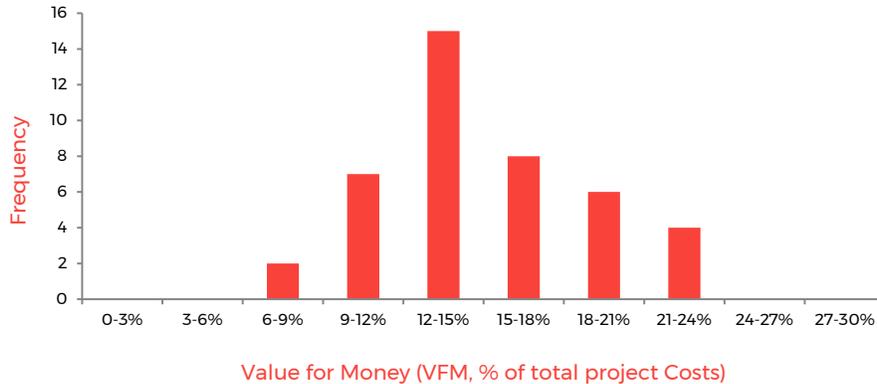


Figure 3: Value for Money obtained in P3 Projects

The average VFM by sector was +/- 3% from this average, showing that VFM was not as correlated with sector as risk. In addition, when comparing delivery models (such as DBF and DBFM) it was found that the average VFM by delivery model was +/- 0.6% from this average, showing that VFM was also not as correlated with the delivery model. This result could be interpreted to mean that the optimal delivery method was chosen for most projects.

CONCLUSION

Risk transfer in P3 projects is often subject to scrutiny. Since risk accounts for such a large portion of project costs and its valuation is may be perceived as unclear, clarity and transparency in the way risk is presented to the public are important. IO’s VFM methodology provides a level of clarity to the public by standardizing the way that these assessments are completed. A benchmarking of past P3 projects was undertaken for this analysis, with relationships identified between risk transfers, VFM, project sector and project delivery models.

To determine what delivery model works best for your project, Procurement Options Analysis (POA) is a standard assessment that is completed for most projects. These typically involve three pieces of work:

- 1 A technical piece, typically provided by an engineering consultant;
- 2 A financial piece, assessing VFM and risk, typically provided by a financial services firm; and
- 3 A commercial piece, typically provided by a law firm.

WSP’s Advisory Services group has the capacity to complete all three pieces of work for a client. This allows a client to leverage WSP’s global experience with P3 planning, procurement advisory and asset management. WSP is confident in its ability to deliver this type of work for clients. WSP takes pride in being a global leader in the professional services field and in delivering solutions that are future ready, adapted to local markets.



REFERENCES

Burger, P., & Hawkesworth, I. (2011). How to Attain Value for Money: Comparing PPP and Traditional Infrastructure Public Procurement. *OECD Journal on Budgeting*, 1-6.

Hanscomb. (2019). *Infrastructure Ontario - Track Record 2018 Report*. Ottawa: Hanscomb Quantity Surveyors.

Infrastructure Ontario. (2015). *Assessing Value for Money - An Updated Guide to Infrastructure Ontario's Methodology*. Ottawa: Queen's Printer for Ontario.