Abstract

Title of Dissertation: SUSTAINING PRIVATIZATION

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This dissertation examines the factors associated with sustainable privatization of infrastructure projects. Privatization offers a way for governments to make infrastructure delivery more effective and efficient than exclusively public provision, but often the promise is fraught with peril. The three essays that constitute this dissertation seek to use empirical data and analysis to answer three selected questions regarding sustainable privatization:

- What causes the private sector to exit from infrastructure projects?
- Do Public-Private Partnerships (PPPs) provide value for money to governments?
- Does privatization lead to benign outcomes?

The first essay of this dissertation takes the broadest view, looking at cross-country, cross-sector regression analysis to unearth patterns in infrastructure privatization failures - with a view to understand as well the factors that lead to success. The second essay takes a further step from the broad overview of the first essay by looking in detail at

individual projects and examining what factors could lead to better value for money to governments. Finally, the third essay looks at the choice between asset sales and share issue privatization as two specific methods for privatization and their subsequent impact on the performance of the privatized company. The three essays thus represent a progression from survival to good health and finally to growth.

My major conclusions are:

- Project cancellation rates, though rising, are still low. Although ownership may change hands, for the most part, the private sector is staying in private infrastructure projects.

- Although trends in cancellation may not be an issue for private infrastructure projects as a whole, it is a concern in the water and sewerage sector. The high probability of cancellation and relatively low level of fresh investment in the sector suggests a declining role for the private sector in making available this essential service.
- There is value for money to governments from entering into Public-Private Partnerships in infrastructure.
- Divestment leads to significant improvement in profitability, efficiency, and real output of firms, besides providing some fiscal boost to the government. However, the impact on employment is negative.

SUSTAINING PRIVATIZATION

by

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Overall Theme

This dissertation examines the factors associated with sustainable privatization of infrastructure projects. Privatization offers a way for governments to make infrastructure delivery more effective and efficient than exclusively public provision, but often the promise is fraught with peril. A huge literature on privatization points to the salience of this key public policy issue as well as to the contention and controversy that often surrounds privatization projects.

Privatization of infrastructure projects has become popular in recent years. The UK has been the pioneer in private provision of infrastructure where it began in 1992 as Private Finance Initiative (PFI) and this became the preferred option for public procurement since 1994. Till end-2004, the total investment in PFI projects was £43 billion and now typically constitutes 15-20% of the UK government's capital budget each year. In Korea, Public-Private Partnership investment is 10-15% of total public investment[1]. In India, the contribution of the private sector to total infrastructure investment in the Tenth Plan period (2002-07) was 25%. This percentage is likely to go up to 36% in the Eleventh Plan period (2007-12)[2] and projected to be 50% in the Twelfth Plan period (2012-17).

The three essays that constitute this dissertation seek to use empirical data and analysis to answer three selected questions regarding sustainable privatization:

[1] Government of India, Planning Commission (Secretariat for Infrastructure). 2010. *Report of the Task Force on Ceiling for Annuity Commitments.*

[2] Haldea, Gajendra. 2010. *Presentation on Building Transmission Systems: Challenges and Opportunities* at the Conference on PPP in Transmission of Electricity. India: New Delhi

1. What causes the private sector to exit from infrastructure projects?
2. Do Public-Private Partnerships (PPPs) provide value for money to governments?
3. Does privatization lead to benign outcomes?

The unifying strand to the three research questions is provided by the political economy of privatization. Since politicians like to remain in power and enjoy the perquisites of their office, a significant goal of any government is to maintain political support. In democracies, such political support usually takes the form of votes. In this context, it is important for the researcher to incorporate political economy considerations in the empirical analysis of policy issues like privatization[3]. In addition, since privatization very often is only one component of economic reforms, the success of privatization would influence the support to and outcomes of other reform measures. Therefore, managing the political economy of privatization, which is a major determinant of its success, is essential both for its own sustenance and for continuing with broader economic reforms.

The first essay of this dissertation takes the broadest view, looking at cross-country, cross-sector regression analysis to unearth patterns in infrastructure privatization failures - with a view to understand as well the factors that lead to success. The second essay takes a further step from the broad overview of the first essay by looking in detail at individual projects and examining what factors could lead to better value for money to government. Finally, the third essay looks at the choice between asset sales and share

[3] Alesina, Alberto and Roberto Perotti. 1994. *The Political Economy of Growth: A Critical Survey of the Recent Literature*. World Bank Economic Review. Volume 8

issue privatization as two specific methods for privatization and their subsequent impact on the performance of the privatized company. The three essays thus represent a progression as well from survival to good health and finally to growth.

