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Opportunism and Hold-up in the Incomplete Public Private Partnership (PPP) Contracts

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Abstract

Opportunism is a concern for contracts that are incomplete in the presence of bounded rationality and uncertainty. Since Public Private Partnership (PPP) contracts are incomplete, are these contracts prone to opportunism? This paper attempts to find the answer to this question. It examines the contract design of the Indian PPP road contracts and analyzes its strengths and weaknesses to avoid the opportunism or hold-up using the probabilistic framework. This framework suggests that each type of contract should have its own self-enforcing range to make it incentive compatible. This paper compares the risk allocated in the two types of contracts (i.e. *linked* and *delinked* contracts) for delivering the project on time. Further, it empirically tests these findings using 82 PPP projects. The low probability of timely completion and longer time overruns in the *delinked* projects indicate the presence of possible opportunism. A further analysis of delinked contracts shows that the same set of companies (which have both types of contracts in their portfolio) could exploit the incorrectly specified *delinked* contract to create a hold-up like situation. In consonance with the contract theory, the analysis suggests that extra leverage should be given with more accountability and better checks.

Keywords: Opportunism, Hold-up, Contracts, Public Private Partnership, India

JEL Code: D86, L14, L33, O22

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1. Introduction

Contract theory suggests that contracts are inevitably incomplete in the presence of bounded rationality and uncertainties. A contract is incomplete if it has a state of nature or action, which a third party cannot verify *ex-post* (Aghion, Dewatripont, Legros, & Zingales, 2016). However, to consider all the uncertainties and to write it in a contract can be very costly. Because of this incompleteness, the likelihood of opportunism remains positive. As the PPP contracts are also incomplete, are the Indian PPP contracts prone to opportunism?

Williamson (1985 pg.47) defines opportunism as "…incomplete or distorted disclosure of information, especially to calculated efforts to mislead, distort, disguise, obfuscate, or otherwise confuse". It also includes ex-ante and ex-post behavior. Love (2010) considers this as a strong form of opportunism as compared to a weak form, where the agent follows its self-interest at other's cost, but not necessarily following a systematically deceitful behavior.

The other related problem which arises due to the incompleteness of the contracts is the hold-up. According to Klein (1980), the problem of hold-up arises when one party tries to extract more benefits (at the other party's cost) than the specified in the contract or in other words, expropriate quasi rents in the presence of the asset specific investments under the contractual relationship (Klein, Crawford, & Alchian, 1978). Klein (1992) describes that hold-up can be created due to change in the circumstances, which are not specified in the original contract. He further discusses about two types of hold-up – i) when, transacting party extracts more benefits by changing its behavior, in case of no formal contract; and ii) when, contracting party exploits the incorrectly or imperfectly specified terms of the contract using the court enforcement.

Klein (1996) argues that the unanticipated behavior in terms of hold-up is created due to change in circumstances, not because of the deceptive behavior and it is different from the opportunism. Even though, Klein's claimed difference of opportunism and hold-up,

both concepts explain the unexpected (or not aligned to true spirit of the contract) behavior of the contracting party, which helps them to extract excess benefits than the promised in the contract.

A body of literature discusses the possible ways to minimize the chances of such behavior. Solutions like vertical integration (or internal organization) and market exchange are widely discussed in the literature. The vertical integration (or internal organization), in simple terms, means integrating (either forward or lateral or backward) the ownership of different stages of production (Williamson, 1971, 1975, 1985). For instance, an electricity generation company integrates with its distribution company; or an automobile company integrates with its component making company[2]. By owning the firm, owner can avoid the hold-up by the other party (Aghion, Bloom, & Van Reenen, 2014). The other option of avoiding the hold-up or opportunism is to transact in the market exchange, where a number of buyers and sellers can exchange without influencing other transactions.

Integration, however, may not be feasible for all type of the transactions; and the transactions based on specialized investments cannot take place in the market place, so the long term contracting remains a feasible option. But the cost of contracting is generally higher than the integration (Klein et al., 1978). The long term contracting faces the usual issues of contracting such as the opportunism and hold-up. The issue is how to remove the opportunistic behavior in the long term contracts.

Scholars suggest various ways (including both implicit and explicit ways) to tackle these issues. Implicit ways could be like including self-enforcing promises in the contracts (Williamson, 1985) or high penalty to set-off the benefits from the contract breach or ex-ante specifying the level of performance or quality of the product. However, a detailed specification or measuring the actual level of performance could be very costly to implement.

[2] Grossman and Hart suggest that direction of integration also influence the outcome, i.e. whether firm A buys B or firm B buys A. They argue that the owner with residual rights of control will have final rights to decide, and can control the hold-up party (Grossman & Hart, 1986).

Explicit ways are like applying private sanctions on the breaching party (Klein, 1996) or the threat of termination (Klein, 1980) of the contractual relationship with the high loss of future business, which should leave the breaching party at loss in the long term. It works through the reputation effects in the relevant market, where both parties are transacting through contracts.

This paper takes a special kind of long term contracts, designed for Indian PPP projects. The focus is to discuss the issues of opportunism and hold-up in these PPP contracts; and to develop a framework of analysis extending the probabilistic framework explained in Klein's (1992) paper. Further, it uses this framework to test it empirically using the information from actual contracts adopted for the Indian highways projects.

With this backdrop, the organization of the paper is as follows. The next section describes the opportunism and hold-up in the PPP model. Section 3 explains the framework of analysis in light of the contract design and their performance. Later, it discusses the contracts adopted for the Indian PPP highway projects and their details in Section 4. Empirical exercise is discussed in the Section 5, followed by the conclusion in Section 6.

2. Opportunism and Hold-up in the PPP Model

The lifespan of a PPP contract varies between 10-30 years, so the relationship is governed by the long term contracts. The infrastructure projects are usually very complex in nature as it involves various dimensions like economic, social, ecological, and political apart from its core technical aspects. Since, these projects are mainly related to the public infrastructure, there are many obligations need to be fulfilled by the government too. Given the complexity of the contracts and uncertainties involved, it is very difficult and costly too, to specify all the scenarios in the contract, which makes it necessarily an incomplete contract.

