

DO STATE PUBLIC-PRIVATE PARTNERSHIP ENABLING LAWS INCREASE INVESTMENT IN TRANSPORTATION INFRASTRUCTURE?

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ABSTRACT

As of late 2011, thirty U.S. states had enacted public-private partnership (PPP) enabling legislation. This legislation provides the institutional framework surrounding the PPP agreement. It typically includes provisions addressing such issues as the mixing of public and private sector funds, the treatment of unsolicited PPP proposals, and need for prior legislative approval of PPP contracts, among many others. We consider thirteen key such elements of enabling laws, and surveyed a number of PPP experts regarding their importance to develop an expert-weighted law index reflecting the degree to which a state's law is encouraging or discouraging of private investment. In previous work, we examined the factors that drive the adoption of PPP enabling laws, and that lead to laws that are more enabling. We here examine the effect of PPP enabling laws on the level of private infrastructure investment in a state. We control for a variety of additional factors, such as the level of indebtedness in a state, the state's political disposition, union membership in a state, and per capita income. We find that more favorable PPP enabling laws increase both design-build and more complex non-design build (mostly design-build-finance-operate) type of PPP contracts. We do not, however, find evidence that either more design-build projects or non-DB projects reduces traffic congestion as measured by the travel-time index, eliminating a potentially important source of endogeneity.

Keywords: Transportation infrastructure; public-private partnerships; private investment; state public-private partnership enabling laws; fiscal constraints

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I. Introduction

A confluence of at least three forces is placing severe stress on U.S. transportation infrastructure: rising traffic demand, aging facilities, and exhausted state and local transportation budgets. Regarding demand for infrastructure relative to supply, total vehicle miles traveled (VMT) in the United States increased by 347 percent between 1957 and 2003, while total highway mileage increased only 15 percent (Fischer 2005). Unsurprisingly, traffic congestion has also increased. According to the Texas Transportation Institute's 2010 *Urban Mobility Report*, annual hours of delay per peak-time traveler increased 136 percent between 1982 and 2009 in the nation's fourteen largest urban areas. A typical peak-period commuter in the Washington, DC metropolitan area, for example, can now expect to experience an average of 70 hours of delay per year, or almost three full days (Lomax, Schrank, & Turner 2010). Vehicle emissions also increase significantly during congested periods, with concomitant environmental harm. One estimate put the annual overall cost of congestion to the economy at \$168 billion (Wells 2006).

Meanwhile, the country's transportation infrastructure is aging and deteriorating. According to the American Society of Civil Engineers, in 2009 about one in four bridges in the United States were structurally deficient or functionally obsolete, and about one-third of the country's major roads were in poor or mediocre condition. Additionally, traditional funding sources for transportation infrastructure construction and renovation are inadequate. This is partly due to reliance on gasoline and diesel taxes for infrastructure funding. Both inflation and the use of more fuel efficient vehicles reduce the purchasing power of fuel tax revenues. Moreover, other national policies, such as higher corporate average fuel economy (CAFE) standards, conflict directly with a fuel-tax-based funding approach. Moreover, a number of U.S.

states and localities are under fiscal stress as indicated by municipal bankruptcies and numerous municipal debt rating downgrades in the wake of the 2007 to 2009 economic recession.²

Such powerful forces are causing states and localities to consider non-traditional approaches to maintaining, renovating, expanding, and financing transportation infrastructure. One alternative is to allow a greater role for private firms in those activities. The main vehicle to facilitate such participation is the public-private partnership, or PPP, which has evolved to encompass a broad range of contractual relationships between a public project sponsor and a private partner that facilitates a larger private role.³

Commentators have suggested that transportation PPPs in the United States are hindered by a lack of state-level enabling legislation.⁴ The stated purpose of such laws is to attract private infrastructure investment to the state.⁵ The laws provide an institutional framework within which PPPs can occur, and clarify such considerations as acceptance of unsolicited PPP proposals, whether a PPP may be used on existing as well as on new transportation facilities, whether agreements may include revenue sharing with the public sponsor, and whether non-compete clauses may be included in the agreement, among many others.⁶ Enabling legislation also

² Bankruptcies include Harrisburg, Pennsylvania; Jefferson County, Alabama; Vallejo, California, and Central Falls, Rhode Island. See e.g. Reuters FactBox, U.S. Municipal Bankruptcies, Aug 11, 2011, available at: <http://www.reuters.com/article/2011/08/11/us-muni-bankruptcy-idUSTRE77A6OE20110811> (accessed December 9, 2011). Regarding large-scale municipal debt downgrades, see Sarah Frier and Michelle Kaske, "S&P Cuts AAA Muni Ratings Linked to U.S. After Federal Downgrade," *Bloomberg Businessweek*, August 09, 2011, available at: <http://www.businessweek.com/news/2011-08-09/s-p-cuts-aaa-muni-ratings-linked-to-u-s-after-federal-downgrade.html> (accessed December 12, 2011).

³ The U.S. Federal Highway Administration definition of PPPs has now become standard: "Public-Private Partnerships (PPPs) are contractual agreements formed between a public agency and private sector entity that allow for greater private sector participation in the delivery and financing of transportation projects." See U.S. Department of Transportation, Federal Highway Administration, *P3 Defined*, <http://www.fhwa.dot.gov/ipd/p3/defined/index.htm> (accessed September 2, 2010).

⁴ See e.g. Fishman (2009) and Reinhardt (2011).

⁵ We provide several examples of state preamble language in Appendix B.

⁶ A list of key provisions is provided in Table 1.

provides a framework for contracting, and more clearly defines the allocation of risks between public project sponsors and private partners.⁷

From the private sector's perspective, it is risky to direct time, money, and effort to developing infrastructure projects that may ultimately fail to receive the necessary authorization. In this paper, we examine empirically the effect of state-level PPP enabling laws on private infrastructure investment. Our inquiry indicates that, even when controlling for a host of exogenous factors, PPP enabling laws are important in facilitating private investment in infrastructure. In Geddes and Wagner (2012), we examine the drivers of a state's decision to adopt a PPP enabling law. We find that states with higher levels of traffic congestion as measured by the travel time index (TTI) are more likely to pass a PPP enabling law. We are thus sensitive to the possibility that the laws may be endogenous to the amount of investment. However, we were unable to detect an effect of actual private infrastructure investment on the travel time index. We thus believe that the estimates reported here provide a relatively accurate assessment of the effect of PPP enabling laws on private investment in infrastructure.

