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An Evaluation of Availability-Based Payments for US Public-Private Partnerships

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Abstract: We investigate the emerging use of availability payments as a method for reimbursing private sector delivery teams for the costs of designing, constructing, financing, operating and maintaining major highway, bridge and tunnel facilities delivered through Public-Private Partnerships (PPPs) in the US. We compare traditional and innovative approaches to infrastructure finance, contrasting the structure of availability payment-based PPPs to other forms of public-private partnerships and providing a comprehensive profile of 12 availability payment projects that are currently proposed, under construction or completed. The paper presents the perspectives of a panel of infrastructure finance experts regarding availability payment-based PPPs, and discusses the potential of availability payments for posing moral hazards to public sponsors. We find that the advantages of availability payments are dependent on fully transparent PPP contracting and execution. There must be mechanisms in place to continuously hold the various members of the PPP project team accountable for their performance under the contract. Such safeguards are essential to compensate for the diminished level of general public involvement in authorizing these projects and the potential for abuse due to a lack of prudent oversight.

Key words: availability payments; public-private partnerships; construction financing; moral hazard
JEL code: R42

1. Introduction

Public-private partnerships (PPP) have many variations and forms of financing (Roumboutsos & Pantelias, 2015; Tang et al., 2010). They are increasingly used for the provision of public infrastructure (De Schepper et al., 2014). Some reasons for their increasing use are the ability of state and local governments to avoid legal and procedural restrictions that normally apply to public construction projects (Bloomfield et al., 1998), and the lack of capital available to governments for such projects (Aziz, 2007). Many articles have compared the risks and advantages of PPP approaches over the traditional method of the public sector retaining the responsibility for financing, design, construction and operations (see for example: Evenhuis & Vickerman, 2010; Cruz & Marques, 2011; Macario, 2010). What has been less studied is the use of availability payments (AP) in PPP projects in the US (Garvin, 2010).

This paper investigates the emerging use of availability payments as a method for reimbursing private sector

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delivery teams for the costs of designing, constructing, financing, operating and maintaining major highway, bridge and tunnel facilities delivered through PPPs.

The paper seeks to address the following question:

> Do Available Payment-based PPPs provide sufficient long-term advantages in terms of timeliness, cost savings and quality to overcome potential fiscal risks associated with circumventing traditional fiscal controls intended to protect state or local governments from incurring more debt obligations to support availability payments over the long term than they can afford?

The paper frames this question by comparing traditional and innovative approaches to infrastructure finance, contrasting the structure of availability payment-based PPPs to other forms of public-private partnerships and providing a comprehensive profile of 12 availability payment projects that are currently proposed, under construction or completed. The paper presents the perspectives of a panel of infrastructure finance experts regarding availability payment-based PPPs, and discusses the potential of availability payments for posing moral hazards to public sponsors.

2. Traditional Approaches to Delivering Surface Transportation Infrastructure

In the 50 years following the start of the Interstate Highway System and the Highway Trust Fund, most large-scale highway projects have followed a standard procurement approach known as design-bid-build (DBB) (Aziz & Elmahdy, 2015). This process separates the design phase from the construction phase, thereby enabling the sponsoring agency to select competing design firms on the basis of their professional credentials and project track record whereas construction firms are selected based on capability and cost. With 80 percent of the total project cost typically consumed during the construction phase, this arrangement enables the majority of the project value to be subject to low-bid competition.

These projects begin with a planning phase, followed by environmental review, utility clearance, and then a preliminary engineering phase that would bring the project to a 20-25 percent design state of completion. These initial phases enable the project sponsor to provide prospective bidders for the design phase with the project information needed about the project to prepare the final design. They also position the project for construction by providing necessary information about environmental conditions, utility clearance requirements, geotechnical conditions and preliminary project design.

The major drawback of the DBB approach is the separation of project design and construction into two sequential phases performed by separate firms under separate contracts. This fragments the project delivery process and introduces a significant time lag in moving the project from design to construction. The DBB approach also inhibits beneficial cooperation and synergy between the design and construction teams (Semer, 2010). In addition, the DBB approach uses a low-bid method to select construction firms to build the project which may not provide the best value to the sponsor when considering experience, innovation and cost.

Another major drawback of DBB is the tendency for low-bid winners of the lucrative construction contracts to submit frequent change orders and extra work orders as a means to significantly increase the value of their contracts without the difference being subject to competition. The result often increases the value of the construction cost to a level higher than the competition, thereby undermining the procurement process. When state departments of transportation (DOTs) enjoy a close relationship with their major construction contractors, these situations can readily occur.

As the private sector expanded its involvement in the development, operation and preservation of highway

and certain transit rail infrastructure assets, private firms became involved in the overall packaging and financing of existing (Brownfield) or new (Greenfield) highway infrastructure facilities (Feigenbaum, 2011). Under certain contractual arrangements, the private concession team took responsibility for all aspects of the deal, including ownership or long-term lease, operation and maintenance, preservation and rehabilitation, and financing supported by toll revenues. Few of these toll-based full concession deals were consummated in the US due to reluctance by most state DOTs to change their traditional ways of delivering projects and due to the high risks associated with projected utilization rates and user fee revenues that are highly susceptible to changing economic conditions (Ryan & Menezes, 2015).

