PROSPECTS AND PITFALLS OF PUBLIC-PRIVATE PARTNERSHIPS IN THE TRANSPORTATION SECTOR – THEORETICAL ISSUES AND EMPIRICAL EXPERIENCE

Gunnar Alexandersson and Staffan Hultén
Stockholm School of Economics, Sweden

ABSTRACT

One effect of the regulatory reforms in the transportation sector is that private companies increasingly participate in the investments in new transportation systems. These investments may amount to very large sums in the coming 10-year-period. There are several different ways to categorise these projects, but with a common name they may all be viewed as Public-Private Partnerships (PPPs). Some PPP projects may be very long-term, including new infrastructure investments as in concessions and Build-Operate-Transfer projects, while others may be more short-term, concerning reinvestments only – and sometimes even limited to the task of operating a finished construction. The overall goal of PPP projects is to find solutions to problems in which the advantages of the private sector (such as financial assets, efficient management, propensity to innovative and entrepreneurship) are combined with the advantages of the public sector (such as social and environmental concern). When carried out successfully, PPP projects can be very powerful tools to quickly construct new infrastructure facilities and operate them efficiently. However, experience has also shown that they may sometimes go wrong, creating transportation systems that are inefficient, under-used and loss-making. Although PPPs are still considered to be interesting solutions for urgent projects when budget constraints limit the possibilities for public-only investments, the discouraging experience of some high-profile projects have had a negative impact on the reputation of the PPP model. In this paper, we discuss the prospects and pitfalls of PPPs in the transportation sector, focussing on long-term projects involving investments in new infrastructure for roads and railways. Of particular interest are the various problems related to the sharing of risks between different partners in a PPP project. This includes both the risk sharing between the private and the public sector and the distribution of risk among the involved private firms, such as the members of a consortium but also their relations to banks and similar institutions. The risks of a PPP project are typically related to estimations and forecasts of market development and other factors. We discuss these issues by using the theoretical concepts of lock-in and hold-up problems, and what can be done to avoid them in terms of PPP and contract design. The theoretical discussion and the conclusions of the paper also draw from the gathered empirical experience of previous projects, primarily from European countries.

INTRODUCTION

Public-Private Partnerships (PPPs) have attracted much attention in recent years as possible means to handle large and costly projects, such as the construction of new infrastructure. From a European perspective, the transportation sector has been particularly affected in this respect. This can be explained by several factors. The progressively deregulated transportation markets, resulting in an increasing role of private sector ownership and involvement, coupled with the budget-restrictions of several EU member states, may be considered as the most important ones.

The overall goal of PPP projects is to find solutions to problems in which the advantages of the private sector (such as financial assets, efficient management, propensity to innovative and entrepreneurship) are combined with the advantages of the public sector (such as social and environmental concern). To be economically sensible, a PPP project should generate a combination of allocative efficiency and productive efficiency that is superior to an entirely public or entirely private project (Välilä, 2005, p. 100).

This article takes a closer look at the prospects and pitfalls of using PPPs in the transportation sector. We will start by considering the various forms of PPPs as they are described in the literature and discuss the generally observed advantages and disadvantages. Our discussion deviates from much of the earlier work by relating the advantages and disadvantages to economic theoretical constructs such as specialised knowledge, hold-ups, hostage-taking and lock-ins. We will then turn to the transportation sector and present some cases that highlight both additional and previously discussed issues. The focus is upon long-term projects involving investments in new infrastructure for roads and railways. In the remaining sections of the article, we use the empirical findings to enrich the discussion on advantages and disadvantages, focussing on the development of some theoretical concepts. In our conclusions we will also discuss the possibilities to avoid some of the problems typically encountered in PPP projects.

TYPOLOGY OF PPP PROJECTS

PPPs refer to contractual agreements formed between a public agency and private sector entity that allow for greater private sector participation in the provision of a public service – for example a transportation system. There are numerous ways to categorise PPP projects. While some scholars argue that “true” PPPs always involve private infrastructure investment and ownership, Benett, Grohman and Gentry (1999) describe PPPs as a spectrum of cooperative relations between private and public organisations directed towards the supply of infrastructure services. Some PPP projects may be very long-term, including new infrastructure investments as in concessions and Build-Operate-Transfer projects, while others may be more short-term, concerning reinvestments only – and sometimes even limited to the task of operating a finished construction. Estache and Serebrisky (2004) identify four principal types of PPP contracts: 1) divestments of public property or businesses to the private sector, 2) greenfield investments, for example the building of a toll motorway, 3) service contracts that can include promises on investments, and 4) concessions, licenses and franchise agreements, which often have a life span of 10-30 years and include detailed provisions on investments and service levels.

In Figure 1, abbreviated from a US Department of Transportation document, we find a classification that categorises PPP projects in terms of the varying degree of public and private sectors ownership and commitments related to the projects. In a Design-Tender-Build

project a public agency pays for a building project that can be carried out by either public or private firms. A tendering procedure for a service contract may lead to the entry of a private firm that operates a transport system that is publicly subsidised. In a Design-Build project the private firm accepts the responsibility for the design, the construction and the operation of a transport system. In a Build-Operate-Transfer project a tendering procedure decides which company that will build and then operate a transport system. After a long time-period, for example 30-50 years, the transport system is handed over to the public sector. In a Design-Build-Finance-Operate project the private sector accepts all responsibility for the project. This type of transport project was tested in Great Britain in the early 1990's. Road projects that use shadow tolls or privately owned roads financed with user charges may use this model.

