Collaborative Development

The Pros and Cons of P3s on Construction Projects

April 22, 2014

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Illinois Economic Policy Institute Policy Brief #5 April 22, 2014

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SUMMARY: This Illinois Economic Policy Institute (ILEPI) Policy Brief investigates the pros and cons of public-private partnerships in the construction industry. Public-private partnerships (P3s) offer the potential for significant cost savings for the public sector. P3s allow governments to increase internal investment, capitalize on the efficiencies and innovations of the private companies, and build infrastructure slightly less expensively and slightly more quickly. For the private sector, P3s provide stable assets (infrastructure facilities) with predictable long-term returns from user fees for portfolio diversification. P3s also allow private entities, backed by the government, to borrow cheaply. The Policy Brief utilizes case studies to demonstrate how P3s may be mutually beneficial and discusses the expected positive benefits of three potential P3 projects in the Midwest. Ultimately, a public-private partnership is a collaborative development strategy which can bring transportation efficiency gains, remove debt from public agency balance sheets, support thousands of jobs for workers in a weak labor market, and spur billions of dollars in economic development.

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EXECUTIVE SUMMARY

Public-private partnerships (P3s) are collaborations between the public sector and private sector on mutually-beneficial projects which expand employment and provide long-run benefits to the public. P3s have become an increasingly popular policy option for governments to invest in and reap the benefits of infrastructure improvements:

- In the short term, the direct jobs that are created by public spending are well-paying middle-class jobs.
- Over the long term, upgrading and expanding infrastructure increases the economic growth, international competitiveness, worker mobility, quality of life, and health outcomes of a region.

Benefits of P3s to the public sector:

- P3s allow the government to leverage private funds to increase internal investment beyond dedicated amounts.
- P3s allow governments to capitalize on the managerial efficiencies, technological innovations, and skills and talents of private companies.
- P3 projects allow governments to provide projects of an acceptable quality at the lowest cost to the taxpayer.
- P3s help foster an efficient network in which those who consume the infrastructure predominately pay for it instead of taxpayers who do not.
- P3s have built infrastructure slightly less expensively and slightly more quickly in America and the U.K.

Potential costs of P3s to the public sector include long-term indebtedness from underperformance, monopolistic practices from private partners which drive up user fees, collusion between politicians and favored firms, the socialization of private costs onto taxpayers, and forgoing future toll revenue.

Benefits of P3s to the private sector:

- Infrastructure assets provide portfolio diversification.
- P3s effectively grant a monopolistic position upon the private actor– even with government regulations to curb user fees, long-term returns are generally linked to inflation or economic growth.
- Annual usage volatility of "Core and Core Plus" infrastructure– such as roads, bridges, water systems, and energy transmission systems– was generally between just 1 and 2 percent from 1998 to 2008, far more stable than the stock market.
- P3s allow private sector entities, backed by government contracts, to borrow cheaply.

Risks presented by P3s to the private sector include political and regulatory risks, construction and completion risks, operation and maintenance risks, and illiquidity problems.

Three P3 case studies:

- The Chicago Skyway P3 allowed the City to repay $855 million in debt, close a $375 million budget shortfall, save millions of dollars annually in interest payments by improving its debt rating, fund $875 million in reserves, and invest $100 million in other infrastructure.
- The Indiana Toll Road P3 allowed the State to contribute $2.6 billion to a 10-year transportation plan which will have constructed 87 roadways, resurfaced 49 percent of the state's highways, and rehabilitated or replaced 19.5 percent of the state's bridges by the end of 2015.
- The Denver metro region's Northwest Parkway P3 generated $603 million in revenues with the potential for additional toll revenues for the public agency.

Three potential P3 projects:

- The Illiana Expressway in the Chicago metropolitan area will support 24,000 vehicles per day. In the construction phase, the expressway will support 3,782 construction jobs, $0.98 billion in worker income, and $2.16 billion in economic output. In the long run, the project will sustain at least 3,378 jobs and produce $21.3 billion in GDP, well above the initial cost of $1.3 billion to both states.
- The Ohio River Bridges project in the Louisville area is expected to support 4,118 construction jobs initially and 17,796 total jobs per year on average over 30 years while producing $7.8 billion in cumulative economic output.
- The Innerbelt Eastbound Bridge in Cleveland will expand capacity by 25 percent and be completed two years earlier under a P3 than without private funding.

P3s are justified when they allow governments to expand the delivery of public works and services of an acceptable quality at lower costs to taxpayers. To improve our nation's infrastructure, seven policy positions are recommended:

1. Governments should increase P3s in "Core and Core Plus" projects and avoid P3s in retail developments, sports stadiums, and schools.
2. P3s should include Project Labor Agreements (PLAs) and should pay the prevailing wages of the communities in which the projects occur.
3. P3s should incorporate a competitive bidding process with at least four bidders.
4. P3s should allow the private sector to collect user fees for the delivery of the public service.
5. To eliminate monopolistic practices, the government should cap user fee prices and incorporate a benefits-sharing agreement.
6. Governments should only offer P3 agreements if the private sector will internalize its externalities.
7. P3s should include stakeholder input throughout the process.

Ultimately, P3s can bring transportation efficiency gains, remove debt from public agency balance sheets, save on distortionary taxes, support thousands of jobs for workers in a weak labor market, and spur billions of dollars in economic development.