Perhaps because of the tradition in the United States of heavy reliance on tax-exempt government bond financing, private investment in transportation infrastructure remains low by global standards, and substantial controversy surrounding the use of PPPs to finance and operate transportation infrastructure remains.⁸ Critics argue that PPPs do not create net social value, merely remove debt from the government's books, raise the social cost of capital, and help to protect the interests of private parties who exploit market power.⁹ One implication of those views is that states have little choice: rather than enhancing efficiency, states are forced by fiscal

⁷ Iseki, Eckert, Uchida, Dunn, & Taylor (2009).

⁸ Regarding low U.S. use of private investment in infrastructure, see Figure 1 on page 4 of Istrate and Puentes (2011).

⁹ See e.g. Roin (2011), Dannin (2011), and Quiggin (2004), among others.

necessity to rely more heavily on private infrastructure investment. Others argue that PPPs can generate net social value through improved incentives to innovate, additional capital, greater contractual transparency, and improved linking of compensation to performance.¹⁰

Our analysis does not address directly debate regarding the social value of PPPs. It does however contribute to our understanding of the effects of PPP enabling laws on investment generally and why states may pass laws that explicitly invite private investment in transportation infrastructure.

Despite their growing number, empirical examination of PPP enabling laws has been limited.¹¹ We assess both the effect of law passage and the impact of laws that are designed to be more favorable to private investment. To examine the favorability of PPP enabling legislation to private investment, we consider thirteen key elements of each law to develop a PPP enabling law “favorability index.”¹² Rather than weight each element of a PPP enabling law equally, we conducted a detailed survey of PPP experts in the United States that allows us to assign weights to various legal provisions based on how important those experts believe they are in attracting private investment. We use data on PPP projects from the monthly newsletter *Public Works Financing*, and consider the effect of laws on both simple design-build projects, on more complex design-build-finance-operate projects, and on all projects involving private participants.

We use linear probability models to examine the effect of PPP enabling laws, and of more favorable laws, on the probability that a state will undertake both DB and non-DB style

¹⁰ See Geddes (2011) for a summary.

¹¹ To our knowledge, we are the first to empirically analyze state PPP enabling laws. There are, however, attempts to understand the determinants of public-private partnerships globally. See e.g. Hammami, Ruhashyankiko and Yehoue (2006). Importantly, those authors examine international data and find that effective rule of law is associated with more PPP projects. See also Istrate and Puentes (2011) for a discussion of the importance of various provisions of state PPP enabling laws.

¹² We recognize that enabling laws most favorable to private investment may not best protect public interests. This raises the separate research question of which laws best control market power, ensure stewardship of public assets, and guarantee service quality, for example. A similar methodology of indexing state laws could be used there.

PPPs. We include both regional and year-fixed effects, as well as a wide variety of controls. Using a variety of samples and specifications, and controlling for time and regional effects, we find that PPP enabling laws increase the number of PPPs undertaken in a state, and that more favorable laws result in more PPPs. We also find that a state's bond rating is an important driver of PPP projects, as is its political disposition as measured by the fraction of democrats in the state's House. We further find that both the growth rate in vehicle registrations and traffic congestion as measured by TTI have a significant effects on the use of design-build PPPs, but have no effect on more complex projects. We find no evidence that variables often thought to impact PPP use, such as union membership in a state, have an impact on either DB or non-DB projects.

We describe the PPP approach in Section II. Section III describes our data and predictions. Section IV presents our empirical estimates, and section V concludes.

II. Public-Private Partnerships in Transportation

Under the PPP approach, private participation includes the management, operation, and renovation of an existing transportation facility (known as a brownfield project), as well as the design, construction, financing and operation of a new facility (known as a greenfield project). Both are extensions of existing procurement approaches in the United States that rely on private participation. For both brownfield and greenfield PPPs with an operational component, the public project sponsor typically specifies in the contract how the facility is to be renovated, maintained, and expanded if necessary. The contract also specifies how tolls will be determined, as well as concession length. Key performance metrics can be included, such as safety standards and pavement quality, with well-defined penalties and rewards. PPPs have been used to help finance and build at least 104 transportation projects worth a total of \$54.3 billion since 1988 in

the United States.¹³ About eighty-one percent were for highways, bridges, and tunnels. Four transportation projects were brownfield leases and the rest were greenfield projects.

PPPs are thought to generate additional investment in transportation infrastructure because they provide access to new types of capital markets. Investment in transportation infrastructure through PPPs is important, accounting for about 11 percent of all national capital investment in new highway capacity in 2011. Private investment in U.S. transportation infrastructure is also growing in importance. From 2001 through 2010, five states on average started a new transportation PPP each year.¹⁴

The attempted lease of the Pennsylvania Turnpike speaks to the importance of enabling laws in securing investment. In May 2008, the Pennsylvania state government announced that a partnership of Citi Infrastructure Investors and the Spanish firm Abertis Infraestructuras was chosen as concessionaire in a 75-year lease of the Pennsylvania Turnpike with a winning bid of \$12.8 billion. The state legislature, however, allowed the bid to expire by not passing the requisite enabling legislation. Substantial costs were incurred by generating bids for which there was ultimately no return, even for the winning bidder.¹⁵ Those costs include holding in place

¹³ Reinhardt (2011), and Istrate and Puentes (2011, p.3).

¹⁴ Reinhardt (2011).