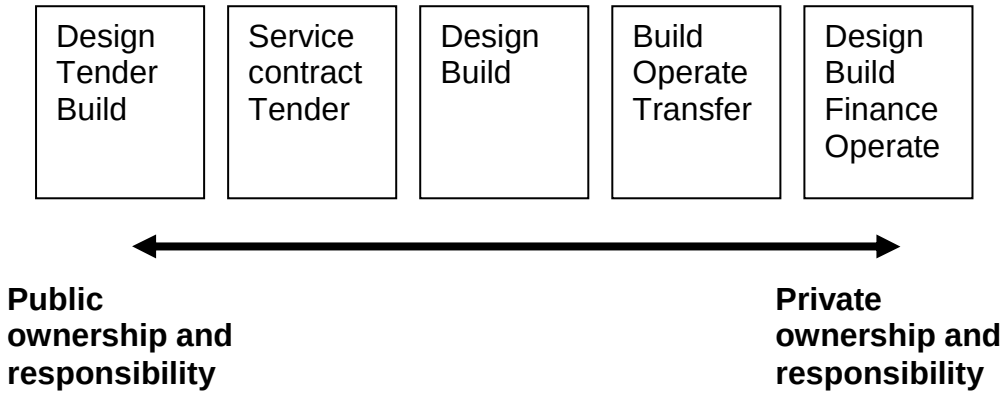

Figure 1: Different types of PPP models depending on the level of public/private ownership and responsibility

ADVANTAGES AND DISADVANTAGES WITH PPPS

Advantages with PPPs

According to a Canadian report (Government of Quebec, 2004), a PPP presents numerous advantages both for the public partner and the private partner. The private partner is likely to get access to new sectors and achieve more business activity, enjoy better margins and get more long-term revenues. Since the alternative to a PPP solution is typically a public- only investment related to public services, the implications for the public partner have been getting much more attention in the literature. We will stick to this focus as well, but will come back to the implications for the private sector later in the article.

The advantages for the public partner may be summarised into the following broad arguments, which we will consider in more detail below: 1) improved service quality, 2) lower project costs, 3) risk sharing, 4) earlier and faster construction, and 5) better budget fulfilment.

Improved service quality

By the use of contracts, the public partner is able to specify and regulate the level of service quality to be offered to the public. The private sector may also carry special expertise and technology that will result in improved service quality. The use of competition in operations may create even more incentives for improved quality by means of entrepreneurial development and innovation.

Lower project costs

PPP projects typically encompass a wide range of activities – design, construction, and future service provision. If all these activities are held together – bundled – in one project rather than being separated into its different parts, better overall solutions are possible to accomplish and the chance to exploit scale economies increases. Consequently, considerable cost reductions may be achieved. The role of bundling has been investigated by Hart (2003). A similar effect may also be reached due to the specialised knowledge held by some firms regarding this type of projects, in contrast to the state that may only encounter these projects once in a while.

Risk sharing

PPP projects should be designed so that each specific risk associated with the project is borne by the partner best suited to handle this risk. This is considered as one of the most important advantages of a PPP project solution. Since PPP projects typically give the private sector a greater responsibility for project design, construction, service obligations and financing, there is a net transfer of risk from the public sector to the private sector. In the literature, there is a general consensus that private firms are better than the public sector to manage construction and market risk and project time - if they are in charge of a project. For example, a private firm exposed to a market risk will act vigorously to safeguard the profitability of the project. However, some risks, like weather, natural disasters and policy changes are better managed by the public sector. Some risks may be shared by both partners (see Table 1).

Table 1: Appropriate division of different types of risks between partners in a PPP project

Public partner	Private partner	Public or private partner (varies from case to case)
Political decisions	Market risks	Demand forecasts
Regulation	Construction risks	
Weather	Project time	
Natural disasters		

Earlier and faster construction

If the public sector is unable to finance all the projects that are considered to be beneficial from a socio-economic point of view then the private sector can participate in the financing of some projects organised as PPP projects. Thereby, public resources for investments may be better allocated over time, and the positive effects of an infrastructure investment may arrive earlier than if only public financing is available (Statskontoret, 1998).

In a PPP project where activities such as design and construction are combined, they may be carried out in parallel rather than sequentially. This typically shortens the project's completion time. According to a British study, only 24% of all new PPP projects are running late, compared to 70% of the earlier public-only projects (National Audit Office, 2003). Contract design and other incentives (for example the possibility to gather revenues from infrastructure usage) may also have a positive effect on the time of completion.

Although PPP projects generally have a longer planning phase, it is often possible to compensate for this in the construction phase.

Better budget fulfilment

When the private sector is responsible for the design, construction and future service production that public sector can be assured that the project goals are reached and kept in line with the price agreed upon at the time of signing the contract. This reduces the possibility for large unexpected cost increases, which facilitates the long-term planning of the public sector. Investigations have shown that PPP projects keep their budgets far more often than public-only projects (22% over budget compared to 73% over budget) (Poulter, 2004).

