Distribution of Highways Public Private Partnerships in India: *Key Legal and Economic Determinants*

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ABSTRACT

Private sector participation and private investment have become the mainstay of the Government of India's policy toward infrastructural development. The success of the ongoing eleventh five-year plan critically depends on the success of Public Private Partnerships (PPPs) in infrastructure. Moreover, several state governments are also trying to attract PPPs for the provision of public goods. In this paper, we have studied the private sector participation in road projects being developed as a part of the National Highways Development Programme (NHDP). Our data set is by far the largest and covers all of road projects that have been taken up for upgradation under various phases of the NHDP so far. We have discussed various issues related to the PPP policy and its limited success. We have analyzed the efficiency properties of PPP contracts. However, the focus of the study is on the following questions: Why have some projects attracted private investment while others have not? Why are PPPs more successful in some states and not so in the other states? We have shown that the richer states have attracted more PPPs than the poorer states. Other things remaining the same, the probability of PPP is higher for projects located on national highways connecting richer states, and those located closer to mega cities. Similarly, *ceteris paribus,* states with better governance index and projects located in them have higher probability of attracting private investment. Empirical evidence in support of these claims is conclusive and robust. In the light of our findings, we have answered the following questions: Is PPP a viable and desirable public policy for development of infrastructure in poorer states? What are the lessons emerging from the Indian experience with PPPs so far?

Key Words: Public Private Partnerships, PPPs, BOT, Contracts, Efficiency, Roads, National Highways, India, NHDP

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1. Introduction

During the last several years, the Indian economy has experienced an unprecedented growth rate. However, poor infrastructure has become one of the major stumbling blocks that can endanger sustainability of this high growth rate. Infrastructural bottlenecks seem to be a greater danger to growth than the current global recession. Indian infrastructure is both inadequate as well as of poor quality. Like other infrastructure sectors, the condition of Indian roads is dismal. Roads are the dominant form of surface transport in India.[1] Yet, Indian roads are of poor quality, congested and unsafe. Only 14 percent of national highways are four laned. In fact, road-density is rather small at 2.75 km per 1000 people and 770 km per 1000 sq. km. while world averages are 6.7 and 841, respectively.[2] Compared to China, its major economic rival, Indian road network is rather poor.[3] China invests as much as 10 times more on roads than India does. The gap between the availability of road infrastructure and its demand is huge and growing.[4] Therefore, there is urgent need to invest heavily in roads.

Various empirical studies suggest that efficient and extensive transport linkages are necessary to improve economic efficiency and expand the growth frontier.[5] Given the heavy reliance on roads for both freight and passenger movements, investment in the road infrastructure in India can pave the way to growth and other economic objectives. Such an investment has a multiplier effect on crucial sectors of the economy; for example, cement, construction, steel, etc. The current economic slowdown makes investment in roads all the more crucial. However, the government does not have funds required for the purpose.[6] In order to bridge this gap, the central government has decided to encourage public private partnership. According to the eleventh five-year plan, the private sector's share is expected to be as much as one third of the planned investment of $ 500 billion for infrastructure.[7] Since 2003-04, while presenting budgets, the successive finance ministers have been very emphatic about promoting public private partnerships (PPPs). Therefore, PPPs have come to be a major part of public policy toward infrastructure in general and national highways in particular.

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[1] The national roads carry about 65 percent of freight and 80 percent of passenger traffic. Highways/Expressways constitute about 2 percent of all roads but carry as much as 40 percent of the road traffic.

[2] *India Infrastructure* (2008 August issue).

[3] During last decade China has made huge investment in roads at national, provincial as also at village levels. For details see Ojiro (2003).

[4] Annual growth is projected at 12-15% for passenger traffic, and 15-18% for cargo traffic. Over $50–60 billion investment is required over the next 5 years to improve road infrastructure. *India Infrastructure* (2008 August issue).

[5] See Miller and Tsoukis (2001), Calderon and Serven (2004), and Rakshit (2009), among others. On linkages between infrastructural and growth variations among Indian states see Majumdar (2008). Also see Kumar *et al* (2007).

[6] In fact, investment in infrastructure as a percentage of the GDP has been declining over the years. Between 1991-92 to 2002-03 capital formation in infrastructure came down from 6.34 to 3.5 percent of GDP. See Rakshit (2009).

[7] See Eleventh Plan document.

In a typical public private partnership, the government and a consortium of private firms pool in their efforts and resources to provide road service. Under this new scheme, the government contracts out the concessions/rights to build, operate and maintain parts of highways, flyovers, underpasses, etc., to the private sector. The private partners are required to fund the project upfront. The ownership of the road assets generated through PPP is returned to the government at the end of the contract period. PPPs on national highways are sponsored by the National Highways Authority of India (NHAI) on behalf of the Ministry of Shipping, Roads Transport and Highways (MSRTH). Mainly two forms of contracts, namely BOT (build, operate and transfer) Toll and BOT Annuity, are being used to form PPPs in roads.[8]

One set of issues concern the efficiency properties of these contracts. In particular, are contracts signed between the government and the consortia governed by efficient rules? In this paper, we undertake economic analysis of these laws to find out whether these are 'good' laws. We have argued that while the governing laws for PPP contracts have several desirable and efficiency enhancing features, the enforcement of these laws is far from satisfactory.

Apart from streamlining the institutional framework for PPPs, since 2005 the government has taken several initiatives to attract private investment in roads. Therefore, a study on the performance of these policy initiatives is called for. As far as the success of PPP is concerned, our analysis reveals that policy initiatives undertaken during 2005 and 2006 have made a favorable impact on private sector participation in roads. Since 2005, the number of PPPs has gone up significantly. However, this increase in private sector investment is attributable to other factors, like learning effects and economic boom as well.

However, there is something very striking about the distribution of PPPs on national highways. PPPs are not uniformly distributed; they are concentrated in only some parts of the country. Some states have been more successful in attracting PPP contracts than the others. To put this observation in perspective, started in 1999, the National Highways Development Programme (NHDP) is an ambitious seven-phase programme undertaken for expansion and upgradation of national highways.[9] So far NHAI has started work only on Phases I, II, III and V. National highways (NHs) covered under these phases span across most states in the union of India. Therefore, the upgradation work on NHs has been (is being) undertaken in most states. Wherever possible the NHAI has tried to award upgradation works on PPP basis. However, some states have attracted more PPPs than others. That is, investors have shown preference for some states over others.

On its face, this outcome may appear somewhat intriguing. First of all NHDP is sponsored by a single agency, that is, NHAI. Moreover, this programme is governed by the laws that are made at the level of the central government and are uniform across the

[8] PPPs can be of several types, like BOOT, DBOT, BOO etc. These forms differ in the control rights that are delegated to the private investors. For more on types of PPPs, see Yescombe (2007), and Grimsey and Lewis (2004).

[9] The programme aims to upgrade 50,000 kms of national highways by 2015. See Appendix C.

country. If so, why have some projects attracted private investment while others have not? Why are PPPs more successful in some states and not so in the other states? These are important questions, which we will discuss and answer in this paper.

In this context, it is important to note that PPP projects are long-term projects and face several risks – political, regulatory, commercial, and financial, among others.[10] Therefore, profitability or otherwise of toll based PPP projects depends on several variables such as institutional framework in place to govern PPPs, traffic density, per-capita income, availability of supporting infrastructure, etc. These variables differ from state to state. Therefore, it is pertinent to examine if these variables can explain the above mentioned skewed distribution of PPPs. That is, can the performance of different states in attracting PPPs be explained in terms of these variables? In our paper, we analyze the extent to which these variables can help explain the observed distribution of PPPs.

In addition, the state governments have a crucial role to play in the implementation of the PPP laws. Starting from land acquisition to shifting of utilities to providing police protection at the project site, the support of the state government is very crucial for successful implementation of the PPP projects. The situation of law and order in a state also has significant bearing on the profitability of a BOT contract. If law enforcement is poor, a concessionaire may fail to realize all the benefits from the toll contract, since in that case users of the facility may not pay the toll fee. Alternatively, the concessionaire may be forced to employ private security agents. The latter option is a costly affair. Therefore, private participants may be reluctant to enter into BOT contract in a state where law enforcement is perceived to be poor. Moreover, whenever they enter into a contract in such states, they are likely to opt for annuity rather than a toll contract. Is the protection of property rights in a state an important consideration for private participants? We investigate this issue as well.

To sum up, in this paper we will analyze the performance of PPP policy in roads in India. In addition, we will provide project-specific and state-specific factors/variables that can explain why some road projects have attracted private investment and not others. We will study the empirical significance of these variables. In order to do so, we have considered all of the road projects undertaken by the NHAI for the upgradation of national highways. We have collected data on all the projects completed or awarded/approved from 1997 to July 2009. This set includes 405 projects including PPP as well as non-PPP projects. Most of these projects are part of NHDP.

In Section 2, we discuss various issues related to PPP policy. An account of the need and the evolution of PPP policy in India are provided. In addition, an efficiency analysis of the governing laws is undertaken. In Section 3, we present an overview of the performance of the policy. In Section 4, we pose the research questions in the backdrop of the observed performance of PPPs. In addition, we propose the explanatory variables along with the relevant hypotheses. Section 5 describes the data used in the study and the sources of data. Section 6 provides details of regression results. Finally, in Section 7, we draw policy conclusions that follow from our empirical analysis.

[10] For the implications of these risks see Quiggin, (2005).

2. Public Private Partnerships in Roads: *The Law and the Economics*

2.1 *The Raison d'être*

During the last several decades vehicle population in India has grown at a very high rate.[11] At the same time, the road network has expanded at a relatively rather slow rate. As a result, the road infrastructure has been stretched to its extreme limits. There is a wide and growing gap between the demand and the supply of road infrastructure. Moreover, the developmental needs of the economy require a better road infrastructure (See Kumar *et al*, 2007). During the last half a decade, Indian economy has registered an unprecedented growth rate. In order to sustain this growth rate, there is a pressing need for an extensive and efficient infrastructure. However, given the fiscal constraints, the government lacks resources as well as expertise to fill in this gap. In such a scenario, private sector participation (PSP) can help on both the counts. Under a PPP the public as well as the private sectors are expected to contribute towards the provisions of public goods or services, such as roads, railways, ports, airports, etc. The government is expected to provide land for the project site, regulatory clearances, and a concession right to the contractor/concessionaire. The private sector, on the other hand, is expected to invest funds during the construction and maintenance phases of infrastructure projects.