The emergence of PPPs in the United States has coincided with the shrinking role played by the Federal Government because of its inability to raise or replace the current motor fuel tax for cars and trucks (Pagdadis et al., 2008; Regan et al., 2010). The tax has remained at 18.4 cents per gallon for cars since 1991 and 24.4 cents per gallon for trucks since 1997. As a result, the Federal government has had to divert $16 billion annually from the General Fund to the Transportation Trust Fund during the last decade. These additional funds enabled the Highway Trust Fund to maintain the historic level of funding established by the last major multi-year highway funding program passed in 2005 despite shrinking gas tax revenues resulting from more fuel efficient automobiles. Instead of taking decisive action by increasing motor fuel taxes and/or developing alternative funding sources, Congress deferred taking meaningful action by enacting periodic extensions — 33 stop-gap measures between 2005 and 2015.

Finally, in early December 2015, Congress and the White House agreed to a five-year $305 billion highway bill called Fixing America's Surface Transportation Act or FAST Act. This latest multi-year funding bill authorizes approximately $205 billion for highways and $48 billion for transit projects. Funding sources include $235 billion in gas tax proceeds (without changing the gas tax rate) plus $70 billion in offsets from other areas of the Federal Budget to help close the $16 billion annual gap between federal spending on transportation projects ($50 billion per year) and gas tax proceeds ($34 billion per year). Without changing the federal gas tax, the FAST Act is expected to keep the Transportation Trust Fund solvent during the next five years by relying on transfers from other parts of the Federal budget. After 2020, Congress and the White House will once again face the prospect of needing greater budget offsets to keep the Transportation Trust Fund solvent unless changes are made to the gas tax or other significant funding sources are defined.

3. Public-Private Partnerships

PPPs are contractual agreements between a public agency and a private entity that provide for greater private participation in the delivery of infrastructure projects, including transportation projects, than traditional project delivery approaches (World Bank, 2014). The PPP movement in the U.S. began with the authorization by the USDOT/Federal Highway Administration (FHWA) for state transportation agencies using federal funds to begin to use design-build and several other non-traditional project delivery approaches, initially on a pilot basis under the Special Experimental Projects programs. The SEP-14 Program enabled the use of alternative contracting techniques while the SEP-15 Program enabled the use of various types of PPPs.

Many of the pilot design-build projects were delivered more quickly, at lower cost and at comparable quality (USDOT, 2005). Much of the time and cost savings resulted from consolidating the procurement of both design and construction functions. This also had the effect of eliminating the tendency to add change orders and extra

work orders in order to drive up the project cost since the same team was responsible for both design and construction which became highly integrated.

Less favorable results occurred when the sponsoring agency lacked the institutional capability or interest in the design-build approach. This was especially so if agency officials opposed this new approach out of concern that it might challenge the status quo and threaten traditional relationships between the agency and the design and construction firms that have served the agency. In addition, local engineering and construction firms who tended to win a high percentage of projects in their respective states also felt threatened by the potential loss of business to large foreign-based firms that dominated the PPP markets in other countries.

PPPs provide a wide variety of options for allocating the roles, responsibilities, risks and rewards associated with these projects. They typically involve the private sector taking on more project risks, including design/construction risks, operating/maintenance risks, revenue/traffic risks, and/or appropriation risks.

The various types of PPPs are differentiated by the extent to which project delivery functions are provided by the private sector. The following lists the primary types of PPPs, with each letter corresponding to a specific function the private sector will provide:

- DB — Design-Build
- DBM — Design-Build-Maintain
- DBFM — Design-Build-Finance-Maintain
- BOT — Build-Operate-Transfer
- DBOM — Design-Build-Operate-Maintain
- DBFOM — Design-Build-Finance-Operate-Maintain

Private sector concession teams can provide whatever functions public sector sponsors are willing to contract out to the private sector, as reflected by the names given to each type of PPP noted above.

Early PPP contracts in the US were structured to place most of the project risks with the concession team members, with the potential for a revenue upside if toll revenues exceeded expectations (Siemiatycki & Friedman, 2012). Many of these deals ended up having to be restructured because:

- The cost and timeframe for clearing environmental restrictions became prohibitive.
- The cost of right-of -way acquisition escalated without eminent domain authority.
- Public sponsors insisted on doing most of the design work themselves, thereby losing the opportunity to gain value engineering efficiencies from design members of the concessionaire team.
- Clearing utilities from the right-of-way was delayed awaiting final design documents and utility clearances.
- Projected toll revenues were based on often exaggerated traffic forecasts provided by traffic modeling firms incentivized to provide unrealistically optimistic forecasts by both public sector sponsors and private sector concessionaires who wanted to move the project forward ahead of other projects in the pipeline.

As noted by the various types of PPPs listed above, there are many ways in which the private sector can get involved in major infrastructure projects by taking on greater roles, responsibilities and risks with the potential for greater rewards. Among the many types of PPPs available for use by state and local transportation agencies, the most prevalent models used in the U.S. are design-build, design-build-operate-maintain, and design-build-finance-operate-maintain. Early projects tended to focus on existing or new toll roads and bridges, where there was a dedicated funding source derived from toll proceeds.

Since 2012 PPPs in the U.S. have benefited from an expanding list of potential funding sources that are not limited to but still include federal-aid funding (see Exhibit 1 for a list).

