**P3 Value for Money Analysis Homework**

**Objectives of this exercise**

* Learn how to compare the Public Sector Comparator to the P3 option to determine which option delivers greater Value-for-Money (VfM) from the perspective of the procuring Agency.
* Learn how to identify key drivers in the VfM analysis.

**Project Background**

A study was done previously by a state DOT to estimate Value for Money 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: Start in 2015; 2 years duration
* Construction duration under PSC: 4 years
* Operations period under PSC: 40 years

**Analysis Steps**

**Part A:** Use the Value for Money Analysis training module to review VfM for a toll concession:

1. Review Public Sector Comparator (PSC)
2. Review P3 Option
3. Compare PSC and P3 Option from the perspective of the Agency

**Part B:** Test the impact of an alternative discount rate on VfM

**Part C**: Estimate VfM for an availability payment (AP) P3 concession.

**Part D:** For the AP concession, estimate the contribution to VfM of some key P3 assumptions:

1. Timing of construction completion
2. Efficiencies assumed for preconstruction and construction costs
3. Efficiencies assumed for O&M and major maintenance costs

**Part A: Toll Concession**

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 model. 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. Then select “Module 1: Value for Money Analysis” and proceed with the steps below.

***Step 1: Conventional Delivery (PSC) Option***: Review the key project information (except for **Risks** which will be covered later in Module 3 on Risk Assessment):

* **Revenues** and their timeline (see *InpTraffic&Toll* through row 28)
* **Costs** and their timeline (see *InpTiming&Cost* through row 79and *InpSeries* through row 32)
* **Competitive neutrality adjustment** to correct for taxation effects in the P3 option (see *InpFin,* row 22-23)
* **Financing fees**, which are the upfront costs incurred to arrange public debt (see *InpFin,* row 40)

Review and record below the PSC net revenues/costs to the Agency (see **VfM Output Summary** sheet).

**PSC Output**

|  |  |  |
| --- | --- | --- |
| **Costs & revenues under Conventional Delivery** | **NPV @ 4.00%** | **Nominal total** |
| **Units >>** | **USD m** | **USD m** |
| Toll revenues |  |  |
| Toll revenues uncertainty adjustment |  |  |
| Pre-construction & construction costs |  |  |
| O&M costs |  |  |
| No Build O&M cost savings |  |  |
| Base variability |  |  |
| Pure risks |  |  |
| Lifecycle performance risk |  |  |
| Financing fees |  |  |
| Competitive neutrality adjustment |  |  |
| ***Total net revenues / (costs) under Conventional Delivery*** |  |  |

Below, please respond to the following questions; we will also discuss them at the webinar:

1. *Ignoring uncertainty and risk adjustments for now, and considering the inputs, do the numbers look reasonable?*
2. *How do nominal costs compare with the inputs? Can you explain the differences?*
3. *Review the discounted values (i.e., NPV) of costs and revenues. Do they make sense?*
4. *Do you think the discount rate of 4% selected to calculate present values is reasonable? Why?*

***Step 2: P3 Option***:

Differences relative to conventional delivery that may be achieved from P3 delivery include:

* Longer project preparation time
* Shorter construction duration
* Higher public procurements costs
* Lower lifecycle costs
* Lower risk contingencies

The P3 Option inputs comprise the following:

* **Revenues:** PSC revenues and timeline, but adjusted to take into consideration assumed P3 differences; for this project, toll rates are the same as PSC, but begin sooner due to earlier completion of construction.
* **Costs:** PSC costs and timeline, but adjusted to take into consideration assumed P3 differences; review the differences assumed in timing and cost between PSC and P3 in the ***InpTiming&Cost*** sheet through row 65**.**
* **Risks:** PSC risks, but adjusted to take into consideration assumed P3 differences; we will review these later in Module 3 on Risk Assessment
* **Financing:** This includes fees, which are the upfront costs incurred to arrange loans/bonds; as well as parameters for debt, equity, reserves and agency contributions (i.e., subsidy/milestone payment); review these in rows 50-68 in ***InputFin***.