A suitably designed policy can motivate the private sector to invest funds in the construction and maintenance of road facilities. Therefore, PSP can supplement public investment in road infrastructure. In addition to providing financial resources, PSP has potential of bringing in cost efficiency. As compared to the public sector, private sector firms have a better structure of incentives and sanctions. They have stronger motivation to earn good returns on the investment. The private sector also has greater flexibility in adjusting its resources (personnel, equipments and materials) to constantly changing circumstances. Private firms optimize resource allocation among the initial construction phase and the maintenance and operation phases later on. The argument goes that as a result, compared to traditional government funded infrastructure projects, instances as well as magnitudes of time and cost overruns are significantly lower for PPPs.[12] Moreover, there are claims that private firms can manage the demand and supply curves in a more rigorous way than the public sector. Therefore, wherever there is scope for financing a project through direct user-fee, investors can use toll fee to recoup their money. In addition, it is argued that a developing country like India can benefit from participation of foreign firms in infrastructure. Foreign firms are expected to possess superior construction techniques, equipments and cheaper finance.[13]

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[11] Since 1980, while the population size of India has doubled, the number of vehicles has gone up 15 times (See Bose, 2006).

[12] (See Donahue, 1989; Panayatou 1997; Mott MacDonald, 2002; National Audit Office, 2003; PwC (2005); Infrastructure Partnerships Australia, 2007).

[13] Here is a quote from a report of the ADB: "The efficient use of resources, availability of modern technology, better project design and implementation, and improved operations combine to deliver efficiency and effectiveness gains which are not readily produced in a public sector project." See ADB (2006, p. 22).

Technically speaking, the above mentioned potential benefits of PSP follow from two sources: 1) the better incentive structure within private firms, and 2) unbundling and shifting of some risks from the public to the private sector. In some cases, this reallocation of risk has the potential to lower overall costs for the society.[14] Therefore, there is scope for the government to utilize efficiency and skills of private sector in providing public services.[15]

2.2 *Policy Initiatives*

According to the National Highways Act, 1956, all national highways are owned by the Government of India. The Act gives all the rights with respect to construction, maintenance, operation and tolling only to the central government. The Act was amended in 1995 with a view to attract private investment in road development, maintenance and operation. With this amendment, private investment in infrastructure via PPPs became a possibility. This amendment allowed government to provide concession to a private 'person' to invest in NH projects, levy, collect and retain fee from road users. Also a private person could be allowed to regulate traffic on such highways in terms of provisions of Motor Vehicle Act, 1988. The Control of National Highways Act (2002) was amended in 2005 to further facilitate the transfer of control rights to private individuals.

However, the first policy framework for PPPs was introduced in 1997 as decision of the Cabinet of the Central Government.[16] It provided guidelines for toll based BOT projects. Later on, in December 2000, the cabinet committee on economic affairs approved the first phase of the NHDP. It was agreed that road projects under NHDP will be taken up for upgradation on BOT Toll and BOT Annuity basis, to the extent possible.[17]

Therefore, the policy essentially provided for two kinds of contracts – BOT toll contracts and BOT annuity contracts. BOT toll contracts are of various types, for example, BOT, DBOT, BOOT etc. The latter types are designed so as to provide greater flexibility to the investors. Under a BOT toll contract, the concessionaire recovers his investment by way of charging toll from the users of the road facility. Therefore, under these contracts the concessionaire bears the entire risk with respect to toll income. Under a BOT annuity contract, the concessionaire is assured a minimum return on his investment. Therefore, under a BOT annuity contract, the government bears the entire risk with respect to toll income. There is yet another form of contracts named as Special Purpose Vehicles (SPVs). SPVs are formed by one or more entities specifically for one project. The (state)

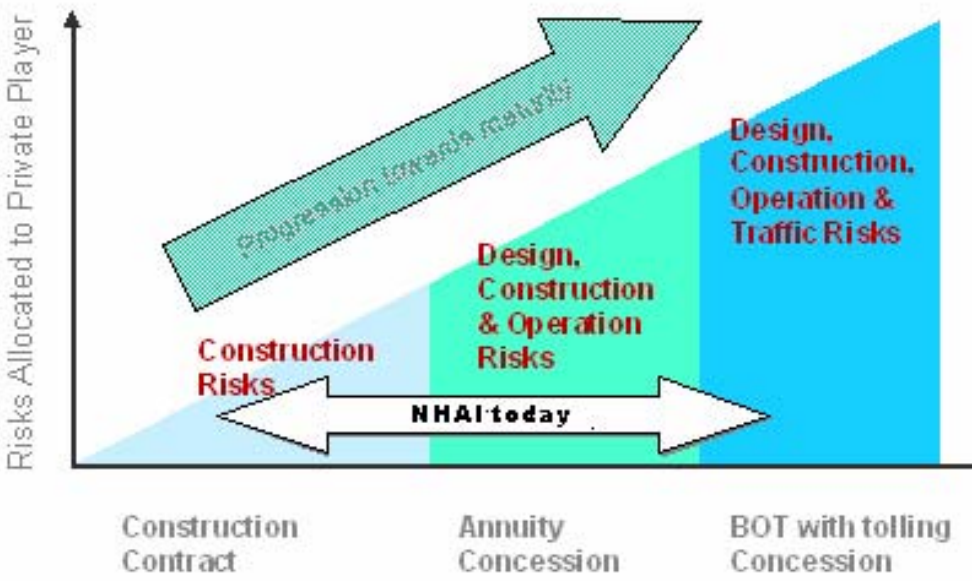
[14] See Quiggin, (2005) and Efraim Sadka (2006).

[15] It is pertinent to mention here that PPPs have several direct and indirect costs associated with them. For one, the cost of raising funds from market is higher for private firms than for the government; therefore the direct costs of financing projects are higher under PPPs. Two, the government is required to make annuity payments to investors or forgo the right to charge fee from the users. Moreover, since private investors are risk averse they demand higher returns on their investment.

[16] For an informative account of policy initiatives towards market based financing of road infrastructure see Haldea (2000), also see Haldea and Mohanty (2003). On PPP policy for road sector see Haldea (2008).

[17] See Report of the Core Group, Planning Commission (2006 a). For a critical review of the PPP policy see Rakshit (2009).

government can be one of the partners. As far as the allocation of the risk is concerned, these contracts are similar to BOT toll contracts.



However, not much success was achieved. For example, out of the total 7507.97 Kms of national highways marked under first phase, only 1349.72 were upgraded through PPP contracts.

The failure of PPP initiatives was not surprising. Due to the long gestation period, infrastructure projects face several kinds of risks including, political, regulatory, financial and economic risks. In PPP contracts these risks have to be allocated between the public and the private sectors. Therefore, the transactions involved in implementation of PPP projects are far more complex than under traditional procurement through construction contracts. These projects involve high initial investment, long gestation period and transfer of control rights over public assets to private hands. Therefore, both writing and management of PPP contracts are critical for their success. Also, it is important to balance the conflict between private commercial interests and the social benefits.

Several constraints can hamper the prospects of PPP formation. These include:

- Lack of an integrated institutional policy framework for project identification, development and implementation.
- Lack of coordination between various Government agencies involved in development and implementation of infrastructure projects.
- Inadequate availability of long term finance – both debt and equity- due to under-developed financial markets.
- Inadequate capacity in public sector to prepare and implement PPP contracts.
- Inadequate capacity in private sector to meet technical and financial requirements of PPPs.

Before 2005, that is, from the very beginning all of the above constraints restricted the growth of PPPs. In 2005, the government decided to give a big thrust to PPPs. In a meeting chaired by the Prime Minister, it was decided that as much as 2100 kms of NHDP phase II and all other future projects will be taken up on BOT basis.[18] Moreover, to overcome the above constraints the government launched several initiatives. Following are the major steps taken to galvanize the PPP programme.

Standardization of Bidding and Concession Documents: In order to ensure transparency in the process, the government has introduced model documents. Request for Qualification (RfQ) and Request for Proposal (RfP) documents have been prepared for small as well as large projects. There is two-stage competitive bidding for award of concession contract. At the Request for Qualification stage, short listing of bidders is done on the basis of their technical and financial capabilities. That is, the bidders who have the necessary technical skills and financial resources to implement the project are short-listed. The admissibility or otherwise of a bid is decided on the basis of the previous experience and the financial capabilities of the bidder. Doubtful, frivolous and unsuitable bids are screened at this stage itself. Bidders so selected are issued Request for Proposal documents for financial bidding. The objective of this stage is to select the best among the qualified bidders. An attempt is made to select the bidder who offers the best value for money to the public sector. Selection is made on the basis of the technical as well as the financial soundness of the proposals. The bidder satisfying maximum of all the parameters of the technical and financial proposal is awarded the contract.

In addition, the introduction of the Model Concession Agreement (MCA) documents has gone a long way in streamlining and clarifying the PPP policy. MCAs have been prepared for BOT Toll, BOT Annuity and BOT operation and maintenance (O&M) contracts. MCAs along with RfQ and RfP documents have provided an integrated institutional policy framework for project identification, development and implementation. Since January 1, 2007, all contracts are awarded on the basis of MCA.

India Infrastructure Finance Company Limited (IIFCL): In the Indian financial market, debts are generally available for duration of 7 to 8 years whereas infrastructure projects require much longer pay back period. This is partly due to the fact that pension and long-term debt markets are underdeveloped. Inadequate availability of long term finance, both debt and equity, is a serious problem facing investors. To mitigate this problem the government set up IIFCL in January 2006. IIFCL is allowed to refinance infrastructure loans by banks and FIs as well as lend directly, subject to a limit of 20 percent of the project cost. PPPs have overriding priority under IIFCL funding schemes. However, it lends only to commercially viable projects.

Provision of Viability Gap Funding (VGF): Since not all projects are commercially viable, the government has made provisions for VGF to provide capital grants for BOT projects on national highway. The objective is to make even commercially unviable projects attractive for private investment by reducing their capital costs. VGF enables leveraging of private investments in the highway sector and can be up to 40 percent of the project costs. The institutional structure to govern the scheme was introduced in August

[18] See Planning Commission (2006 a).

2005.[19] Though the provision of VGF was made in 2005, the detailed guidelines for the financial support under this scheme were published in 2006.[20] Financial support under the scheme is available for PPP projects which are meant to provide service against tariff or user charges. Also, contracts for these projects are awarded through competitive bidding.

India Infrastructure Project Development Fund (IIPDF): A major reason behind lackluster performance of PPPs is said to be non-availability of credible and bankable projects. Detailed Project Reports (DPRs) and Project Feasibility Reports (PFRs) are of poor quality and cannot be relied upon. This is because the public sector in India has little capacity to prepare quality project reports. It also lacks abilities to implement PPP contracts. At the same time, the bidders cannot be expected to prepare their own reports as the cost of transaction advisors for PPP projects is huge. Therefore, the government has decided to develop capacity in the public sector as to line up credible and bankable projects that can be offered through competitive bidding. IIPDF has been set up with an initial contribution of Rs 100 crore.[21] It is meant to help meet project development costs of public sponsoring agencies of infrastructure projects, both at central as well as state levels. It can assist to meet up to 75 percent of the project development costs. The costs are recovered from the successful bidder.