Disadvantages and problems with PPPs:

PPP projects are typically complicated projects. One major reason for this is the fact that the projects generally have to deal with long-term investments that are divided into two phases – the construction phase and the operational/maintenance phase – being very different in character and implying different demands. Empirically, problems and failures have generated more discussions than the advantages of PPPs. As we will see, there are also additional lessons to be learned from the empirical cases presented later in the article. However, the disadvantages of PPPs, as listed in the theoretical literature, are generally fewer but are important to consider in order to reducing the risks of running into problems that are avoidable. We can broadly identify three types of problems. The first depends on the fact that the state, during normal economic circumstances, can borrow money at a lower cost than private firms, and the second and third types of problems – hold-up and lock-in – arise because of the difficulties in writing complete contracts. The outcome of this can be that the advantages of increased private involvement in infrastructure projects may be constrained by badly designed contracts that may either include way too high or way too low compensation to the private actors in comparison to their efforts and bearing of risk.

Higher costs of capital

In theory, there is no safer borrower than the state and the state should therefore always be able to get the best interest terms available when additional funds are necessary to finance a large-scale project. Private firms may also need extra compensation for bearing some of the financial risks associated with a large project. As long as the state or another public agency is present as a partner and somehow guarantees that it will be completed, it should however be

possible to achieve similar costs of capital also for the private firms that take part in a PPP project.

Complicated contracts and hold-ups

Hold-up problems occur when un-anticipated events place the contractual relationship outside the self-enforcing range. This may happen because all the actors in a PPP are ignorant or because one actor deceives the other actors by providing incomplete or distorted disclosure of information (Klein, 1996, pp. 444-45). The reason why hold-ups aren't negotiated in the contractual stage is because they are surprises in the sense that the particular conditions that will lead to the hold-up are considered unlikely and therefore costly to negotiate in the contract (Klein, 1996, pp. 461).

If we bring these insights into the realm of public-private partnerships it can be argued that PPP contracts tend to be complicated due to the difficulty to cover (in detail) all the effects and the risks associated with large and long-term PPP projects. It may therefore take a long time to negotiate all the contract terms which increases the costs and prolongs the project time in the introductory phase. PPP agreements are typically viewed as being particularly prone to contractual incompleteness (Välilä, 2005; Nilsson, 2006). Consequently PPPs often present risks that can make hold-up to become an issue. Hold-up as a problem in infrastructure PPPs has to our knowledge not been treated in the literature. Some insights into how the problem can be managed can be found in Bös and Lülfelsmann (1996). They argue (p. 71) that a welfare-maximising public partner should offer renegotiations and higher compensation to avoid the hold-up problem in the public procurement of specific goods when necessary innovations drive cost increases that were unforeseeable by both actors. Another way of managing the non-fulfilment of a PPP contract would be for the procuring entity to ask for safeguards like surety bonds (Calveras et al, 2004) when negotiating the project. This can provide a guarantee against interrupted delivery or complete withdrawal due to financial distress, e.g. by assuring commitment from company owners. However, its applicability is probably very dependent on the context of the PPP-project. Surety bonds seem to work well in the construction industry, where the aim is to make sure that a building or any type of construction is completed (see for example the report prepared by the DGIII Working Group on Abnormally Low Tenders, 1999). In a transportation sector PPP that includes both a construction stage and an operational stage a loss-making firm may regard the surety bond as a sunk cost and exit the contract.

In addition to non-opportunistic hold-ups it also happens that actors consciously provide incomplete or distorted disclosure of information to gain an advantage in a complex transaction. These types of hold-ups are much more difficult to handle with simple rules as they thrive on opportunistic behaviour. They may only gradually become apparent to the other actors involved in a long-term project as they acquire information about the project's functioning and effects.

Reduced flexibility with long-term contracts and lock-ins

Many PPP projects presume long-term commitment from all parties, which may create lock-ins and reduced flexibility. Lock-ins may sometimes be exploited strategically, as in the case of hostage-taking. This refers to when one party has made a sunk investment in a second party, an investment that presumes that the relationship continues. The second party may use this sunk cost as a hostage to hold up the first party, ensuring that a sequence of transactions takes place or seeking renegotiations in its favour (Williamson ,1983; Hoff, 1994).

In case a project is profit-making the actor in control of costs and revenues can continue to manage the project as long as it wants. However, if the project is loss-making the actor in control can either demand a renegotiation – see the discussion above – or dissociate itself from the project by accepting any sunk costs. This means that the public partner is in a potentially disadvantageous position. All profitable projects will continue without renegotiations and all loss-making projects stand the risk of being renegotiated or terminated.

PPP PROJECTS IN THE TRANSPORTATION SECTOR

The history of transportation of the past two centuries shows that regardless if the focus is on railways, bus traffic, roads, airports or seaports, cooperation between the public and the private sectors and how to regulate this has been a recurrent policy problem. The trends to deregulate several transportation markets have put renewed emphasis on the role of private sector investment and ownership in the transportation sector. In a report from the World Bank (Estache & Sirebrisky, 2004) there are references made to the Public Works database, highlighting that 1137 new transport projects between 1985 and 2003 involved private actors, amounting to a collected sum of investments of 684 billion US dollars. This equals an average of 600 million US dollars per project. 50% were directed to roads, 22% to railways, 16 percent to airports and 12% to seaports. The developing countries accounted for 60% of the projects. Among the developed countries, the US accounted for 122 projects, Great Britain for 64 (although a larger share, 27%, of the invested money compared to the US figure, 17%). Other countries with a high level of private capital investments in infrastructure projects were Canada, Spain, Australia and Portugal. The investments in Europe were mainly directed towards toll road projects and railways.

