

## **SHOULD PPPS PENCIL OUT? INFRASTRUCTURE PARTNERSHIPS IN REGIONAL DEVELOPMENT**

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**ABSTRACT:** This paper presents an economic argument toward defining the appropriate levels of public and private participation in infrastructure provision. The need for better public facilities and services is constantly growing, but resources are always constrained. Recognising the private benefits inherent in many planning decisions, many authorities seek partnerships with the private sector to contribute to their finance. However, rather than taking public provision as given and seeking private participation, it is possible to assume pure private provision and then analyse the desirable amount of public provision. There is a wide range of positive impacts that are not usually incorporated in such analyses, but should be. When it comes to infrastructure planning for social and economic development, public-private partnerships are certainly a key part of the equation.

### **1. INTRODUCTION**

This paper discusses public/private partnerships (PPPs) in large-scale core infrastructure. There are of course many other interesting areas where PPPs are being developed, such as football stadia, convention centres, and auto assembly plants. But in many countries and regions, the need for infrastructure investment is critical and is driving the greatest innovation in planning and financing.

This paper presents an economic argument on public/private co-operation, broadly defined. Although clearly the details of how to structure public/private finance are important, economics underpin the financial decisions. The objective is to make a case for a rather broad framework for analysing the public participation decision – how much to contribute to a partnership, and why?

The paper first addresses the public and private perspectives that motivate the search for viable PPP structures in infrastructure development. It then describes a conceptual framework for planning and analysis, before presenting the evidence and trends from a survey of the academic literature. The paper concludes with recommendations for policy analysis.

### **2. MOTIVATIONS: PUBLIC AND PRIVATE PERSPECTIVES**

PPPs have become an important component of regional planning through the evolving public sector context. Resource constraints, both fiscal and human, are getting tighter, but public demands for facilities and services are ever growing. Experience and attitudes toward public enterprises vary, from more or less neutral (ports) to deep disappointment (public telephone companies). The era of sole reliance on the public sector is long gone. However, few are calling for increased levels of public sector activity. Concurrently, there is an increasing appreciation of the efficiency of markets even in formerly sacrosanct areas, such

as toll roads in the anti-tax bastion of southern California.

Before the rise of partnership approaches in the broad field of infrastructure planning, the conventional approach started from an assumption that most types of infrastructure are public goods. For example, to over simplify: roads are non-excludable so can't be charged for, and non-rival so should not be charged for (as the marginal cost of usage is zero, up to the point of congestion). Then there are the positive externalities that benefit society as a whole but that individuals may not perceive as such and would not be willing to pay for. Some forms of infrastructure are even merit goods – that is, they should be provided because they are good for us, whether we think so or not (e.g. public safety, education, or symphony halls!). Therefore, because they can't be charged for, and should not be charged for, the public sector must provide these facilities and services.

In the modern era, even the public sector has recognised that there are few truly pure public goods, and, up to a point, most people are willing to pay for good facilities and services. It therefore makes both economic and social sense to bring the private sector along, and invite it to “participate” in infrastructure provision. The now-conventional wisdom is that doing so creates win-win situations.

Following this line of argument, it is now accepted that the private sector should have a role in providing public infrastructure, often with the implication that the public sector has the lead role. However, before proceeding to recommend the usual range of incentives and structures to attract private capital for public projects, it is instructive to consider the converse of the argument. Rather than taking the public provision of infrastructure as given, and looking for private participation, is it possible to assume a zero base and build up a case for public participation in privately provided infrastructure?

From this perspective, it is possible to outline a framework to analyse whether the public sector should contribute to infrastructure that is primarily privately provided. There is ample evidence that the private responds to the creation of infrastructure market opportunities. Finance is generated through user charges that match peoples' willingness to pay, based on the private benefits gained through consumption of infrastructure services. However, because of the public goods nature of facilities and services, user charges cannot capture all of these benefits, and infrastructure would be under-provided. In recognition of this form of market failure, it would be necessary to assess the difference between economic benefits to society as a whole, and economic benefits as perceived by individuals. The result could be a set of taxes that equate individual and societal benefits, and the revenue would be used to finance the public contribution to a PPP as a subsidy.

This is of course the conventional benefit-cost analysis approach and it has served well for a long time. The argument in this paper is that this approach has much to recommend it, but that practitioners do not go far enough, or broadly enough, in their calculations.

As all practitioners are well aware, constraints force governments to do more with less, and to leverage their resources to achieve all of the demands for services and facilities. When it comes to infrastructure investments, the direct

benefits are well known, and straightforward to assess. The indirect benefits reach farther than we usually appreciate however, and are not at all easy to assess. In order to calculate the appropriate level of public sector involvement in a PPP, this theoretical approach must be converted to practical tools that would be useful to regional planners. Like any economic decision, there is an optimum level of investment, and it is certain not to be the maximum. Regional science therefore has a challenge ahead, in applying its tools to the questions of magnitude and incidence.

