**P3 Financial Viability Exercise**

**ANSWERS SHOWN IN RED**

**Objectives of this exercise**

Learn how to estimate affordability for a public agency under various financing scenarios for (a) Conventional Delivery; and (b) P3 Delivery

**Project Background**

A study was done previously by a state DOT to estimate Value for Money and net social benefits of P3 delivery for a highway project. The various inputs required for the analysis are included in the P3-VALUE 2.0 spreadsheet model. The project information is as follows:

* 20 miles highway expansion
* Expansion from 3 lanes to 5 lanes in each direction:
  + 3 General Purpose Lanes (GPL)
  + 2 Managed Lanes (ML)
* Costs under PSC (excluding risks and financing):
  + Pre-construction & construction: $25M and $400M respectively
  + Routine O&M: $4M per year
  + Major maintenance: $10M (every 8 years)
* Preconstruction under PSC starts in 2015; 2 years duration
* Construction duration under PSC: 4 years, starting in 2017
* Operations period under PSC: 40 years, starting in 2021

**Analysis Steps**

**Part A:** Conventional Delivery

1. Test the impact of a lower DSCR requirement;
2. Test the impact of a longer debt maturity;
3. Test the impact of lower interest rates*.*

**Part B:** P3 Delivery

1. Test the impact of an optimistic scenario with reduced DSCR, increased debt maturity and lower interest rate;
2. Test the impact of increased leverage;
3. Test the impact of higher peak period toll rates*.*

**Process to Access the Financial Viability Module**

1. Open P3-VALUE 2.0 Excel file.
2. When opening the file, Excel may prompt you to approve the use of macros. To do so, click “Enable editing” and/or “Enable content” on the yellow bar across the top of the screen.
3. After the model opens, the following user form will appear.



1. Select the “Training Navigator” to access the training modules. The “Training Navigator” contains four training modules that provide limited access to only the most relevant inputs and outputs for a particular training session.
2. Select “Module 4: Financial Viability Assessment” and proceed with the steps below (Note that the Training Navigator window may be closed and reopened at any point. Also, the tool has already been optimized and therefore optimizing the tool is not required unless specified).

**Part A: Financial Viability of Conventional Delivery**

Levers in Conventional Delivery are:

* Project scope
* Debt terms:
  + Annuity re-payment vs. sculpted debt
  + DSCR
  + Debt maturity/grace period
  + Interest rate
* Revenue:
  + Toll rates

Conventional Delivery contains the following financial inputs:

* **Subsidy**: Public subsidy amount
* **Debt**: Annuity vs. sculpted, maturity, grace period, interest rates, fees, minimum required DSCR
* **Reserves**: Number of months of debt service required, interest received on cash balances and reserves
* **Revenue**: Toll rates and traffic forecasts

Review the key project information in the ***InpFin*** and ***InpTraffic&Toll*** sheets of the model provided. Review the **Financing Outputs** and record the base case outputs in the Conventional Delivery Test Results table below. Then perform the following three tests:

1. Test the impact of a lower DSCR requirement: To do so, reduce the minimum DSCR requirement (I41 in ***InpFin*)** to 1.20x, optimize the model and record the results the Conventional Delivery Test Results table below.
2. Test the impact of a longer debt maturity: Increase the debt maturity (I36 in ***InpFin*)** to 40 years, optimize the model and record the results the Conventional Delivery Test Results table.
3. Test the impact of lower interest rates: Reduce the interest rate (I39 in ***InpFin***) to 3%, optimize the model and record the results the Conventional Delivery Test Results table.

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| **Scenario** | **Debt size  ($k,  N12)** | **Average calculated  DSCR (N7)** | **Minimum calculated DSCR (N8)** | **Subsidy ($k, N13+N14)** |
| Base Case: Sculpted with 30 yrs maturity, minimum DSCR 1.30x, 4% interest rate, default tolls | **334,375** | **1.30** | **1.30** | **282,019** |
| Test 1: Reduce minimum DSCR to 1.20x | **362,789** | **1.20** | **1.20** | **257,206** |
| Test 2: Increase debt maturity to 40 years | **418,638** | **1.20** | **1.20** | **206,071** |
| Test 3: Lower interest rate to 3% | **503,152** | **1.20** | **1.20** | **117,530** |

Below, please respond to the following question; we will also discuss it at the webinar:

1. Which test has the largest impact on the required subsidy? Why do you think this is the case?

**Test 3 has the largest impact on the required subsidy among these specific scenarios. It reduces the total subsidy by $89 M compared to the Test 2 scenario and by $164 M when compared to the base case.**

**Although all changes in financing conditions have a significant impact on the debt capacity, the interest rate reduction from 4% to 3% results in the biggest increase in debt capacity, demonstrating the importance of accurate interest rate assumptions.**

1. Does the total funding (Debt size + Total Subsidy) change with each test? If there are changes, what might be the reason for the changes?

**The total funding ranges from $616 M in the base case to $624 M in Test 2. While each individual component changes, there is relatively little overall variation as the needs of the project do not change. However, additional debt does increase the amount of capitalized interest during the construction period (assuming no interest is paid during construction, which is typically the case in a project that cannot generate revenues during construction), resulting in higher overall financing needs. Also, since debt issuance fees are calculated as a percentage of the total amount borrowed, the fees increase as the amount of financing needs increases. In combination, this results in an increase of the total funding and financing needs.**

1. Compare the debt size for each of the above scenarios with the debt size under the P3 option. Can you explain the significant difference?