INTRODUCTION

Across America, governments of all levels continue to face fiscal conditions that limit their ability to provide more and better services. In these tough budgetary times, however, governments need to spur long-term economic growth by finding ways to *increase* internal investment beyond the amounts to which they are already committed. With fewer resources, the public sector has explored the idea of turning to the business community to help make up the shortfall. The search for new methods of providing public services has produced concepts ranging from simple contracting-out to outright privatization. In between, public-private partnerships (also called "P3s" or "PPPs") have become an increasingly popular policy option in which decision-making, risks, and benefits are shared by both the government and a private entity or group of businesses.

While public-private partnerships have only recently taken off in the United States, the first known P3 in American culture predates the Revolutionary War (Witters et al., 2012). In 1742, the Pennsylvania House of Representatives turned to the American Philosophical Society of Philadelphia, established by Benjamin Franklin, to finance the founding of the University of Pennsylvania. Intended to advance knowledge and innovation in the fields of agriculture, science, and medicine, the university was a collaborative effort between the state and private actors to invest in the success of the economy over the long term. Now an Ivy League institution, the University of Pennsylvania has produced eight signers of the Declaration of Independence, twelve heads of state (including America's ninth President, William Henry Harrison), three U.S. Supreme Court justices, 28 Nobel Prize winners, and countless academics and entrepreneurs ("University of Pennsylvania," 2014).

More recently, a growing number of transportation initiatives have incorporated P3 structures. Between 2005 and 2008, more P3s were established for surface transportation improvements than ever before in the nation's history (Witters et al., 2012). These initiatives aimed to upgrade infrastructure through innovative funding methods, better management, and technological development. The Great Recession, however, halted public-private partnerships because public sector revenues were diminished, private sector investment stalled as many firms went out of business, and the housing crash depressed the whole construction industry. But as the nation's inadequate infrastructure has continued to deteriorate and the public sector remains cash-strapped while private sector growth has picked up, demand for P3 strategies has returned.

This Illinois Economic Policy Institute (ILEPI) Policy Brief investigates the pros and cons of public-private partnerships in the construction industry. In the first section, the benefits of investing in public infrastructure– for both the public sector and the private sector– are discussed. Then, the specifics of public-private partnerships are examined, including types and structures of P3 projects. The subsequent sections outline the benefits and costs of public-private partnerships to both public entities and private entities before the political feasibility of P3s is considered. Case studies of current and proposed P3 projects in America follow, and demonstrate the positive impacts that P3s can have for private firms, governments, and citizens. Finally, policy positions are recommended.

WHY INVEST IN PUBLIC INFRASTRUCTURE?

Infrastructure investments provide both immediate and long-lasting benefits. In the short term, the direct jobs that are created by public infrastructure spending are well-paying middle-class jobs which frequently provide workers with benefits packages. In a national economy which is still experiencing a demand shortfall and 10.5 million Americans remain jobless (BLS, 2014a), putting people back to work and idle machines back online help reduce the unemployment rate. Employment growth raises consumer demand over the short run, which

h in turn spurs private economic development. In Illinois, for example, raising nonresidential construction employment by 10,000 workers generates and estimated 6,690 additional jobs and $1.04 billion in new economic activity in other industries that would not otherwise occur (in 2014 dollars). Of these newly stimulated jobs, on average, the retail sales industry grows by 1,140 jobs, the architectural and engineering services sector adds 630 jobs, the food services industry increases by 510 jobs, and 260 jobs each are created in private hospitals and the offices of health practitioners (Manzo, 2013a).

Over the long term, upgrading and expanding infrastructure increases the economic growth and international competitiveness of a city, state, or nation (World Bank, 2006). In America, the marginal productivity of public capital is 27.5 percent, "substantially above the marginal productivity of private capital – which is typically reflected in the long-term real rate of interest" (Ligthart & Martin Suarez, 2011). As of April 2014, the current 30-year real interest rate was just 1.3 percent (Multpl, 2014). Furthermore, in 1988 the Congressional Budget Office estimated that the effective rate of return was 35 percent for projects to maintain highway conditions, 15 percent for new urban construction projects, and between 0 and 5 percent for new rural construction projects (Gramlich, 1994). In plain English, investment in public capital

projects is a worthwhile investment that "should be encouraged from a macroeconomic point of view" (Ligthart & Martin Suarez, 2011).

Upgrading and expanding infrastructure increases the economic growth and international competitiveness of a city, state, or nation.

In addition to the high social rates of return from infrastructure projects, research suggests that infrastructure projects yield many other benefits to economies. Road construction, for instance, lowers economically-inefficient congestion, decreases the hours traveled per year by automobiles, increases worker mobility, and lowers transportation costs to businesses (CMAP, 2013). Additionally, at a national level, insufficient infrastructure has been found to reduce quality of life and health outcomes (Willoughby, 2004). Infrastructure investment is also a "pro-poor" growth policy that reduces income inequality, "with income levels of the poor rising more than proportionately to overall income increases" (Delmon, 2011). Ultimately, for these reasons and more, investing in infrastructure attracts firms to locate and stay in a city, state, or nation over the long term.

WHAT IS A P3? TYPES AND STRUCTURES

A public-private partnership is a contractual or legal agreement between a public agency and a private firm or collection of private entities for private sector participation in the financing, delivery, operations, and/or maintenance of a project which may allow agencies to "do more with less" (Chi et al., 2012). A P3, although a collaborative partnership, is a vertical covenant. The government entity (the "principal" or "grantor") has more say in the agreement by determining the local need for, type, and terms of the project while the private entity (the "agent" or "contractor") has more knowledge of technologies and workers, access to finance, and potentially greater managerial efficiency.