Now please consider how a P3 developer might prepare a bid, as reflected in the third table on the ***VfM Output Summary*** sheet. Combining all revenues, costs, risks and financing allows the concessionaire to prepare a bid. Depending on the structure of the transaction, the bid is either a subsidy/concession fee for a toll concession, or an availability payment for an AP concession. Since we are considering a toll concession, the model calculates either a subsidy (for a revenue-negative project) or a concession fee (for a revenue-positive project).

Review and record below the P3 net revenues/costs to the Developer (see ***VfM Output Summary*** sheet, third table).

**P3 Output – Private Perspective**

|  |  |  |
| --- | --- | --- |
| **Costs & revenues to Developer under P3** | **NPV** | **Nominal total** |
| **Units >>** | **USD m** | **USD m** |
| Toll revenues for private side |  |  |
| Pre-construction & construction costs (transferred) |  |  |
| O&M costs (transferred) |  |  |
| Base variability (transferred) |  |  |
| Pure risks (transferred) |  |  |
| Net subsidy from Agency to Developer |  |  |
| Financing fees |  |  |
| Taxes |  |  |
| ***Total net revenues / (costs) to Developer under P3*** |  |  |

Below, please respond to the following questions; we will discuss at the webinar:

1. *Ignoring uncertainty and risk adjustments for now, and considering the inputs, do the numbers look reasonable?*
2. *Review the nominal toll revenues. How do they compare with PSC revenues? Considering the inputs, why do you think they differ?*
3. *Review the discounted values (NPV) of revenues. Why are they lower than under the PSC?*
4. *Is the discount rate used to calculate present values reasonable? Why?*
5. *Why is there no estimate for lifecycle performance risk or for revenue uncertainty, as for the PSC?*
6. *Why is the NPV of total net revenues / (costs) to Developer under P3 equal to zero?*

From the procuring Agency’s perspective, the cost of P3 includes the above bid as well as any retained costs or risks. Review and record below the P3 net revenues/costs to the Agency (see the second table in the ***VfM Output Summary*** sheet).

**P3 Output – Agency Perspective**

|  |  |  |
| --- | --- | --- |
| **Costs & revenues to Agency under P3** | **NPV @ 4.00%** | **Nominal total** |
| **Units >>** | **USD m** | **USD m** |
| Toll revenues (for public side) |  |  |
| Toll revenues uncertainty adjustment (for public side) |  |  |
| Pre-construction & construction costs (retained) |  |  |
| O&M costs (retained) |  |  |
| No Build O&M cost savings |  |  |
| Base variability (retained) |  |  |
| Pure risks (retained) |  |  |
| Net subsidy from Agency to Developer |  |  |
| ***Total net revenues / (costs) to Agency under P3*** |  |  |

Below, please respond to the following questions; we will discuss at the webinar:

1. *Ignoring uncertainty and risk adjustments for now, and considering the inputs, do the numbers look reasonable?*
2. *Why are there no toll revenues?*
3. *Review the discounted present values of pre-construction and construction costs. Why are they lower than under PSC or the Developer costs?*
4. *Why is the discounted value (NPV) of the net subsidy from the Agency to the Developer different from the same subsidy in the table on the Developer’s bid?*
5. *Why is the discount rate different from the rate used to calculate the Developer bid?*

Please fill in the blanks below (see ***VfM Output Summary*** sheet):

* NPV of net revenues/costs to Agency under PSC $\_\_\_\_\_\_\_M
* NPV of net cash flows to Agency under P3 $\_ \_\_\_\_\_\_M
* NPV of difference (= VfM) $\_\_\_\_\_\_\_\_M

Below, please respond to the following questions; we will discuss at the webinar:

1. *Is the VfM estimate sufficient to decide whether the State DOT should procure this project as a P3 or use conventional procurement? Why or why not?*
2. *Why do No Build O&M cost savings differ between PSC and the Agency Costs & Revenues under P3? Why are No Build O&M cost savings excluded in the Developer table?*