¹⁵ Commentators consider such unrecovered bidding costs to be a significant deterrent to private participation. John Durbin, former executive director of the Pennsylvania Turnpike Commission, noted that “[t]here will not be another consortium that will proceed in any state where they have to put their bids in first and then gain legislative approval to lease the asset” (Pew Center on the States 2009, p.18). Regarding the Pennsylvania Turnpike lease, one PPP expert notes the deterring effect of such political risk on private investment: “As Karl Reichelt of the construction company Skanska notes, global firms are willing to assume all kinds of technical and other risks, but they deeply fear political risk—the possibility that their clients could do what Pennsylvania did two years ago. The state decided to privatize its turnpike, invited bidders to spend millions of dollars preparing bids for a long-term contract, and then dropped the whole idea at the last minute.” See Nicole Gelinas, “The Tappan Zee Is Falling Down,” *City Journal*, Spring 2011, Vol. 21, No. 2. The unexpected cancellation of the GA/I-75 and I-575 toll lanes PPP in December 2011 provides another example of lost bidding costs. See e.g. Peter Samuel, “Georgia shocks investor groups with abrupt cancellation of procurement for toll lanes concession on GA/I-75&575” *TOLLROADS News*, December 11, 2011, available at: <http://www.tollroadsnews.com/node/5661> (accessed December 15, 2011).

commitments on \$12.8 billion in financing, which forestalled other uses for those resources.¹⁶

Partly as a result of the events in Pennsylvania, *ex post* legislative approval for individual PPP agreements is seen as a large disincentive to private sector investment.¹⁷ PPP enabling laws reduce the risk of such political vacillation by granting *ex ante* legislative approval.¹⁸

For these reasons, commentators suggest that a lack of enabling legislation at the state level is an impediment to PPP use in the United States, and conversely that PPP legislation provides an important foundation for private sector involvement in U.S. transportation infrastructure.¹⁹ In addition, some observers suggest that states with the most attractive models of PPP legislation are receiving the greatest attention from the private sector.²⁰ Moreover, sixty - five percent of all PPP projects since 1989 have occurred in only eight states, and all of those states have PPP enabling legislation.²¹

Overall, PPP enabling laws are likely to be important in attracting private capital into infrastructure construction, renovation, and operation. When properly designed, they reduce uncertainty, establish pre-set guidelines, and lower the transaction costs associated with public-private partnerships. We next discuss our data and predictions regarding the effects of PPP enabling laws on private investment in infrastructure.

¹⁶ See e.g. Peter Samuel, "Abertis-Citi likely to announce end of bid for Penn Pike early next week – Turnpike Commission wins," *TOLLROADSnews*, September 27, 2008. The lack of enabling legislation was dispositive for the investors in this case. As the above article states, "The Abertis-Citi current offer of \$12.8 billion for a 75 year lease/concession of the Pennsylvania Turnpike expires next Tuesday Sept 30, and signs are it won't be extended. Last week a senior officer of the two companies was saying that *without movement on enabling legislation this month, they were done*" (emphasis added).

¹⁷ Rall, Reed, & Farber (2010). Several states nevertheless have provisions in their enabling legislation requiring legislative approval. Regarding the disincentive to invest created by legislative approval requirements, one commentator claims that, "[i]n those states whose PPP enabling acts required legislative approval of negotiated deals no such deals were ever proposed." Poole (2009).

¹⁸ See Geddes and Wagner (2012) for further discussion of the importance of PPP enabling laws.

¹⁹ See Fishman (2009). Istrate and Puentes (2011) suggest that states pass PPP enabling laws as one of their three key recommendations to attract private investment to U.S. infrastructure.

²⁰ Gilroy (2009).

²¹ Those states are Florida, California, Texas, Colorado, Virginia, Minnesota, North Carolina, and South Carolina.

Through December 2011 thirty states plus Puerto Rico had legislation giving explicit authority to the state, typically through an agent (such as the state Department of Transportation), to enter into PPP agreements.²² Figure 1 displays states with PPP enabling laws as of 2008, the end of our timeframe.

(Figure 1 here)

III. Data and Predictions

We explore empirically the effect of PPP enabling laws on private infrastructure investment. We utilized the Federal Highway Administration (FHWA) website and several other sources to determine the states that have enacted PPP enabling laws.²³ All information was verified through examination of state PPP statutes and traced back to its passage using LexisNexis.

Our dataset indicates the year in which a state first passed a PPP enabling law. Our time frame begins with the passage of the first modern PPP law, Virginia's Highway Corporation Act of 1988, and ends in 2008, which is the last year for which we have complete data on independent variables. Our data are thus a panel of states from 1988 to 2008, inclusive. Although 30 states have PPP enabling laws as of this writing, one of those states (Massachusetts) passed its law in 2009, two states (Illinois and Maine) passed laws in 2010, and two states (Ohio and North

²² Istrate and Puentes (2011) list thirty-one states as having passed PPP enabling legislation as of December 2011. We list thirty because we do not consider Arkansas's legislation in our analysis of PPP enabling laws. The Arkansas statute dates back to 1927 and is very limited in scope. It essentially allows county courts to grant private franchises to persons to build toll bridges or turnpikes over or alongside any watercourse, lake, bay, or swamp with the approval of the federal government (Ark Stat. Ann. §§27-86-201). This statute is too simplistic given the complexity of PPP agreements occurring today. We thus consider modern PPP legislation to begin with Virginia's Highway Corporation Act, which was passed in 1988.

²³ Federal Highway Administration, *State P3 Legislation*, (available at: http://www.fhwa.dot.gov/ipd/p3/state_legislation/index.htm, accessed June 2, 2011). Additional sources include Pikiel & Plata (2008); Iseki et. al (2009); and Rall, Reed, & Farber (2010).

Dakota) passed in 2011. As a result, 25 states are indicated as having PPP laws during our timeframe.²⁴

A. The PPP Legislation Favorability Index

We address two key empirical questions: (1) what factors are important in determining whether or not a state utilizes a DB or non-DB (mostly DBFO) PPP project in a particular year; and (2) how important are PPP enabling laws and the favorability of those laws to private investment in determining the use of private investment? Our first step was to examine the literature on PPP enabling legislation to determine which elements of the laws are generally considered most important.²⁵ We relied broadly on Poole (1993) and Hedlund and Chase (2005) to guide our decisions regarding the key elements of PPP enabling laws to include in the index.²⁶ Using those and several additional sources, we selected thirteen critical elements of PPP enabling laws to form our PPP legislation favorability index as reported in Table 1 below.²⁷ To assign weights for each element, we conducted a survey of PPP experts that asked respondents to rank each provision on a five-point Likert scale ranging from “very discouraging” to “very encouraging” of private investment.²⁸ We then assigned each rank an integer value as follows:

- 2 = Very discouraging of private investment
- 1 = Somewhat discouraging of private investment

²⁴ Twenty-six states are documented as having passed a PPP law between 1988 and 2008 because New Jersey passed a law that expired in 2003.

²⁵ Much of the research in the area of PPP enabling legislation comes from so-called “secondary literature,” which includes government reports, working papers, and white papers, etc.