I begin my analysis by looking closely at the determinants of failure of private infrastructure projects - when projects that have been privatized are later cancelled. My major finding is that macro-economic shocks and water and sewerage projects are strongly associated with private infrastructure project cancellation. With macro-economic shocks, domestic currency loses value rapidly, inflation rate rises, and demand declines causing financial stress to private infrastructure projects, especially those that have used foreign financing. At the same time, governments find it difficult to raise user charges to mitigate the financial stress due to political economy reasons. The political economy considerations are more pronounced in the water and sewerage sector that I discuss next.

High project cancellation associated with water and sewerage projects

Water and sewerage projects are disproportionately prone to project cancellation. Water and sewerage are essential public services and have traditionally been provided free or at user fees much below costs by governments. Privatization is usually associated with a tendency towards an increase in user charges for the concessionaire to be able to run a sustainable operation, though a well designed concession will have staggered user fee increase for making the process politically palatable and as a means for being equitable through protecting the interests of poor families. Even if the public systems are not

working at all or providing unpredictable and low quality services, this does not impede political opposition to reforms.[4] The very presence of the private sector in provision of these "essential" services raises major concerns and it is also easy to sensationalize issues around water for activists and political agents. If the control of privatized water and sewerage services is passed on to foreigners, it is seen as sale of essential services to foreigners for profit-making and exploitation of the masses, that creates further problems to such projects. The history of private project failures in the water sector in Latin America (exemplified by Aguas Argentinas in Argentina and Cochabamba in Bolivia) emphasizes the need for political sustainability of privatization of essential services.

This also suggests a method by which private water projects can be sustained, especially when the overall outcomes are benign. Looking at the celebrated privatization of water services in Manila (Philippines), it is interesting how Manila Water and Maynilad Water, the two private concessionaires in Manila for water services, mobilized unserved communities to overcome resistance to tariff increases. In the public hearings on the tariff increases, people who represented non-governmental organizations (NGOs) and groups that were against tariff increases were often outnumbered by representatives of unserved communities that had been programmed for connection in the business plan justifying the tariff increase.

[4] One recent study found no conclusive evidence of a change in consumer prices as a result of private sector participation in the water sector, highlighting "the economic and political difficulties to align prices with costs in a large number of developing countries" (see Gassner Katharina, Alexander Popov and Nataliya Pushak 2007. *An Empirical Assessment of Private Sector Participation in Electricity and Water Distribution in Developing and Transition Countries*. Washington DC: The World Bank)

While privatization of essential services is itself politically problematic, it becomes more difficult to sustain when the private operators are remiss in their functions. This may mean that the effective water tariff may increase without any improvement in its quality, which may lead to significant political opposition resulting in the eventual cancellation of such projects. This is especially clear from the case study of privatization of Dar-es-Salaam Water in Tanzania that I have looked at in Chapter 1 of my dissertation.

Moving from analysis of failure of private infrastructure projects, Chapter 2 of my dissertation analyzes success of such projects. These projects perform functions that have traditionally been performed by the public sector. The primary reason for politicians to let go of direct control on infrastructure services is the resource crunch facing governments. Therefore, it is essential to examine whether PPP projects provide net benefits to government or they merely move liabilities to the future. Studies show that the average value for money to the government from public-private partnership (PPP) projects in UK was 17 percent as compared to 9 percent in Australia. However, no such analysis of value for money from PPP projects has been done for developing countries. I look at the PPP experience of India, which is among the first five developing countries with regard to the size of the PPP portfolio, to help make up for the dearth of such studies for developing countries as well as facilitate evaluation of PPPs on an objective basis.

Public-Private Partnerships in Infrastructure

Across the world, many governments, faced with limited funds but growing demand for infrastructure services such as airports, roads, power, and telecommunications networks, have begun to engage the private sector to invest in and build large infrastructure projects. Typically, these PPPs involve the private sector agreeing to build a project and then recouping its investment by running the infrastructure project for a fixed number of years, thus benefitting from user charges or availability based payments from the government.

PPPs seem to work against political incentives. There is a much larger scope of corruption in cost-plus contracts implemented by the public sector and therefore self-seeking politicians would not want a change to fixed-price PPP contracts in project procurement and maintenance. Since cost-plus contracts often deliver other political benefits such as new high wage jobs, giving suppliers incentives for cost minimization in PPP contracts only gets them to reduce these political benefits[5]. We also know that in politically important projects, there is under-estimation of costs so as to include the project in the budget, owing to which time and cost-overruns are a regular occurrence in conventional procurement. In PPPs, in principle, this is not the case[6], and so this is one more reason why such projects work against political incentives.