P3s are an answer to both market failure and government failure. Without the public sector, infrastructure such as roads and sewage systems would be underprovided because the private profit from building and operating the network would fall below the social demand for the infrastructure. Private firms would also be unlikely to factor in environmental and social responsibilities without the public sector. On the other hand, without the private sector maximizing profit, infrastructure investment would lack funding, technological innovation, and an entrepreneurial spirit. P3s, in short, are collaborations between the public sector and private sector on mutually-beneficial projects which expand employment and provide long-run benefits to a region's residents and businesses.

There are four primary tasks to infrastructure investment. First, the project must be defined and designed to fit local needs. Second, the capital costs must be financed. Third, the project must be constructed. Finally, the physical asset must be operated and maintained. It is common for governments to contract with a private firm to construct the project while assuming the three other tasks. Public-private partnerships, conversely, usually extend the private sector contracting-out to encompass one or more of the three other tasks as well.

Figure 1 presents the typical risk allocation between the P3 parties. In general, the public sector assumes the legal, political, and environmental risks of the project while the private sector assumes the design and construction risks. Depending on the form of P3, the private sector also assumes the financial risks and the operating and maintenance risks. Both sectors take on the demand and revenue risks associated with the project.

Figure 1: Typical Risk Allocation Between P3 Parties: Public Sector and Private Sector

Type of Risk	Sector
Demand and Revenue Risks	Public *and* Private
Design and Construction Risks	Private
Operating and Maintenance Risks	Public *or* Private
Financial Risks	Public *or* Private
Legal Risks	Public
Political Risks	Public
Environmental Risks	Public

Source: Shediac et al., 2008.

There are three broad forms of public-private partnerships– and one type does not fit for all projects (Koppenian & Enserink, 2009). The first are "operation, maintenance, and service contracts" in which the government designs, finances, and owns the road or system but private actors operate and manage the project. The Chicago Skyway is an example of this P3 model. The second type of P3s are "build, operate, and invest" agreements in which private parties recover costs and turn a profit for a predetermined period of time before the project is wholly transferred over to government. Build, Operate, and Transfer (BOT) arrangements are the primary examples of this type of project, especially for highway construction projects such as the proposed Illiana Expressway in Illinois and Indiana.

Public-private partnerships are an answer to both market failure and government failure.

Build, Lease, and Own (BLO) projects are also common arrangements in this second type of P3. In BLO projects, a private sponsor builds a new facility, transfers ownership to

the government, leases the facility, and operates it at its own risk: university medical offices, low-income housing units, and sports stadiums such as Soldier Field in Chicago, Illinois are both provided under contracts akin to this model. Third, P3s can take the form of true "joint ventures" in which both the public and private sector invest in a project and subsequently share both the benefits and the risks. These types of projects are more common internationally (such as in China) than in America.

COSTS AND BENEFITS OF P3S TO THE PUBLIC SECTOR

Public Sector Benefits

Infrastructure investment is needed to improve living standards and to create the conditions for sustainable economic development (Koppenian & Enserink, 2009). Public-private partnerships, as tools to achieve these aims, provide substantial benefits to both the government and the public. Primarily, P3s allow the government to leverage private funds to increase internal investment beyond dedicated amounts. A P3 does not equal privatization: P3s are not intended to *replace* the public sector but rather to *expand* public works and accomplish goals which, given current finances, would not be achieved if governments were to go it alone.

P3s allow governments to complete more projects which serve the public interest. Consider a simplified example in which a government has $10 billion to invest in infrastructure and all possible projects are identical in size, scope, riskiness, importance, and labor and capital needed. Suppose the government could construct projects for $2.5 billion each or it could choose a P3 route in which the government will contribute $0.5 billion toward the project (with the private sector making up the $2.0 billion difference). Suppose also that the risk of P3 project failure is (a high) 50 percent chance– for instance, due to underperforming projections or to private partners failing to follow the contractual agreement or going bankrupt. If the project fails to meet expectations, assume that the public sector will instead have to contribute $3.0 billion, for the project cost plus associated legal fees and other improvements. Finally, assume that the government will design, fund, build, and operate at least one project without private investment.

Figure 2 illustrates the implications of P3s in this example. Without private sector funds, a government with a $10 billion budget could carry out four projects that each cost $2.5 billion. With private sector help, however, an individual P3 project would be *expected* to cost the state $1.75 billion. This is because there is a 50 percent chance that it will cost the government $0.5 billion and a 50 percent chance that it will cost the government $3.0 billion. Together, 50 percent of $0.5 billion and 50 percent of $3.0 billion combine to total $1.75 billion. Thus, even if the government chooses to execute one project through the traditional public procurement model, it could deliver five total projects using P3 agreements. At a price of $2.5 billion for the public-only project and a cost of $1.75 billion for each P3 project, the government would also be expected to save taxpayers an additional $0.5 billion. Note that if the risk of failure is below 50 percent, the government could utilize P3s to construct *even more* projects. P3s in this basic example allow the government to construct at least one additional project while saving taxpayer dollars. Though oversimplified, this thought experiment demonstrates how underfunded governments can serve the public interest by bringing in private financing and sharing risks (Figure 2).

P3s allow governments to capitalize on the managerial efficiencies, technological innovations, and skills of private companies.