²⁶ See Geddes and Wagner (2012) for a detailed discussion of the development of our PPP enabling law index.

²⁷ Additional sources include Fishman (2009); Iseki et al (2009); and Rall, Reed, & Farber (2010). Table 1 has 19 rows, but there are only thirteen elements that comprise the favorability index. This is because some elements can have either a negative or positive aspect. For example, a law may or may not require legislative approval of PPP agreements. These are part of the same element, but were asked about separately in the survey. An important research question involves creating and analyzing a similar ranking for all states, not only those with enabling laws. We leave that question for future research.

²⁸ Fifteen experts answered the survey. Table A3 in the appendix reports the distribution of experts across ten major organizational types, such as federal and state government, think tanks and academia. Experts are well-distributed across organizational types, with the exception of law firms and toll road operators. We thus have no reason to believe that our survey weightings are systematically biased.

- 0 = No effect on private investment
- 1 = Somewhat encouraging of private investment
- 2 = Very encouraging of private investment

We calculated the mean value for each provision and divided it by two to produce a favorability score for each provision between -1 and 1. We display the resulting “survey-weighted enabling score” for each provision in the third column of Table 1. Values below 0.50 indicate provisions that on average experts believe on net discourage private investment while values above 0.50 encourage investment.

(Table 1 about here)

We catalogued the provisions contained in each state’s enabling law to determine how many of the provisions each law contained. We divided the total by 13 (the total number of possible provisions in any given law) to generate an overall favorability index for each state’s law.²⁹ A number of states replaced older laws with newer ones during our study period. We used LexisNexis to track changes in PPP laws since their inception, which we incorporated into the favorability variable. This provides a time-varying favorability score for each state that varies between zero and ten.³⁰ Scores for each state are reported in Table 3, along with year of passage, while Table 2 provides summary statistics including dependent variables, which we discuss below.

(Table 2 about here)

Our index is consistent with expert views regarding which states are typically thought to be more encouraging of private infrastructure investment. For example, Texas, Virginia, Georgia, and Florida are often cited as examples of states with favorable enabling legislation.

²⁹ We scale the favorability index to be between zero and ten to aid interpretation of regression coefficients. See Table 2 in Geddes and Wagner (2012) for further information on the maximum possible favorability scores based on potential and actual survey responses.

³⁰ States without laws received favorability index scores of zero.

Consistent with our contention that PPP enabling laws in those states facilitate investment, one commentator notes that, “[s]tates like Texas, Virginia, Georgia, and Florida are generally regarded as offering the best models [of PPP legislation], as evidenced by the fact that they are reaping the most private sector interest and investment.”³¹

(Table 3 about here)

Figure 2 displays the average PPP law favorability index over time. The solid line provides a measure of average overall state-level favorability to private infrastructure investment in the United States, while the lighter dashed line displays the total favorability score divided by the number of states having PPP laws in that year. Average favorability of extant laws rises over time, which indicates that states are replacing existing PPP laws with more favorable laws, or new states are passing more favorable laws on average, or both.

(Figure 2 here)

B. Reasons for State Utilization of PPPs

We next describe variables that we include in reduced form estimation of the drivers of state use of PPPs. We first examine demand-side variables. If a state’s legislature wishes to increase private participation in response to rising travel demand, for example, then travel-demand variables will positively affect the probability of utilizing a PPP in a particular year. We include four demand-side variables: year-over-year population growth, motor vehicle registration growth, VMT growth, and the travel time index (TTI), which is a measure of congestion calculated by the *Texas Transportation Institute*.³²

³¹ Gilroy (2009, p.14).

³² Because congestion data are at the city level, but an observation in the dataset is at the state level, a mechanism was needed to aggregate city level data to the state level. Two problems arose. First, many states have more than one city listed in the *Urban Mobility Report*. Each state’s total TTI was calculated by weighting each city’s TTI by the proportion of VMT that city contributed to the total state VMT. Second, some states do not have a city large enough to be included in the *Urban Mobility Report*. For these states we used a conservative estimate of traffic congestion: the average TTI for all small urban areas included in the report, defined as those areas with a population under

Another set of researchers argue that governments utilize private investment in response to constraints on traditional sources of financing for public service provision. They are thus forced to turn to the private sector due to capital constraints rather than a quest for efficiency.³³ We consider two variable groups as proxies for capital constraints: those measuring a state's general fiscal health, and those measuring a state's access to traditional sources of infrastructure financing (which we call "traditional finance" variables).³⁴ General fiscal health variables include a state's debt outstanding per capita and its bond rating. Traditional finance variables include gas tax receipts per capita, federal aid for highways per capita, and the fraction of a state's total expenditures it uses for highway purposes.

If a state utilizes the PPP approach in response to poor fiscal conditions, then greater per capita debt will increase the probability of utilizing a PPP. Similarly, a reduction in the state's bond rating will increase the probability of utilizing a PPP. That is, the worse a state's bond rating, the more expensive it will be to use traditional municipal bond financing, and the more likely a state is to use the PPP approach.³⁵ One reason to believe that a state will use the PPP approach in response to a poor bond rating is evidenced by Chicago, whose debt was upgraded when it used proceeds from the lease of the Chicago Skyway to pay down existing debt.³⁶ We thus predict that both the likelihood of passage and the favorability of PPP legislation will increase as a state's fiscal situation worsens.

500,000 people. A travel time index of 105, for example, indicates that a trip in the peak period takes five percent longer than a trip during the free flow period.

³³ See e.g., Bel and Fageda (2007).

³⁴ We were unable to locate adequate state-level data for our time period that measures the condition of transportation infrastructure. Available measures were incomplete.

³⁵ Bond rating data come from Standard and Poor's. A higher numerical value corresponds to a better bond rating. For example, AAA = 21, AA+ = 20, AA = 19, etc.

³⁶ Brown (2007).

Bel and Fageda's meta-regression studies of local government privatization consider political interests and ideology to be important factors in the privatization decision.³⁷ Our measures of political factors and political interests include the proportion of Democrats in the state House of Representatives and state unionization rates. We expect the proportion of Democrats to have a negative effect on the utilization of both DB and non-DB projects, since conservative parties are associated with pro-business policies, while liberal parties are more associated with public values. If unions (especially public sector unions) oppose PPPs in favor of a traditional approach that is more likely to involve use of union labor, then the union variable will negatively impact the utilization of both DB and non-DB projects. In addition, if privately operated roadways are more likely to employ electronic tolling, then toll collectors unions may oppose the use of PPPs as well.