The PPP contract is, however, different from a usual two party contract discussed widely in the literature, where both parties can create the hold-up or can behave opportunistically. In a standard two party long term contract, each party invests in the specific assets, which has more salvage value if used in the contractual transaction, than otherwise. For example, an event organizing company hires a logistic firm to erect a

temporary (but customized) stage for a social event. For the customized stage, it would require a specific design, which can be useful for this particular event only; otherwise the design will have no value. Let's assume that the stage building requires a month's time to complete. Both companies write a contract for it.

In this case, the event organizer can create hold-up knowing that the structure prepared for the event will have no value outside this transaction for the logistic company, and event organizer can ask for lower price once the stage is ready. At the same time, logistic firm can also create hold-up just before the event by asking for higher price for its services, as it knows that organizing company will have no alternative given the time constraint, as it has already invested in the preparation of the event programs (say, it has booked an orchestra to perform, and has paid them in advance). The logistic firm can also behave opportunistically by compromising on the quality or size of the materials used in the stage preparation. Hence, in a standard two party contract, hold-up and reverse hold-up is possible.

But in the PPP contracts, government gives its guarantee and being a sovereign entity, it can reasonably be assumed (with an implicit assumption of a politically stable country) that it will not behave opportunistically or will not create any hold-up. In a PPP contract, rights or entitlements given to the private party works as asset specificity, i.e. specialized investments, which will have no value outside the contract for the transacting party (here private partner). Having the rights to operate, the private party can behave opportunistically or can also create hold-up by not investing or compromising on the quality. Hence, the contracts need to be designed to discourage such behavior. The next section discusses this issue in detail and prepares an analytical framework to explain the contract self-enforcement.

3. Contract Design and Outcomes

To avoid the hold-up or opportunism, contracts need to have the implicit mechanism (in terms of incentive compatibility as a protection from the anticipated opportunism arising from either the mis-specification or the absence of specification) and the supportive

institutional set-up to counter the various external factors that can influence the contract enforcement.

Let's assume that the government wants to upgrade an existing infrastructure facility. For the reasons discussed above, the government decides to contract out this upgradation to a private firm through the PPP mode, and writes a contract. For recovering the investment by the private firm, the government gives the rights to the private firm to charge the user fee during the contract period. The government has two options to give this entitlement of charging fee. The first option allows the private player to charge the user fee only when it completes the upgradation. In the second option, the government can allow to charge the fee even during the upgradation process in order to leverage the cash flow as an incentive to the private players. In countries, where private participation in the infrastructure is at the nascent stage, governments offer such incentives. Hence, the government can offer two different types of the contracts with differences in its attributes. This section discusses that how differences in contract design influence the contract enforcement through implicit mechanism and under external factors.

3.1 Self-enforcing Range: An Implicit Mechanism

To upgrade the facility, the investment 'I' would be required. Let's assume that the revenue (in terms of net present value) from the facility (at the end of the project life) is expected to be R. For the financial viability of the project, it is assumed that R > I. If the private firm could not provide the promised facility to users, it will have to pay the penalty K. To enforce the contract, the government will have cost T. It is the transaction cost for the government. It consists of direct and hidden costs. Another assumption is that I, R, K and T will have non-negative values only. The payoffs are as following:

If the firm completes the project, its total payoff will be:

$$P_c = R - I; \qquad \ldots \textit{Eq. 1}$$

On the other extreme, if the firm breaches the contract, and makes no investment, then it's payoff will be:

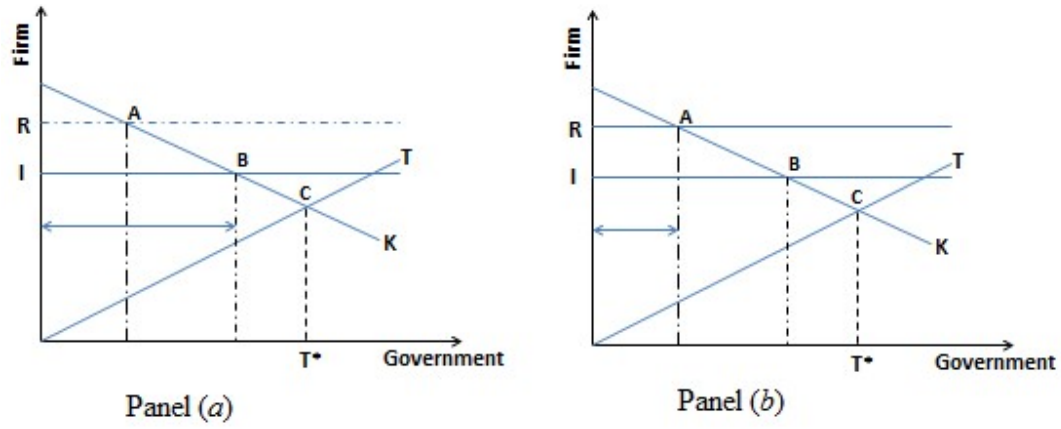
$$P_b = R - K; \qquad \ldots \textit{Eq. 2}$$

Now, an incentive compatible contract would be, when the payoff from completing the contract should be greater than the payoff arising from breaching the contractual obligations. Another condition would be that the transaction cost of enforcing the contract should be lower than the penalty charged from the breaching party (i.e. K>T), so that the enforcing partner must remain with the positive pay off. But what should be the optimal level of penalty to satisfy these two conditions, and the contract should also be incentive compatible to make it self-enforcing. To illustrate it further, it discusses various cases for possible ranges of K, and combinations of the rights of revenue collection, and see that how it impact on the two conditions discussed above.

Let's say that the government has two options to include in the contract about the timings of starting the collection of user charges. The first option is that private company can charge the user fee only after investing I, whereas, alternatively, the government can allow the company to start the fee collection, while undergoing the upgradation, i.e. without investment of I. The government also needs to fix the value of K, so as to make the contract incentive compatible.

Now, for these two alternatives, it has a range of values available for K. Both the alternatives are discussed in the same sequence. In the first part, company can start charging user fee, only after the completion of upgradation. Now, If value of K is greater than I, it will leave the company with highest negative payoff, and if K is between I and T, it will still give negative payoff to the company for breaching the contract, but will have positive payoff for the government, as K will be higher than its cost for the government, i.e. T. But, if K goes lower than a threshold (say T*), where the government's enforcement cost is higher than the penalty K, and the private player breaches the contract, then it leaves a negative payoff for both the contracting parties, i.e. the company as well as the government (see panel a, Figure 1).