### **3. A CONCEPTUAL FRAMEWORK FOR PLANNING AND ANALYSIS**

In order to elaborate the concept of a broad range of social and economic benefits from infrastructure provision, it is useful to return to first principles. The key questions are: Why do regions or cities grow? What is the role of infrastructure in that development? What do we expect in the form of impacts?

In the regional science context, the stylised narrative is well known. Regions grow because they make increasingly productive use of their resources. The simplest set of resources would include private capital and labour, plus raw materials. Growth enables economies of scale and scope, thereby lowering costs and increasing opportunities. If the city or region performs well, additional private capital and labour will be attracted. It is possible to imagine a virtuous circle, up to a point (but that point may be very large and very far away, considering the success of mega-regions). This stylised story is known in the literature as endogenous growth theory, but most practising planners will recognise it as good old-fashioned economic development.

Within growth theory, the role of infrastructure is straightforward. New facilities provide needed services, or eliminate capacity constraints and congestion. Good facilities and services also lower the costs of production, giving the city or region an advantage. Infrastructure provision reinforces these effects, promoting economic development.

If that were the end of the story, the common wisdom would have simply been confirmed. Engineers could be instructed to just keep building, and planners would not have to think too hard about how to calculate the direct and indirect benefits. For example, methodologies for things like savings in travel time from a new bridge are well established. The total direct benefit to society could be summed, a toll imposed to capture some of those benefits and revenues used as the public sector's contribution to a PPP. However, it is not the end of the story. As will be argued below, infrastructure planning can and should be done in a broader and more integrated fashion.

From the perspective of economic development, and the portion of an investment that can be justified from the public sector, infrastructure is also an input to production. If there is an extra input, obviously there should be more output. There can also be significant positive effects of infrastructure provision on private capital and labour. Better facilities and services promote urban and

**Table 1.** Social Impacts from Provision of Infrastructure.

<b>Impacts on Sectoral Development</b>	<b>Impacts on Social Development</b>
<u>Productivity</u> <ul style="list-style-type: none"> <li>▪ increased output as a result of direct input and higher productivity</li> <li>▪ structural and comparative cost changes through improved technology</li> </ul>	<u>Income</u> <ul style="list-style-type: none"> <li>▪ higher wages through improved productivity</li> <li>▪ direct and multiplier effects of infrastructure construction wages</li> </ul>
<u>Complements / Substitutes</u> <ul style="list-style-type: none"> <li>▪ reduced costs of production and transactions through complementarity</li> <li>▪ increased productivity of other factors through complementarity</li> </ul>	<u>Access</u> <ul style="list-style-type: none"> <li>▪ access to markets: cheaper inputs, higher output prices, and alternative employment</li> <li>▪ improved health, education, and social services due to better mobility and access</li> </ul>
<u>Location</u> <ul style="list-style-type: none"> <li>▪ productive amenities attract firms, consumption amenities attract labour</li> <li>▪ induced private investment through lower costs and higher returns</li> </ul>	<u>Consumption</u> <ul style="list-style-type: none"> <li>▪ consumption value of infrastructure services</li> <li>▪ environmental improvement</li> </ul>

regional sectoral development by increasing productivity of those private inputs, lowering costs, increasing returns to scale, and facilitating agglomeration economies. In the light of these positive effects, more private capital and labour than would otherwise exist are attracted to the opportunities created through greater productivity. Finally, there is also a large range of what might be called social impacts from infrastructure provision. These impacts are summarised in Table 1.

Taking the argument one step further and considering what effects PPPs in particular might have on infrastructure provision can produce the final part of the public-private investment equation. There is good reason to expect that private sector participation in infrastructure provision has beneficial effects. From the literature on private versus public sector production, such partnerships are expected to increase efficiency through lower costs, increased quality and responsiveness to customer demand, and shorter implementation schedules. Finally, promoting PPPs as a desirable solution to urban and regional infrastructure can increase the incentives to invest and improve even further

In summary, if a virtuous development circle exists as described by the stylised growth story outlined above, a public-private partnership for infrastructure provision can add a third component to the more commonly known two categories of development: first through the initial resource endowment, second via complementary infrastructure provision (which was previously entirely in the public sector) and thirdly via the salutary effects of private sector involvement.

#### 4. EVIDENCE AND TRENDS

Governments have long been dominant as regulators, buyers and suppliers of infrastructure facilities and services. They therefore create and shape markets for infrastructure, whether or not they have begun to allow anyone else to participate in them. However, in an increasingly rapid process, cities, regions, and entire countries are increasingly moving away from pure public monopolies in a wide range of sectors.

The transformation of public utilities and telephone companies in developed countries has been dramatic, and privately financed roads are well established. In developing countries there is increasing private sector activity both as a proportion of infrastructure and its scale. This trend is likely to accelerate, as participation within sectors becomes increasingly feasible, due to technological change and new forms of regulation (e.g. independent regulatory units, public utility boards, rigorous cost accounting, and unbundling of services from infrastructure).