C. Control Variables

Two of our four basic controls are per capita income and per capita income growth. It is difficult to predict *ex ante* the effect income will have on the likelihood of utilizing a PPP. Higher income states pay more in taxes and have more money from traditional sources of revenue, suggesting a negative effect. Alternatively, private investors may favor wealthier over poorer states. Investors may then work towards the utilization of PPPs, suggesting a positive effect.³⁸

³⁷ See Geddes and Wagner (2012) for further discussion of the literature surrounding political ideology and the privatization decision.

³⁸ Although we have not conducted extensive analysis of media reports, the only state we are aware of where a PPP law was passed in response to a "deal on the table" was in Indiana in response to the Indiana Toll Road lease.

IV. Empirical Approach and Estimates

We next examine the effects of PPP enabling laws on private investment utilizing linear regression analysis. We here consider factors explaining the completion of a PPP in a particular year only, leaving a more complete analysis for future work. To measure investment we utilized data on all PPP projects as reported in the U.S. Transportation Projects Scorecard in *Public Works Financing* (September 2011, p. 30). Of the 93 projects listed, 60 are straight design-build (DB) projects, twelve are design-build-finance-operate-maintain (DBFOM), while four are asset leases. We divide our analysis into DB projects only, non-DB projects, and all project types. For each type of project, we examine separately the effect of a PPP act versus the favorability of a PPP law to private investment. We control for a variety of key factors.

Linear probability model estimates of the likelihood of completing a PPP are reported in Table 4 Panels A through C below. As indicated there, both the existence of a PPP enabling law and a more favorable law are associated with a higher probability of PPP completion, with the exception of the PPP act indicator for non-DB projects. Regarding magnitudes, the existence of a PPP enabling law increases the probability of completing a DB PPP by about 6.6 percent, and the probability of completing a PPP of any type by about 8 percent. The favorability of a PPP law to private investment also has an important effect on the likelihood of PPP completion. In addition to being statistically significant, a unit change in the favorability index increases the probability of completing a DB PPP by about 12 percent and a non-DB project by about 9 percent.

Growth in vehicle registrations and greater traffic congestion as reflected in the travel time index increase the probability of completing both a DB project and a project of any type, while a higher fraction of democrats in the state house reduces those probabilities. Regarding a

state's fiscal health, a better bond rating reduces the probability of completing a PPP in a particular year, but in a non-linear fashion.

V. Summary and Conclusions

Many states and localities are now facing major burdens in financing, maintaining, expanding and renovating their transportation infrastructure. Much transportation infrastructure is used intensively, but is nevertheless past its original design life. Meanwhile, many states and localities are facing severe budgetary constraints. One approach used at the state level is increased private participation through PPPs. Thirty states plus Puerto Rico had passed modern PPP enabling laws as of late 2011. Such laws provide the institutional arrangements within which PPPs can be undertaken, and thus lower the transaction costs associated with such agreements. PPP enabling laws also clarify such important issues as whether or not PPPs can be used on both new and existing facilities, whether the PPP allows the mixing of public- and private-sector financing, whether or not the government can share toll revenue, and whether or not state legislative approval is needed after the PPP agreement is concluded.

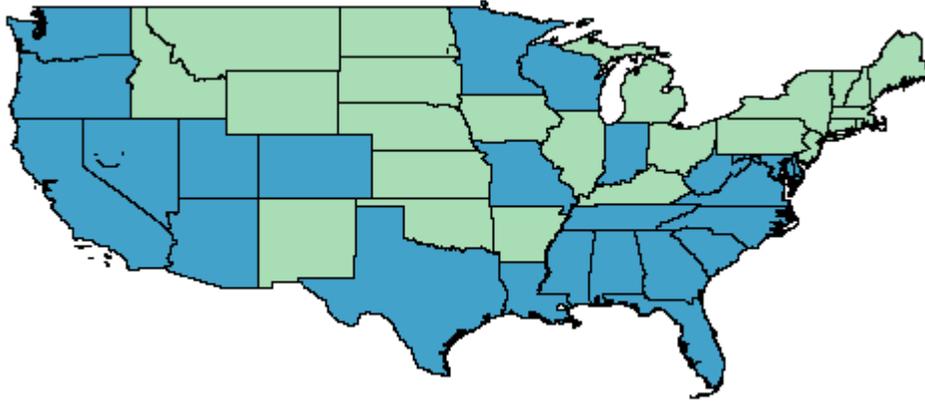
We created an expert-weighted index of PPP enabling law favorability by surveying PPP experts from a range of backgrounds. Rather than weighting provisions equally, this allows us to attach weights to thirteen critical elements of PPP enabling laws. We then carefully examined state laws to see which laws contain which provisions. This allowed us to generate an index of enabling law favorability to private investment. We find that not only are more states are passing PPP enabling laws over time, but that the favorability of the average PPP enabling law is also rising over time.

We use linear probability models to estimate the effect of PPP enabling laws on private investment, and find that the existence and the favorability of those laws have a significant effect on private investment as measured by both DB only and by all project types. Somewhat surprisingly, we also examine only non-DB projects (which are mostly DBFO projects) and find that enabling laws more favorable to private investment also increase such projects. Although we view the estimates reported here as preliminary, we find this supportive of the hypothesis that better designed PPP enabling laws can serve to attract more private investment into a state. We further find that growth in vehicle registrations, traffic congestion, a state's bond rating, and a state's political disposition, all affect the probability of utilizing the PPP approach.

We believe that further research into the factors driving states to utilize the PPP approach, and into the effects of utilizing that approach, is warranted. Future analysis will consider specific components of state PPP enabling laws to ascertain which aspects of those laws are most important in attracting private investment. The estimates reported in Table 4 below are, however, overall supportive of the hypothesis that PPP enabling laws significantly impact private infrastructure investment.

Figures and Tables

Figure 1 – States with PPP Enabling Laws as of 2008



Notes: Source: Geddes and Wagner (2012). Darker states passed PPP legislation as of 2008. Alaska (not pictured) has PPP legislation specific to one project, the Knik Arm Bridge. New Jersey’s law expired in 2003. Massachusetts passed legislation in 2009, Maine and Illinois passed in 2010, and Ohio passed in 2011.