Public Private Partnership Appraisal Committee (PPPAC):[22] This high powered committee has been set up with an objective to reduce transaction costs, enhance coordination among ministries involved and ensure fast track approval of PPP projects.[23] It appraises high cost Central government projects. For low cost projects, it has issued guidelines that are the main reference point for the NHAI.

In addition, over the years, the government has offered several fiscal and other incentives to attract investors to road projects. The following are the additional features of the new PPP policy:[24]

- Declaration of road sector as an industry, to facilitate borrowing on easy terms and to permit floating of bonds.
- Longer concession periods (up to 30 years).
- Easier external commercial borrowing norms.
- FDI including foreign equity participation up to 100 percent in the highways is allowed for BOT projects. Foreign investors generally allowed to repatriate 100 percent profits.
- Provision of encumbrance free site for work, i.e. government bears expenses for land and pre-construction activities.

[19] Notification F.No. 2/10/2004-INF dated August 18, 2005 of Ministry of Finance.
[20] The guidelines were notified by Ministry of Finance vide O.M. No 1/5/2005-PPP dated January 12, 2006, and later were published by Planning Commission. See Planning Commission (2006 b).
[21] The fund was set up following an announcement by the Finance Minister in the Budget Speech for 2007-08.
[22] www.pppindia.com (Notification dated April 2, 2007)
[23] Secretary (Economic Affairs) is the chairman of the committee, and Secretary (Planning Commission), Secretary (Expenditure), Secretary (Legal Affairs), and Secretary of the sponsoring department, are the members.
[24] See GoI (2007).

- MRTP provisions have been relaxed to enable large firms to enter the highway sector.
- Duty free import of modern high capacity construction equipments has been allowed.
- Treating housing and other development activities which are integral part of highway project, as a part of infrastructure, for the purpose of tax concession.
- 100 percent tax holiday for any 10 consecutive years out of 20 years after commissioning of the project.
- Financial institutions providing long term finance for road projects have also been given an incentive by way of deduction of up to 40 percent of their taxable income derived from financing these investments.

2.3 ***Essentials of Concession Contracts***

Parties: The direct contract concession is between the NHAI on behalf of the Government of India, and the Concessionaire. However, there are three parties to a contract: NHAI, Concessionaire and the State Government(s) of the state(s) in which the road facility is to be developed.[25]

Duration: Duration of the concession generally is 20 years but it can extend up to 30 years. The duration includes the construction period (assumed to be two years in most cases). The contract specifies the responsibilities/obligations of the parties. The main responsibilities of the government (Authority) are to acquire land for the project and get forest and other environment related clearances for the concessionaire (See Clause 6 of the MCA). The concessionaire has the obligation to meet all the project related deadlines, satisfy all design and material related standards, and cooperate with the independent engineers who monitor the project, etc (See Clauses 5, 13 17 of the MCA).

Risk Allocation: Contractual clauses provide for detailed risk allocation during all stages of the project. Clauses 2.1, 9.4, 13.2, 13.5, 15.4, 18.8, and 18.11 of the MCA deal with the details of risk allocation during the construction phase. Details of the allocation of financial and commercial risks are provided in Clauses 6 and 24 of the MCA. Moreover, the MCA contract clearly spells out the responsibilities as well as the entitlements/rights of the parties involved – NHAI and the Concessionaire (Clauses 5, 6, 13, 17, 37 and 43 of the MCA).

*The Damage Measures***:** The contract provides for different damage measures for different violations of the contractual clauses. It employs what can be called '*expectation damages'*, '*reliance damages'* and '*liquidation damages'*. For example, expectation damages are to be used if the central or the state government develops an additional toll way or a competing road that adversely affects the interests of the concessionaire. In that event the government is required to pay to the concessionaire, in compensation, a sum equal to the difference between the realizable fee and the projected fee (Clauses 29 and 30 of the MCA). The compensation is to be made for the entire period of breach, that is, until the breach is cured. Reliance damages are used in case of material loss sustained by either concessionaire or the government. The party who is in the breach of contract pays

[25] The state government's role is limited to signing and abiding with the state support agreement.

all the direct cost borne by the other party. For certain violations the contract explicitly provides for penalties which are very similar to the liquidation damages in nature.[26] For example, when the government doesn't grant land to the concessionaire after a specified period of time, the concessionaire receives a pre-agreed fixed sum on a daily basis**.** (Clause 12 of the MCA).

Regulator: It is important to note that under PPP, actions taken by one party have consequences for the other party. Long-term and flexible nature of contracts also means greater scope for disputes. At times the concessionaire as well as the government may make conflicting claims regarding their entitlements and obligations. Therefore, there is a need for an independent regulator to verify the claims made by the parties. To this end, the contract provides for an 'independent' engineer to monitor the progress of the project. Also, in case the government asks for a change in the scope of the contract, the financial implications of the required change have to be verified by the independent inspector (Clauses 12, 19 and 26 of the MCA). The appointment of the engineer is made by the NHAI for a period of three years.[27] The remuneration, cost and expenses of the independent engineer are shared by both the parties. The disputes over any aspect of the contract are governed by the Arbitration and Conciliation Act 1996. The Act is based on the provisions of UNCITRAL Model Law international commercial arbitration.[28]

2.4. *Efficiency of PPP Contracts***:**

Several contractual clauses create a system of incentives and sanctions that is conducive for economic efficiency. Price and other regulations built in the contracts have desired attributes.[29] The following features are notable:

- *Reduced Adverse Selection:* There are provisions of fines and penalties for both the parties. These fines can be invoked by a party if the other party reneges on its commitment under the contract. Provisions for suspension and termination of the contract induce the concessionaires to choose a project carefully as well as to avoid subsequent breach. The requirements of concession fee and performance security help in screening of fraudulent bidders.
- *Avoiding Time overruns:* The time period of construction (generally assumed to be two years) is included in a concession period. This along with the provisions of the above mentioned penalties encourages the concessionaire to complete the project sooner and avoid time overrun. An earlier completion of project enables the concessionaire to increase the total toll revenue from the project. In case of annuity contract, the concessionaire receives a bonus for an earlier completion. If there is any delay in the completion of the project, he is penalized in the form of reduced annuity payments.

[26] These penalties are triggered in the event of deficiency in performance rather than in the even of contract termination. Perhaps that is why, the MCA does call these penalties as liquidated damages.
[27] The NHAI forms a panel of 10 firms or corporate bodies in accordance with selection criterion set forth in the schedule.
[28] The Model Law has the backing of the General Assembly of the United Nations.
[29] For a studies on efficient management of Road PPPs see DeCorla-Souza, (2005) and Brown, Christine (2005).

- *Technology:* The above provision also induces the concessionaire to use better technology in order to complete the project ahead of the agreed time. In addition, technological capabilities of the bidders are taken into account while selecting the concessionaire.
- *Flexibility:* The contract has provisions like cure period for delay in meeting deadlines. The contract also allows changes in the scope of the contract under certain circumstances. There are provisions for modification/renegotiation of the original contract. Contract modification can be resorted to in cases of changes in law or *force majeure*. These provisions help in increasing the flexibility of the contract.
- *Better Demand management*: Concessionaire has the sole and exclusive right to demand, collect and appropriate toll from users. Though toll rates are fixed by NHAI, annual revision of toll takes place. The concessionaire is fully compensated for inflation, which is measured by the WPI. The contract also allows the concessionaire at its discretion to levy, determine and collect a higher and discounted fee for the use of the facility during peak and off-peak hours, respectively.[30]
- *Efficient Risk Sharing*: Contract allocates risks to a party who is in a better position to bear it. For example, the government is in a better position to bear the risk associated with land acquisition and getting forest and other environment related clearances. These risks are assigned to the government. Other construction related and financial risks are assigned to the concessionaire who can bear these risks more efficiently. The provisions regarding changes in scope and law have also helped to mitigate some risk.

In addition, the contract allows for regular monitoring by the government of the progress on the project. In order to enable the government to monitor the progress in terms of material standards and meeting of deadlines, the contract provides for the following:

- Submission of monthly progress report of the project by an independent engineer.
- The concessionaire has to submit a concession fee which is on the basis of an ascending revenue–share.
- Concessionaire is also required to pay performance security which is seized by the Authority in case of default.

3. Performance of PPP policy

3.1 Overview:

As mentioned in the Introduction and Section 2, under NHDP, national highways are being upgraded. The programme has to be implemented in seven phases. Phases I, II, III, V, VI and VII are to be executed by NHAI.[31] Details of these phases are provided in Table B1 in Appendix B. So far work has started only on Phases I, II, III and V. As on *31, 2009* a total of 405 road projects have been undertaken for upgradation. Some of these projects have been undertaken on PPP basis; for the rest funding has been provided by NHAI, WB, ADB and JBIC. Table 1 provides year-wise break up of the number of PPPs that have come up on national highways. The first PPP on national highways was

[30] This option can be exercised from the 5th year on and after obtaining prior and written approval of the authority.
[31] Phase IV will be executed by the Ministry of Shipping, Roads Transport and Highways.

construction of a railway over bridge (ROB) at Kishangarh located in the Ajmer district of Rajasthan. This segment was formed in March 1998 on NH 8 and was developed on BOT basis. Since then the number of PPPs has been increasing gradually over the years. However, the rate of growth was rather dismal up to 2005 (See Graph 1). It has significantly picked up since then. Seemingly, the policy interventions made in 2005 and 2006 to woo private investment in road projects have had a desirable impact on the investors. Alternatively, the spurt in PPPs since 2006 might have been triggered by the exuberance generated by an unprecedented growth of Indian economy in the recent years. In the next section, we will investigate plausibility of these and other possible explanations for the growth and the distribution of PPPs across Indian states.