Most observers agree that private actors – for example construction firms, vehicle manufacturers, operators and banks – in the future will become even more active in transport projects through PPP projects. According to the World Bank, the private sector will likely continue its involvement and invest hundreds of billions US dollars in the coming 10-year period.

In the following sections we will take a closer look at some specific European PPP projects in the transportation sector and their related experiences regarding the prospects and pitfalls of PPP project solutions.

The Channel Tunnel

During the 1970s, the French and British governments tried but ultimately failed to reach an agreement on public construction and management of a tunnel connecting the countries under the English Channel. This was one of the main reasons why the tunnel instead came to be a privately financed and operated construction. During the Thatcher era, a joint decision on private ownership was taken with the social democrat government of France.

According to a report written by top managers of the Eurotunnel company, the tunnel project has faced several difficult problems. The main problem was the initial difficulties to reach a decision on public ownership. This lead to a number of related problems, such as the difficulties during the 1980's to find anyone interested in owning a transportation system. As en effect, the concession to construct the tunnel was granted to a group of companies that had shown proposals regarding the construction, rather than a future suitable owner of the tunnel. The proponents to construct the tunnel consisted of a construction consortium and a financing syndicate. They got the concession without any tendering procedure and a newly set-up listed

stock company became the owner of the tunnel, with many small private investors among its shareholders.

The Eurotunnel company was restricted in several ways. For example, the national railway companies got the right to 50% of the tunnel's capacity but were only obliged to put in 40% of the revenues. This share was also supposed to decrease over time (Noulton, 1999). From a socio-economic perspective this had a negative impact. The Eurotunnel company has tended to demand very high fees when it believes that the market can bear them. For instance, this pricing policy contributed to the decision made by Avesta-Sheffield to choose a combined railway and sea shipping solution rather than a railway-only solution (Alexandersson et al, 2000).

Despite an unusual amount of new shares offered in order to raise capital, the company started off with a small amount of capital compared to its total needs. Instead, the Eurotunnel company borrowed considerable amounts of money, by means of long-term loans at fixed interest rates. Since these rates, along with the inflation rate, were much higher than they came to be towards the end of the 1990's, the costs of capital remained high while it was not possible to compensate for this with higher prices. Yet another factor that kept revenues from rising was the fact that the new high-speed line on the English side was delayed by 7 years, not being completed until 2006, i.e. more than 10 years after the start of the tunnel services (see below). The airline industry has also been able to keep a rather large share of the traffic between Paris-London and Bruxelles-London, partly since many passengers want to continue with connecting flights, and partly because new actors like EasyJet have entered the market and forced the established firms to lower their prices and develop their services (Commission of European Communities, 2004). Nevertheless, the number of passenger travelling with the Eurostar has increased on a rather healthy way, but it has been achieved by means of low prices and rebates.

One additional problem was that the project was not protected against political intervention once it had been initiated. For example, the size of the emergency exits had to be altered post-ordering, leading to cost increases amounting to 40 million pounds and a 9-month-delay (Noulton, 1999).

In summary, the economy of the Eurotunnel project was destroyed by four main components. Firstly, the interest rates became fixed at too high long-term levels. The tunnel is now generating a surplus before financial costs, but large deficits once the interest is paid for the 9 billion Euro capital debts. In the triumvirate of companies handling the channel tunnel project it is clear that the Eurotunnel company became the losing part while the banks got their interest revenues secured at a high level and the construction companies were able to complete the project as any other large construction project. Secondly, the inflation rate was dampened making it impossible for Eurotunnel and Eurostar to raise their prices as expected. Thirdly, the high-speed line on the English side was delayed. Fourthly, the airlines developed their traffic and did not lose as much ground as expected.

The link from the Channel Tunnel to London

The high-speed railway link from the Channel Tunnel to London (already mentioned above) was another unsuccessful PPP project. The construction project lost many years while private firms and the British state negotiated how the private sector could get an adequate return on its investment. When the discussions started, some actors thought that building permits and shopping facilities in the vicinity of the railway line would entice the private sector to accept the investments. These incentives proved to be insufficient considering the magnitude of the

investments and the uncertainties surrounding both the number of trains and the value of the properties that could be built as part of the agreement.

The Öresund bridge

The Öresund bridge construction project may be considered as a PPP project of the Design-Build type, in which two national states took over the bridge once it had been completed by a consortium.

In March 1991, the Swedish and Danish governments signed an agreement concerning a fixed connection over the strait called Öresund. In January 1992, the Öresund construction consortium was formed by means of a contract between the Danish state-owned company A/S Öresundsförbindelsen and the Swedish state-owned company Svensk-Danska Broförbindelsen Svedab AB. The two companies each have a 50% stake in the consortium.