Figure 1: Self-enforcing range



In case of second option, where the private party can start charging fee, before its actual investment I, the quantum of K becomes critical component for the private partner to decide, whether to renege the contract or not. In this case, the value of K lower than R will leave the positive payoff for the private party, if it breaches the contract. However, if K is further lower than I, and then it will give higher payoff to the private partner to renege the contract (see panel b of Figure 1). Table 1 (below) summarizes this in the payoff matrix for the private firm.

Table 1: Pay-off matrix for private firm

Contractual Conditions		Contract Completion	Contract Breach	Incentive Intensity	Remarks
Panel (a)	R > 0 (if contract completes), else R = 0	R – I	– K (if K > I)	Strongest	Self-enforcing range till *B*
		R – I	– K (if K < I)	Strong	
Panel (b)	R > 0 (in all states)	R – I	R – K (K > R > I)	Strong	Self-enforcing range shrinks to *A*
		R – I	R – K (R > K > I)	Weak	
		R – I	R – K (R > I > K)	Weakest	

3.2 State of Economy and Transaction Costs: External Factors

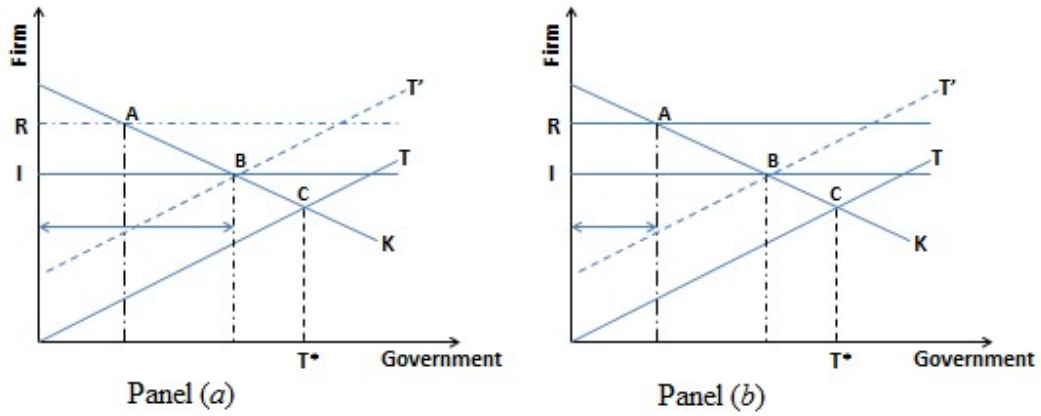
The enforcement of the contracts depends on the external factors too. The most important is the transaction cost of enforcement. It includes the direct and hidden costs. It can be considered directly related to the institutional development and ease of doing the business in the country. Here, the institutional set up can be explained by the prevailing contract law, effectiveness and efficiency of the judiciary or semi-judiciary system (i.e. the dispute resolution system) along with the overall functioning of the government machinery. In the developing economies, T tends to be higher as compared to their developed counterparts. Hence, it becomes more costly to enforce the contracts in the developing countries.

There is another dimension that can influence the magnitude of the transaction cost, i.e. the complexity of the contract. A contract becomes more complex as it has more number of contingencies, high variability in pay-offs and difficult terms to understand (Karen Eggleston, Eric A. Posner, & Richard Zeckhauser, 2000). More complex the contract, higher could be its transaction cost to enforce it[3]. If the transaction costs (T) are higher than the penalty imposed (K), then it would be negative payoff for the government to enforce the contract. Hence K should be greater than T, at least to have incentive for enforcing the contract.

However, for the contracts in the real world, it would be difficult to keep K very high, particularly when the contract designer knows that many external factors can influence the contract execution, which is beyond the capacity of the contracting parties. It is a very tricky task for the contract designer to fix the value of K, especially in the second set of contracts, where the private party has higher chances of breaching the contract.

[3] Because, a complicated term of the contract can have different interpretations by contracting parties, which can lead to conflict or dispute, in turn, higher transaction cost of enforcement.

Figure 2: Self-enforcing Range



In case of PPP, where the objective is to encourage the private participation and it has complimentary obligations from the government side too, it becomes difficult to have higher K. And in case of complex contracts, T also increases while enforcing the contracts. In such cases, the contractual incentive structure for the private firm lies between point B & C (for panel b of Figure 2), which is a trap, where private player has incentive to breach, but the public authority finds it very costly to impose the penalty due to higher T. So it would be better to avoid such contracts, rather than paying the high cost later on. Contracts shown in panel *a* of Figure 2 could be the solution in such cases, where even with lower K, the private party will have lesser incentive to breach the contract, because if he breaches the contract, his payoff will be negative, even if the enforcement cost (T) is high for the government.

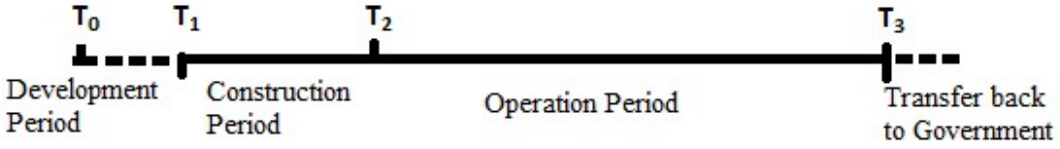
4. Analysis of Indian PPP Projects

4.1 Two Types of Contracts: Linked and Delinked

To develop the quality roads, the Government of India adopted two kinds of PPP toll contracts. The difference between both kinds of contracts is the starting point of time for toll collection, which is the main source of the revenue to recover their investment. In the construction linked contracts (here onwards linked projects), the concessionaire is entitled to collect the toll only after completion of the construction (i.e. between time period T_2 and T_3) (See Figure 3). On the other hand, in the construction delinked contracts (here onwards delinked projects), the concessionaire can start collecting the toll

charges from the beginning of the contract (i.e. from the time period T_1 till T_3). These kinds of contracts are similar to the one explained in Panel (a) and (b) of Figure 1 respectively.

Figure 3: Life cycle of PPP Project



Both types of the projects are to be awarded through competitive bidding, where bidders' have their own calculations of revenue and costs based on various uncertain parameters of the project life cycle. In case of any breach of the contractual commitments, the government agency can penalize the private player, and can ask the concessionaire to pay the damages accordingly.