Of course, reality is far more complex than the example in Figure 2. Government agencies need to calculate or predict expected public costs and savings according to the specifics, risks, and expenditures associated with each project. Occasionally, a P3 may be able to generate substantial savings for taxpayers. The Chicago Skyway public-private partnership in 2005, as an example, generated $1.83 billion in new revenues and savings for the City of Chicago and moved debt off the City's balance sheet (Schribner, 2011). If a priority project is determined to be too risky to become a P3 agreement, on the other hand, then an agency should not pursue the P3 option. But it would be a disservice to the public to leave the P3 option entirely off the table.

Governments derive many other benefits from public-private partnerships. In addition to innovative new private-sector financing which minimizes public exposure to risk, P3s allow governments to capitalize on the managerial efficiencies, technological innovations, and skills and talents of private companies (Witters et al., 2012). P3 projects, when private bids are competitive, allow governments to provide projects of a contractually-desired quality at the

Figure 2: Thought Experiment of P3 Benefits to the Public Sector

	Public-Only Projects	P3 Projects	Total Projects	Expected Public Cost	Expected Public Savings
Without Private Sector	4	0	4	$10.0 billion	$0.0 billion
With Private Sector	1	4	5	$9.5 billion	$0.5 billion

lowest possible cost to the taxpayer. In capturing user revenues to repay private investors, P3s also help foster an efficient network in which those who consume the infrastructure (i.e., road, bridge, water system, etc.) predominately pay for it instead of other taxpayers who do not (Scribner, 2011).

Empirical research on public-private partnerships around the world has demonstrated the potential benefits to governments. In 26 developing countries from 1990 to 1999, private firms invested more than $60 billion on P3 projects. The investments translated into the construction of over 21,000 miles of toll roads, bridges, and tunnels (Scribner, 2011). Additionally, in the United Kingdom, the Labour government of 1997 to 2010 extensively used P3s to build schools, hospitals, prisons, and other infrastructure. An analysis of the effectiveness of projects with private capital compared to traditionally-procured public projects from 2003 to 2008 found that the former were slightly more efficient. An estimated 31 percent of P3 projects were delivered late and 35 percent were over-budget. Meanwhile, however, public projects were delivered late 37 percent of the time and 45 percent were over-budget (Hare, 2013). Thus, while P3s were not "a stunning success," they "delivered a great deal of much needed public infrastructure for the UK" (Hare, 2013). Finally, based on evidence from a small number of studies, the U.S. Congressional Budget Office has also found that P3s have built highways slightly less expensively and slightly more quickly compared with the traditional public-sector approach (CBO, 2012).

In America, P3s have built highways slightly less expensively and slightly more quickly compared with the traditional public-sector approach.

Potential Costs and Best Practices to Avoid Them

Public-private partnerships also have several potential costs. Poorly designed projects in which revenues fall below projections can result in long-term public sector indebtedness and costly contract renegotiation processes (Koppenian & Enserink, 2009). By granting service provision to one firm, the government may also create a monopolistic environment in which the private actor finds it most profitable to over-engineer, misallocate resources, and impose high user fees (such as tolls) which hurt the poor and make access unequal (Koppenian & Enserink, 2009). One study found that P3 prices are 24 percent more expensive than traditionally-procured roads, indicating that the public sector might pay a premium on P3 projects to cover the transfer of construction risk (Blanc-Brude et al., 2009). Monopolistic agreements drive rent-seeking behavior, can result in collusion between politicians and firms which provided electoral support, and ultimately distort the market (Scribner, 2011). In addition, some P3 projects such as large-scale developments for shopping centers and sports stadiums have been found to significantly alter the demand for transportation, socialize private costs onto taxpayers, concentrate benefits into the hands of owners, and provide limited economic development benefits (Scribner, 2011; Coates & Humphreys, 2008). Finally, although P3s allow governments to save taxpayer dollars, resource savings are partially offset by giving up future revenues to the private actor (Engel et al., 2012).

These potential costs can be mitigated or eliminated entirely with best practices, however. Governments can minimize the risk of investor default by allowing the private sector to collect user fees for the public service delivery. When the private entity faces no other competition and is in a monopoly setting, the government can and should include regulations which cap the price that can be charged to use the good or service. Limiting increases in toll prices, for example, to the rate of inflation or to the rate of economic growth ensures that P3s do not overcharge the public. In some cases, governments can contractually agree to a share of the revenues as well. To eliminate collusion and nepotism, P3 contracts should be based on the competitive bid model, should avoid single-bid concessions, and should involve all stakeholders early in the process– including private sector actors, public administration officials, local community residents, and potential users of the project (Koppenian & Enserink, 2009).

Governments can also avoid the devastating costs of some public-private partnerships by simply rejecting certain projects. P3s have been found to bring efficiency gains when infrastructure quality significantly impacts the quality of service and prevents long-term costs, and when demand is stable and easy to forecast. P3s "are suitable, therefore, in transport and water sectors" (Iossa & Martimort, 2009). P3s for nursing homes and schools are less likely to benefit the economy because demand changes rapidly and because the primary factor influencing quality is not infrastructure. In these areas, the education of, skills of, and technology used by the workforce are considerably more important. Finally, capital improvements for large retail centers and sports stadiums– which are private market enterprises– should be left to private corporations and owners. Public sector involvement in these developments produces no discernible economic value while concentrating benefits in the hands of wealthy individuals. P3s should be used *exclusively* to expand the provision of public goods and services that would not otherwise be provided by the private sector.