TABLE 1: Growth of PPPs in Roads over the years

TIME	NO. OF PPP's	Cumulative no. of PPP's (BOT Toll + BOT annuity + SPV)
1996	0	0
1997	0	0
1998	1	1
1999	2	3
2000	1	4
2001	4	8
2002	14	22
2003	2	24
2004	3	27
2005	2	29
2006	35	64
2007	21	85
2008	19	104
2009	5	109

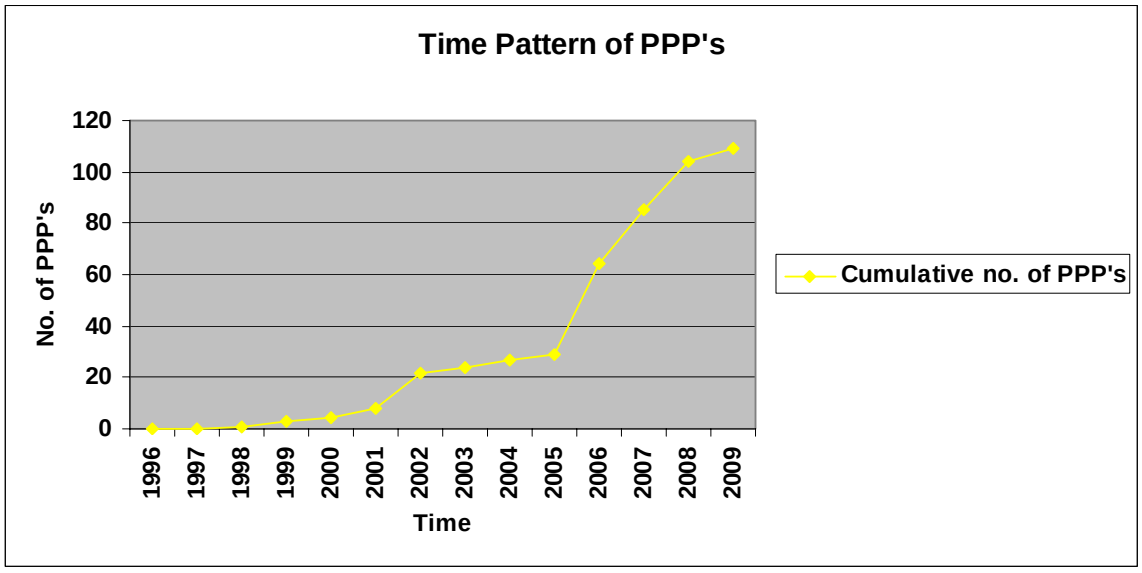
Source: www.nhai.org and www.pppinindia.com as on 31, 2009.

3.2 Profile of Concessionaires in PPPs

Table 2 shows nationality-wise break-up of PPPs on national highways. For example, out of a total of 134 PPPs, 43 have been formed by Indian firms. The table also provides nationality-wise break-up of the distance covered by PPPs on national highways.

As is clear from the table, many investors in PPPs are Indian firms. About one third of all PPPs have been formed by Indian firms; together accounting for at least one fifth of the distance covered by all PPP projects. As far as foreign participation is concerned, it is dominated by Malaysian and American firms. In most cases of foreign participation, the foreign firm and an Indian firm form a consortium to bid for projects. The bidding rules have encouraged Indian firms to opt for joint venture with foreign firm(s). The rules for the Request for Qualification as well as for the final Request for Proposal stages provide weights to prior experience and financial soundness of the bidders. Foreign firms

GRAPH 1: Growth of PPPs in Roads over the years



generally have longer experience and easier access to capital in international market. Therefore, a consortium of foreign and Indian firms stand better chances of qualifying the short listing criteria as well as winning the bid. The following Table 3 shows the profile of major Indian players in PPPs.

TABLE 2: Nationality-wise break-up of concessionaires in PPPs.

Nationality	No.of PPPs	Proportion of distance covered
India	45	0.32
Malaysia	15	0.15
USA	14	0.13
French	6	0.06
Italy	3	0.04
Korean	1	0.01
Spain	2	0.06
Singapore	1	0.04
UK	4	0.04
Dubai	1	0.03
Denmark	1	0.01
Canadian	1	0.01
China	1	0.00
Switzerland	1	0.00
Miscellaneous*	10	0.09
Others**	3	0.02
Total	**109**	**1.00**

***** *1. Miscellaneous includes Indonesia, Germany and Philippines, among others.*

****** *2. Others include the projects for which the information on contractor is not available.*

3.3 Distribution of PPPs across States

National highways covered under Phases I, II, III and V span across most states in the union of India. Therefore, the upgradation work on NHs has been (is being) undertaken in most states. As was stated earlier, regardless of the state, wherever possible the NHAI has tried to award upgradation works on PPP basis. However, some states have attracted more PPPs than others. That is, investors have shown preference for some states over others. Table 4 shows the ranking of Indian states in terms of the number of PPPs attracted by them. As the table shows, Tamil Nadu, Andhra Pradesh and Maharashtra are the favorite states; together these states account for as much as 45 percent of all PPPs in the country. States like Assam, Jharkhand, Bihar, Orissa and Kerala, on the other hand, have failed to attract many of the PPP projects.

TABLE 3: Profile of major Indian players in PPPs.

PPP Concessionaire	Market Capitalization** (Rs Crores)	Net Sales (Rs Crores)	Net Worth (Rs Crores)	No. of Contracts*
L & T	110340	17645	5768	5=5+0
Rel Energy	47414	5752	9339	3=0+3
GMR infra	32262	33.39	1639	5=4+1
IDFC	27348	1500	2882	4=0+4
Lanco	11985	541	1379	2=2+0
Nagarjuna	5815	2870	1039	1=0+1
IVRCL Infra	5726	974	1321	3=0+3
Gammon India	4810	1851	1150	3=0+3
Patel	4425	1110	703	2=0+2
HCC	4404	1850	904	2=2+0
Madhucon	2616	510	447	4=4+0
Gayatri	543	502	141	2=0+2
Soma	NL			4=0+4
Ashoka	NL			4=0+4
Navayuga	NL			3=2+1
Ircon Int.	NL			2=2+0
KNR	NL			2=0+2

Source: Websites of the company concerned and internet sources.

NL= not listed

*= first figure denotes single ownership and the second figure indicates number of joint ownership

** As on January 2008.

However, to assess relative success of states merely in terms of the number of PPPs is not desirable. Since the number of PPPs in a state may not adequately represent the stakes involved, that is, the investment made in PPP projects in that state.

Therefore, one may be tempted to consider the cost of PPP projects rather than their number as an indicator of the performance of PPPs. After all, the investment made in PPP projects in a state captures the stakes for private parties better than the number of PPPs. However, there is a problem with this measure of performance as well. It is important to remember that Indian states are quite diverse in terms of their size and the length of national highways passing through them. More importantly, PPP projects under study form parts of the highways upgradation activities undertaken by the NHAI. Therefore, it is quite possible that states like Uttar Pradesh and Bihar have attracted a fair amount of financial resources in PPP projects simply because NHAI has taken up many projects in these states. Similarly, Delhi and Punjab may be lagging behind not because they are un-remunerative for toll based road facilities, but because NHAI has not taken up too many projects where PPPs could be formed. Therefore, in a state if a large network of highways (in terms of the length covered or the total costs of all projects) is being upgraded, it is likely to attract more of PPPs. Similarly, if there is not much work undertaken in a state, there is little scope for PPPs to add to the pot. We therefore propose to analyze the ratio of the road distance covered under PPP contracts to the total distance being covered under all contracts in a state.

TABLE 4: Ranking of States in terms of number of PPPs

STATE	**NO. OF PPP's**	**RANK**
Tamil Nadu	20+0=20	1
Andhra Pradesh	17+0=17	2
Maharashtra	12+1=13	3
Uttar Pradesh	7+2=9	4
Gujarat	6+2=8	5
Karnataka	8+0=8	5
Rajasthan	5+3=8	5
Haryana	2+6=8	5
Madhya Pradesh	6+1=7	6
Punjab	3+3=6	7
West Bengal	4+0=4	8
Chattisgarh	3+0=3	9
Kerala	3+0=3	9
Delhi	0+2=2	10
Orissa	1+0=1	11
Bihar	1+0=1	11
Goa	1+0=1	11
Himachal Pradesh	1+0=1	11
Jharkhand	0+0=0	12
Assam	0+0=0	12
Jammu&Kashmir	0+0=0	12
Total		**109**

*. The first term on left side is the number of PPPs within the state and the second is the number of PPPs shared with neighbouring state(s).

Before proceeding further, we must clarify that Phases III and V of the NHDP are far from being complete. NHAI is still trying to award contracts for majority of projects under these phases on PPP basis. So, in principle, the total number as well as ranking of

states in terms of PPPs can change. While some changes in ranks cannot be ruled out, it is unlikely to change significantly. Since, many projects in low performing states have been on offer for quite some time, yet there are no takers for them. To substantiate the argument we have studied the distribution of PPPs on the Golden Quadrilateral (GQ), North-South and East-West (NSEW) Corridors. Contracts for most projects on these corridors (except in Jammu and Kashmir and North East) have been awarded. Table A1 in Appendix A gives the details regarding the number of PPPs on GQ and the NSEW Corridors. Table A2 in Appendix A provides the ranking of states in terms of the ratio of distance covered by PPP projects to total distance covered by all the projects in the state. For the reasons mentioned above, this ratio is a better measure of relative performance than ranking in terms of the absolute number of PPPs. Again, the distribution of the length of expressways covered by PPP projects is highly skewed. The top five states account for more than three fourth of the total length covered by PPPs (See Table A1). In fact, the top three high income states alone make up for as much as 60 percent of the total distance.

Therefore, richer states with relatively high per capita SGDP seem to have attracted more PPPs than the poorer states. This is especially true for BOT and SPV projects. In the following section, we will pose research questions in this regard and will answer them in Section 6.

4. Research Questions, Hypotheses and the Model

4.1 Research Questions:

In this section, we want to know why some states have performed better in attracting PPPs than the other states. For policy purpose it will be useful to know why investors have shown greater keenness for some states over others. That is, we want to answer the following question: Why some states have performed better in attracting PPPs while others have not succeeded in doing so?

Alternatively, the focus of analysis can be individual projects rather than states. As is shown in Section 4, only a fraction of road projects undertaken under NHDP have attracted private investment in the form of PPPs. Therefore, we can try to explain why some road projects have attracted private investment and why others have failed to do so. That is the question can be: Why some road projects have been taken up on PPP basis while others have not succeeded in doing so? But, the skewed distribution of PPPs across states shown by Table 4 indicates that the above two questions posed in this section may be closely related. Mindful of these interconnections, in this section we will answer both of these questions. We will show that answers to these questions have striking similarities. In addition, we will answer the following related questions: What matters for PPPs? Which legal and economic factors are likely to influence the decision making of the private investors?

To assess these questions we have compiled data for all the 405 projects undertaken so far as a part of the NHDP.

Data Description

We have collected data for all of the 405 projects under various phases of NHDP. These include projects that have been completed, are being implemented, as well as those that have been approved for implementation as on July 31, 2009. We have collected data on all of the above mentioned explanatory variables. Data on project specific attributes such as project cost, start date, the district(s) in which a project is located, distance of project from the closest mega city etc. were most difficult to get. Even on one aspect, say project cost, there is no single source of data. The NHAI's online publications do not provide data on cost of projects. The quarterly reports of the Ministry of Statistics and Programme Implementation, MOSPI, do contain data on project cost. However, these reports provide data only for the ongoing projects that are worth Rs 20 crore or more. Moreover, the earliest quarterly report available goes back only as far as 2004. Therefore, for small projects and those that got completed before 2004, these reports do not provide data. However, the NHAI provided us access to the crucial data on cost and time aspects of the projects. We were also provided access to the EMI reports of NHAI. For the remaining aspects, we have consulted 20 odd quarterly reports of MOSPI, publications of WB, ADB and the information available from web sources.[32] Still we have managed to collect data on 381 projects. Fortunately, we were able to collect the relevant data on all of the PPP projects. For the remaining 24 projects data on one or the other relevant aspect was unavailable. Most of these projects were implemented before 1999, that is, before any meaningful implementation of the PPP policy. Therefore, absence of these projects should not affect the validity of the claims in the paper.

