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Details of road safety incentives in PPPs

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Abstract

Public-Private Partnerships (PPP) are a new investment model around the world. Its growing popularity has been due to its effectiveness in estimating the optimal quality level maximizing the social benefit (public sector objective) and increasing profits (private sector interest). This paper seeks to resolve the question of whether the incorporation of incentives in concession contracts through PPPs improves road safety indicators. This is an important issue since 1.3 million people currently die around the world as a result of road accidents. Our findings show that under certain conditions this is possible, especially if private interests are met.

This is achieved when private parties will invest in safety measures only if the marginal revenue provided by the incentive is greater than the marginal cost of the investment to improve safety. Therefore, in order to apply the right incentive, governments must know and quantify the social benefits derived from improved security.

Keywords: Concession contracts, Economic incentives, road safety.

1. INTRODUCTION

There is a growing trend for countries around the world to implement alternative ways to manage and/or finance their infrastructure projects (roads, hospitals, airports, ports, hydroelectric, among others) that involve alliances or partnerships between the public and private sector; this type of mutual collaboration is known worldwide as public-private partnerships (PPP). There are three reasons behind this trend: increasing budgetary constraints, the search for greater efficiency in productivity, and an increase in quality through better allocation of risks and incentives. [1], [2].

Traditionally, most PPP concession contracts have not taken into account explicit incentives to improve the quality of service measured through indicators such as: road operability, congestion, pavement condition, road safety, among others. However, the introduction of incentives to encourage PPPs to provide an optimal level of quality is currently being promoted. [3]–[6]. Thus any increase in efficiency will be transferred to user satisfaction.

In road infrastructure projects, road safety is one of the services most closely related to the socio-economic benefit and an aspect on which the infrastructure manager has a remarkable capacity to act. However, due to its special characteristics, its regulation cannot be assimilated to that of other services provided in the free market. Given these circumstances, PPP contracts began to incorporate incentives for road safety explicitly, objectively and above all, oriented towards maximizing the net social benefit. In this way, it is desired that the private parties orient their efforts to earn these bonuses or they will be penalized. [7]–[9].

But, does the incorporation of incentives in concession contracts through PPPs improve road safety indicators? To answer this question, the following is a review of aspects that allow us to understand how the incentives incorporated into PPP contracts have affected the indices associated with road safety, in addition to showing how the state of practice has been in various countries incorporating this type of management approach.

The essay is structured as follows: firstly, it contextualizes the detail of road safety incentives in PPPs, showing evidence from different countries. Next, an analysis is made based on the evidence found, incorporating a vision of the approach or direction in which efforts should be focused to achieve a balance between public and private. Finally, conclusions, implications and future lines of research are presented.

2. THE DETAIL OF ROAD SAFETY INCENTIVES

In the early days of PPP contracts, the revenues obtained by PPPs were solely based on the tariffs charged for tolls (associated with vehicular demand) rather than on performance or operational performance measures (road safety, waiting times and queues at tolls, pavement surface quality, among others). However, in recent years most concession contracts have been used to promote and introduce incentives linked to bonuses and penalties based on road safety indicators (number of accidents per kilometer or per year, number of injuries per year, number of fatalities per year). [8].

Among the incentives given to PPPs, two types are identified: extension in the duration of the concession contract and increase in toll rates or a certain amount paid directly to the concession contractor. Incentives given to contractors must comply with the objectives of the authority (governments) in the project, for example, if the contractor does not comply with the contractually established requirements, the public authority

penalizes the contractor or even terminates the contract. On the other hand, if the contractor meets or exceeds the authority's expectations, the contractor will be rewarded.

Experience in various countries shows a varied number of facets. In the UK, they have mostly replaced the demand-driven contracts with the operational performance approach. [10], [11] by the operational performance based approach. On the other hand, countries such as Spain, have incorporated bonuses and penalties based on operational performance based standards. [12], [13].

The findings show that safety incentives in Spain are not a major source of revenue for PPP contractors compared to other countries such as Finland and the UK. Although safety incentives in Spain are small compared to other countries, the application of safety incentives in PPPs has had a positive influence on reducing the number of fatalities, injuries and accidents. [8].

Italy has introduced tariff caps linked to road safety indicators such that the concessionaire sets higher toll rates if safety indicators improve. In Ireland, concession contracts include some road safety indicators, but do not provide bonuses for improving them. In other countries, such as Denmark, the Netherlands and Belgium, new and sophisticated concession contracts have been implemented, but they do not have positive incentives based on road safety indicators. [8].