COSTS AND BENEFITS OF P3S TO THE PRIVATE SECTOR

Private Sector Benefits

In today's business climate, investors are "increasingly considering infrastructure as an attractive alternative primarily because these assets can provide portfolio diversification" (Kohn, 2009). From the private sector perspective, infrastructure investment offers the potential for stable, inflation-protected cash flows. Most P3s effectively grant a monopolistic position upon the private actor, so competition from other firms is limited while demand for infrastructure is relatively stable over time. Even with government regulations to curb monopolistic prices on infrastructure assets, long-term returns are generally linked to inflation or economic growth, making the investment attractive to firms because there is minimal uncertainty over future revenues (Kohn, 2009).

How stable is infrastructure demand compared to other goods and services? From 1998 to 2008, annual usage *volatility* of the S&P 500 stock was 16 percent. Consumption of groceries, clothing, and medical drugs also fluctuated by about 3 to 5 percent over that time. Note that pharmaceutical investments are generally even more risky than drug consumption. Infrastructure usage, however, was more predictable: usage volatility was 2 percent for electricity, 1 percent for water, and about 1.5 percent for miles driven by motorists. At 5 percent, natural gas usage was slightly more precarious, but the volatility was highly correlated with weather and still more stable than the stock market (Kohn, 2009).

J.P. Morgan Chase has classified infrastructure investments into three groups for private actors (Kohn, 2009). First, "Core and Core Plus" construction projects are the least risky but also offer the least return. These include bridges, tunnels, toll roads, pipelines, energy transmission, and water systems. Second, "Value-Added" infrastructure investments have a medium risk and medium return for private firms and include airports, rail transit, and contracted power generation. Finally, the riskiest but most lucrative investments are "Opportunistic" assets. These comprise satellite networks and development projects. As discussed in the previous section, development projects can be very profitable for the private sector but are largely economically inefficient under P3 models with taxpayer support. P3s on these developments should be avoided from a public policy perspective.

Finally, public-private partnerships allow private sector actors to borrow on the cheap. Compared to a financially solvent government, the private sector borrows at a higher rate (Sadka, 2006). Governments, because they have the last-resort power of taxation to generate revenue and pay off loans, very rarely declare for bankruptcy compared to private businesses. Backed by "a solid, long-term contract from a government buyer," the private entity in the P3 is able to secure a good rate from private lenders (De Bettignies & Ross, 2004). Since the rates of return for many construction projects exceed the interest rates on 10-year and 30-year Treasury Bills, which are at historical lows, investment in infrastructure is now cheaper than ever and offers ample financial returns (Frank, 2012).

Usage volatility of "Core and Core Plus" infrastructure generally ranges from 1 to 2 percent, making infrastructure assets far more stable than other financial investments.

Costs to the Private Sector

Private sector costs can best be expressed in terms of risks. First, businesses who sign on to a P3 project face political risks. Changes to a government's laws and regulations, especially if the changes are specific to the sector involved, and regulatory decisions that differ from the contractual arrangements outlined in the P3 could cost the private sector over the life of a contract (Delmon, 2011). Construction and completion risks are also significant. Upfront fixed costs are high and unless a private sector actor is willing to expend significant money initially for modest gains over the long-term, investors can only avoid this risk by investing in existing infrastructure. At the same time, an incomplete P3 project has zero, or at best limited, value (Kohn, 2012). P3 projects can also be costly if the project fails to deliver services in the manner and timing required for the contract or if labor and capital inputs to operating and maintaining the project become expensive (Delmon, 2011). Finally, illiquidity problems and financial risk could be issues for the private entity.

FEASIBILITY OF P3S ON CONSTRUCTION PROJECTS

Public-private partnerships are politically feasible for construction projects. Referendum voting, which permits state and local governments to find their own optimal stock of infrastructure capital based on public demand, has shown that infrastructure investments are approved by voters 70 percent of the time on average (Gramlich, 1994). Additionally, in two March 2013 Gallup Polls which surveyed a combined total of 2,051 American adults, 74.5 percent said that they would vote for "a federal government program that would spend government money to put people to work on urgent infrastructure repairs" compared to 21.0 percent who would vote against (PollingReport, 2014). The American people recognize the inadequate quality and supply of the nation's infrastructure and are in

favor of increased spending to improve conditions (Frank, 2012).

Opponents of public-private partnerships often express two main concerns. First, there is a concern that P3s divert revenues from the public sector and end up costing the government in the long run. The previously-mentioned benefits to the public sector, however, should alleviate these concerns. Rather than shift taxpayer dollars from public projects to privately-supported projects and limiting the government's influence, P3s allow governments to *expand* public works projects to accomplish goals which would not be achieved if they were to go it alone. It is true that moving entirely to P3-financed projects would be problematic, because some projects which do not provide enough profit for private firms to be willing to invest can still provide substantial enough social benefit to merit construction, but it would be a disservice to taxpayers to completely ignore the P3 option.

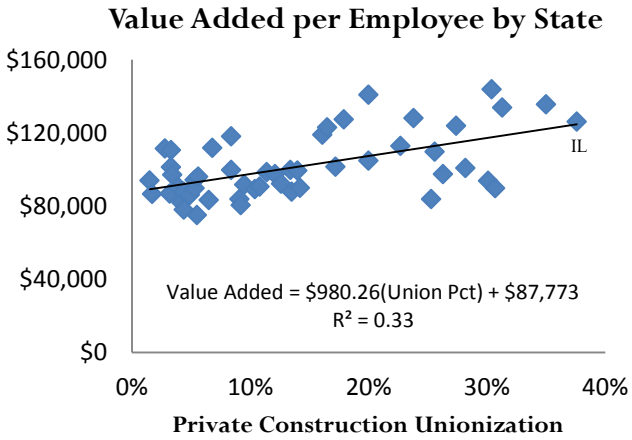
Second, some opponents believe that P3 projects are intended only to replace public sector union quality with nonunion workers. While this may be the case in some industries, construction is largely a private sector industry: just 0.83 percent of workers in the construction industry are employed by the public sector (BLS, 2014b). The concern here is important, though, as union workers have been found to be 17 to 22 percent more productive than nonunion workers in the construction industry, measured by value added per employee after controlling for inter-area construction price differences– largely due to higher rates of apprenticeship training among unionized workers (Allen, 1984).