Figure 1: Average PPP Law Favorability, 1988-2008

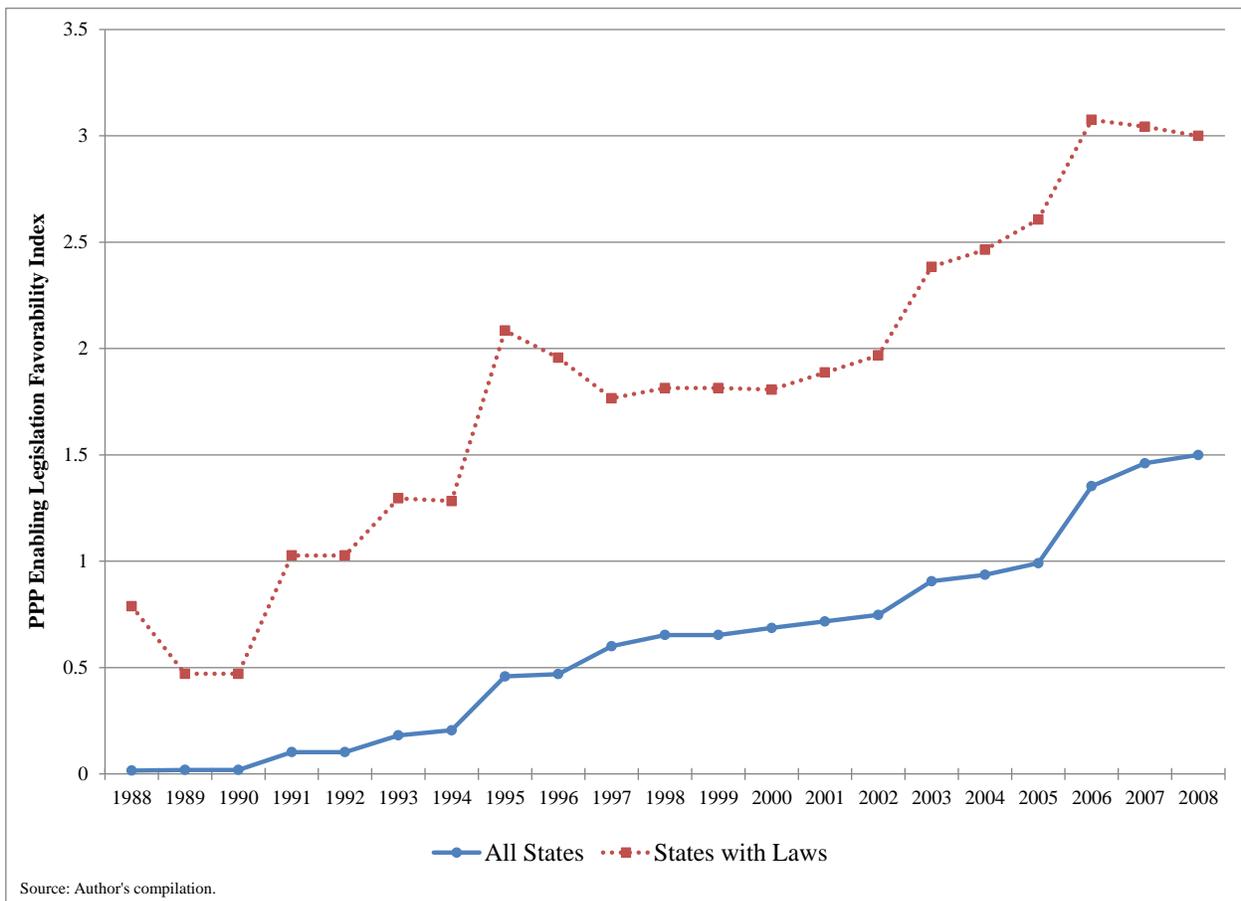


Table 1: Survey-Weighted Enabling Scores for Key Provisions of PPP Laws

Number	Provision	Survey-Weighted Enabling Score	Standard Deviation of Responses
1A	The law allows multiple modes of transportation and types of transportation facilities to be eligible for a PPP.	0.80	0.74
1B	Roads and highways are not eligible for PPPs under the statute.	-0.84	0.72
2	The law allows existing transportation facilities, as well as new transportation facilities, to be PPP-eligible.	0.77	0.64
3	The law allows the responsible public entity to receive both solicited and unsolicited proposals.	0.54	1.16
4	The statute exempts PPPs from the state's procurement laws.	0.61	1.05
5A	The law explicitly permits revenue sharing in PPP agreements.	0.60	0.77
5B	The law does not allow revenue sharing in PPP agreements.	-0.57	0.66
6	The law explicitly permits the state to make payments to the private entity in lieu of direct user fees (e.g. availability payments).	0.82	0.50
7	The law explicitly grants authority to entities other than the primary public sponsor (i.e. counties, municipalities) to enter into PPP agreements.	0.67	0.62
8	The law exempts the private entity from paying property taxes on the land required to operate the facility.	0.47	1.03
9A	The law explicitly allows PPP agreements to contain non-compete clauses or compensation clauses.	0.57	1.06
9B	The law explicitly prohibits the PPP agreement from containing non-compete clauses or requires the state to maintain a free, alternative route.	-0.47	0.47
10A	The law allows both public and private sector money to be combined in the financing of a PPP project.	0.90	0.41
10B	The law requires the private sector to put up all of the financing for a PPP project (i.e. no public sector funds allowed).	-0.64	0.46
11	The law protects the confidentiality of proprietary information contained in a private entity's proposal.	0.79	0.51
12A	The law includes a provision that allows the state legislature (or another public body) to reject a PPP agreement.	-0.90	0.43
12B	The law does not include a provision that allows the state legislature (or another public body) to reject a PPP agreement.	0.77	0.66
13A	The law puts a limit on the number of projects that can be developed under the PPP approach.	-0.54	0.83
13B	The law does not put a limit on the number of projects that can be developed under the PPP approach.	0.79	0.51

Note: Source; Table 1 of Geddes and Wagner (2012). The survey-weighted enabling score was created by asking PPP experts to weight each provision on a five-point Likert Scale from minus two (“very discouraging”) to plus two (“very encouraging”) and then normalizing the scale to be between zero and one.