The bridge connection was divided into large construction contracts for 1) the countersunk tunnels, 2) the artificial island in the strait, and 3) the suspension bridge over the strait. In order to place a bid, the companies had to show that they had previous experience from this type of project. The consortium wanted to have only a few companies in each constellation of which one should be the primary responsible company. The projects were ordered on a design/project basis, meaning that responsibility for design, technology, choose of methods and permit applications were placed in the hands of the contractors. Thee consortium asked for bids including planning and technical aspects as well as responsibility for related costs, but not for financial responsibility and attached risks. The contractors were offered index-linked compensation for their costs and the possibility to get paid in a mixture of currencies, decided at the time of signing of the contract. All loans and other financial instruments were jointly guaranteed by both the Danish and the Swedish states. Unexpected events that could not be attributed to any specific party was to be under the responsibility of the Öresund construction consortium, i.e. the contractors did not have to bear the risk of delays due to for example an extremely cold winter. In order to obtain a proper foundation for these decisions, agreements were made upon references in terms of geological and meteorological conditions (Öresund Link, 1999).

Once the bridge opened it was soon discovered that the car traffic development did not amount to the prognosticated values (while the number of train journeys developed quickly). At a relatively early stage, the consortium therefore began to lower the fees and develop new products. To mention a few examples, the car commuting travel card entitling to 50 journeys a month was lowered to 3000 SEK from 4080 SEK within a year, and the creation of a “bridge passport” at 270 SEK, entitling the owner to get discounts on single journeys.

Travelling over the Öresund bridge was considerably below the expected levels during the first years. The prognoses were than adjusted, primarily by means of extending the establishment phase from three to 20 years. In 2004, a mere two years later than expected when the bridge opened, the annual average traffic levels reached 11.800 cars per day. Traffic volumes are now even stronger than prognosticated in the year 2000 and the consortium now hopes that the 2008 levels will surpass the expectations from the time before the bridge was opened (Öresundsbrokonsortiet, 2005).

The Arlanda airport link

There were primarily three factors that paved the way for the construction of the Arlanda airport link as a BOT project in Sweden during the 1990’s: worsened state finances in the

beginning of the decade, the idea that a railway link to Arlanda should be commercially attractive to run, and a wish to proceed with railway deregulation (Alexandersson & Hultén, 1998).

The Arlanda airport link project was being set up a few years after the Eurotunnel and managed to avoid some of the problems characterising the Eurotunnel project. Firstly, the government made the decision that the state should finance socio-economically motivated supporting investments. Thereby, Banverket came to pay for and build the railway part between Ulriksdal and Rosersberg and also the so-called North Bend connecting Arlanda to the main line north of the airport. Secondly, the state provided a conditioned loan of 1 billion SEK to the winning construction consortium.

The contract to construct and operate the new line was awarded by means of a tendering procedure. 30 companies showed interest in the pre-qualifying phase and then four consortiums competed for the contract. The winning consortium, including the vehicle manufacturer Alstom, built the line and formed the operator A-train to run the passenger services, which started in 1999 as projected. The contract with the state runs for 45 years and may be prolonged by another 10 years. It may also be ended already in 2010 if the parties reach such an agreement.

The government sought to make a clear distinction between the financial responsibility of the parties (the state and the consortium) and to allocate risks in a conscious manner. A-train had considerable freedom in terms of how to construct the line, but had to accept bearing risks associated with cost and revenues, both during the construction phase and the train operating phase. The company was therefore to bear the market risks, for example if the airline traffic did not develop as expected. On the other hand, it was entitled to compensation for cost increases caused by political decisions or unexpected archaeological excavations.

The state was committed to pay for the North Bend and 50% of the costs for connecting the Arlanda airport link with the northern main line. The state also granted a loan of 1 billion SEK to the consortium in return for financing 75% of the total costs separate from the national budget and contributed with at least 15% (600 million SEK) by means of risk capital.

A-train committed itself to run at least four trains an hour for most part of the day and got the permission to run as much as six trains per hour. A-train pays for the maintenance of the line and for its own trains.

The project was almost completed within the budget as it had been projected in 1992 before the tender was performed. A big problem for A-train is that the airline traffic has not developed as quickly as anticipated. A-train has primarily gained travellers from the bus services, while the private journeys made by car and taxi have almost kept their market shares unchanged compared to the pre-construction period.

A weakness in the consortium strategy, as pointed out by Hultkrantz et al (2005), is the choice to maximize profits by means of high ticket prices but a relatively modest use of price differentiation. This makes patronage levels rather healthy during peak time – despite high fares – but unsatisfactory during off-peak hours. During the weekends there are certain rebates, for example for two passengers travelling together.

The Östgöta railway link

The Östgöta railway link is the name of a planned new 150 km double-track railway for high-speed trains between Södertälje (south of Stockholm) and Linköping. In 2001 the municipalities affected by the line formed a consortium to support the realisation of the project. In 2003, Banverket initiated its investigation for the line. The link is often mentioned as a part of a much larger project, the Nordic Triangle, that seeks to connect the three major cities of Sweden by means of a modern railway network.