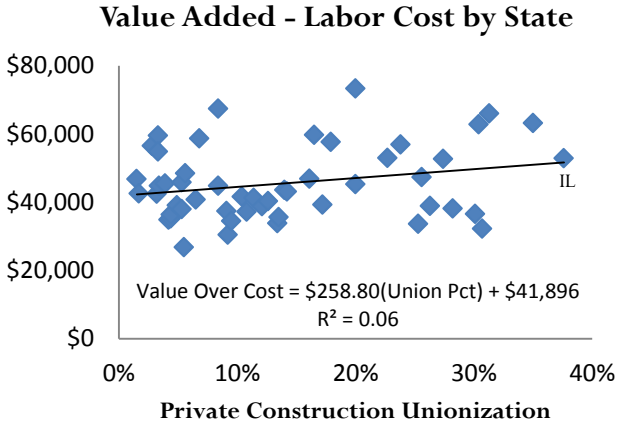
Figure 3 provides state-level data on construction worker value added and payroll costs from the 2007 Economic Census, the most-recent year for which data are available (Census, 2007).[1] Pairing average value added per employee with state-level data in 2007 from the Bureau of Labor Statistics on private construction union membership rates substantiates the claim that union workers tend to be more productive (Hirsch & Macpherson, 2014). The positive relationship finds that a 1 percentage-point increase in a state's private construction industry unionization rate is associated with a $980 increase in worker value added on average per year; a 10 percentage-point increase in union membership raises productivity by $9,803 per year on average (Figure 3).

Union workers tend to be more productive: a 10 percentage-point increase in a state's private construction industry unionization rate is associated with a $9,803 per-year increase in the average "value added" by each worker.

Additionally, while payroll costs are higher in states with more union density, this is *because* union workers are more productive (Figure 3). Indeed, even after accounting for labor cost, states with higher unionization rates are still more productive on average. The positive relationship between productivity minus payroll cost ("value over cost") and a state's unionization rate finds suggestive evidence that a 1 percentage-point increase in unionization raises value to firms by $259 per worker on average. Furthermore, workers in the ten-most unionized states for construction (which had a 30.8 percent mean unionization rate) contributed $49,032 worth of value over their individual payroll cost on average in 2007. In comparison, workers in the ten-least unionized states for construction (which had a 3.2 percent mean unionization rate) contributed $46,280 value over cost on average, or $2,752 less than the most-unionized states (Figure 4).

Figure 3: Average Construction Worker Productivity by State, by Private Construction Unionization Rates, 2007





Sources: Author's analysis of data from the 2007 Economic Census and the 2007 Current Population Survey. Census, 2007 and Hirsch & Macpherson, 2014.

[1] "Value added" is the value of business done minus the costs for materials, components, supplies, fuels, and subcontracted work.

Figure 4: Average Construction Worker Productivity by Ten-Most and Ten-Least Unionized States, 2007

2007	Ten-Most Unionized	Ten-Least Unionized
Average Value Added	$115,461	$93,814
Average Value Over Cost	$49,032	$46,280
Average Unionization	30.8%	3.2%
States (Most to Least)	IL, HA, MN, MI, AK, IN, WI, NY, OH, WA	SD, ME, NM, VA, MS, FL, SC, TX, AR, NC

Sources: Author's analysis of data from the 2007 Economic Census and the 2007 Current Population Survey. Results are unweighted averages of state averages. Census, 2007 and Hirsch & Macpherson, 2014.

There is an easy solution to this second issue. Governments engaging in public-private partnerships can stipulate the terms of the contract. Governments should mandate a certain level of quality by incorporating a Project Labor Agreement (PLA) in the contract or by requiring that prevailing wages be applied in order for a contractor to win a bid on a P3s. These stipulations can increase the probability that the winning bidder will deliver the service at a union standard that will be acceptable to the public. These prerequisites, however, are up to each individual government to determine. If private actors are not pleased with the standards set by the government, then they do not have to take the taxpayers' money and projects.

Ultimately, P3 projects should be politically feasible. There is demonstrable public support for an increase in infrastructure investment. P3s allow governments to accomplish this aim, largely without taxpayer dollars. Including stipulations that the project must meet quality standards, must include a PLA, and must pay prevailing wages would also benefit the public.

P3 Case Studies in the United States

Public-private partnerships are only recently taking off in America. Thus far, P3s have allowed governments to repay debts, shore up budget deficits, fund reserves, invest in additional infrastructure, and earn revenues if toll profits exceed certain levels. For motorists, technological innovations from P3 projects have increased mobility and decreased congestion.