Exhibit 1

(1) General state appropriations based on the allocation of available state revenues derived from various sources for specified purposes.
(2) State tax revenues from sales, fuel, and excise taxes when dedicated to transportation infrastructure programs and projects.
(3) General Obligation Bonds (GO Bonds) — tax exempt bonds issued by states, cities, towns and counties and approved by voter referendum, often for certain prescribed purposes. So-called GO bonds are backed by the taxing power of the issuer. Hence these bonds are also referred to as full faith and credit bonds.
(4) Revenue bonds may be issued by an agency or authority created by legislation to construct a facility, such as atoll bridge, turnpike, managed express lanes, hospital, university dormitory, water and sewer treatment facilities, and power generating plants and transmission lines. They are paid for by the proceeds generated by the tolls or fees applied to users of these facilities. Since a state or municipality do not back such bonds, they are considered riskier than GO bonds and generally pay a higher coupon rate. When the underlying state or municipality assumes liability for the debt service if the income from the facility was insufficient, such as for certain sewer and electric system bonds, a lower coupon rate was established for these "double-barreled" issues.
(5) Private Activity Bonds (PABs) — tax-exempt bonds issued by state and local governments for use by private developers of public use/private infrastructure such as transportation infrastructure, sports arena, and civic centers. PABs do not impact the volume cap on debt.
(6) Transportation trust fund pledge (Grant Anticipation Revenue Vehicle–GARVEE) is a type of bond or similar financing method issued by a state or state infrastructure bank to fund a project approved for federal assistance that must be repaid using federal funds expected to be received in the future. GARVEEs do not guarantee that the federal government will provide the expected financing, nor are they guaranteed by the federal government. Eligible costs for reimbursement may include interest, retirement of principal, costs for issuing bonds, and other approved incidental costs.
(7) Federal-aid funds provided to state and local governments for capital development, rehabilitation, and replacement of surface transportation infrastructure under Title 23 of the United States Code.
(8) Joint development proceeds from economic development facilities which share property rights (such as air rights over a transportation facility) and benefit from the enhanced accessibility provided by surface transportation infrastructure (through an upfront payment or shared annual lease proceeds).
(9) Bank loans which are made to the concession team by one or more individual banks and used to provide up-front financing to get the project started more quickly. Bank loans are repaid from the proceeds of availability payments and other sources of revenues available to the project sponsor.
(10) State Infrastructure Bank (SIB) loans are made to a public or private sponsor of an eligible surface transportation projects from revolving infrastructure investment funds that are established and administered by participating states. SIBs are capitalized with Federal-aid surface transportation funds and matching State funds. SIBs are capitalized with Federal-aid surface transportation funds and matching state funds. Refunded loans or other credit assistance forms can be used to support subsequent projects.
(11) Transportation Infrastructure Finance and Innovation Act (TIFIA) loans and credit enhancement. The TIFIA program provides Federal credit assistance to significant surface transportation projects, including highway, transit and rail. The program provides secured loans, loan guarantees, and lines of credit. Projects must receive an investment grade rating and total TIFIA assistance cannot exceed 33 percent of eligible project costs. Credit assistance must be repaid within 35 years after the project is substantially complete.
(12) Equity contributions from concessionaires represent a cash contribution from the concession team at the beginning of the project to enhance the available funding to launch the project.

In 2012 the FHWA implemented a policy allowing the use of federal-aid funds for innovative long-term contracts with private developers, including those using availability payments based on the concessionaire making the highway available to the public on schedule and at prescribed levels of service. Such payments require the projects to follow FHWA and State DOT regulations. While federal funds can be used to pay for the profit associated with the concession contract, these funds cannot be used to pay for operations and maintenance costs (USDOT, 2012).

These many funding sources are being tapped in numerous combinations and to varying degrees to pay for the costs of PPP projects , based on the relative priority of the project, its risk-return profile and the ability of the project sponsor and concessionaire team to secure credit-worthy commitments of debt and funding. The availability of federal-aid funds adds significant potential revenues to the pool of government funding for these projects (Ramsey & El Asmar, 2015).

4. Availability Payments Approach to Infrastructure Financing

More recently, PPPs have been developed as DBFOM projects, often without tolls as a dedicated funding source. To make up for this lack of dedicated funding, public sponsors have increasingly turned to availability payments to provide the framework for the public agency to pay for the DBFOM contract in digestible increments over the life of the contract (Semer, 2010).

Availability payments are project payments for performance made irrespective of demand where there is pure availability (usable lanes) and constructive availability (safe, clean, well-lit). This approach involves a concessionaire helping to obtain financing to develop a project and then receiving annual payments from a public agency based on the availability and physical condition of the facility. Payments are made in accordance with contractually specified performance standards.

Availability can be defined in terms of several performance criteria besides whether the facility is fully open to the public. Factors may include average minimum level of speed on the facility in each direction (for example 45 miles per hour), proportion of total system lane-miles that are not in service during each operating hour due to unscheduled maintenance or incidents (beyond a certain clearance timeframe), and lane-mile-hours that certain operating equipment (such as lighting or toll operating equipment) are out of service.

Availability payments are typically structured in two parts. The first consists of one or more installments provided during the construction phase with the largest installment made when construction is completed and the road, bridge or tunnel is available for use by the traveling public. The second typically consists of equal annual payments made over the term of the operation and maintenance phase of the contract. The final payment is predicated on the concessionaire turning the project over to the public sponsor in a condition consistent with the requirements of the contract.