4.2 Analysis of Contract Design and their Self-enforcing range

The contracts discussed in Section 3 were simple and illustrative to highlight the intricacies of the factors involved. But the PPP contracts are not simple and static. They are complicated, dynamic and contain many factors, which can influence the actual contract execution. Here, R, I, K and T are not static and they vary depending on the conditions realized.

Given the design of contract, each set of the contracts will have distinguished self-enforcing range (as explained in Figure 1). Hence, each type should have corresponding level of penalty (i.e. K) to deter the private party from breaching the contract, provided that it should at least be greater than T*.

For both sets of the Indian PPP contracts, K is defined as damages for each specified work or activity. But the ultimate penalty of breaching the contract grossly, the project can be terminated. As a result of the termination, a fraction of the total project cost (here onwards TPC), which is deposited with the NHAI as a performance security, will be forfeited. Interestingly, quantum of K is the same in both kinds of the contracts.

If both sets of contracts have same level of penalty, then the contracts (of Panel b of Figure 1), which have smaller self-enforcing range, will have higher chances for the private partner to breach the contract and earn higher pay off by breaching (if K is lower than I). TPC is the I in the contract.

As described in the Figure 1, if K (which is just five percent of the TPC) is lower than I, the benefits for the private player will still be high for the delinked contracts, as the payoff would be R-K, which is greater than R-I as I > K[4]. Moreover, the process of the termination is itself a lengthy, and in addition to that, the complexity of the contract (in terms of obligations from both parties such as land acquisition, inter-ministerial clearances and others) makes it further difficult to terminate the contract. In turn, it raises the transaction costs, as we see the differences in Figure 2, it will further reduce the scope for the government agency to enforce the contractual commitments of the private player.

If the transaction cost of implementing both sets of the contracts (especially during the construction period) is same, then the scope of enforcing the contract is limited in the delinked projects as compared to the linked projects. In such scenarios, the government has less bargaining power, and it will leave sufficient scope for the private party to behave opportunistically or create hold-up.

Another method to remove hold up is the 'private sanctions'. Here, it can be done through black listing of such companies. But, it can have two serious limitations. i) complexity of contract itself can hinder the process, as holding up party can raise the dispute or litigate the matter; and ii) it has practical implementation perspective, for these big ticket projects, developing countries like India have only very few companies of that capacity, and if the government blacklist them, which may not be a politically viable option.

5. Empirical Exercise

This section examines empirically the above analyzed framework using the information from the actual contracts and their execution aspects. The major objective of adopting

[4] A point to note is that R is dynamic here, and will be accumulated till contract gets terminated.

these contracts is to bring capital and efficiency in the public delivery of services. The efficiency for the highway projects is its quality and timely delivery in a cost effective manner. In this exercise, the focus is on the timeliness of the delivery, and not on the quality and cost aspects. It is not that cost and quality aspects are not important. But as both the contracts differ on the timing of the rights of the toll collection, that is reason, this exercise focuses on the time aspect.

5.1 Data

Under the toll category, it has two types of contracts, i.e. linked and delinked contracts. In 2008, the NHAI implemented the delinked contracts, whereas the linked projects were in the practice since late 1990s. However, the contracts for the linked projects were also standardized in 2007. So to make this empirical exercise more meaningful, a set of projects, which are signed post-2007, are selected. Usually the construction period (i.e. between T_1 to T_2 of Figure 1) for these projects span between two to three years, hence, some projects, which are awarded recently, will still be under construction stage, so cannot be considered for this analysis. The Table 2 below gives the picture about number of projects considered under each category.

Table 2: Projects Studied

	Linked	Delinked
No. of Projects since 2008	81	23
To be completed by 2015	61	21

Source: NHAI

The rationale for adopting the delinked contracts was the relatively higher financial requirements for some projects as compared to other toll road projects. To provide some financial leverage to the private companies, the NHAI allowed them to charge the toll from the inception of the contract period.

The descriptive statistics (see Table 3) explains the size and the other characteristics of both types of the projects. As explained above, the delinked projects are bigger than the linked projects in terms of the project cost, length of the road stretch. The average project cost of the delinked projects is INR 12.46 billion, whereas the linked project's mean cost

is roughly INR 8.05 billion. The average length of the road is also higher for the delinked projects (around 126.4 Kms per project as compared to 93.3 kms average length for the linked projects). However, the average construction and contract period (i.e. from T_1 to T_2 and T_1 to T_3 respectively) is roughly same.

Table 3: Descriptive Statistics

	Linked	Delinked
No. of Projects	61	21
Mean Project Cost (in Rs. Crores)	805.7	1245.6
Mean Contract Period (in Years)	23.6	22.3
Mean Construction Period (in Years)	2.4	2.5
Mean Length (in Kms)	93.3	126.4

Source: Compiled using Project level information from NHAI

5.2 Methodology

In the PPP contracts discussed above, the private party may create the hold-up either by not building the road or take longer time than the expected. The analysis above using the probabilistic framework to avoid the hold-up in the PPP contracts shows that if the self-enforcing range is lower, then, it is likely to have the higher probability for the hold-up. So the working hypothesis for this exercise is: will the delinked projects have the lower probability of completing the road? Or will delinked projects have more time overruns?

This hypothesis is tested by using the two step analysis. The first step calculates the probability score for each type of the contract for their completion rate, followed by calculating and comparing their actual time overruns (both absolute and proportion of the stipulated construction period).

Though both types of the projects are different in their features in terms of the size and length, therefore many smaller companies cannot bid for the bigger projects under the delinked projects. Hence, to make the comparison more sensible, the second step selects the companies, which have both types of the contracts and prepare their profiles to examine their performance under both kinds of the contracts.

5.3 Results

The results are explained in two sections. The first section discusses the probability of completion under each type of contract, followed by the details of common set of companies, which have both types of the projects under their portfolio. It also explicates the performance of these companies for each category of the contract.

5.3.1 Probability of Completion

In the construction stage, there are issues like various inter-departmental clearances and cooperation required from other governmental departments and organizations, many other preparatory tasks (such as land acquisition) to be fulfilled by both the private company and the government agency (i.e. NHAI) and sometimes tight construction schedule. These external factors can lead to time overrun irrespective of type of the contract. Hence, it should not be surprising to expect some time overrun beforehand. However, the interesting point would be to find the differences in the probability and quantum of time overrun in both types of the contracts.