We have mapped all the projects with the district(s) in which they are located. While the information regarding the state in which project is located was available, we had to find out the district(s). Similarly, we had to calculate the distance of a project from the nearest mega city. We carried out this exercise for all of the 381 projects.

4.2 The Model and Explanatory Variables:

Under PPPs most of the construction and maintenance related risks are passed on to the private investors. Under BOT Toll contracts, even traffic and financial return related risks are borne by investors. Therefore, as one would conjecture, several factors are likely to influence the decision making of the private investors in PPPs. For example, road projects with high projected traffic are more likely to attract PPPs. Similarly, *ceteris paribus* provision of viability gap funding is likely to make investment in road projects more attractive. Below, we list the relevant legal and economic variables and the associated hypotheses.

The following project specific attributes/variables are likely to affect the chances of a project being taken up on PPP basis.

4.2.1 ECONOMIC VARIABLES: Other things held constant, higher the demand and willingness to pay for a better road service, more likely the project will attract private investment. Similarly, greater is the profitability or lower is the risk profile of a project,

[32] www.pppinindia.com is a useful source for PPP projects.

higher will be chances of formation of PPP. We have attempted to capture these attributes with help of the following variables:

i. *Local Infrastructure: INFRASTRUCTURE:* A higher level of economic activities in general is likely to result in a greater demand as well as ability to pay for better road facility. Moreover, enabling infrastructure can facilitate a project during construction as well as the O&M phases. We have considered infrastructural index of the district in which the road project is located as an explanatory variable.[33] We have used the infrastructure index prepared by the Center for Monitoring of Indian Economy. The main components of the index are power, communication and transport.

Since national highways attract traffic from other districts of the state in which the project is located as well as from other neighboring states, we think the following state specific variables are likely to affect the probability of formation of PPPs.

ii. *Vehicular Population of the State: TRANSPORTVEHICLE:* The benefits in terms of reduced travel time and lower risk of accidents are proportional to the level of congestion on the alternative routes. The road segments developed by BOT and other PPP projects generally save travel time and have better driving conditions. Therefore, such road facilities are likely to be in greater demand in states with high traffic density. For this purpose, we have used data of total vehicular population of the state in which the project is located. The number of registered vehicle is taken for the same year in which road project is taken up for upgradation.

We should however note that private buses, trucks and heavy vehicles are the main sources of toll revenue. However, the data available is an aggregate of small and large vehicle. Further, there is lot of inter-state traffic plying on National Highways. So this variable may or may not turn out to be very significant.

iii. *Per capita State Gross Domestic Product: PSGDP:* A higher per capita SGDP is indicative of income and hence demand for transport services of the state. States with higher per capita SGDP are also the states with larger number of economic activities that involve intensive use of surface transport, and *vice-versa*. Moreover, when average per capita income is high, average road user will be more willing and able to pay for the services of BOT toll roads. Therefore, states with relatively high per capita income are likely to attract more PPP projects as compared to the states with relatively low per-capita GDP. In other words, we conjecture that per-capita income can provide a demand based explanation for the distribution of PPP projects among Indian states. Therefore, we have per-capita SPGDP as an explanatory variable. A ranking of Indian states in terms of per-capita SPGDP is provided in Table A3 in Appendix A.

iv. *Per capita State Gross Domestic Product of neighbouring states: AVGEPSGDP:* As argued above, a significant proportion of traffic plying on National Highways is inter-state. This is especially true of commercial and goods/freight vehicles.

[33] Ideally we would like to consider the number of vehicles plying on the road segment under consideration. Unfortunately, such a data does not exist.

Therefore, in addition to the local demand, income level and intensity of economic activity in the neighbouring states also affects traffic density and hence the profitability of BOT toll projects. We have captured this effect by taking an average of per capita SGDP of neighbouring states.

v. *Project Cost: PCOST*: Project cost captures the financial stakes involved in the project. However, a project cost per se is not an indicator of financial viability of a project. Several factors such as length of road project and availability of an alternative road facility affect returns from a project. As a result, it is apriori difficult to say whether the project cost will increase or decrease the attractiveness of a project for PPP.

vi. *Time Factor: TIMELAPSE:* When PPP policy was introduced in 1995, the policy makers as well as investors were inexperienced. In other words, the risk profile of projects was unknown. With the passage of time, both have become better informed about the strengths and weaknesses of PPPs in India. So, presumably some learning has taken place overtime. We expect that this learning has increased probability for formation of PPPs significantly. Further the policy regime has itself evolved over time.

vii. *Distance from mega city: DISTANCECITY:* Big cities are hubs of commercial activity. These cities act as growth pole for many of industrial and commercial activities. A lot of freight and passenger traffic on National Highways move to and from these cities. Road segments closer to mega cities experience denser traffic as opposed to projects tucked away from cities. As a result, ceteris paribus, the closer a project is to a mega city, higher are the chances of formation of PPP.

To sum up we should expect the following pattern of results. Other things remaining the same,

i) higher the value of INFRASTRUCTURE, i.e., better local infrastructure, better are chances of forming PPP.
ii) higher the value of TRANSPORTVEHICLE, i.e., larger is the number of vehicles in the state, better are chances of forming PPP.
iii) higher the PSGDP, i.e., richer is the state in term of per capita GDP, better are chances of forming PPP.
iv) higher the AVGEPSGDP, i.e., richer are the neighbouring states, better are chances of forming PPP.
v) smaller is the project cost, PCOST, better are chances of forming PPP.
vi) longer is the time lapse, TIMELAPSE, better are chances of forming PPP.
vii) closer a project is to a mega city, higher are chances of formation of PPP.

4.2.2 *Governance and Legal Indicators*:

In addition to the above mentioned economic factors, the law governing PPP contracts will have several consequences for investors. Similarly, the situation of law and order and protection of property rights in the state in which a road project is located has bearing on

the prospects of PPPs. We consider the following law and governance related variables to be relevant.

i. *Governance and Property Rights*: *PROPRIGHTS:* All PPPs contracts are primarily contracts between the NHAI on behalf of the central government and the contractor/concessionaire. Moreover, the nature of contracts and the governing laws are the same for PPPs across states.[34] To that extent, all PPPs are governed by the same property and contract laws. Therefore, one may think that the states have little role to play in the entire exercise. However, state governments have two crucial roles in the matter. The all-important tasks of land acquisition and shifting of utilities are undertaken and performed by the state government concerned. Therefore, during the construction phase, a state government can make the concessionaire's life easy or very difficult. Presumably, better governed states are likely to facilitate the contraction activities for a project. These states have better coordination among various ministries and departments. Therefore, state machinery in properly governed states is likely to be efficient and fast in land acquisition. It may also be able to resolve disputes over land acquisition expeditiously. As a result, these states are likely to be efficient in shifting of utilities, a major cause of the delay in project implementation. The state machinery in poorly governed states, in contrast, is likely to be less efficient and slow in performing these activities. Therefore, projects in different states have different risk profiles. Secondly, law and order, and protection of property rights are state subjects. The situation of law and order and the level of property rights protection in a state can have significant bearing on the risk and hence on profitability of a BOT contract. Specifically, the protection provided to the private property rights is crucial for the concessionaire to be able to appropriate benefits from the investment made in the project. If property rights are not protected or poorly protected, a concessionaire may fail to realize all the benefits from the toll contract. In that case, users of a road facility may not pay the toll fee. Alternatively, the concessionaire may be forced to employ private security agents. The latter option is a costly affair. Moreover, a weaker property right protection is generally associated with encroachments on project sites and prolonged litigations. Therefore, other things remaining the same, investors may be reluctant to enter into BOT Toll contract in a state where law enforcement is perceived to be poor. Whenever they enter into a contract in such states, they are likely to opt for BOT annuity rather than a BOT Toll contract. In sum, we expect the level of property rights protection of the relevant state to play an important role in determining whether a project is taken up as PPP or not. We are using the index generated by Debroy and Bhandari (2007)[35] to approximate the governance climate in a state.

ii. *Changes in Legal Regime*: *POLICYDUMMY:* As argued above, the PPP policy of the government has evolved overtime. Many policy changes have been introduced overtime. However, significant changes like provision for VGF were introduced in the Union Budget of 2003-04. Moreover, since 2005 when NHDP Phase III was undertaken, NHAI has pushed for PPPs in a big way. Projects under this and later

[34] For details of contractual clauses and the governing laws see MCA for PPPs in roads.
[35] The index captures the relative efficiency of the executive and the judiciary across states in recovering the stolen property, dispute settlement and the law and order. For details, see Debroy and Bhandari (2007).

phases can be taken up on non-PPP basis, that is public funding is provided, only if a project has no chances of attracting private investment. We expect these policy changes to have impacted the probability of a project being taken up on PPP basis favorably and significantly. We have used policy dummy for projects that started in April 2005 or later. We expect the policy dummy to be a significant explanatory variable.

However, we expect the effects of the policy dummy to be intertwined with the time factor variable. Both of these variables capture the effects of several concurrent phenomena; learning with time, intermittent policy changes, general economic outlook and of course the significant policy changes of 2004-05. Hence, while we expect the coefficients of both the variables to be significant if considered individually, taken together one of them may confound the effect of the other.

Thus to sum up, other things remaining the same,

i) higher the PROPRIGHTS index, i.e., stronger is the protection provided to property rights in the state, better are chances of forming PPP.
ii) if POLICYDUMMY=1, i.e., if the project is offered after April 2005, better are chances of forming PPP.

The following tables provide detailed description of data and sources (as on till 31, 2009).

TABLE 5:

Item	Total	PPP projects	non-PPP projects
Projects initiated/complete under various phases of NHDP	405	109+2*	294
Number of projects for which data available	381	109	272

* ***These are the projects for which contract has been terminated and therefore excluded.***

4.3. Model: To analyze this problem we construct a binary variable *pppnonppp* that takes two values; 'yes' or 'no', depending on whether the project is PPP or not. Therefore, we have decided to use binary choice probability models. We have estimated the models using *logit*. The details of the different models estimated are provided in Appendix B.