Availability payment-based PPPs have become popular with both public sponsors and private mega-project infrastructure developers because they (Ryan & Menezes, 2015; Semer, 2010):

- Help fill the void in eligible PPP projects due to the shortage of stand-alone toll road projects that have their own revenue generating capability.
- Move to the public sponsor the responsibility, risk and return associated with preparing the project scope and preliminary design features, clearing environmental requirements, obtaining the necessary rights-of-way, clearing utilities and providing program administration relative to the PPP contract. These are the key project functions the public sector is best equipped to perform and manage.
- Move to the public sponsor the responsibility, risk and return associated with the vehicular volume of traffic that will use the facility and, if applicable, the revenues generated by tolls or related economic development (joint development or transit-oriented development) — each of which is often difficult to predict with any degree of certainty and is subject to many conditions beyond the control of either the public or private sectors.
- Focus the responsibilities of the private sector concession team on the design, construction, operations and maintenance of the facility and on helping to arrange the financing needed to support the project's schedule of availability payments. These are all functions the private sector partners are better able to perform and manage.
- Avoid the downside risks to the private sector partners of lower-than-expected traffic volumes, toll revenues and development proceeds that can significantly reduce the attractiveness of these projects to potential private sector partners.
- Avoid the upside risk of greater than expected revenues from tolls or real estate development making the

project appear like a windfall to private concessionaires, particularly international members of consortia. Keeping both the traffic and revenue risks with the public sponsor provides a more balanced approach.

Many of the early PPPs were large-scale toll-funded projects consisting of Brownfield and Greenfield projects in which the concession team was composed of one or more foreign firms. These projects represent the most likely candidates for toll-funded PPPs. In recent years and with growing backlash against tolling existing highways the opportunities for successful toll-based PPPs have diminished. The availability payment-based PPP has emerged as an effective contract vehicle for developing financing and funding packages and balancing the risks and returns among PPP sponsors and providers, whether or not tolling is involved.

4.1 Assumed Benefits and Risks of Availability Payment-Based PPPs

There are a number of benefits attributed to availability payment-based PPPs when compared to more traditional project delivery approaches such as DBB and other earlier forms of PPPs such as DB and DBOM (Siemiatycki & Friedman, 2012). These include the following:

- Assigns functional responsibilities to those entities best able to manage/mitigate them.
- Eliminates revenue risk to private concessionaire and investors, which may reduce the cost of capital and lowers the debt service coverage ratio requirements.
- Revenue commitments for availability payments are not considered general obligation debt or part of the state's debt cap.
- Reduces project financing costs due to more stable cash flows to the private entity, lower debt service coverage ratio requirements, and lower risk to the private sector in risk-adverse markets.
- Provides consistent long-term budget certainty.
- Links payments and achievement of certain performance standards.
- Eliminates the need for large up-front capital payments during the early stages of the construction.
- Delays payments until the facility is in use, which encourages the private provider to speed delivery (especially for new or "Greenfield" projects).
- Considered less risky than toll revenue-based projects, particularly when sponsored by a highly rated government entity, which reduces the cost of capital and the overall project cost (Aon, 2014).
- Payment schedule limits the maximum public cost exposure and private revenue potential (in the case of tolled facilities), thereby eliminating the potential for windfall concessionaire profits.
- Provides full funding of maintenance and capital renewal and replacement through the availability payments, which require the asset to be returned to the public owner in satisfactory condition upon completion of the agreement.
- Provides major opportunity for the concessionaire to generate significant savings by applying life-cycle asset management techniques over the full term of the PPP contract to reduce the frequency of asset rehabilitation and replacement without impacting the level of public sector availability payments.

Life-cycle asset management has been demonstrated by both private and public sector entities to dramatically reduce the total cost of building and maintaining infrastructure facilities over the long term, defined as up to 99 years. This is because of the ability to dramatically reduce the frequency of replacement by designing, building, and maintaining the facility to last a long time through preventive design and maintenance. This is made possible because of the long term of the concession contract. With the requirement to return the infrastructure asset in like-new condition at the end of a 35-year to 99-year contract term, the concession team is incentivized to adopt life-cycle asset management techniques to most cost-effectively achieve compliance with the contract terms for

turning over the facility to the public sponsor in the most cost-effective manner.

The potential drawbacks of availability payment-based PPPs include the following:

- Lack the legal framework associated with general obligation bonds which require voter approval in a public referendum before the public agency can incur this debt.
- Absence of a referendum exposes the public sponsor and ultimately the general public to a greater moral hazard should the private concession team be unable to fulfill its obligations under the PPP contract and seek to transfer the project's financial risk to the public sector.
- May not be viewed as debt owed by the public entity but merely a moral obligation of the government or agency subject to budget appropriations.
- Risk that in future budget cycles the public legislative body may not appropriate the funds needed to fund future availability payments due to fiscal difficulties, economic downturns, or changing budget priorities.
- Higher cost of public debt compared to general obligation bonds, which have higher seniority and lower interest rates due to the greater assurance of payment.
- Potentially higher risks incurred by the public sponsor through the assignment of contingent liabilities, which are often not fully disclosed during contract negotiations or in the contract language for availability payment-based PPPs. Contingent liabilities are different from availability payments in that payments are needed only if some future event or circumstance takes place, whereby the occurrence, value and timing of payments may be unknown.