The demonstration effect is also evident, as successful initial efforts create pressure to continue reforms and expand into more ambitious partnerships. Small existing programmes grow larger (e.g. cellular phone operators), there are more new entrants (e.g. independent power producers), involvement becomes deeper (from private investment in public entities to eventual privatisation of entire industries) and there is often expansion to other sectors (e.g. successful power producers pave the way for other utilities such as water).

There is a range of motivations behind the apparent acceleration of these trends. In all probability, some administrations are expanding private sector involvement based on a good analytic understanding of the benefits, some are responding opportunistically to lessen budgetary pressures and some are operating on faith. But on balance, those operating in expectation of positive impacts have good reason to do so. The evidence on expected economic impacts (summarised and evaluated in a survey article by Guild (2000)) is clear.

With respect to infrastructure provision, regional output does indeed increase. Elasticities of output as a result of investments in “core infrastructure” (water, power, roads, phones) range from 0.1 to 0.3. In other words, annual output increases between 10 and 30 cents for every dollar invested in public capital. Sectoral output varies even more, and ranges even higher, with elasticities of output as high as 0.5 in some industries. Private capital and labour also become more productive through interactions. These effects are more difficult to quantify, but it has been shown that following infrastructure improvements total factor productivity goes up and firm creations and relocations are stimulated.

The evidence on social impacts is less clear, but points to the following. Wages increase in areas with infrastructure investment due to higher productivity. Total household incomes are higher, due to both wage increases and higher employment rates. In developing countries, educational achievement is much higher, health much better and women’s employment much greater in areas with better transport and communications.

To generalise, the high end of the range of impact estimates is roughly equal

to the contribution made by private capital investment, and has been reliably found in a few cases. The bulk of the evidence however points to the lower end of the range. In general, positive effects are easier to identify at national and regional levels than at metropolitan, most likely due to the importance of positive spillover effects. Some of the more impressive estimates have come from highly developed regions, probably due to the fact that areas with more going on, make more of new facilities and service. But the positive direction of impacts is unquestioned.

Of course these relationships are not simple and straightforward. Local conditions vary greatly and affect the potential gains that can be expected. If there are particular capacity constraints that can be relieved, for example, the effects are larger. There is a wide-ranging debate in the infrastructure productivity literature, exemplified by Gramlich (1994) and since extended by many others. Improved analytic methods are needed to help with the decisions on quantities, locations, and sectors for private provision and public-private partnerships.

##### **5. WHERE TO NEXT? RECOMMENDATIONS FOR POLICY ANALYSIS**

The implications of these findings for PPPs are clear. If people and firms benefit from infrastructure investment in broader ways than are typically analysed, the case for a public contribution to a PPP is both broader and deeper. The task for regional scientists is to combine econometric tools and social impact analysis with the physical planning processes more commonly used to make infrastructure decisions. Doing so will lead to better decisions in both the public and private sectors.

Although the exact quantification of these positive benefits remains an open question, the argument outlined in this paper has a number of implications for planning. The role of the public sector in infrastructure provision can, and in some cases perhaps should, be determined from the bottom-up, rather than the top-down. This determination can be helped through analysis of externalities, socio-economic benefits over a wide area and a broad range of sectors and the likelihood of natural monopolies. The public role may also be limited to one or more aspects of the infrastructure process, from planning, to finance, production, management and operations. There is certainly no reason why involvement in an early phase should always mean continued involvement in 100% of subsequent phases.

Many public sector planning processes require benefit-cost analysis of projects, and social aspects are often part of the analysis. This paper has described some additional aspects that are not usually taken into account in such analyses, but should be. At first glance, this framework may seem to suggest that public investment in infrastructure is even easier to justify than commonly thought. After all, if all those indirect benefits exist, then the public contribution can be even higher, and the calculation should be undertaken immediately. On the other hand, all those benefits accrue to firms and individuals. A case could be made that users should be willing to pay for them in full, or at least in greater

measure, if the benefits can be thoroughly understood and their value quantified. This realisation has implications for both taxation and user charges as a means of financing public infrastructure.

Regional science has always made very valuable contributions to these issues. This is in part due to the mix of theoretical, empirical, and applied work represented in the field. Practitioners identify problems, academics develop tools to understand them, and all sides are involved in implementation. Over the years, regional scientists have developed many of the analytic tools that are needed to implement these kinds of ideas. The ability to quantify social benefits and marginal changes to sectoral output through microeconomic tools such as CGE and MRIO has grown tremendously in power and detail. Regional science therefore has a challenge ahead, in applying its tools to these questions. Convincing the public of changes in the way we finance infrastructure and services, on the basis of applied econometrics, should keep regional scientists busy for some time to come.

#### **REFERENCES**

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