The results show that the probability of the project completion (i.e. construction stage) rate for the linked projects is higher (56 per cent) as compared to the delinked projects (24 per cent) (see Table 4). As the objective of the PPP projects is to complete the construction within the stipulated time, the linked projects do better than the delinked projects on that front. Within the completed projects, 38 per cent (i.e. 13 projects) linked projects completed within time limits, whereas none of the delinked project completed on time. Interestingly, 27 per cent (i.e. nine projects) linked projects completed even before time.

In terms of the average additional time taken for completing the construction, the magnitude is relatively lower for the linked projects (257 days per project for 34 completed projects) in comparison to 404 days per project for five completed delinked projects. A similar picture emerges for the proportion of time overrun to the construction period allotted in the contracts, which is 30 per cent for the linked projects and 46 per cent for the delinked projects.

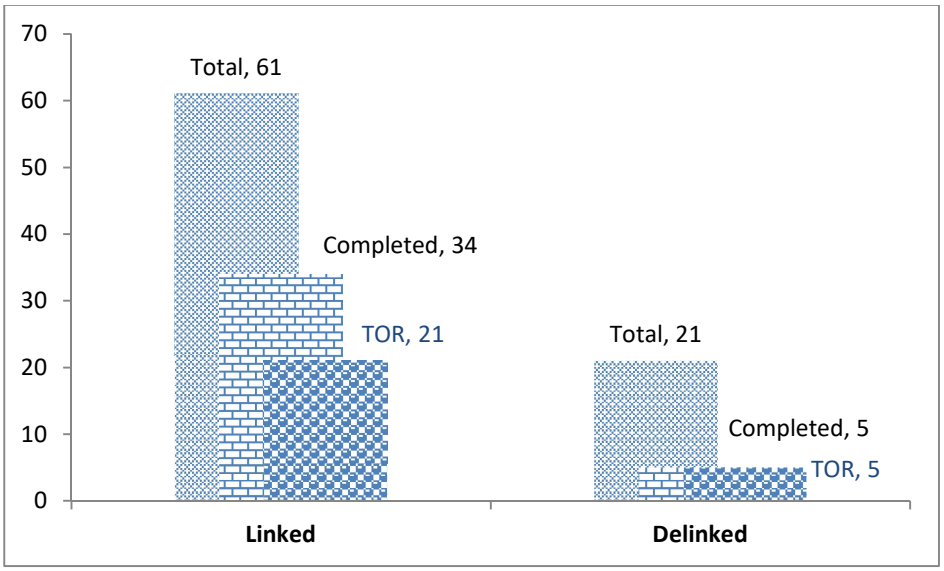
Though, the linked projects too, may not be considered best, but in comparison to the delinked projects, it shows better results (see Table 4 and Figure 4).

Table 4: Performance of Contracts

	Linked	Delinked
To be completed by 2015	61	21
Actual Completed	34	5
Completion Probability	56%	24%
Mean Time Overrun (days)	257	404
Mean Time Overrun (%age)	30%	46%

Source: Calculated using Project level information from NHAI

Figure 4: Aggregate Performance (All Projects)



5.3.2 Project performance under the same set of companies

There are total 37 companies in the current dataset, which are building the toll roads for the NHAI under the PPP model in India. As the delinked projects are bigger projects than the linked projects, so given the financial and technical requirements, only the bigger size companies can qualify the bidding requirements for these projects. So, in order to control the company effect and dissect the actual impact of differences in the contractual incentive structure, a common set of companies are selected, which have both types of

projects during the same time period. A brief description about the actual number of projects under each company is given in the Table 5 below.

Table 5: Projects under Common set of Companies

Company Name	Linked	Delinked
Ashoka	1	2
Essel	3	1
IL&FS	2	1
IRB	3	2
KMC	2	1
L&T	3	3
Navayuga	2	1
Oriental	1	1
Reliance Infra	2	3
Soma & Isolux	3	2
SREI	1	1
Total	23	18

Source: NHAI

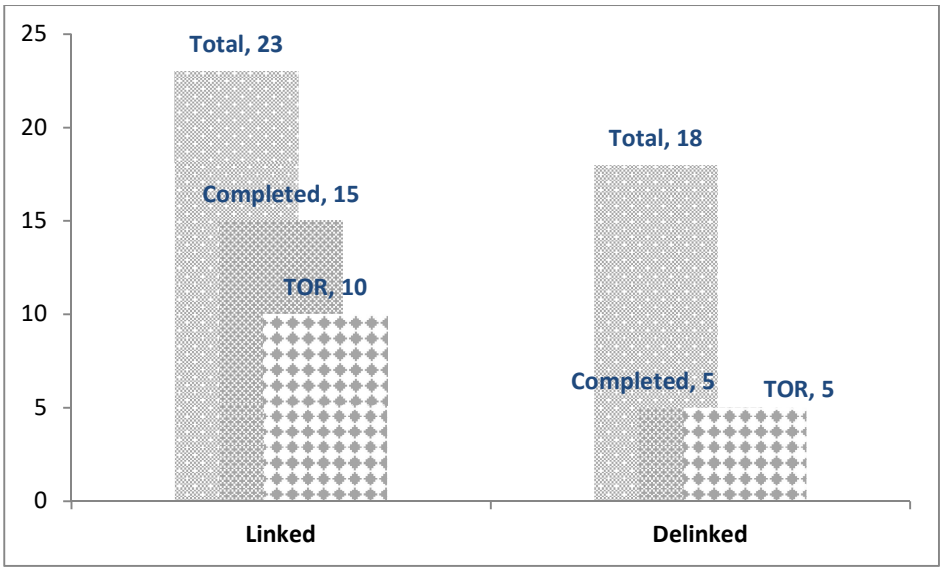
The average capital worth of the overlapping set of companies is quite large, and can be considered (technically and financially) more capable. But in terms of the performance, even the bigger companies do not necessarily enhance the efficiency. Comparison of the project performance for both types of the contracts under this set of companies shows a similar kind of picture as explained above (see Table 6 and Figure 5). Just to highlight, out of these eleven companies, four companies were able to finish their linked projects on time (it includes L&T and IRB), rather two projects were completed before time (by IL&FS and Navayuga). While, only 28 per cent of the delinked projects got completed. But none of the companies has completed their delinked project on time. It clearly underlines the impact of differences in the implicit mechanism of contract design. Company-wise details are given in the Appendix 1 in the company profiles.