The Chicago Skyway, a 7.8-mile elevated toll road which connects I-94 from the downtown Chicago Loop to I-90 at the Indiana border, was built in 1958. Operated and maintained by the City of Chicago, the City issued a request for qualifications (RFQ) in 2004 from potential bidders interested in operating the facility. The City received ten responses and went through with the process. In 2005, the City finalized a $1.83 billion, 99-year concession agreement with Cintra and Macquarie, making the Chicago Skyway the first long-term lease of an existing public toll road in America (FHWA, 2014a). The agreement allowed the City to repay $855 million in debt, close a $375 million budget shortfall, and save millions of dollars annually in interest payments by improving its debt rating (Schribner, 2011). The revenue also funded $875 million in medium-term and long-term reserves for the city and $100 million in neighborhood, human, and business infrastructure (FHWA, 2014). Within a year of taking over management, the private entity invested in electronic tolling technologies, which have increased mobility and traffic volumes while decreasing congestion– a large capital investment that the City could not previously afford due to its limited annual budget (GAO, 2008).

The Indiana Toll Road, a 157-mile highway across northern Indiana which connects Illinois to Ohio, was built in 1956. In 2005, Indiana agreed to lease the toll road to Cintra and Macquarie in a 75-year concession agreement for $3.8 billion. The private entity assumed operational responsibility for the Indiana Toll Road in 2006. Toll rates and increases were established in the contract, with maximum caps on the return on investment for the private concessionaire (FHWA, 2014b). The agreement allowed the State to contribute $2.6 billion to a 10-year transportation plan called "Major Moves." Paired with funds from the American Recovery and Reinvestment Act (ARRA), the "Major Moves" program will have constructed 87 roadways, built or reconstructed 65 interchanges, resurfaced 6,350 miles of highway (49 percent of the state's inventory), and rehabilitated or replaced 1,070 bridges (19.5 percent of the state's inventory) by the end of 2015 (INDOT, 2014).

The $3.8 billion Indiana Toll Road P3 allowed the State of Indiana to contribute $2.6 billion to "Major Moves," a 10-year transportation plan which will build 87 roadways and resurface 49 percent of the state's highway miles by 2015.

The Northwest Parkway is an 8-mile toll road in the Denver metro region that comprises four lanes, three major interchanges, and four mainline toll plazas (FHWA, 2014c). The project was built in 2003 with toll revenue bonds by the Northwest Parkway Public Highway Authority to improve worker and consumer mobility. After traffic volumes were lower than projected, a 99-year lease agreement was reached with a private concessionaire for

about $603 million. About half of the money ($303 million) went toward assuming the Authority's debt obligations, $200 million was granted to the Authority over the life of the contract for administrative fees, and $100 million was dedicated to future extensions of the road. Additionally, the concessionaire is required by the contract to share revenue with the Authority if toll revenues exceed specified amounts (FHWA, 2014c).

THREE POTENTIAL P3 PROJECTS

Future public-private partnerships aim to extend the collaborative effort by including the private sector in the design, building, and financing stages of the project. These P3 agreements are intended to expand infrastructure investment beyond that which the public sector can complete without assistance. In the Midwest, the three projects in this section have the potential to create thousands of jobs and billions of dollars in economic output.

The Illiana Expressway will create 3,782 short-term construction job and generate $0.98 billion in worker income by 2018. In the long run, the project will produce $21.3 billion in GDP gains.

The Illiana Expressway is a four-lane, 47-mile construction project in the Chicago metropolitan area proposed by the Illinois Department of Transportation and the Indiana Department of Transportation. The Illiana Expressway will support 24,000 vehicles per day from I-55 in Will County, Illinois to I-65 in Lake County, Indiana. The Illinois portion of the project is expected to cost $950 million while the Indiana portion will cost $350 million. The benefits, however, far exceed these costs: The expressway will reduce both vehicle miles traveled and vehicle hours traveled in the region, will make 20,000 jobs newly accessible to workers in 30 minutes or less, and will increase access to higher education for Chicago area students (Manzo, 2013b). Over the construction phase from 2015 to 2018, the Illinois Economic Policy Institute estimates that the project will support 3,782 construction jobs, $0.98 billion in worker income, and $2.16 billion in economic output (Manzo, 2013b; Manzo, 2013c). A separate economic impact analysis by the Economic Development Research Group, a Boston-based consulting firm, reached very similar projections: 4,322 jobs, $0.83 billion in household income, and $2.0 billion in economic activity (EDRG, 2014). In the long run, the project will sustain at least 3,378 jobs and produce $21.3 billion in cumulative GDP gains, well above the initial cost of $1.3 billion to both states (EDRG, 2014). The economic and social benefits of the Illiana Expressway will only increase with the likely construction of the South Suburban Airport in Peotone, Illinois, which will create over 50,000 direct and indirect jobs and add $7.0 billion to the regional economy (Murtha & Palzer, 2007).

The Ohio River Bridges project is a $2.6 billion project by Kentucky and Indiana in the Louisville metropolitan area to build two new bridges over the Ohio River (FHWA, 2014d). Two P3s will be used and are expected to result in significant cost savings. The Downtown Crossing, which Kentucky is managing, will be delivered through a design-build contract while the East End Crossing, managed by Indiana, will be delivered as an "availability pay" design-build-finance-operate-maintain concession over 35-years (FHWA, 2014e). Both bridges will be tolled and the East End Bridge will include a 13-foot-wide pedestrian and bicycle path. Overall, the Ohio River Bridges project is expected to support 4,118 construction jobs initially and 17,796 total jobs per year on average over 30 years while producing $7.8 billion in cumulative economic output by 2042 (EDRG, 2012).