***Preliminary Observations*:**

From the definitions of TIMELAPSE and POLICYDUMMY, these variables are expected to be correlated. Indeed, they are highly correlated with correlation coefficient equal to 0.88 (See Table C1 in Appendix C). Therefore, we cannot use TIMELAPSE and POLICYDUMMY variables simultaneously. TIMELAPSE variable, however, is

TABLE 6: Explanatory Variables and Data Sources

S. No.	VARIABLES	DESCRIPTION	DATA SOURCE
1	PGSDP	Per-capita Gross State Domestic Product of the state in which project is located. PSGDP is taken for the year in which the project was started or approved. All figures at 1999-2000 constant prices. Figures for years 2007-08 and 2008-09 have been extrapolated using the average growth rate for the previous four years.	Ministry of Statistics and Programme Implementation (MOSPI), Central Statistical Organization (CSO)
2	PCOST	Total Cost of the project. We have deflated all project costs. All costs are at constant prices of 1990-2000.	Data on project cost is collected from various reports of NHAI and MOSPI. Source of WPI is the office of the Economic Adviser, Ministry of Commerce and Industry
3	PROPRIGHTS	Index representing the property rights ranging from 0 to 100.	Bhadari and Debroy (2007)
4	DISTANCECITY	Distance of the project from mega-city.	OUR CALCULATIONS: We have calculated the distance of each project from the nearest city of population 10 lakhs or more.
5	TRANSPORTVEHICLE	Total number of registered Motor Vehicles in the state in which the project is located in the year. Figures for the years 2007-08 and 2008-09 have been extrapolated using average growth rate of the last four years.	Ministry of Shipping, Road Transport and Highways, Govt. of India, various publications.
6	INFRASTRUCTURE	Infrastructure index of the district in which the project is located. The index is based on four major infrastructure facilities (energy, transport, irrigation and finance) and two social infrastructure facilities (education and health).	CMIE Published Data, Oct 2000, and OUR CALCULATIONS. We have mapped each project with the district(s) in which it is located.
7	TIMELAPSE	Time elapsed since August 1995, when the first project under NHDP was started, to the start date of the project. Time elapsed is measured in months.	OUR CALCULATIONS: We have calculated time TIMELAPSE for each project.
8	POLICYDUMMY	Policy dummy is used for projects that stated during or after April, 2005.	OUR CALCULATIONS
9	AVGPGSDP	This is the average of PGSDP of the states that are in immediate neighbors of the state in which project is located. The figures are for the year of start/approval of the project, and are at 1999-2000 constant prices.	MOSPI and CSO and OUR CALCULATIONS: For each project, we have determined the neighboring states and their average PGSDP. Immediate neighboring states differ depending on which NH the project at hand is located.

expected to have better explaining power. It captures several effects, for example, the learning effect, intermittent and gradual policy changes as well as significant policy changes and general economic outlook. The POLICYDUMMY, in contrast, captures only the last effect.

As far as the distribution of PPPs among states is concerned, Table 4 shows that Tamil Nadu has attracted a disproportionately large number of them.[36] The state of Bihar has attracted only 5 PPPs. However, 4 of these PPPs have been approved recently and the work on projects is yet to start. One conjecture could be that the PPPs in Bihar are an outcome of excessive exuberance shown by Corporate India before it got caught up in the unexpected slowdown. Therefore, to check robustness of our results, we have decided to run a set of regressions by dropping all the projects in these two states.

***RESULTS*:**

We have run regressions using variables discussed in the previous section. For the reasons mentioned above, we have used only one of the TIMELAPSE and POLICYDUMMY variables at a time. Results of regressions using TIMELAPSE (instead of POLICYDUMMY) along with other variables are presented in Tables 7 and 8 below. If we use POLICYDUMMY and drop the TIMELAPSE variable instead, the results are very similar and are reported in Tables 2B and 3B in Appendix B.

As we had expected the coefficient of *PSGDP* is positive and highly significant (p=0.000). Moreover, marginal effect of this variables is positive and very significant (p=0.000). The coefficients of *PROPRIGTS* and *AVGEPGSDP* are positive and significant; both are significant at 5% level of significance. Also, marginal effects of these variables are positive and significant. For obvious reasons, *PSGDP* has a stronger marginal effect on the probability of PPP than *AVGEPGSDP*.

The coefficient of TRANSPORTVEHICLE (p=0.563) is positive but not very significant; it is significant at 10%. The coefficient of INFRASTRUCTRE (p=0.171) has turned out to be negative though not very significant. The outcome with respect to these variables is not surprising. Since a large proportion of traffic plying on National Highways is inter-district and inter-state, local demand captured by district infrastructure index does play a significant role in the overall demand for National Highways. Similarly, private buses, trucks and heavy vehicles are the main source of toll revenue. However, the data available is an aggregate of the state level small and large vehicles. So this variable does not capture even the state level demand and therefore its coefficient is not significant.

The coefficient of the TIMELAPSE is positive and very significant (p=0.007). Moreover, the marginal effect on the probability of PPP is positive and highly significant (p=0.005).

[36] Coincidently, the last two ministers in the Ministry have come from the state.

TABLE 7: Effects of economic and legal indicators

Model 1: Dependant variable y = Pr(pppnonppp).

Logistic regression — Number of observations = 381
LR chi2(8) = 152.49
Prob > chi2 = 0.0000
Log likelihood = -150.90684 — Pseudo R2 = 0.3357

pppnonppp	Coef.	Std. Err.	z	P>|z|	95% Conf. Interval	
Distancecity	-0.001921	0.000762	-2.52	0.012	-0.003415	-0.00043
Pgsdp	0.0000692	1.92E-05	3.61	0	3.16E-05	0.000107
Pcost	0.007214	0.001261	5.72	0	0.004743	0.009685
Timelapse	0.0164029	0.006066	2.7	0.007	0.004514	0.028292
Transportvehicle	0.0000344	5.96E-05	0.58	0.563	-8.23E-05	0.000151
Proprights	1.346156	1.059277	1.27	0.204	-0.729989	3.422301
Infrastructure	-0.006909	0.003543	-1.95	0.051	-0.013854	3.64E-05
Avgpgsdp	0.0000356	2.56E-05	1.39	0.165	-1.46E-05	8.59E-05
_cons	-6.243977	0.799962	-7.81	0	-7.811873	-4.67608

TABLE 8: Marginal effects of economic and legal indicators

Marginal effects after logit
y = Pr(pppnonppp) (predict) = .2238985

variable	dy/dx	Std. Err.	z	P>|z|	95% Conf. Interval		X
Distancecity	-0.000334	0.00013	-2.51	0.012	-0.000595	-7.3E-05	231.057
Pgsdp	0.000012	0	3.51	0	5.30E-06	0.000019	21040.2
Pcost	0.0012536	0.00023	5.38	0	0.000796	0.001711	208.908
Timela~e	0.0028503	0.00103	2.78	0.005	0.000841	0.00486	104.378
Transveh	5.98E-06	0.00001	0.58	0.563	-0.000014	0.000026	4793.79
Proprights	0.2339188	0.18417	1.27	0.204	-0.127049	0.594887	0.404622
Infras~e	-0.001201	0.00061	-1.95	0.051	-0.002405	3.80E-06	110.521
Avgpgsdp	6.19E-06	0	1.39	0.166	-2.60E-06	0.000015	23140

As one would expect, proximity of a project to a mega city affect the chances of PPP favorably. The coefficient of *DISTANCECITY* is negative and it is very significant (p=0.012). The total project cost has turned out to be significant (p=0.000). The coefficient is positive implying that greater is the project cost, higher is the probability that it will attract private investment.

We have got very similar results by replacing TIMELAPSE with POLICYDUMMY – the coefficient of the latter is positive and significant (p=0.08). Again, the marginal effect is positive and significant (p=0.076) (See Tables B2 and B3 in Appendix B). That is, the

policy interventions made in 2005-06 have made a desirable impact on the performance of PPPs. However, the combined effect of learning, intermittent and significant policy interventions along with the generally optimistic economic environment during last three-four years seems to offer a better and stronger explanation. It is the combined effect of these variables that has caused a spurt in the number of PPPs during the last three years.

Excluding TRANSPORTVEHICLE from the set of explanatory variables, our results remain unaltered. However, the coefficient of PROPRIGHTS increases in magnitude as well as significance (p=0.082). The significance of the marginal effect of this variable also increases (p=0.082). See Tables B4 and B5 in Appendix B.

We have checked the robustness of our results by excluding the state of Tamil Nadu on account of disproportionately large number of PPPs and Bihar due to recently approved PPPs. Results are presented in Tables B6 and B7 in Appendix B. We have also run regressions by considering on BOT Toll projects. Again, we have got results very similar to that for all PPPs in terms of the magnitude of coefficients as well as their level of significance.

6. Concluding Remarks

We can now answer the questions posed in Section 4: Why some states have performed better in attracting PPPs while others have not succeeded in doing so? And, why some road projects have been taken up on PPP basis while others have not succeeded in doing so? The results of regressions presented in the last section provide clear answers to these questions. States with higher per capita income have attracted more PPPs than the poorer states. Road projects located in richer states have shown higher probability of attracting private investment than those located in the poorer ones. Other things remaining the same, projects located on national highways connecting richer states and those located closer to mega cities have exhibited higher probability of becoming PPPs. Similarly, *ceteris paribus,* states with better governance index and projects located in them have higher probability of attracting private investment. Empirical evidence in support of these claims is conclusive and robust.

Our analysis enables us to make several public policy recommendations.

PPPs as a public policy tool for financing infrastructure

Our study provides strong empirical evidence that per capita SGDP is a significant factor in attracting private investment in road projects. This means that road projects located in rich states can be expected to attract PPPs, in the form of BOT toll as well as BOT annuity contracts. Therefore, only the richer states can hope to mobilize private funds for infrastructure projects as well as realize efficiency gains from private sector participation. That is, the private sector participation is likely to help provide more and better infrastructure in rich states like Haryana, Gujarat, Punjab, Tamil Nadu, etc. There is a large state level demand for better infrastructure facilities in these states, enabling the investors to recoup their investment with good returns by charging toll or user fee. In contrast, projects located in poor states, like Orissa, Jharkhand, UP, Bihar, cannot draw on private investment. In such states, private sector is likely to invest only in projects if

they are located very close to some big city. Since average per capita SGDP of neighboring states is a significant explanatory variable, wherever possible, the poor states can capitalize on their geographical proximity to rich states. Therefore, in a poor state, the private investment can also come in if this state has rich neighboring states and the project happens to be located on a highway that connects the neighbors. For example, states like Rajasthan can hope to attract PPPs on major national highways passing through the state that connect Delhi and Haryana in the North with Gujarat and Maharashtra in the South. In addition, poor states with better law and order situation like Madhya Pradesh and Rajasthan can also hope to attract PPPs.

Therefore, policy recommendation for road projects to be undertaken under NHDP and other centrally sponsored projects is clear. PPP is likely to work as a public policy for financing infrastructure for projects located in richer and better governed states. Conversely in states with low income and thus low demand, PPP are not going to be as attractive.

Options available to poor states

It does not require any persuasion that poor states lack infrastructure and are deficient in financial resources. Therefore, these states are in greater need of resources as well as expertise of private sector. Unfortunately, projects located in these states cannot count on private investment, especially on BOT toll contracts that pass the entire risk on to the private sector. Therefore, centrally sponsored projects in such states should be implemented either through BOT annuity contracts, wherever possible, or by providing public funding. A look at Table A4 in Appendix A shows that many of the PPPs formed in relatively poor states like Bihar, UP and MP, and Andhra Pradesh, are BOT annuity contracts; relatively better off states like Haryana, Gujarat, Tamil Nadu and Karnataka have relatively smaller share of annuity contracts. Most of BOT Toll PPPs, on the other hand, are located in the top five rich states.