Table 6: Projects under Common Set of Companies

	Linked	Delinked
To be completed by 2015	23	18
Actual Completed	15	5
Completion Probability	65%	28%
Mean Time Overrun (days)	301	404
Mean Time Overrun (%age)	33%	46%

Source: Calculated using Project level information from NHAI

Figure 5: Aggregate Performance under Common Companies



5.4 More insights from the Incomplete Projects

5.4.1 The Delinked Projects

As the results show, the delinked projects have performed poorly. Out of 21 projects, only five projects could be completed, that is with the high level of time overruns (with the delay of average 404 days per project). What is the status of rest 16 projects? A further examination of these 16 projects reveals more insights from the contract execution.

Most of the projects are delayed by more than a year, whereas some are delayed even more than three to four years. (Details of all 16 projects are given in Table 7 below).

There are three to four projects, which highlight that how the complexity of the contract can be used to extract undue benefits. To illustrate it further, two prominent cases are being discussed, which clearly indicates that given the low level of penalty (i.e. K) and increased transaction cost due to litigation and complexity of the project, private player end up with positive payoff even after breaching the contract.

The first case is the *Panipat-Jalandhar* project. This project was awarded in 2008, and it started its construction in 2009, with expected completion in 2011. The contract period is for 15 years (i.e. till 2024). The awarded project cost was INR 27.5 billion, which shot up to INR 45.2 billion, even before the construction started. The construction work was slow since beginning and it led to public outcry and litigation in 2012, which further hampered the work. Though, court (here Punjab and Haryana High Court) ordered to complete the work within a timeline or face the penalty of INR 0.6 billion (which was lower than two per cent of the project cost). But, it didn't help much to improve the situation. Hence in 2013, the High court, finally, ordered the NHAI to terminate the project and take over it. The private party challenged it in the higher court (i.e. the Supreme Court of India), and interestingly, it diverted the attention of the court to a different issue of location of the toll plaza, which further delayed the discussion on the issue of work progress. Later, the matter was taken to arbitration in 2015. Now, the construction work is at stand still even after crossing half of its contract life. But the revenue stream is still continued for the private party.

Chennai-Tada project too had a similar story. The project time lines were almost similar to the previous project. Due to very poor performance, the NHAI issued the termination notice, which was challenged in the court, and court finally ordered in 2016 to terminate the project after seven years of the contract execution, which was almost half of the contract period. In the last seven years, company could complete only half of the construction, but earned its complete share of the revenue. Even during the litigation period, the concessionaire kept on earning its revenue, for which the NHAI raised its concern, and the matter is still under consideration.

Projects like *Gurgaon-Kotputli-Jaipur* and *Varanasi-Aurangabad* also have similar kind of stories, with some or the other reasons. The incidences of breach are observed in other

projects too, but with lower extents, which could avoid any serious action or the termination. However, the overall results are not very encouraging.

Except one or two projects, which have serious external issues like land non-availability or political opposition, otherwise most of the projects do not have major hindrances. Though, claims and counterclaims for putting the blame of delay on other party are common in their communication.

Table 7: Status of (incomplete) Delinked Projects

Project Name	Company	Contract Period	Commenced	Expected Completion	Current Status (as on)	Remarks
Indore Dewas	DLF	25	6-Apr-11	28-Feb-14	89% (Feb'15)	1+ year lag
Chandikhol-Bhubaneswar	SREI	26	14-Dec-11	11-Jun-14	75% (Sep'14)	Rev. 31/03/16, 2 years lag
Panipat - Jalandhar	SOMA	15	11-May-09	8-Nov-11	71% (Sep'14)	Under Litigation; No progress further
Chennai Tada Section	L&T	15	3-Apr-09	1-Oct-11	56% (Aug'16)	Termination order in May'16
Hosur Krishnagiri	RELIANCE	24	7-Jun-11	4-Dec-13	99% (Oct'15)	2 years lag
Krishnagiri Walajahpet	L&T	30	7-Jun-11	4-Nov-13	96% (Apr'16)	2.5 years lag
Walajapet Poonamalee	ESSEL	17	1-Jun-13	30-Nov-15	10% (Mar'14)	No recent information
Samaikhiali - Gandhidham	L&T	24	11-Sep-10	10-Mar-13	99% (Dec'15)	2.5 years lag
Nellore - Chilkaluripet	KMC	30	21-Nov-11	20-May-14	93% (Apr'16)	2+ years lag
Chilkaluripet - Vijayawada	IJM	15	1-May-09	29-Oct-11	NA (Dec'14)	Claims and counterclaims for delay
Gurgaon Kotputli Jaipur	ETA	12	3-Apr-09	1-Oct-11	88% (Aug'15)	4+ yrs lag; contract will over in 6 yrs
Dhankuni Khargpur	ASHOKA	25	1-Apr-12	28-Sep-14	87% (Jan'15)	
Etawah Chakeri	ORIENTAL	16	13-Mar-13	11-Sep-15	60% (Mar'15)	
Delhi Agra	RELIANCE	26	16-Oct-12	15-Apr-15	53% (Jun'16)	1+ year lag
Varanasi Aurangabad	SOMA	30	12-Sep-11	10-Mar-14	16% (Dec'15)	Rev. 18/04/17; 3+ yrs lag; SA signed
Pune Satara	RELIANCE	24	1-Oct-10	30-Mar-13	79% (Apr'16)	Rev.June'17; 4+ years lag

Source: Compiled from NHAI

Notes: **1. Abreviations** (NA=Not Available; Rev.= Revised Date of Expected Completion; SA = Supplimentary Agreement; yrs = Years), **2. Variable Details** (Commenced = when Construction period started (i.e. T1); Expected Completion = T2; Current Status (as on) = Project latest information on actual completion (as on updated in project documents), **3. Construction Period** was 2.5 years for all the projects.