5. Study Approach

To assess whether the assumed benefits of AP approaches to PPPs were actually being achieved in the US, we reviewed the 12 such projects that have been in process in the US. Starting in 2008, public agencies in the U.S. began to move toward the availability payment-based PPP model for transportation and other major public facilities. There are currently 12 availability payment-based PPPs that are either planned, under construction or operating in the United States. These include the following:

- Knik Arm Bridge/Tunnel Crossing
- East End Bridge/Tunnel Crossing
- I-4 and Orlando Interchange Reconstruction
- I-595 Corridor Road Improvement Project
- Port of Miami Tunnel
- Presidio Parkway Replacement
- I-69 Section 5
- Goethals Bridge Replacement
- Pennsylvania Bridges
- Southern Ohio Veterans Memorial Highway
- Denver Eagle Commuter and Light Rail Transit
- Maryland Purple Line Light Rail Transit[1]

[1] The Maryland Governor recently selected the Purple Line Project to proceed, provided the local counties (Montgomery County and Prince George's County) contribute more money to help fund this $2.45 billion capital project. As a result, the total cost of the project may be reduced through value engineering and reducing the service frequency along the line.

Exhibit 2 lists the characteristics of these twelve projects, including their description, location, contract type, duration, cost, and financing arrangements. Availability payment-based PPPs tend to be used for large projects with long contract duration and a variety of financing and funding sources.

Because the project formulas are proprietary, we interviewed six infrastructure finance experts who were willing to talk about the projects in general terms as opposed to providing any confidential information.

Exhibit 3 presents the averages of these statistics across the relevant projects. A review of these 12 projects reveals the following characteristics

- Projects are generally large, ranging from $1-to-$7 billion, with capital costs averaging $1 billion (40% of the total project cost) and O&M costs averaging $1.5 billion (60% of the total project cost).
- Project contract terms are generally long, ranging from 28 to 40 years with an average of 36 years.
- Availability payments for O&M span 25 to 35 years, averaging almost 30 years and $46.5 million annually.
- Most of the projects (9 out of 12) use the same DBFOM type of PPP contract.
- Half the projects involve tolling.
- Most projects include contractor equity, TIFIA Loans, and Private Activity Bond funding and financing sources.
- These projects are dispersed across the county, with 9 out of the 12 projects located in different states.
- Ten projects are for highway-related projects and two are for transit projects.

Exhibit 2 Availability Payment-Based PPP Projects in the United States

Project Name	Knik Arm Crossing	East End Crossing	I-4 and Orlando Interchange Reconstruction	I-595 Corridor Road Improvement Project	Port of Miami Tunnel	Presidio Parkway
Project Description	Greenfield Bridge, Tunnel and associated Roads	Greenfield Bridge, Tunnel and associated Roads	Reconstruction of I-4 through Orlando, plus 4 Tolled Express Lanes	Upgrade I-595 and add 4 Tolled Express Lanes	Greenfield Tunnel	Replacement of 6-lane Parkway and Bridges
Location	Anchorage – Mat-Su, AK	Louisville, IN	Orlando, FL	Broward County, FL	Miami, FL	San Francisco, CA
Length	1.74 miles	0.47 miles	21 miles	10.5 miles	0.74 miles twin tubes	1.6 miles
Sponsor	Knik Arm Bridge & Toll Authority (KABATA)	Indiana Finance Authority	Florida Department of Transportation	Florida Department of Transportation	Florida DOT, Miami-Dade County, City of Miami	Caltrans, San Francisco County Transportation Authority
Contract Type	Availability Payment DBFOM P3 paid from toll revenues and backed by moral obligation of the state	Availability Payment DBFOM P3 paid from toll revenues	Availability Payment DBFOM P3	Availability Payment DBFOM P3	Availability Payment DBFOM P3	Phase II - Availability Payment DBOM P3
Duration	40 years	39 years	40 years	35 years	34 years	32 years
Construction Period	5 years	4 years	7 years	5 years	4 years	4 years
O&M Period	35 years - $45.5M/yr	35 years - $32.9M/yr	33 years - $55.8M/yr	30 years - $34.8M/yr	30 years - $32.5M/yr	30 years - $28M/yr
Total Value	$2.375B	$1.915B	$2.877B	$1.834B	$1.113B	$1.205B
Total Capital Cost	$782M	$763M	$1.035B	$686M	$450M	$364.7M - Phase I
O&M Costs	$1.593B	$1.152B	$1.842B	$1.148B	$975M	$840M
Contractor Equity	$78M	$81M	I-4 Mobility Partners	I-595 Express, LLC - $207.7M	$80.3M	$45.6M
Federal TIFIA Loans	33% TIFIA loans	33% TIFIA loans $162M	$1.255M, 6 banks	$603M; senior bank debt: $781.1M, 12 banks	$341M - 10 banks, secured by availability payments	$150M; bank loans: $166.6M
Private Activity Bonds (PABs)	Up to $600M	$676.8M	N/A	None	None	None
Tolls	Yes	Yes	Yes - on 4 express lanes in median	Yes	No	No
Availability Payments Schedule	35 years - $45.5M/yr	35 years - $32.9M/yr	33 years - $55.8M/yr	30 years - $34.8M/yr	30 years - $32.5M/yr	30 years - $28M/yr
Early Payments	N/A	$392M milestone payments	$1.035B milestone payments	$686M at final acceptance	$450M milestone payments	$364.7M milestone payments

Principal source: USDOT, Federal Highway Administration, Office of Innovative Program Delivery, http://www.fhwa.dot.gov/ipd/p3/project_profiles/