Table 2: Summary**Statistics**

Variable	Min	Max	Mean	S.D.	Obs
PPP Act (equal to one if state has PPP enabling law)	0.00	1.00	0.28	0.45	1050
PPP Index (survey-weighted favorability index)	0.00	6.18	0.61	1.31	1050
Per capita income (2008 dollars, hundreds)	115.61	562.48	261.60	76.54	1050
Per capita income growth (%)	-9.58	33.19	4.50	2.36	1050
Motor vehicle registration growth (%)	-53.74	28.28	1.57	4.52	1050
Vehicle-miles traveled growth (%)	-14.14	41.20	2.16	2.99	1050
Travel Time Index ^A	102.00	135.00	113.88	7.38	1050
State debt outstanding per capita (2000 dollars, hundreds)	1.66	165.01	23.52	17.36	1050
State bond rating ^B	13.00	21.00	19.20	1.35	948
Democrats in state House of Representatives (%)	13.00	95.00	54.03	16.26	1029
Union membership (%)	2.30	30.50	12.98	5.98	1050
Federal-aid for highways per capita (2000 dollars)	0.22	542.78	113.03	76.15	1050
State gas tax receipts per capita (2000 dollars)	29.78	216.62	121.07	30.48	1050
State highway expenditures as a percent of total expenditures (%)	2.69	17.91	8.30	2.68	1050

Note(s):

^A The travel time index is a congestion measure calculated by the *Texas Transportation Institute*. For example, a value of 105 indicates that a trip during the "peak" period takes 5 percent longer than a trip during the "free-flow" period.

^B Bond rating data come from Standard and Poor's. A higher value corresponds to a better (i.e. less risky) bond rating. For example, AAA = 21, AA+ = 20, AA = 19, etc.

All growth variables are year-over-year. See Appendix for a full list of data sources.

Table 3 - Dates of First Passage of PPP Laws and 2008 Favorability Scores

State	First Passed	Enabling Index	Rank	State	First Passed	Enabling Index	Rank
AK	2006	1.6	22	MT	---	---	---
AL	1996	3.3	17	NE	---	---	---
AZ	1991	3	18	NV	2003	2.8	21
AR	---	---	---	NH	---	---	---
CA	1989	3.9	15	NJ ^C	1997	---	---
CO	1995	6.5	4	NM	---	---	---
CT	---	---	---	NY	---	---	---
DE	1995	5.9	8	NC	2000	4.2	13
FL	1991	6.2	5	ND	---	---	---
GA	1998	6	7	OH ^D	---	---	---
HI	---	---	---	OK	---	---	---
ID	---	---	---	OR	1995	6.1	6
IL ^A	---	---	---	PA	---	---	---
IN	2006	4.6	11	RI	---	---	---
IA	---	---	---	SC	1994	1.4	24
KS	---	---	---	SD	---	---	---
KY	---	---	---	TN	2007	1.6	23
LA	1997	6.6	3	TX	1991	7.5	1
ME ^B	---	---	---	UT	1997	5.2	9
MD	1997	3.4	16	VT	---	---	---
MA ^A	---	---	---	VA	1988	7.2	2
MI	---	---	---	WA	1993	2.8	20
MN	1993	2.8	19	WV	2008	4	14
MS	2007	4.8	10	WI	1997	1.4	24
MO	2006	4.2	12	WY	---	---	---

Notes: Dash indicates that no law was ever passed. Source: Author's compilation.

^A Passed PPP statute in 2009 ^B Passed statute in 2010 ^C Law expired in 2003 ^D Passed statute in 2011

Table 4. Panel A: Linear Probability Estimates of the Effects of PPP Enabling Laws on the Likelihood of PPP Completion (DB Projects only)

<i>Specification</i>	DB			
	1		2	
PPPAct	0.0658***	(0.0213)		
PPPIndex			0.117**	(0.0526)
<i>Demand</i>				
Pop growth	0.0033	(0.0098)	0.0033	(0.0098)
Registration growth	0.0053***	(0.0016)	0.0056***	(0.0016)
VMT growth	0.0008	(0.0026)	0.0008	(0.0026)
Travel Time Index	0.0038**	(0.0017)	0.0046***	(0.0017)
<i>Fiscal Health</i>				
Debt per Capita	0.0003	(0.0007)	0.0003	(0.0007)
Bonds	0.0569	(0.0821)	0.0711	(0.0820)
Bonds-squared	0.0017	(0.0022)	0.0020	(0.0022)
<i>Political</i>				
Democrats voting for President	0.0005	(0.0015)	0.0006	(0.0015)
Dems in House	0.0011	(0.0007)	-0.00134**	(0.0007)
Union membership	0.0006	(0.0020)	0.0008	(0.0020)
<i>Traditional Finance</i>				
Federal aid per capita	0.0001	(0.0002)	0.0001	(0.0002)
Pct. Highway expenditures	0.0037	(0.0042)	0.0053	(0.0042)
<i>Controls</i>				
Per capita income	0.0000	(0.0003)	0.0000	0.0003
Per capita income growth	0.0029	(0.0037)	0.0032	(0.0037)
<i>Intercept</i>	0.1519	(0.7895)	0.2326	(0.7916)
<i>Regional fixed effects</i>	Yes		Yes	
<i>Year fixed effects</i>	Yes		Yes	
<i>Goodness-of-fit</i>				
Observations	945		945	
R-Squared	0.1235000		0.1190000	

Table 4. Panel B: Linear Probability Estimates of the Effects of PPP Enabling Laws on the Likelihood of PPP Completion (Non-DB Projects Only)