Table 8: Status of (incomplete) Linked Projects

Project Name	Company	Contract Period	Commenced	Expected Completion	Current Status (as on)	Remarks
Kundapur Surathkal	Navyuga	25	5-Sep-10	2-Mar-13	*87% (Aug'16)*	*3+ yr lag; LA issues, Applied for PCOD*
Gwalior Shivpuri	Essel	29	16-May-13	11-Nov-15	*74% (Aug'16)*	*Rev. 31/03/17, 1.5 yrs lag; Forest LA*
Sambalpur-Baragarh-Chattisgarh	Ashoka	30	14-Nov-11	13-May-14	*85% (Mar'15)*	*Forest LA*
Ludhiyana- Talwandi	Essel	29	26-Mar-12	21-Sep-14	*72% (Feb'16)*	*1.5 yrs lag;*
Elevated Road from Chennai	SOMA	15	14-Sep-10	13-Sep-13	*15% (Mar'14)*	*Matter under Litigation*
Guj/Maha Border-Surat Hazira Port	SOMA	19	30-Mar-10	26-Sep-12	*84% (Oct'15)*	*3 yrs lag; LA process is slow*
Kudapa - Mydukur - Kurnool	KMC	30	15-Nov-10	12-May-13	*75% (Jun'15)*	*2 yrs lag; Cash Flow issues*
Vadakkancherry - Thrissuresection	KMC	20	15-Sep-12	14-Mar-15	*47% (Dec'16)*	*Rev. 31/03/17, 1.5 yrs lag*

Source: Compiled from NHAI

Notes: 1. Abreviations (LA=Land Acquisition Issue; Rev.= Revised Date of Expected Completion; PCOD= Provisional Completion Certificate; yrs = Years), 2. Variable Details (Commenced = when Construction period started (i.e. T1); Expected Completion = T2; Current Status (as on) = Project latest information on actual completion (as updated in project documents), 3. Construction Period was 2.5 years for all the projects (Except the project of Elevated Road from Chennai).

5.4.2 The Linked Projects

Out of 23 linked projects under the same set of companies, 15 projects are completed with average delay of 301 days (i.e. less than a year). Only eight projects (i.e. 35 per cent) are still incomplete. Details of all eight projects are given in Table 8 above. A further analysis of these incomplete linked projects reveals that half of these projects got delayed due to land acquisition issues and one project (*Elevated Road from Chennai*) is under litigation and the issue of lack of the state government support is cited for its incompletion. Rest three projects (*Ludhiyana-Talwandi; Kudapa-Mydukur-Kurnool* and *Vadakkancherry-Thrissuresection*) are delayed by the concessionaire. One of these project (*Kudapa-Mydukur-Kurnool*) is facing cash flow problem. So overall, only three projects out of 23 projects (i.e. 13 per cent) are not delivered because of the private player.

5.5 Discussion

The highways stretches, for which the delinked contracts are adopted, are relatively longer road stretches and high quality roads. And it requires huge investments to upgrade these highways. To reduce the financial burden on the private companies, the government adopted the delinked contract so as to leverage the potential of charging user fee from the existing road users, in view of better services in the future.

However, the extra leverage provided in the delinked contracts does not match the required safeguards. It does not have extra penalty to prevent any opportunistic behavior through compromising on its obligations or contractual commitments. Due to complexity of the contract, it becomes difficult to penalize for the exact reason of delays. As a result both contracting parties claims and counterclaims of fulfilling their commitments. The outcome is the long delays in the project completion.

However, the claims and counter-claims of non-fulfilling the obligations from both parties remain in the linked projects too. But, the relatively bigger self-enforcing range of the linked contracts keeps the incentive to finish the projects on time if nothing is externally obstructing the project. That is the precise reason that the probability of

finishing the projects for the linked contract is higher than the delinked projects, and that is even with lower time overruns.

Another serious concern is the lengthy process of termination. It is neither easy nor a straight forward process. The NHAI can terminate the contract only when there is sufficient breach of obligations from the concessionaire. Before termination, it requires to give cure period (of 90 days) to rectify the breach, and even after the termination notice issued, lenders have rights to either nominate a new concessionaire or can ask for further cure period (of roughly 90 to 180 days), which can be extended further. Apart from that concessionaire can raise issues like non-fulfillment of obligations from the NHAI in its defense or it can also challenge it in the court or arbitration, in order to buy more time. The whole process can take one to two years, and it, eventually, provides ample time space for the concessionaire to carry on taking advantage of the situation. Moreover, there is no clause (apart from the damages i.e. penalty), which can entitle the NHAI to recover the user fee paid (i.e. revenue earned by the concessionaire).

It results into higher T, and if K is lower, then it is unlikely not to have hold-up or opportunistic behavior. It may not be due to change of circumstances, but due to lapse in the contract design, which explains the second type of hold-up discussed by Klein (1992).

6. Conclusion

Uncertainties and complexities make incomplete contracts prone to opportunism and hold-up. The contract theory suggests many implicit and explicit ways to prevent such behavior. The framework developed in this paper indicates that the same level of penalty (i.e. implicit part of contract) may not be suitable to all type of contracts. Each type of contract should have its own self-enforcing range to make it incentive compatible, where contracting parties should lose if they breach or disrespect the contractual commitments.

The case of two type of contracts (for Indian highways PPP projects) discussed here highlights the same experience, where both types of contracts have the same level of penalty for the breach of contract, but the contract that has better incentives, performs better. Results from the empirical exercise confirm the findings of the analytical framework. The delinked contracts were adopted majorly for financial reasons, without

incorporating much checks and balances in the contract while giving the rights to collect the revenue from the beginning. A thorough analysis of the delinked contracts shows that how the same set of companies (which have both types of contracts in their portfolio) could exploit the incorrectly specified delinked contract to create hold-up in project execution and project completion. The analysis highlights an important lesson, as contract theory suggests, that extra leverage should be given with more accountability and better checks.