**The debt capacity primarily depends on the cash flows available for debt service (CFADS). The calculation of these CFADS are different under conventional and P3 delivery. Under P3, the T&R projection is used to determine how much revenues are available to 1) pay for operating costs and 2) service debt. The (more expensive) P3 financing conditions already reflect uncertainty in the T&R projections. To ensure that uncertainty in T&R projections is accounted for under conventional delivery, P3-VALUE 2.0 makes a revenue uncertainty adjustment to the projected revenues based on the difference in financing conditions between a P3 availability payment structure and a P3 toll concession (see *InpFin*, row 71). As a result, the cash flows available for debt service are different for conventional delivery and P3.**

**Furthermore, P3 delivery requires an equity contribution, which helps reduce the overall debt financing needs. To determine the required subsidy and debt capacity, the model optimizes the conventional and P3 financing structure in different ways. For both models, the specified minimum DSCR must be met at all times. However, for P3, the target equity return (subject to a specified debt-to-equity ratio) must also be achieved. These will lead to different subsidy amounts and debt capacity. As a result of the above, the overall debt amount is likely to be different under conventional delivery and P3.**

**Part B: Financial Viability of P3 Delivery**

Financial levers in P3 Delivery are:

* Project scope
* Financing terms:
  + Annuity debt re-payment vs. sculpted debt
  + DSCR
  + Debt maturity/grace period
  + Interest rate
  + Equity return required
* Revenue:
  + Toll rates and traffic forecasts

The P3 Option contains the following financing inputs:

* **Subsidy**: Subsidy amount
* **Equity**: Cost of equity, gearing
* **Debt**: Annuity vs. sculpted, maturity, grace period, interest rates, fees, minimum required DSCR
* **Reserves**: Number of months of debt service required, interest received on cash balances and reserves
* **Revenue**: Toll rates and traffic forecasts

Review the key project information in the ***InpFin*** and ***InpTraffic&Toll*** sheets of the model provided. Review the **Financing Outputs** and record the base case outputs in the P3 Test Results table below. Then perform the following three tests:

1. Test the impact of an optimistic scenario with reduced DSCR, increased debt maturity and lower interest rate: Reduce the DSCR to 1.25x (I64 in ***InpFin***), increase the debt maturity (I59 in **InpFin**) to 35 years, and lower the interest rates (I61/I62 in ***InpFin***) to 5%, optimize the model and record the results in the P3 Test Results table below.
2. Test the impact of increased leverage: Increase the gearing/debt-to-equity ratio (I55 in ***InpFin***) to 80%-20%, optimize the model and record the results in the P3 Test Results table below.
3. Test the impact of higher peak period toll rates: Increase the peak weekday toll rate for 2-axle vehicles (L21 in ***InpTraffic&Toll***) by $0.25, optimize the model and record the results in the P3 Test Results table below.

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| **Scenario** | **Equity ($k,  N30)** | **Equity IRR % (N34)** | **Minimum DSCR  (N23)** | | **Concession fee/subsidy  ($k, N28+N29)** |
| Base Case: Sculpted with 30-yr maturity, minimum DSCR 1.30x, gearing 75%-25%, 6% interest rate, default toll rates | **79,539** | **12.00** | | **1.63** | **205,055** |
| Test 1: Reduce DSCR to 1.25x, increase maturity to 35 years, lower interest rate to 5% | **89,396** | **12.00** | | **1.89** | **160,169** |
| Test 2: Increase gearing to 80%-20% | **76,406** | **12.00** | | **1.66** | **138,137** |
| Test 3: Increase peak tolls for 2-axle vehicles by $0.25 | **78,680** | **12.00** | | **1.66** | **126,808** |

Below, please respond to the following questions (we will also discuss it at the webinar):

1. Which test has the largest impact on the required subsidy? Why do you think this is the case?

**Test 1 has the largest impact on the required subsidy. Reducing the DSCR, increasing the maturity, and lowering the interest rate reduced the total required subsidy by $142 M. Improving the terms of the debt (other than gearing) has a larger impact on the required subsidy than the other two tests. The increase in gearing lowers the required subsidy by about $22M, a substantial amount. A toll increase of $0.25 is relatively small and causes a relatively small impact.**

2. Why does the Equity contribution increase for Test 1 and decrease or stay about the same for Tests 2 and 3?

**Each of the tests makes the project increasingly more profitable from the concessionaire’s perspective. As the model optimizes the P3 bid by changing the subsidy to the concessionaire in such a way that the target equity return and minimum DSCR are both met, a more profitable project will lead to a lower subsidy (as observed). In an ideal financing structure, the target equity return and minimum DSCR would both be met at the same time. However, given that the leverage is fixed as an input (typically a hard condition from the debt financiers), that may not always be the case.**

**In the first test, the required subsidy is reduced by $45M. However, the underlying cost of the project hasn’t effectively changed (with the exception of interest during construction and debt fees). As the financing conditions are now less restrictive and cheaper, the project can sustain more debt ($30M, or 75% of the increase in financing needs). The remainder is provided by equity ($10M, or 25% of the increase in financing needs). The result is an equity return that is exactly equal to the target equity return, but a relatively high minimum DSCR.**

**By increasing leverage under the second test, more of the financing will come from debt (which results in a small increase in the overall project cost due to higher interest during construction and fees) and less from equity. Under this test, the target equity return is still met but the DSCR is still above target (but lower than under the first test).**

**The increase in toll makes the project more attractive, hence reducing the subsidy. The reduction in subsidy ($11M) is offset by an increase in debt ($9M, or 80% of the increase in financing needs) and equity ($2.3M, or 20% of the increase in financing needs).**

1. Why does the Minimum DSCR drop in Test 2 but remains constant in Test 3?

**In line with the explanation provided above, an increase in leverage in Test 2 allows for a more efficient financing structure (DSCR closer to target DSCR while meeting target equity return). In Test 3, the increase in revenues does not change the overall financing structure, resulting in the same minimum DSCR as under Test 2.**