Therefore, it appears that poor states have two options available to them if they want to improve infrastructure. Either they can go for public funding of infrastructure projects, or they can hope to attract private investment only by providing extra 'sweeteners' to investors. The sweeteners can be provided in various ways. For example, project risk can be reduced by the sharing of revenue risk with the private participants. In extreme case, the state can assume the entire revenue risk, while construction and maintenance risks can be allocated to the private sector. Annuity contracts are examples of this latter option. In addition, private investment can be attracted by increasing the viability gap funding and/or by lowering of applicable taxes, etc. In addition, investors can be allowed to develop land on or adjacent to the project site for other commercial purposes. That is, investors in road projects can be granted developmental rights over the adjacent land. Some states have experimented with this last option. The contract for the Ganga Expressway in UP is an illustrative case in point. The government of UP and the developers, a JP group led consortium, have signed an annuity contract. As a part of the contract, the consortium has been allocated land that it can use for commercial activities. Similarly, real estate considerations have played major role in the Hyderabad Metro Rail project.

However, for several reasons, the use of real estate to finance infrastructure is very problematic. First of all, note that under annuity contracts, the costs and benefits to investors and society are clear. The investors get annuity payments as returns on their investment, and the society receives a public service for predetermined price (annuities). In contrast, if rights of land or property are transferred to investors, the cost society pays and the benefits it receives from doing so becomes very unclear. More importantly, it increases the project risk, since property market is inherently risky. Any downturn in property market adversely affects the progress of the project, if not its viability itself. Therefore, it is not surprising that due to the recent economic slowdown, each one of the above mentioned project has got delayed.

PPP policy needs improvements

As was discussed in Section 2, during 2005 and 2006, the Government of India launched several policy initiatives to attract private investment in infrastructure, especially in roads. The rules and laws that govern PPP contracts have several desirable features. Our regression results show that these interventions have made a significant impact. Most of PPPs in roads have been formed after these policies were implemented. The coefficient of the POLICYDUMMY is positive and very significant (p=0.014) with strong and significant marginal effect (p=0.008). Therefore, PPP policy has surely helped in tapping financial resources of the private sector for upgradation of the road infrastructure. However, the effect of time lapse is even stronger. The coefficient of TIMELAPSE is larger and more significant (p=0.000). Its marginal effect is also larger and more significant (p=0.000). That is, the combined effect of learning, intermittent and significant policy interventions along with the generally optimistic economic environment during last three-four years seems to offer a better and stronger explanation. Perhaps, it is due to the combined effect of these variables that in recent times even relatively backward states like UP, Bihar and Orissa have been able to attract PPPs. It is worth to dwell more on this conjecture. Therefore, refer back to our analysis on PPP policy and the relevant contract law.

At the same time, there is a widespread feeling that the PPP policy has not delivered what was expected of it. For instance, out of 60 projects offered for PPPs during the last fiscal, 34 received no response from investors, and six received only one bid each.[37] To a significant extent, the ever changing PPP policy is responsible for this poor performance. It is important to note that even commercial viable projects will attract private funding only if a clear and consistent policy is in place. Unfortunately, PPP policy has been subjected to midway changes. In the past, such changes have triggered litigation and delays. The insertion of clause 3.5.2 in model request for qualifications (RFQ) for road sector and its subsequent deletion is a case in point. Last year, at least 60 projects worth about Rs 60,000 crore became casualty of this policy change. The clause had used an aggregate score method that invited protests from some Indian companies and led to litigation.[38] In response, the ministry of roads and surface transport imposed another odd

[37] See The Economic Times, dated January 22, 2009.

[38] According to Indian companies this clause favored large multinational companies with vast experience across sectors. It was inherently anti-competitive and discriminatory against Indian companies who have enough experience in road sector but otherwise are relatively small.

condition. The new clause 2.1.18 restricted, among other things, the number of projects a company could bid for to eight projects. While the government was still going back and forth on the bidding rule, the economy was hit by the downturn. As a result, many projects are getting delayed. There are no takers around.

In addition, there are some other serious problems with the way PPP contracts are awarded and implemented. Take for instance, BOT contracts provide for contract modification on the grounds of over/under estimation of the traffic. In several instances, the realized traffic has been much less than the projected traffic leading to disputes over contract renegotiations. Though over estimation of the revenue streams has been observed in other countries as well, [39] in India renegotiations are neither transparent nor conclusive.[40] In addition, some state governments have been found wanting in providing the necessary support to the concessionaire. There have been long delays in land acquisition in the states of West Bengal, Jharkhand and Karnataka. As a result, several projects have been held up in these states. Indeed, many projects are being held up because of delays in land acquisition, environmental clearances, shifting of utilities, and contract renegotiations due to flaws in the initial specifications of projects. These problems can be and need to be addressed without delay.

Several other measures need to be taken to encourage private sector participation and improve the delivery system. The project feasibility reports should be prepared seriously so as to avoid later changes in design and alignments. Contracts should clearly spell out the obligations of the parties involved. Moreover, there should be an independent agency to arbitrate or adjudicate the disputes between government agencies and concessionaires/contractors.

A total neglect of operation and maintenance of highways is a serious concern. All road projects that were developed using public funds are experiencing a complete neglect. As a result, quality of these segments is deteriorating fast. Maintenance of the developed highways is as important activity as building of new ones.

[39] Similar patterns have been observed the world over. See Guasch (2004).
[40] For a case study on contract relegation of Delhi-Noida Bridge over traffic shortfall, see Pargal (2007).

APPENDIX A: Tables

TABLE A1: PPPs on Golden Quadrilateral and NSEW corridors

Stretch	Number of BOT contracts	Number of Annuity contracts	Number of SPV contracts	Total number of PPPs	Proportion of length under PPP (%)
GQ:Delhi-Mumbai	2	-	2	4	2.04
GQ: Mumbai-Chennai	2	1	-	3	2.67
GQ:Kolkata-Chennai	1	4	-	5	3.16
GQ:Delhi-Kolkata	1	2	-	3	1.49
NS	13	12	-	25	14.16
EW	1	4	-	5	2.39

Source: *NHAI*

TABLE A2: Distance covered by PPP projects on GQ and NSEW corridors

STATE	Total Length Upgraded (Kms)	Length Funded by PPPs (Kms)	Length covered by PPPs (%age of Total)
Kerala	86.6	70	80.83
Andhra Pradesh	1785.462	741.922	41.55
Karnataka	655.28	170.88	26.08
Tamil Nadu	1008.385	360.715	35.77
Madhya Pradesh	643.525	227.825	35.40
West Bengal	521.017	135.457	26.00
Maharashtra	549.95	133	24.18
Gujarat	872.2	129.4	14.84
Rajasthan	1136.155	167.38	14.73
Uttar Pradesh	1602	194.4	12.13
Haryana	192.7	10	5.19
Bihar	756.235	10	1.32
Assam	648.3	0	0.00
Delhi	202.4	0	0.00
Jammu & Kashmir	134.53	0	0.00
Jharkhand	121.75	0	0.00
Orissa	388.095	0	0.00
Punjab	81.17	0	0.00
Total	**11385.75**	**2350.98**	**20.65**

Source: *Calculations based on NHAI data*

Table A3: Ranking of states in terms of Per Capita State GDP (Average of SGDP for years 2006-07, 2007-08 and 2008-09)

STATE	AVERAGE SGDP	RANK
Delhi	52101.33	1
Haryana	34893.67	3
Punjab	30163.00	4
Maharashtra	29776.33	5
Himachal Pradesh	28233.67	6
Gujarat	27665.00	7
Kerala	27358.33	8
Tamil Nadu	26006.00	9
West Bengal	22707.67	10
Andhra Pradesh	22614.00	11
Karnataka	22093.67	12
Chattisgarh	16778.00	13
Jharkhand	16235.67	14
Assam	16100.00	15
Rajasthan	15497.33	16
Jammu&Kashmir	15304.00	17
Orissa	14801.67	18
Madhya Pradesh	12779.33	19
Uttar Pradesh	11636.67	20
Bihar	7462.00	21

Source: www.rbi.org

Table A4: Distribution of Annuity PPPs across states

STATES	NO. OF ANNUITY PPP'S	RANK
Andhra Pradesh	9	1
Uttar Pradesh	4+1*=5	2
Madhya Pradesh	3+1*=4	3
Karnataka	2	4
West Bengal	2	4
Bihar	1	5
Gujarat	1*	5
Rajasthan	1*	5
Tamil nadu	1	5
Punjab	1	5
Assam	0	6
Chattisgarh	0	6
Haryana, Delhi Maharashtra, Goa	0	6
Himachal Pradesh	0	6
Jammu&kashmir	0	6
Orissa	0	6
Total No.of Annuity Projects		**25**

*** These are the projects which are shared with the other states**

Appendix B

The Model: As mentioned in the text, we have used a *Logit Probability Function*:

$$p = F(Z) = \frac{1}{1+e^{-Z}}$$

where variable *Z* is a linear function of the above mentioned explanatory variables. We have used the following two specifications of this model.

Model 1:

$$Z = \beta_0 + \beta_1 PSGDP + \beta_2 PCOST + \beta_3 PROPRIGHTS + \beta_4 DISTANCECITY + \beta_5 TRANSPORTVEHICLE + \beta_6 INFRASTRUCTURE + \beta_7 TIMELAPSE + \beta_8 AVEGPSGDP + \beta_9 POLICYDUMMY$$

The marginal effect of a variable, say *PSGDP* is given by

$$\frac{dp}{dPSGDP} = \frac{dp}{dZ}\frac{\partial Z}{\partial PSGDP} = f(Z)\beta_2, \text{ where } f(Z) = \frac{dp}{dZ} = \frac{e^{-Z}}{(1-e^{-Z})^2}.$$

Similarly for the other variables.

As we had expected variables TIMELAPSE and POLICYDUMMY were highly correlated with the coefficient of correlation equal to 0.9. As a result, these variables could not be used simultaneously. Therefore, we have dropped the variable POLICYDUMMY, leading to the following specification.