Appendix 1: Company Profiles

Company	Contract Type	TPC (INR Cr)	Length (Kms)	Contract Period (Years)	Construction Period	Year of Contract	Expected Completion	Actual Completion	Time Overrun (Days)	Time Overrun (%age)
ASHOKA	Linked	909.0	88.0	30	2.5	2010	13/05/2014	.		
ASHOKA	Delinked	480.0	79.4	30	2.5	2010	01/11/2013	21/08/2015	658	72.1
ASHOKA	Delinked	1396.2	111.4	25	2.5	2011	28/09/2014	.		
ESSEL	Linked	1055.0	125.3	29	2.5	2012	11/11/2015	.		
ESSEL	Linked	479.0	78.0	29	2.5	2011	21/09/2014	.		
ESSEL	Linked	1008.5	117.6	30	2.5	2010	24/06/2013	31/10/2013	129	14.1
ESSEL	Delinked	1288.0	93.0	17	2.5	2012	30/11/2015	.		
ILFS	Linked	1267.0	114.0	25	2.5	2010	01/06/2013	06/01/2015	584	64.0
ILFS	Linked	835.0	101.0	20	2.5	2009	27/03/2014	23/08/2013	-216	-23.7
ILFS	Delinked	471.1	119.3	24	2.5	2012	30/06/2015	26/12/2015	179	19.6
IRB	Linked	705.0	102.4	20	2.5	2009	27/06/2013	28/11/2014	519	56.9
IRB	Linked	792.1	148.8	25	2.5	2009	09/12/2012	27/09/2013	292	32.0
IRB	Linked	567.0	66.7	22	2.5	2009	01/03/2013	24/04/2013	54	5.9
IRB	Delinked	839.0	114.0	26	2.5	2010	01/12/2013	04/07/2014	215	23.6
IRB	Delinked	1693.8	239.0	12	2.5	2008	19/08/2011	06/04/2013	596	65.3
KMC	Linked	1585.0	188.8	30	2.5	2010	12/05/2013	.		
KMC	Linked	617.0	28.4	20	2.5	2009	14/03/2015	.		
KMC	Delinked	1535.0	183.6	30	2.5	2010	20/05/2014	.		
L&T	Linked	453.0	77.3	30	2.5	2010	12/06/2013	14/11/2013	155	17.0
L&T	Linked	2388.0	244.1	23	2.5	2011	15/06/2014	11/06/2015	361	39.6
L&T	Linked	940.0	60.0	20	2.5	2009	02/07/2012	18/08/2012	47	5.2
L&T	Delinked	418.8	43.4	15	2.5	2008	01/10/2011	.		
L&T	Delinked	1250.0	148.3	30	2.5	2010	04/11/2013	.	-881	
L&T	Delinked	805.4	56.2	24	2.5	2010	10/03/2013	.		
NAVYUGA	Linked	671.0	90.1	25	2.5	2010	02/03/2013	.		
NAVYUGA	Linked	549.0	82.8	18	2.5	2008	17/05/2011	04/04/2011	-43	-4.7
NAVYUGA	Delinked	680.0	22.1	20	2	2010	24/04/2013	01/05/2014	372	51.0
ORIENTAL	Linked	1170.5	117.1	27	2.5	2009	29/09/2012	11/06/2012	-110	-12.1
ORIENTAL	Delinked	1573.0	160.2	16	2.5	2012	11/09/2015	.	-912	
RELIANCE	Linked	953.9	71.4	25	2.5	2010	16/07/2013	04/11/2015	841	92.2
RELIANCE	Linked	267.8	51.9	18	2.5	2010	08/02/2013	15/07/2013	157	17.2
RELIANCE	Delinked	535.0	59.9	24	2.5	2010	04/12/2013	.	-911	
RELIANCE	Delinked	1928.2	179.5	26	2.5	2010	15/04/2015	.		
RELIANCE	Delinked	1724.6	140.4	24	2.5	2010	30/03/2013	.		
SOMA ISOLU	Linked	1345.0	18.5	15	3	2009	13/09/2013	.		
SOMA ISOLU	Linked	1509.0	131.5	19	2.5	2009	26/09/2012	.		
SOMA ISOLU	Linked	795.0	93.6	18	2.5	2009	13/05/2012	28/04/2015	1080	118.4
SOMA ISOLU	Delinked	2747.5	291.1	17.5	2.5	2008	08/11/2011	.		
SOMA ISOLU	Delinked	2848.0	192.4	30	2.5	2010	10/03/2014	.	-910	
SREI	Linked	1141.0	126.3	24	2.5	2010	22/08/2013	24/06/2015	671	73.5
SREI	Delinked	1047.0	67.0	26	2.5	2010	11/06/2014	.		

Source: NHAI;

References

Aghion, P., Bloom, N., & Van Reenen, J. (2014). Incomplete Contracts and the Internal Organization of Firms. *Journal of Law, Economics, and Organization*, *30*(suppl 1), i37–i63.

Aghion, P., Dewatripont, M., Legros, P., & Zingales, L. (2016). *The Impact of Incomplete Contracts on Economics*. (P. Aghion, M. Dewatripont, P. Legros, & L. Zingales, Eds.). New York: Oxford University Press.

Grossman, S. J., & Hart, O. D. (1986). The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy*, *94*(4), 691–719.

Karen Eggleston, Eric A. Posner, & Richard Zeckhauser. (2000). *Simplicity and Complexity in Contracts* (John M. Olin Program in Law and Economics Working Paper No. WP. 93).

Klein, B. (1980). Transaction cost determinants of" unfair" contractual arrangements. *The American Economic Review*, *70*(2), 356–362.

Klein, B. (1992). Contracts and incentives: The role of contract terms in assuring performance. In *Contract economics* (p. 149).

Klein, B. (1996). Why hold-ups occur: the self-enforcing range of contractual relationships. *Economic Inquiry*, *34*(3), 444–463.

Klein, B., Crawford, R. G., & Alchian, A. A. (1978). Vertical Integration, Appropriable Rents, and the Competitive Contracting Process. *The Journal of Law & Economics*, *21*(2), 297–326.

Love, J. H. (2010). Opportunism, Hold-Up and the (Contractual) Theory of the Firm. *Journal of Institutional and Theoretical Economics (JITE) / Zeitschrift Für Die Gesamte Staatswissenschaft*, *166*(3), 479–501.

Williamson, O. E. (1971). The Vertical Integration of Production: Market Failure Considerations. *The American Economic Review*, *61*(2), 112–123.

Williamson, O. E. (1975). *Markets and hierarchies, analysis and antitrust implications : a study in the economics of internal organization*. Free Press.

Williamson, O. E. (1985). *The economic institutions of capitalism : firms, markets, relational contracting*. Free Press.

Data Sources

http://www.nhai.org/ (NHAI's website)

http://nhai.org.in/Home.aspx (for project specific websites under NHAI)

http://morth.nic.in/ (Ministry of Road Transport & Highways)

http://www.pppinindia.com/ (Ministry of Finance's specific website for PPP projects)

https://infrastructureindia.gov.in/ (Ministry of Finance's another website to cover all infrastructure sectors)