For these cases it was found that there are more accidents on non-concession roads than on PPP concession roads and there are more accidents on PPP roads without incentives than on PPP roads with incentives.

From a purely economic perspective, Perez de Villar [14] states that in perfect markets, any company adjusts its prices and conditions according to demand; this causes users willing to pay for some improvement to encourage companies to implement it. For PPPs in roads, one could think of a freely exercised quality management. However, there are the following impediments: since it is a public service, the tariffs are regulated and fixed in advance; also, given its monopoly nature, demand has a low elasticity; and finally, given the nature of the service provided, users may not value the improvements or they may not notice them. From these impediments it follows that quality in road concessions cannot be regulated in a conventional way; specifically, it cannot be made to depend on the tariff-demand ratio, so in order to obtain the desired quality, indicators and incentives must be expressly introduced.

Contrary to this trend [14]–[16] showed that for several PPP concessions in Spain, both traditional and new generation incentives applied are not effective in reducing road safety rates for two reasons: (i) because they are much lower than the social benefit derived from them, (ii) they are apparently far below the cost of measures to improve safer roads.

The most recent concessions in the European environment, although they have introduced specific bonuses, these are insignificant due to their low amount. Along the same lines, Albalete [17], [18] has found that charging for the use of road improvements could have a negative effect on road safety. This is because in some cases road accidents in Spain are higher on roads adjacent to toll motorways than those adjacent to free motorways.

As can be seen, there is great controversy on this issue and there is no absolute truth to prove that PPPs and the incentives incorporated in the contracts are the solution to improve road safety on the world's roads; certainly the incentives contribute but there are other elements that could influence to improve these indicators.

3. RESULTS AND DISCUSSION

These incentives based on operational performance, have to be introduced in the right way in concession contracts. To this end, the marginal reward to the contractor for achieving a certain level of quality should never be higher than the social marginal benefit produced at that level. The contractor must provide a level of quality at the point where the marginal revenue obtained due to a certain increase in quality is equal to its marginal cost. Thus, if the incentives are defined in this way, the contractor will be encouraged to provide the best service consistent with its production costs. [7].

Finally, it is necessary to discuss that both public and private authorities, although they have different goals, must converge to the same end; in this aspect it is clear that while the authorities pursue the maximization of social welfare, the private sector focuses on maximizing its economic benefit.

The introduction of incentives and/or penalties based on operational performance and linked to social objectives in contracts is a popular way to align private and government objectives to achieve value for money. To this end, PPP contracts should include the necessary provisions to ensure that the relationship between public and private is at its best for the duration of the contract. One way to achieve this tradeoff is to meet these two requirements: first, to ensure that the most efficient bidder, in terms of price and quality, is awarded the contract; and second, to provide incentives for the contractor to perform its contractual obligations to the highest quality at a reasonable cost.

4. CONCLUSION

There is no absolute and verifiable truth to the argument that incentives are the solution to reduce accident rates in road infrastructure PPPs. The evidence shows that there are cases where incentives and bonuses have been effective. However, these are insufficient due to their low amount. In this regard, it would be advisable that in future road concessions, incentives for improving road safety be more closely linked and proportionate to the social benefit actually derived from the management of the concessionaire to prevent accidents.

To improve the effectiveness of these incentives it is necessary to adjust the value for money of the incentive; governments need to ensure that the savings from accidents are higher than the additional costs to infrastructure managers of implementing measures that improve road safety.

To align the objectives of both the authority and the private sector it is desirable to create clauses in contracts to encourage infrastructure operators to achieve the social optimum of the stated level of road safety. One way to do this is to link incentives to marginal social benefit measured as monetary accident savings.

Incentives should be linked to the number of accidents avoided and the socio-economic value derived from their prevention. Thus, private parties will invest in safety measures only if the marginal revenue provided by the incentive is greater than the marginal cost of the investment to improve safety. Therefore, in order to apply the appropriate incentive, governments must know and quantify the social benefits derived from the safety improvement.

An important direction for future research is to address the size of the set of economic incentives in the PPP contract in the ultimate improvement of safety ratios. It would also be worthwhile to determine what other types of elements could be incorporated into PPP contracts to improve road safety ratios.

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