	Non - DB			
<i>Specification</i>	1		2	
PPPAct	0.0177	(0.0134)		
PPPIndex			0.091***	(0.0328)
<i>Demand</i>				
Pop growth	0.0040	(0.0062)	0.0038	(0.0061)
Registration growth	0.0001	(0.0010)	0.0000	(0.0010)
VMT growth	0.0015	(0.0017)	0.0014	(0.0016)
Travel Time Index	0.0004	(0.0011)	0.0002	(0.0010)
<i>Fiscal Health</i>				
Debt per Capita	0.0000	(0.0004)	0.0000	(0.0004)
Bonds	-0.136***	(0.0515)	-0.135***	(0.0512)
Bonds-squared	0.0034***	(0.0014)	0.0035***	(0.0014)
<i>Political</i>				
Democrats voting for President	0.0006	(0.0010)	0.0005	(0.0010)
Dems in House	0.0005	(0.0004)	0.0003	(0.0004)
Union membership	0.0014	(0.0012)	0.0013	(0.0012)
<i>Traditional Finance</i>				
Federal aid per capita	0.0001	(0.0001)	0.0001	(0.0001)
Pct. Highway expenditures	0.0018	(0.0027)	0.0016	(0.0026)
<i>Controls</i>				
Per capita income	0.0003	(0.0002)	0.0002	(0.0002)
Per capita income growth	0.0012	(0.0023)	0.0013	(0.0023)
<i>Intercept</i>	1.2554	(0.4958)	1.2968	(0.4942)
<i>Regional fixed effects</i>	Yes		Yes	
<i>Year fixed effects</i>	Yes		Yes	
<i>Goodness-of-fit</i>				
Observations	945		945	
R-Squared	0.0581000		0.0643000	

Table 4. Panel C: Linear Probability Estimates of the Effects of PPP Enabling Laws on the Likelihood of PPP Completion (All PPP Projects)

<i>Specification</i>	All			
	1		2	
PPPAct	0.0803***	(0.0240)		
PPPIndex			0.191***	(0.0592)
<i>Demand</i>				
Pop growth	0.0092	(0.0011)	0.0090	(0.0111)
Registration growth	0.0053***	(0.0018)	0.0056***	(0.0018)
VMT growth	0.0003	(0.0030)	0.0003	(0.0030)
Travel Time Index	0.0043**	(0.0019)	0.0046***	(0.0019)
<i>Fiscal Health</i>				
Debt per Capita	0.0003	(0.0007)	0.0003	(0.0007)
Bonds	-0.201**	(0.0925)	-0.215***	(0.0923)
Bonds-squared	0.0054**	(0.0025)	0.0058**	(0.0025)
<i>Political</i>				
Democrats voting for President	0.0012	(0.0017)	0.0012	(0.0017)
Dems in House	-0.0014*	(0.0008)	-0.0015*	(0.0008)
Union membership	0.0017	(0.0220)	0.0018	(0.0022)
<i>Traditional Finance</i>				
Federal aid per capita	0.0000	(0.0002)	0.0000	(0.0002)
Pct. Highway expenditures	0.0005	(0.0048)	0.0023	(0.0047)
<i>Controls</i>				
Per capita income	0.0003	(0.0003)	0.0002	(0.0003)
Per capita income growth	0.0045	(0.0042)	0.0002	(0.0042)
<i>Intercept</i>	1.4574	(0.8897)	1.5721	(0.8902)
<i>Regional fixed effects</i>	Yes		Yes	
<i>Year fixed effects</i>	Yes		Yes	
<i>Goodness-of-fit</i>				
Observations	945		945	
R-Squared	0.1375000		0.1368000	

Note: Estimation was ordinary least squares. Dependent variable set to one if PPP of that type was completed in that state/year. Standard errors are in parentheses;

**** Significant at 1 percent level*

*** Significant at 5 percent level*

** Significant at 10 percent level*

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Appendix A: Additional Tables

Table A1: Data Sources

Variable	Source
. PPP Act	Author's compilation
. PPP Index	Author's compilation
. Population Growth	U.S. Census Bureau Population Estimates
. Registration Growth	FHWA Highway Statistics Series
. VMT Growth	FHWA Highway Statistics Series
. Personal Income	Statistical Abstract of the U.S.
. Gas Tax Receipts	FHWA Highway Statistics Series
. Federal Aid for Highways	Statistical Abstract of the United States
. State Highway Expenditures	U.S. Census Bureau, Annual Survey of State Government Finances and Census of Governments
. State Debt Outstanding	U.S. Census Bureau, Annual Survey of State Government Finances and Census of Governments
. State Bond Ratings	Standard & Poor's
. Democrats in State House	Almanac of American Politics (Barone), Source for 2000: Politics in America (CQ)
. Union Membership	www.unionstats.com
. Travel Time Index	Texas Transportation Institute

Table A2: Distribution of PPP Experts Surveyed, by Organizational Type

Organizational Type	Number
Federal Government	4
State-level government	2
Bank or investment firm	1
Design and/or construction firm	2
Toll road operating firm	0
Consulting firm	3
Law firm	0

Academia	2
Think tank/Public-policy research firm	4
Other	3
Total	21

Note: To properly reflect backgrounds, experts were allowed to check more than one organizational type. The total number of survey respondents was 15.

Appendix B: Examples of PPP Enabling Law Preambles

We here provide several examples from the preambles of state PPP enabling laws to offer insights into the explanation given by state legislatures for the passage of these laws. For example, this excerpt is taken from Delaware’s PPP statute:

(d) In addition to alleviating the strain on the public treasury and allowing the State to use its limited resources for other needed projects, public-private initiative projects also do all of the following:

(3) More quickly reduce congestion in existing transportation corridors and provide the public with alternate route and mode selections.

This excerpt is taken from Indiana’s House Bill (HB) 1008, passed in 2006:

There is a public need for timely development and operation of transportation facilities in Indiana that addresses the needs identified by the department, through the department’s transportation plan and otherwise, by accelerating project delivery, improving safety, reducing congestion, increasing mobility, improving connectivity, increasing capacity, enhancing economic efficiency, promoting economic development, or any combination of those methods.

Another example is taken from North Carolina’s HB 644, passed in 2002:

The General Assembly finds that the existing state road system is becoming increasingly congested and overburdened with traffic in many areas of the state; that the sharp surge of vehicle miles traveled is overwhelming the state’s ability to build and pay for adequate road improvements; and that an adequate answer to this challenge will require the state to be innovative and utilize several new approaches to transportation improvements in North Carolina.

Similarly, Indiana’s House Bill (HB) 1008, passed in 2006, states that:

There is a public need for timely development and operation of transportation facilities in Indiana that addresses the needs identified by the department, through the department’s

transportation plan and otherwise, by accelerating project delivery, improving safety, reducing congestion, increasing mobility, improving connectivity, increasing capacity, enhancing economic efficiency, promoting economic development, or any combination of those methods (Burns Indiana Code Ann. §8-15.7-1-1(1)).