**Part B: Impact of change in discount rate from 4% to 5%**

Now change the discount rate used in the VfM analysis from 4% to 5% (cell F14 in ***InpFin***), optimize the model and record the revised estimates below. (Note: Optimizing the model may take a few minutes)

* NPV of net revenues/cost to Agency under PSC $\_\_\_\_\_\_\_\_M
* NPV of net cash flows to Agency under P3 $\_\_\_\_\_\_\_\_M
* NPV of difference (= VfM) $\_\_\_\_\_\_\_\_M

Below, please respond to the following questions; we will discuss at the webinar:

1. *Review the nominal and present value of subsidy costs to the Agency under P3. Can you explain the difference relative to the VfM output using a 4% discount rate?*
2. *Did the NPV of the value for money increase or decrease? How would you address an uncertainty with regard to which discount rate to use?*

**Part C: VfM for an Availability Payment P3**

Change the discount rate used in the VfM analysis back to 4% and change the active scenario to “PSC: Toll; P3: Availability Payment” (cell F6 in ***InpFin***).

Review all financing inputs for this scenario. Then optimize the model and record the revised estimates below:

* NPV of net revenues/cost to Agency under PSC $\_\_\_\_\_\_\_M
* NPV of net cash flows to Agency under P3 $\_\_\_\_\_\_\_M
* NPV of difference (= VfM) $\_\_\_\_\_\_\_M

Below, please respond to the following questions; we will discuss at the webinar:

1. *Given the inputs alone, why are revenues under P3 different from revenues under conventional delivery?*
2. *Why did the discount rate used for the Developer cost change?*
3. *Did the NPV of the value for money increase or decrease relative to the toll concession VfM? Can an Agency make a choice of P3 structure based only on these results? Why or why not?*

**Part D: Test P3 Value Drivers:**

For the AP scenario, check one by one the effect of key P3 cost efficiency assumptions on VfM. After each input change, optimize the model and record the revised VfM estimates. Each model run should be additive, i.e., do not reverse any changes you made in the prior run.

Construction timing – Increase P3 construction duration to 4 years to match PSC schedule (L14 in ***InpTiming&Cost***), hit “calculate now” under Formulas on the Excel toolbar, and adjust InpSeries accordingly so that 25% of construction cost is expended in each of the 4 years (row 66-73). Record the results below:

* NPV of net revenues/cost to Agency under PSC $\_\_\_\_\_\_\_M
* NPV of net cash flows to Agency under P3 $\_\_\_\_\_\_\_M
* NPV of difference (= VfM) $\_\_\_\_\_\_\_M

Pre-construction and Construction Cost – Eliminate the reduction in P3 pre-construction cost (L26 in ***InpTiming&Cost***) and construction costs (L37-L38 in ***InpTiming&Cost***) to match PSC inputs, i.e., 0% P3 cost efficiencies. Record your results below:

* NPV of net revenues/cost to Agency under PSC $\_\_\_\_\_\_\_M
* NPV of net cash flows to Agency under P3 $\_\_\_\_\_\_\_M
* NPV of difference (= VfM) $\_\_\_\_\_\_\_M

Operations Cost – Eliminate reduction in P3 operation costs (O&M and major maintenance) to match PSC operation costs (0% P3 cost efficiencies, L52 and L59 in ***InpTiming&Cost***)

* NPV of net revenues/cost to Agency under PSC $\_\_\_\_\_\_\_M
* NPV of net cash flows to Agency under P3 $\_\_\_\_\_\_\_M
* NPV of difference (= VfM) $\_\_\_\_\_\_\_M

Below, please respond to the following questions; we will discuss at the webinar:

1. *Which set of P3 efficiency assumptions appear to have the biggest impact on VfM?*
2. *Why did the PSC’s net cost to the Agency change, even though no changes were made to PSC input data?*

**Thank you for your efforts! To receive a certificate from FHWA’s Office of Innovative Program Delivery acknowledging your participation in the Webinar and completion of the exercise, please email your completed answers by Tuesday, February 16 at 12:00pm Eastern to Patrick DeCorla-Souza at:** [**patrick.decorla-souza@dot.gov**](mailto:patrick.decorla-souza@dot.gov)