Model 2:

$$Z = \beta_0 + \beta_1 PSGDP + \beta_2 PCOST + \beta_3 PROPRIGHTS + \beta_4 DISTANCECITY + \beta_5 TRANSPORTVEHICLE + \beta_6 INFRASTRUCTURE + \beta_7 TIMELAPSE + \beta_8 AVEGPSGDP$$

If we retain POLICYDUMMY and drop the TIMELAPSE variable instead, i.e., if we use the following specification

$$Z = \beta_0 + \beta_1 PSGDP + \beta_2 PCOST + \beta_3 PROPRIGHTS + \beta_4 DISTANCECITY + \beta_5 TRANSPORTVEHICLE + \beta_6 INFRASTRUCTURE + \beta_8 AVEGPSGDP + \beta_9 POLICYDUMMY$$

Regression Results:

TABLE B1: Partial Correlation Matrix

	distan~y	pgsdp	pcost	timela~e	policy~y	transp~e	propri~s	infras~e	avgpgsdp
distancecity	1								
pgsdp	-0.0337	1							
pcost	0.0285	0.252	1						
timelapse	0.1356	0.3554	0.3269	1					
policydummy	0.1135	0.2554	0.1761	0.8891	1				
transportv~e	-0.02	0.4675	0.2496	0.351	0.263	1			
proprights	0.0631	0.2914	0.0544	0.0501	0.0437	0.5142	1		
infrastruc~e	-0.1183	0.2232	0.0086	0.0091	0.0357	0.2114	0.3621	1	
avgpgsdp	0.0028	0.4116	0.1971	0.4527	0.3794	0.3088	0.3943	0.145	1

TABLE 2B: Effects of economic and legal indicators when TIMELAPSE is replaced with POLICYDUMMY

Model 2:

Logistic regression — Number of obs = 381
LR chi2(8) = 147.83
Prob > chi2 = 0.0000
Log likelihood = -153.23666 — Pseudo R2 = 0.3254

pppnonppp	Coef.	Std. Err.	z	P>|z|	95% Conf.	Interval
distancecity	-0.001643	0.000746	-2.2	0.028	-0.003105	-0.00018
pgsdp	0.0000747	1.87E-05	4.01	0	3.82E-05	0.000111
pcost	0.007601	0.001259	6.04	0	0.005134	0.010069
policydummy	0.5866185	0.336548	1.74	0.081	-0.073004	1.246241
transportv~e	0.0000571	5.78E-05	0.99	0.323	-5.61E-05	0.00017
proprights	0.8997062	1.031263	0.87	0.383	-1.121532	2.920945
infrastruc~e	-0.006924	0.003549	-1.95	0.051	-0.01388	3.25E-05
avgpgsdp	0.0000517	2.46E-05	2.11	0.035	3.57E-06	9.99E-05
_cons	-5.368326	0.725367	-7.4	0	-6.79002	-3.94663

TABLE 3B: Marginal effects of economic and legal indicators when TIMELAPSE is replaced with POLICYDUMMY

variable	dy/dx	Std. Err.	z	P>|z|	95% Conf.	Interval	X
distan~y	-0.000292	0.00013	-2.19	0.029	-0.000555	-0.00003	231.057
pgsdp	0.0000133	0	3.92	0	6.70E-06	0.00002	21040.2
pcost	0.0013531	0.00024	5.7	0	0.000888	0.001819	208.908
policy~y	0.1029158	0.058	1.77	0.076	-0.010759	0.216591	0.543307
transp~e	0.0000102	0.00001	0.99	0.322	-1.00E-05	0.00003	4793.79
propri~s	0.1601568	0.18377	0.87	0.383	-0.200028	0.520342	0.404622
infras~e	-0.001233	0.00063	-1.96	0.05	-0.002467	2.10E-06	110.521
avgpgsdp	9.21E-06	0	2.12	0.034	6.90E-07	0.000018	23140

TABLE 4B: Effects of economic and legal indicators when TRANSPORTVEHICLE is dropped.

Logistic regression — Number of obs = 381
LR chi2(7) = 152.16
Prob > chi2 = 0.0000
Log likelihood = -151.07272 — Pseudo R2 = 0.3349

pppnonppp	Coef.	Std. Err.	z	P>|z|	95% Conf.	Interval
distancecity	-0.001957	0.000762	-2.57	0.01	-0.00345	-0.00046
pgsdp	0.0000723	1.86E-05	3.88	0	3.58E-05	0.000109
pcost	0.0072739	0.001257	5.79	0	0.00481	0.009738
timelapse	0.0172806	0.005897	2.93	0.003	0.005722	0.028839
proprights	1.627082	0.936523	1.74	0.082	-0.208469	3.462633
infrastruc~e	-0.006869	0.003546	-1.94	0.053	-0.013819	8.16E-05
avgpgsdp	0.0000338	2.56E-05	1.32	0.188	-1.65E-05	0.000084
_cons	-6.312693	0.79333	-7.96	0	-7.867592	-4.75779

TABLE 5B: Marginal Effects of economic and legal indicators when TRANSPORTVEHICLE is dropped.

variable	dy/dx	Std. Err.	z	P>|z|	95% Conf.	Interval	X
distan~y	-0.000341	0.00013	-2.56	0.011	-0.000602	-7.9E-05	231.057
pgsdp	0.0000126	0	3.76	0	6.00E-06	0.000019	21040.2
pcost	0.0012659	0.00023	5.43	0	0.000809	0.001722	208.908
timela~e	0.0030074	0.00099	3.03	0.002	0.001059	0.004955	104.378
propri~s	0.283167	0.16284	1.74	0.082	-0.036002	0.602336	0.404622
infras~e	-0.001195	0.00062	-1.94	0.052	-0.002403	0.000012	110.521
avgpgsdp	5.88E-06	0	1.31	0.189	-2.90E-06	0.000015	23140

TABLE 6B: Effects of economic and legal indicators when Bihar and Tamil Nadu projects are dropped

Logistic regression — Number of obs = 312
LR chi2(8) = 117.93
Prob > chi2 = 0.0000
Log likelihood = -125.69478 — Pseudo R2 = 0.3193

pppnonppp	Coef.	Std. Err.	z	P>|z|	95% Conf.	Interval
distancecity	-0.002077	0.000792	-2.62	0.009	-0.00363	-0.00052
pgsdp	0.0000772	2.06E-05	3.74	0	3.68E-05	0.000118
pcost	0.0069057	0.001353	5.1	0	0.004254	0.009558
timelapse	0.0130295	0.006169	2.11	0.035	0.000938	0.025121
transportv~e	0.0000486	6.92E-05	0.7	0.482	-0.000087	0.000184
proprights	3.601493	1.503418	2.4	0.017	0.654848	6.548137
infrastruc~e	-0.007163	0.007623	-0.94	0.347	-0.022104	0.007778
avgpgsdp	0.0000336	2.74E-05	1.23	0.22	-2.01E-05	8.73E-05
_cons	-6.33481	1.077455	-5.88	0	-8.446584	-4.22304

TABLE 7B: Marginal Effects of economic and legal indicators when Bihar and Tamil Nadu projects are dropped

variable	dy/dx	Std. Err.	z	P>|z|	95% Conf. Interval		X
distan~y	-0.000363	0.00014	-2.6	0.009	-0.000637	-8.9E-05	240.746
pgsdp	0.0000135	0	3.59	0	6.10E-06	0.000021	20882.7
pcost	0.0012069	0.00025	4.82	0	0.000716	0.001698	206.461
timela~e	0.0022772	0.00107	2.13	0.033	0.000185	0.00437	75.5256
transp~e	8.50E-06	0.00001	0.71	0.48	-0.000015	0.000032	4395.1
propri~s	0.629443	0.26129	2.41	0.016	0.11733	1.14156	0.369186
infras~e	-0.001252	0.00133	-0.94	0.346	-0.003858	0.001354	101.954
avgpgsdp	5.87E-06	0	1.23	0.22	-3.50E-06	0.000015	22797.4

APPENDIX C

NHDP: Details of planned works and modes of funding, for 2005-15

NHDP Phase	Item	Construction Contracts	BOT (Toll)	BOT (Annuity)	Total
I (Balance work)	Length (Km) Cost (Rs Crore)	1711 8145	20 581	7 85	1738^ 8811
II (Balance work)	Length (Km) Cost (Rs Crore)	4569 29493	1237 8065	930** 6064	6736 43622
III	Length (Km) Cost (Rs Crore)	- -	10000 65197		10000 65197
IV	Length (Km) Cost (Rs Crore)	- -	5000 6950	15000** 20850	20000 27800
V	Length (Km) Cost (Rs Crore)	- -	6500 41210	- -	6500 41210
VI	Length (Km) Cost (Rs Crore)	- -	1000 16680	- -	1000 16680
VII	Length (Km) Cost (Rs Crore)	 2594	 9638	 4448	* 16680
Total	Length (Km) Cost (Rs Crore)	6280 40232	23757 148321	15937 31447	45974* 2,20,000

Source: Planning Commission (2006a)

* Length covered under NHDP Phase VII is yet to be finalized.

** To be determined based on budgetary resources and the tolling policy for two-lane highways

^ Total length of Phase I is 7,507 km. 7,300 km

^^ Total length of Phase II is 7,300 km.

Description and the status of NHDP as on (June, 2009.)

Phase I: The objective of this phase is to connect four major cities Delhi, Mumbai, Chennai, and Kolkata. This is popularly known as the Golden Quadrilateral (GQ).

Phase II: The objective is to construct North-South and East-West corridors connecting four extreme points of the country: Srinagar in the North to Kanyakumari in the South and Silchar in the East to Porbandar in the West.

Phase III: The objective is to improve the existing National Highways of 12,230 km. This phase mainly included connectivity to state capitals, major commercial hubs, and ports.

Phase IV: To widen the existing National Highways which were not a part of the earlier phases. This phase mainly included widening of single lane National Highways to two or more lanes. The length of the network in this phase is expected to be 20,000 km. Work on this phase has not started yet.

Phase V: To upgrade 5,000 km (3,125 mi)(6500km) of four lane highways to six lanes including some portions of GQ.

Phase VI: To construct 1,000 km (625 mi) of expressways to connect major hubs in the country. Work on this phase has not started yet.

Phase VII: To provide faster connectivity to the highways by improving the urban road network. Construction of flyovers and bypass roads for seamless movement on the highways are also part of this phase. Work on this phase has not started yet.

Status Of Different Phases of NHDP (as on 30.6.2009)

Phase	**Total Length in km**	**Approved Cost (Expenditure till 30.6.2009) in Rs Crore**	**Length Completed in km**	**Length under Imp.**	**Likely date of Completion**
I GQ,EW-NS corridors, Port connectivity & others	7,498	30,300 (35,224)	7,825	267	Substantially completed
II 4/6-laning North South-East West Corridor, Others	6,647	34,339 (30,756)	3,192	2,703	Dec - 2010
III 4/6-laning links from network to capital etc.	12,109	80,626 (9098)	890	2069	Dec. 2013
IV 2 - laning with paved shoulders	20,000	27,800	-	-	Dec. 2015
V 6-laning of GQ and High density corridors	6,500	41,210 (1514)	130	900	Dec - 2013
VI Expressways	1000	16,680 (NIL)	NIL	NIL	Dec - 2015
VII Ring Roads, Bypasses and flyovers and other structures	700 km of ring roads/ bypass + flyovers etc.	16,680 (NIL)	NIL	NIL	Dec-2014

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