The Östgöta link is mentioned in Banverket's (the National Rail Administration) long term planning document, with an estimated time of construction start of 2010-2015. However, in 2005, initiatives were taken by the national government in order to examine whether it would be possible to bring this project forward. The result was a report presented in late 2006, suggesting that overlapping the sequential parts of the planning process to create a parallel (rather than linear) planning process would cut the planning time substantially (Näringsdepartementet, 2006). It was also argued that a PPP arrangement could be favourable, drawing (among other sources) from an earlier study of ours (Hultén & Alexandersson, 2006). In the following text, we will revisit some of the contents of that particular study.

It is commonly argued that a PPP solution is a way to bring forward the construction start of a certain project when national budget constraints may otherwise introduce a delay. As has been discussed above, PPP solutions are also favourable by means of standing a better chance of being completed in time. What we want to add to this picture is why an early completion in itself may bring some additional advantages. One of the main arguments for the Östgöta railway link is that it will lead to shorter travel times between the cities along the lines which will form the basis for a regional expansion with a number of spin-off effects – expanding the labour market near Stockholm, reduce unemployment, increase the real estate and land property values etc. An early completion would of course make it possible to obtain such positive effects earlier, but we also argue that some effects coming from the construction of the Östgöta link will be more pronounced if the project is brought forward or even presupposes an early finalisation. In order to affect or offset certain trends, such as migration or business cycle dependent parameters, the actual point in time for the completion of the project may become particularly important.

Some local and regional companies may have specific needs that presuppose a fast completion of the Östgöta railway link. The new line will include a connection to the airport Skavsta. This airport has the potential to become the much discussed major airport south of Stockholm (an important complement to Arlanda). However, such an expansion may be dependent on that a fast railway connection to Stockholm is completed within a few years time rather than later. Otherwise, other airport locations may be necessary to consider, but these alternatives may turn out to be costly. Moreover, if Skavsta quickly comes out as the only alternative, it would become possible to close the Stockholm city airport Bromma, making way for new homes and working places in a rapidly growing part of Stockholm. The time aspect is critical here since the current concession for Bromma ends in 2011.

Road projects using shadow tolls

A system of road shadow tolls is based upon a concession to a private sector company being responsible for design, construction, financing and operating a part of a road during a predetermined time period. A special element of the shadow toll system is that the public entity pays the concessionaire an amount of money that is dependent upon how many users the road has, while the users themselves pay no fees directly to the road owner. The shadow

toll principle was developed under the conservative government in the UK in the early 1990's as a part of its Private Finance Initiative (PFI). By the year 2000, ten road projects encompassing 770 km and a construction cost of 1.9 billion US dollars had been completed. At the same time, Portugal had decided to go ahead with seven projects at a total cost of 2.7 billion US dollars and concerning more than 610 km of roads.

In recent years, shadow toll projects have lost some of their attraction. In Britain, no new large projects have been initiated and in Portugal one large project has resulted in unexpected cost increases due to mistakes made during the planning phase. This project is the Beiras Letoral e Alta, a 167 km road from the Aviero coast to the Spanish border at Vilar Formoso. The first mistake was to choose a concessionaire and sign a contract before even deciding on the exact location of the road. When a decision on this was finally reached, the government did not approve it. Since the probable new location will be further than 200 meters away from the initial location, the concessionaire is entitled to compensation for any incurred additional costs and project delays. The second mistake was that around 81% of the traffic flow forecast in the winning consortium's business case at full completion was already achieved on the older road. These mistakes have lead to dramatic cost increases for the road project (Commission of European Communities, 2004, pp. 101-03).

Additional experience from European PPP projects

The General Directorate for regional policy at the EU commission has studied a number of PPP projects in Europe from several sectors, including the transportation industry (Commission of European Communities, 2004). The analyses were based upon an evaluation model looking into six criteria/dimensions: the value of the investment, the responsibility of the private partner, the contract length, the demand risk, the accessibility risk and the contract type. There are several general lessons to be learned, as presented below.

The division of risks between the parties is a key to an efficient PPP solution. Without a proper balance in this respect, costs may rise or one or several parties may face difficulties developing its full potential. In order to have a successful division of risks it is necessary that the public authority achieves a thorough insight regarding the goals one wishes to reach and thereby the character of the project. This includes an understanding of the strengths as well as the weaknesses of each participating actor.

As has been mentioned previously, each specific risk should be borne by the partner that is bets suited to handle that risk. Several cases illustrate that costs will be added if too much risks is transferred to the private sector partner. In addition, they show that each case is unique in some sense and therefore its risk profile should be investigated separately. The larger a project gets in terms of economic value, the greater the temptation to transfer too much risk to the private partner, which then has to be matched with a greater potential for generating profits.

It is necessary to have a long-term political commitment and support, especially when it comes to large projects and when a PPP arrangement is being tried for the very first time. The risks of project abortion as en effect of protests from the public must not be underestimated. This is particularly important if the PPP project is founded on user fees motivated by promises on improved service levels or quality. Closely connected to this is the importance to show that a project really delivers value-for-money. In some countries, this is the reason behind a special evaluation procedure to the effect of showing when a PPP solution is more cost effective than a traditional procurement procedure and provides additional value. The

method may also be used in order to find the most efficient project design and to identify strengths and weaknesses.