Exhibit 2 continued Availability Payment-Based PPP Projects in the United States

Project Name	I-69 Section 5	Goethals Bridge	Pennsylvania Bridges	Southern Ohio Veterans Memorial Highway	Denver Eagle	Maryland Purple Line
Project Description	Highway Extension and Widening	Bridge Replacement	Bridge Replacement	Highway Bypass	Commuter Rail, Light Rail, Parking, BRT and Redev Denver Union Station	Greenfield Light Rail Line
Location	Bloomington - Martinsville, IN	Staten Island, NY to Elizabeth, NJ	NE and SW PA	Portsmouth to Lucasville, OH	Denver Metro Area, CO	Bethesda to New Carrollton, MD
Length	21 miles	1.34 miles	560 bridges	16 miles	122 miles commuter & light rail, 18 miles bus rapid transit	16 miles
Sponsor	Indiana Finance Authority, Indiana DOT	Port Authority of New York & New Jersey	Pennsylvania DOT	Ohio DOT	Regional Transportation District	Maryland Department of Transportation
Contract Type	Availability Payment DBFOM P3	Availability Payment DBFM P3	Availability Payment DBFM P3	Availability Payment DBFOM P3	Availability Payment DBFOM P3	Availability Payment DBFOM P3 paid from fare revenues and backed by moral obligation of the state
Duration	37.3 years	40 years	28.5 years	35 years	40 years	35 years
Construction Period	2.3 years	5 years	3.5 years	4 years	6 years	5 years
O&M Period	35 years - $21.8M/yr	35 years - $56.5M/yr	25 years - $36.8M/yr performance based subject to appropriation	31 years - $8.6M/yr	34 years - $150M/yr	30 years - $58M/yr
Total Value	$1.086B	$3.414B	$2.014B	$634M	$7.186B	$4.190B
Total Capital Cost	$325M	$1.436B	$1.119B	$429M	$2.086M	$2.450B - fixed price
O&M Costs	$763M	$1.978B	$895M	$205M	$5.1B	$1.74B
Contractor Equity	$43.5M	$136.8M	$69.4M	None	$54.3M	N/A
Federal TIFIA Loans	None	$473.7M	None	$209.3M	$250.0M	None
Private Activity Bonds (PABs)	$243.6M	$453.3M	$721.5M	$251.0M	$336.1M	None
Tolls	No	Yes	No	No	Transit Fares	Transit Fares
Availability Payments Schedule	35 years - $21.8M/yr	35 years - $56.5M/yr	25 years - $36.8M/yr performance based subject to appropriation	31 years - $8.6M yr	34 years - $150M/yr	30 years - $58M/yr
Early Payments	$80M	$425.2M milestone payments	$224.7M	N/A	N/A	N/A

Principal source: USDOT, Federal Highway Administration, Office of Innovative Program Delivery, http://www.fhwa.dot.govipd/p3/project_profiles/

Exhibit 3 Average Statistics for Availability Payment-Based PPP Projects in the U.S

Availability Payment Characteristics	Average Statistics
Length	19.3 miles
Contract Type	9 DBFOM, 2 DBFM, 1 DBOM
Duration	36.3 years
Construction Period	4.6 years
O&M Period	29.4 years
Total Value	$2.487 B
Total Capital Cost	$993.8 M
O&M Costs	$1.519 B
Contractor Equity	83.7 M
Federal TIFIA Loans	$415 M
Private Activity Bonds (PABs)	$477.5 M
Tolls	5 tolls, 5 no tolls, 2 transit fares
Availability Payments Schedule	$46.5 M
Early Payments	$470.4 M

6. Findings

The size and complexity of these projects make them very difficult to program and fund using traditional project delivery and financing approaches. None of these projects would likely have gotten to the project financing and implementation stages without the use of PPP project delivery methods.

Availability payments are helping these projects advance and garner the level of funding commitments from various sources. Availability payments provide greater clarity regarding the responsibility and timing of public payments to be made during the term of the contract. Availability payment-based PPPs expedite the commitment of public sector funding by avoiding the requirement for a voter referendum with an uncertain outcome. Availability payment-based PPPs also typically avoid the uncertainty regarding revenue responsibility by making the public sponsor take on the revenue and traffic risks instead of private concessionaires who are less able to control these risks. Finally, availability payments are scheduled to occur at key milestones during the project construction phase and at prescribed intervals throughout the operation and maintenance phase based on availability of the facility.

These attributes make availability payments a key ingredient in expediting PPP projects which may otherwise have stalled. Availability payment-based PPPs help public sponsors and private concessionaires allocate their roles, responsibilities, risks and returns in a way that benefits all parties (see Exhibit 4).

Not all availability payment-based PPPs are without peril. Due to the complex nature of these contracts, the reduced level of transparency and the absence of direct voter approval, these deals can pose a significant moral hazard to the sponsoring agency and the general public. Moral hazard occurs when one person or group makes a decision about how much risk to take, while another person or group bears the cost if things go badly. A recent case in Virginia demonstrates how an availability payment-based PPP project can generate moral hazard due to a lack of transparency and public oversight.