The Innerbelt Eastbound Bridge is a proposed five-lane bridge over the Cuyahoga River into Cleveland, Ohio. The $302-million project would accompany a new five-lane westbound bridge, which is currently under construction. The two bridges will expand capacity by 25 percent by replacing an existing structure that is over 60 years old and has surpassed its useful life. When the westbound facility is finished, the current bridge will be demolished and the westbound bridge will accommodate all traffic until the eastbound P3 project is completed. While the westbound component was funded by the Ohio Department of Transportation, the Department is pursuing a design-build-finance P3 for the eastbound project due to a three-year funding gap between completion of the former bridge and the beginning of construction for the latter. The P3 is expected to allow the state to complete the project two years earlier than without private funds (FHWA, 2014f).

POLICY RECOMMENDATIONS AND CONCLUSIONS

Public-private partnerships are justified when they allow governments to multiply the delivery of public works and services of an acceptable quality at lower costs to taxpayers and consumers. To improve our nation's infrastructure, seven public policy positions are recommended.

Governments should increase public-private partnerships in "Core and Core Plus" projects and avoid P3s in "Opportunistic" retail and stadium developments as well as schools. Public-private partnerships create value when infrastructure quality significantly impacts the service provided and when demand is stable (Iossa & Martimort, 2009). P3s are thus

most suitable for bridges, tunnels, toll roads, energy transmission, and water systems. Infrastructure investments in these areas create consumer demand, attract firms through lower transportation costs, and increase the economic growth and international competitiveness of a region. In retail and sports stadiums, long-term demand is volatile and public funds only distort transportation demand and socialize private costs onto taxpayers, subsidizing the incomes of wealthy private sector individuals (Schribner, 2011). Lastly, public schools should remain publicly-financed: the primary factors influencing education are the teachers' skills and education and the technology used in the classroom, not the infrastructure.

Public-private partnerships should include Project Labor Agreements (PLAs) and should pay the prevailing wage of the communities in which the projects occur. A Project Labor Agreement (PLA) is a pre-hire agreement– covering all crafts on a project and lasting only as long as the project– which promotes stability, efficiency, and productivity. A PLA is a "valuable construction management tool for project planning and labor cost reduction" which establishes quality standards that the private actor must meet. There is also no evidence that PLAs reduce the pool of bidders or drive up construction costs (Kotler, 2009). Meanwhile, prevailing wage rates establish minimum income levels that allow workers to support a family, increase apprenticeship program rates and productivity, and reduce income inequality– helping the poorest workers most (Manzo & Bruno, 2014). As a result, prevailing wages promote significant community economic development impacts that extend far beyond the industry. In Illinois, prevailing wage laws create 3,300 jobs and generate an additional $1.1 billion in state GDP (Dickson Quesada et al., 2013).

Public-private partnerships should incorporate a competitive bidding process with at least four bidders. Competition in the bidding process ensures that services are delivered at an acceptable quality at the lowest possible cost to taxpayers. If a project does not receive proposals from multiple bidders, the probability that the taxpayers are getting a bad deal increases substantially and the project should not be carried out. Once the bid is awarded, competitive risks to the private entity should be removed.

Public-private partnerships should allow the private sector to collect user fees for the delivery of the public service. The collection of user fees (such as tolls) reduces the default risk of investors and increases the attractiveness of the project to the private sector. User fees also distribute the cost of infrastructure to those citizens who actually utilize it, saving taxpayer dollars and fostering a reliable, ongoing revenue stream (Koppenian & Enserink, 2009).

To eliminate monopolistic practices in public-private partnerships, the government should cap user fee prices and incorporate a benefits-sharing agreement. To ensure that the private entity is not exploiting the taxpayers in a government-created monopoly, the public agency should regulate tolls or other user fees and limit price increases to the rate of inflation or economic growth. Tolls should be set such that private investments can be recovered and a profit can be made, but benefits-sharing agreements clauses should be written to ensure that neither the government nor the private party receives disproportionate returns compared to the other partner (Koppenjan & Enserink, 2009). Therefore, minimum revenue guarantees and revenue caps should both be established in the P3 contract to provide certainty to the private partner and fairness to the public entity (Engel et al., 2012).

Governments should only offer public-private partnership agreements if the private sector will internalize its externalities. In one water-system P3 agreement in Cordoba, Argentina, the concession for private providers only covered the profitable portion of supplying the water but stuck public authorities with the costly sanitation and management responsibilities (Koppenian & Enserink, 2009). In this arrangement, the public sector did not generate long-term revenues and in effect was forced to use taxpayer dollars to subsidize the unprofitable components of a private enterprise. In America, private actors should cover the costs of any negative externalities generated by their activities. If a P3 road negatively impacts the environment, the private sector actor should be obligated to add an appropriate sustainable-development component to the project, such as accompanying bike lanes or greenspace. If a P3 energy transmission instrument leaks and causes property or environmental damage, the private actor should be liable if they also designed, built, and were operating the asset. In short, clauses should be in place such that taxpayers are not forced to foot the bill for private sector mistakes or losses to ensure private accountability.

Public-private partnerships should include stakeholder input at all stages of development. To eliminate nepotism, P3 contracts should involve all stakeholders early in the process and throughout the project– including private sector actors, public administration officials, local community residents, and potential users of the project. Stakeholder input increases accountability, transparency, and the democratic nature of P3 projects.

Ultimately, the pros of public-private partnerships outweigh the cons for transport, water, and energy construction. P3s can bring transportation efficiency gains, remove debt from public agency balance sheets, save on distortionary taxes, support thousands of jobs for workers in a weak labor market, and spur billions of dollars in economic development. Public-private partnerships should be utilized more frequently to expand the government's work in the public interest and to update the nation's deteriorating infrastructure.

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