There is a need for a well-defined context when it comes to laws and regulations. This makes it possible to sign contracts with some certainty and that the parties are aware of the limitations of their interaction with one another.

Since there are such complex patterns of interaction between the providers of services and economic viability, it is necessary for all parties to make accurate estimations of the project parameters. Not least in the transportation sector, there are many examples of projects that have failed due to inaccurate prognostication of demand or costs.

The transportation projects studied by the Commission (most of which were concessions or BOT projects) also highlighted some specific lessons, as follows.

As illustrated by the Wijker tunnel case in the Netherlands, the participating actors may sometimes have very different goals and working methods. In order to make a PPP project successful under such conditions, it is vital that these differences are identified, understood and integrated into the project. This case, together with a number of Hungarian road projects, also shows the importance of prognoses and the difficulties of getting these to match the actual outcome. They also show the need for flexibility in contract compensation levels that are based upon the possibility to revise revenue flows in accordance with changes in actual demand. It is also important that the PPP project does not develop as an isolated system but as a part of a larger context. In the Hungarian case, the economy of the PPP project became deteriorated by another parallel road.

Political and public demands may have negative impacts upon the continued expansion of PPP projects or increased involvement from private sector actors. This is illustrated by the project for Hamburg's international airport, in which political concerns limited the share of private ownership, with negative consequences for airport development.

One interesting new case of a PPP arrangement concerns the new high-speed line Amsterdam-Rotterdam-Bruxelles (Van de Velde, 2005). According to a Dutch government initiative in 2001, the construction and maintenance of the line was organised as a procured PPP project with a contract-length of 30 years (5 years to build and 25 years to maintain). The winning consortium Infraspeed involves the companies Fluor and Siemens (among others) and will receive pre-defined annual payments from the state, being dependent on performance but not on traffic volumes. The actual train operations were procured as a separate 15-year concession contract won by NS and KLM. The new line is expected to be connected to the line Bruxelles-Paris in 2007. The experiences from this project remain to be evaluated.

ANALYSIS AND CONCLUSIONS

When carried out successfully, PPP projects can be very powerful tools to quickly construct new infrastructures and operate them efficiently. However, experience has also shown that they may sometimes go wrong, for example creating transportation systems that are inefficient, under-used and loss-making.

The possibility for an earlier launch and completion of a project is one advantage with a PPP arrangement that is explicitly or implicitly recognised by researchers that analyse PPPs. Drawing from the case of the Östgöta railway link, we have developed the timing issue in

some more detail, seeking to trace all the relevant public advantages (disadvantages) of initiating an investment earlier. When all these issues and arguments are combined, the organisation of a project as a PPP arrangement appears to be a very favourable one for infrastructure investments.

The asymmetric nature of the possible outcomes of PPP projects seems to be one source of several problems in these types of projects. A PPP project will only be really successful if it is able to generate net profits for the private sector participants. When the project instead results in losses, the private sector will ultimately withdraw, leading to a termination of the project unless the public sector steps in and increases the payments to the private partner or reclaims the responsibility to finish the project. Therefore, private sector partners rarely find themselves locked-in, while this is a common outcome for the public partner.

PPPs have been used or tried in a couple of high-speed train projects in Europe. The most famous example is the Channel Tunnel that connects the French high-speed railway network with the British high-speed railway to London. This project has not been economically successful, mostly because of lack of foresight of the management team that negotiated the debt of the Eurotunnel company. The managers accepted to lock-in the interest rate on the historical interest rates for a fifty-year period rather than renegotiating the debt at decided time intervals. They were effectively banking on continued high inflation in Great Britain and France that would enable the Eurotunnel company to raise prices as fast or faster than the interest rate. This was a questionable forecast in light of the slowing down of the inflation in the late 1980s and early 1990s, and turned out to be impossible to fulfil. The politicians and regulators have been passive bystanders as the Eurotunnel system has been underutilised and over-priced and wealth has been redistributed from mostly French private shareholders to the same financial institutions that locked-in the future of the company and took the shareholders as hostages. Bankruptcy was the best option from early on but no politician or regulator could force it as long as the small shareholders kept the dream of making fortunes on their shares. Today, the shares are valued at 0.71 € cents, a fraction of their value when the company was listed.

The Swedish Stockholm-Arlanda airport link was eventually constructed and “financed” by private capital in a PPP. In this project, that was negotiated later than the Eurotunnel deal, the Swedish state used a tender to find the best private partner. However, as the project moved towards decision, the state had to accept larger and larger shares of the costs to make the private investment attractive. The state financed and constructed a longer part of the line than initially planned and also offered a loan of one billion SEK to the winning consortium. Despite of this, the privately-controlled railway services from Stockholm to Arlanda remained loss-making for many years and the ticket prices are extremely high by Swedish standards. The outcome has been dismal from a welfare point of view with a low modal market share for the trains, at least when compared to similar services like the Heathrow railway shuttle.

The Öresund link demonstrates that a welfare optimising strategy aiming at increasing the utilisation of an infrastructure can give positive effects for the long-term profitability of the infrastructure. This way of attracting increased usage by price discrimination could easily have been introduced on the Arlanda Express and to some extent on the Eurotunnel. But the rent-seeking behaviour of these firms made it unfeasible and the public partners had no bargaining power to force a change in strategy.