Exhibit 4 Comparison of Project Risk and Costs Based on Method of Project Delivery

Criteria	Traditional Delivery	Public-Private Partnerships (P3s)	Availability Payment Based P3s
	Design-Bid-Build (DBB)	Design-Build-Operate-Maintain-Finance (DBOMF) Private Toll Road	Design-Build-Operate-Maintain (DBOM)
Ridership/Revenue Risk	Public Sponsor	User Fee-Based Private Concessionaire	Public Sponsor
Environmental Risk	Public Sponsor	Private Concessionaire	Public Sponsor
ROW Acquisition Risk	Public Sponsor	Private Concessionaire	Public Sponsor
Utility Clearance Risk	Public Sponsor	Private Concessionaire	Public Sponsor
Construction Cost Risk	Construction Contractor	Private Concessionaire	Private Concessionaire
O&M Cost Risk	Public Sponsor	Private Concessionaire	Private Concessionaire
Referendum Risk	Public Sponsor	Public Sponsor	Avoided
Payment Schedule	Front-loaded construction costs, with annual O&M costs as incurred	Payments based on traffic-generated user fees (tolls)	Deferred payment of capital costs, coupled with annualized O&M costs in fixed payment schedule till the end of the contract
Cost of Capital	Lowest with pay-as-you-go funding and municipal bond financing	Highest with private financing; moderated with TIFIA Loans and Private Activity Bonds	Lower due to use of public debt financing
Debt Financing Cost	Lowest with pay-as-you-go funding and municipal bond financing	Highest with private equity financing, moderated with TIFIA Loans and Private Activity Bonds	Low due to use of public debt financing based on availability of public funds, whose payment obligations may be subordinated to other public debt
Debt Service Coverage Ratio Requirement	Low due to use of public debt financing	Highest due to revenue, construction and O&M risks	Low due to use of public debt financing based on availability of public funds, with payment obligations given a higher rating due to public sector commitment to supply the availability payments as agreed to
Typical Asset Life-Cycle	20-25 years, with deferred maintenance	30 - 99 years, with life-cycle asset management	35 - 40 years, linked to the terms of the contract
Efficiency Gains in Construction and O&M	Public Sector	Private Sector	Private Sector
Time to Reach Construction Stage	20-25 years	10-12 years	7-10 years
Time to Financial Closure	10 - 20 years, depends on available funding	5 - 10 years, accelerated by private equity involvement	4 - 8 years, propels projects ahead of other competing public works projects which are constrained by program budget caps
Control Over User Fees, where applicable	Public Sector	Private Sector	Public Sector
Budget Certainty	Low - due to typical public construction cost overruns	Low - due to uncertainty over traffic volume and user fees generated	Higher, due to surety of public funding stream
Government Financial Obligations	All	None	Capped
Private Upside	None	All	Capped
Demand Risk Premium	Public Sector	Private Sector	Public Sector

The U.S. 460 project was intended to provide a 55-mile tolled highway to spur economic development and regional connectivity in Southeastern Virginia. According to the PPP contract for this project, the concessionaire assumed the construction risk by signing a fixed-price design-build contract which stipulated the concessionaire would be paid a monthly availability payment of $30 million during the scheduled construction period.

When construction was scheduled to begin, the State still had not obtained the necessary Federal permits. Despite this, the Virginia Department of Transportation (VDOT) began to pay monthly installments to the concessionaire according to the project schedule as though the construction phase was proceeding in earnest. The

Commonwealth made 10 monthly payments totaling $300 million by the time the contract was ultimately terminated in mid-March 2015, even though there was nothing to show for the work for which it had paid. VDOT is currently exploring legal remedies to recover some or all of the money paid to the concessionaire.

Clearly this availability payment-based DB PPP arrangement has exposed the Commonwealth of Virginia to a significant moral hazard which was made more apparent as a result of political changes in the Governor's office. The lack of transparency and accountability resulted in actions being taken with regards to the PPP contract which were not in the best interest of the Commonwealth of Virginia and its taxpayers.

The case demonstrates several of the major risks of PPPs, especially those involving availability payments:

- Lack of transparency regarding the details of the deal due to political maneuvering and/or concessionaire demands to keep PPP contract details secret.
- Lack of proper oversight by the sponsoring agency to hold the contractor accountable for its performance of contract terms.

6.1 Comparison of Availability Payment-Based PPPs to Traditional Infrastructure Development Approaches

When considering traditional and innovative approaches to finance, fund, develop and deploy highways, bridges, tunnels and other major infrastructure assets such as transit rail, several observations can be made:

- The role of the public agency has moved from being the provider of most infrastructure development services under traditional project delivery approaches to being an administrator focusing on project clearance, programming, funding, procurement and contract management — supported by legal, finance, procurement and life-cycle asset management specialists. In these instances, the traditional engineering and construction management positions in state and local DOTs are being focused on quality assurance/quality control over work now performed by members of concession teams. This is a gradual, inevitable and irreversible process whereby private delivery teams replace public delivery teams as public-private partnerships become more frequently used for larger infrastructure projects.
- The role of the private sector has moved from being merely the designer or construction contractor for these projects to that of a multidisciplinary team responsible for project design, construction, inspection, financing, operation and maintenance. Early PPPs involved private sector financing supported by proceeds from tolls collected from users of the facilities. These early Design-Build-Finance-Operate-Maintain PPPs placed almost all project risks on the private sector.
- After a series of failures in which projects were unable to produce forecasted traffic volumes and toll revenues, the private sector and public sector sponsors began to re-evaluate their respective roles and responsibilities and the appropriate distribution of risks and returns. Based on a re-examination of successful PPP models used in England and Canada, the availability payment-based PPP model has emerged as a preferred alternative to traditional project delivery approaches and other PPP models which had shifted the risk-reward balance predominately to the private sector.
- Technology advances in electronic toll collection and vehicle automation will improve the desirability and efficiency of user fee-based approaches to generating the revenues needed to fund PPP projects for rehabilitating and expanding transportation infrastructure.