Moving forward

Looking forward, we suggest that a methodology is developed to evaluate the importance of bringing forward certain investments by using PPP-projects. To alleviate the potential adverse effects of PPPs – lock-ins, hold-ups and hostage-taking – we suggest that guidelines are developed for risk-sharing, compulsory renegotiations and the balance between socio-economic and private economic goals. It should also be fruitful to further consider how to avoid the special problems that relate to the relationships between different private partners taking part in the same PPP project, rather than only the relationship between the public sector and the private sector.

As a final word on policy, the principle driving forces behind new PPP arrangements should not be short-term national budgetary constraints or to identify projects that can be attractive for private investments. Instead, projects should be chosen where a PPP project solution provides a favourable mix of productive efficiency and allocative efficiency and makes proper use of the relative strengths and merits of both the public and the private sector.

REFERENCES

Alexandersson, G. & S. Hultén (1998). Arlandabanan – järnvägsbygge med privata intressenter. In: Järnvägens organisation och finansiering, Konferensrapport 1998:1 [in Swedish].

Alexandersson, G., S. Hultén, L. Nordenlöw & G. Ehrling (2000). Spåren efter avregleringen. KFB-rapport 2000:25, Kommunikationsforskningsberedningen, Stockholm [in Swedish].

Benett, E., P. Grohman, & B. Gentry (1999). Public-Private Partnerships for the Urban Environment Options and Issues. PPPUE Working Paper Series Volume I. United Nations Development Programme. Yale University.

Bös, D. & C. Lülfelsmann (1996). The Hold-up Problem in Government Contracting. *Scandinavian Journal of Economics*, **98**, 53-74.

Calveras, A., J-J. Ganuza, & E. Hauk. (2004). Wild Bids. Gambling for Resurrection in Procurement Contracts. *Journal of Regulatory Economics*, **26**, 41-68.

Commission of the European Communities (2004). Resource Book on PPP Case Studies. Brussels.

DGIII Working Group on Abnormally Low Tenders (1999). Prevention, Detection and Elimination of Abnormally Low Tenders in the European Construction Industry. http://europa.eu.int/comm/enterprise/construction/alo/altfin.htm

Estache, A. & T. Serebrisky (2004). Where Do We Stand on Transport Infrastructure Deregulation and Public-Private Partnership? World Bank Policy Research Working Paper 3356.

Government of Quebec (2004). Public-Private Partnerships Framework Policy. Secrétariat du Conseil du trésor, Quebec.

Hart, O. (2003). Incomplete contracts and public ownership: remarks, and application to public-private ownership. *Economic Journal*, (**113**:486), C69-C76.

Hoff, K. (1994). The second theorem of the second best. *Journal of Public Economics*, **45**, 223-242, North-Holland.

Hultén, S. & G. Alexandersson (2006). En komparativ analys av olika PPP-modeller och implikationer för projektet Ostlänken. Vinnova/MTC, Stockholm [in Swedish].

Hultkrantz, L., U. Karlström & J.-E. Nilsson (2005). The Arlanda Airport Rail Link. Lessons Learned from the Swedish PPP Construction Project. Paper presented at the Third Conference on Railroad Industry Structure, Competition and Investment, Stockholm, October 22-24, 2005.

Klein, B. (1996). Why Hold-ups Occur: The Self-enforcing Range of Contractual Relationships. *Economic Inquiry*, 34, 444-63.

National Audit Office (2003). PFI: Construction Performance. Report by the Comptroller and Auditor General. HC 371, session 2002-2003: 5 February 2003.

Nilsson, J-E. (2006). Designing Public-Private Contracts for the Efficient Provision of Infrastructure Services. Draft paper. Swedish National Road and Transportation Research Institute, Borlänge.

Noulton, J. (1999). Lessons from the Channel Tunnel Experience. ECMT Seminar on PPPs in Transport Infrastructure Financing.

Näringsdepartementet (2006). Det är möjligt att med fyra år tidigarelägga Ostlänken, till 2010 – både ett järnvägs- och samhällsbygge. Government report, 21 December [in Swedish].

Poulter, T. (2004). PPP – Private Sector Perspective. Presentation at the Public Private Partnership Forum, 6 October 2005.

Statskontoret (1998). Privatfinansiering genom partnerskap. Rapport 1998:12, Stockholm.

Öresund Link (1999). ECMT Seminar on PPPs in Transport Infrastructure Financing.

Öresundbrokonsortiet (2005). Trafik över Öresundsbron 2000-2005. June 2005 [in Swedish].

Van de Velde, D. M. (2005). The Netherlands. In: Reforming Europe´s Railways – An Assessment of Progress (E. Calthrop & J. Ludewig, eds). Community of European Railway and Infrastructure Companies (CER), Eurailpress, Hamburg.

Välilä, T. (2005). How expensive are cost savings? On the economics of public-private partnerships. In: Innovative financing of infrastructure – the role of public-private partnerships: Infrastructure, economic growth, and the economics of PPPs. EIB Papers, 10 (1).

Williamson, O. E. (1983), Credible Commitments: Using Hostages to Support Exchange, The American Economic Review, Vol. 73, No 4, pp. 519-40