6.2 Reasons for Popularity of Availability Payment-Based PPPs

The growing interest in and popularity of availability payment-based PPPs can be attributed to:

- The allocation of functional responsibilities among PPP participants based on which are best able to perform

those functions and manage the associated risks.

- The ability to combine numerous financing alternatives that permit the project to advance in an expedited manner without obligating the public sponsor to commit up-front funding for the early high-cost construction phase, including:
  - Contractor equity
  - Bank loans
  - Private Activity Bonds
  - TIFIA loans
  - State Infrastructure Bank (SIB) loans
  - Grant Anticipation Revenue Vehicles (GARVEEs)
  - Build America Bonds (BABs)
  - Federal transportation program funding
  - State transportation program funding
  - Toll revenues
- The willingness of the USDOT/Federal Highway Administration to allow sponsors of availability payment-based PPPs to have comparable access to Federal funding assistance as for traditional public works projects. This makes it easier for public sponsors to take advantage of this form of innovative financing.
- The increasing comfort of the nation's financial institutions to rate the debt associated with availability payment-based PPPs with a modest markup to account for the uncertainty of funding appropriation to cover availability payments.
- Difficulties encountered by public sponsors and private concessionaires in complying with the terms of the agreements, especially for Greenfield projects which relied on forecasted traffic volumes and toll revenues.
- The shortage of stand-alone toll road projects and the long history of over estimating revenues and underestimating costs for projects which pose a moral hazard to public sponsors having to pick up the resulting budget shortfalls.
- The ability to hold the Concession team accountable for the performance of the infrastructure asset based on delivery date, condition, lane availability and incidence response time.
- A payment schedule that locks in the maximum public cost and maximum private revenues earned over the project's lifespan.
- An extended contract term for operations and maintenance which provides the opportunity for the concession team to apply innovation life-cycle asset management techniques that can significantly lower overall project costs while providing a more consistent level of performance.

6.3 Implications for Public and Private Sector Risks and Returns

- Availability payment-based PPPs enable mega projects to advance more quickly, in part by allocating more risk on the public sector.
- Availability payment-based PPPs are perceived to provide a more equitable distribution of risks and returns between the public sector and the private sector by seeking to leverage each party's strengths to pursue new opportunities:
  - Public Sector Risks: traffic volume/usage, revenue (if tolled), funding, appropriation, planning, environmental clearance, right-of-way clearance, and preliminary design.
  - Private Sector Risks: final design, construction, inspection, operations, maintenance, preservation

(life-cycle), and financing (including equity contribution).

- Public Sector Returns: expediting needed projects far ahead of normal schedules, having full control over project development consistent with appropriate design standards and construction practices and attracting significant finance partners allowing the public sponsor to spread out the availability payments.
- Private Sector Returns: greater ability to move mega projects forward, enhanced ability to gain significant savings from the application of life-cycle project development and construction approaches and fixed schedule of availability-based payments provides certainty regarding the timing of project development cost incurrence and their reimbursement.

- Availability payment-based PPPs overcome impediments of toll-based projects which generate less revenue than projected, particularly in the short-term, following completion of the project when a significant percentage of the project costs are incurred.
- Availability payment-based PPPs are a logical transition from the user revenue-supported PPP model by placing all revenue, usage, and financing risks with the public agency sponsor versus the private sector. This reflects a distinct move away from the "user pay" turnpike toll model where usage and revenue risks fall solely on the private sector.

6.4 Implications for Public Sponsor Financial Exposure

- Availability payment-based PPPs may overcommit public sponsors of these deals to a debt payment schedule they may not be financially capable of meeting. However, the involvement of various financing entities can bring sufficient due diligence to avoid the public sponsors becoming overleveraged by these deals.
- Availability payment-based PPPs that are paid from toll revenues and backed by the moral obligation of the state place the state government in a more risky position of providing payment assurance without revenue assurance from the tolls.
- Availability payment-based PPPs backed by the moral obligation of the state can be viewed as merely circumventing established fiscal safeguards, approval processes and monitoring requirements associated with major infrastructure projects. This can be moderated by enhanced contract transparency and accountability.

7. Conclusions

An increasing number of states are embracing the availability payment-based PPP model to capitalize on these advantages.

All these advantages are dependent on fully transparent PPP contracting and execution. There must be mechanisms in place to continuously hold the various members of the PPP project team accountable for their performance under the contract. Such safeguards are essential to compensate for the diminished level of general public involvement in authorizing these projects and the potential for abuse due to a lack of prudent oversight. In addition to the scrutiny provided by legislative oversight committees, transportation commissions, internal audit agencies and public sector budget analysts, the rating agencies will play an important role to ensure that the sponsoring state and local government agencies and appropriating legislative bodies have sufficient fiscal capacity to meet the availability payment and debt service obligations of these PPP contracts without overcommitting the government's fiscal capacity.

The ability of public agencies seeking to cost-effectively pursue major projects using PPPs, including availability payment-based PPPs, will depend on their ability to engage legal, financial, and procurement

resources equivalent to what the private sector concession teams bring to contract negotiations. Otherwise the public sponsor will not likely have the capability to negotiate a balanced contract that protects the interests of the agency, the state, and the general public.

When the inherent risks of availability payment-based PPPs are effectively managed the rewards of using this project delivery model to expedite needed transportation infrastructure projects can be substantial.

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