[5] Shleifer, Andrei and Robert W. Vishny. 1994. *Politicians and Firms*. The Quarterly Journal of Economics. Vol. 109, No. 4 (Nov., 1994), pp. 995-1025.

[6] With the private sector implementing projects, any given project is less likely to be selected only for political reasons as a business case would have to be built for the project to be able to attract commercial financing.

However, it also needs to be kept in mind that governments do not have the resources to implement infrastructure projects on a scale required to meet the huge unmet infrastructure needs of the population, which might lead to a political backlash. So, forward thinking politicians choose PPPs to deliver infrastructure services, as they could be good for politics as well, since they are not expected to cause an immediate drain on fiscal resources.

In support of the PPP arrangements, it has been opined that as long as it is possible to write enforceable contracts with the private sector, it should not matter whether the government is actually providing the services or contracting it out to the private sector. Similarly, if there is concern about usurious private monopoly players exploiting users, impartial regulation can help deliver the goods and services without undue duress to the consumers while at the same time providing reasonable returns to the private sector. In other words, with perfect contracting and regulation, in principle, there may not be much of a concern with private provision of infrastructure services[7].

However, short-term incentives for political gain may adversely impact PPP implementation. Politicians may be tempted to offer excessive incentives to the private sector through reckless revenue guarantees and agree for pass through in tariffs on account of foreign exchange depreciation or domestic inflation to make the PPP project virtually risk-free to the private sector. However, in many cases, governments may find such projects too expensive to service when they become operational. For example,

[7] Shleifer, Andrei. 1998. *State versus Private Ownership*. The Journal of Economic Perspectives, Vol. 12, No. 4 (Autumn, 1998), pp. 133-150

excessive incentives to the private sector was the primary reason for the cancellation of the Dabhol Power Project in India. Since there is a gestation period of a few years in most infrastructure projects, the government at the helm may change by the time the project becomes operational. Thus, there may be an incentive for incumbent governments to indulge in reckless contracting with the private sector and show huge returns on paper without bearing the responsibility of seeing these projects come to fruition. Thus, in practice, there are many instances of improper contracts, frequent renegotiations, and regulatory capture by the private sector, raising apprehensions about returns to the government from private participation in infrastructure.

In light of the above concerns, I have analyzed a sample of PPP projects in India to find whether such projects actually represent value for money to the government. My finding is that PPP projects in India provide substantial net benefits to the government in the base case scenario, which are augmented further if we factor in low risk of cost overruns and smaller time overruns vis-à-vis the public sector.

Outcomes of privatization

Reform measures like privatization of public assets have drastic distributional consequences - it undoubtedly hurts some people who have a strong interest in the status quo. Losers include some employees of the public sector companies who have got used to receiving their pay without working and some politicians and bureaucrats who have been

using these public sector companies for bestowing patronage to favored constituencies[8]. When the times are good, the power of the vested interests tends to be strong as well[9]. Crises often raise the cost of maintaining the status quo, while also imposing a sense of urgency for reforms as they serve to increase awareness about inefficiencies, including that of public sector enterprises. These factors weaken the resistance of the coalitions supporting the status quo[10]. Therefore, it is only to be expected that difficult policy measures like divestment of public assets are launched in periods of grave crisis, as in India in 1991 when inflation was above 15 percent per annum and the foreign exchange reserves were dangerously low.

Divestment is the form of privatization where it is most clear to see that the losers are concentrated and most able to organize a halt to reforms. The gainers from privatization are diffused across the population: general public who would see that their tax contributions are no longer being wasted on inefficient State Owned Enterprises, which is expected to have an impact on the price level in the medium term. However, "modest average real price declines thrill economists, but not voters."[11] So, for sustaining these

[8] It has been widely documented that State-owned enterprises are an important source of political rent for elected politicians, who can interfere in the operating activity of the company in order to cater to specific interest groups (for example, see Bortolotti, Bernardo and Paolo Pinotti. 2003. *The Political Economy of Privatization*).

[9] As Rodrik (1994) observes, resistance to reform can generally be expected to increase with the "political cost-benefit ratio" – the relationship between a reform's redistributive impact and the efficiency gains it yields. Thus, the greater the degree of redistribution implied by a reform, the harder it will be to realize, other things being equal.

[10] Organization for Economic Cooperation and Development. 2010. *Making Reform Happen: Lessons from OECD countries*

[11] Nellis John. 2006. Back to the Future for African Infrastructure? Why State-Ownership is no more promising the Second Time Around. *Working Paper No 84*. Washington DC: Center for Global Development.

reforms, their benefits have to be broadly shared, making them inclusive. Governments try to do this by making the important constituencies of employees and retail investors 'stakeholders' in reforms even if that means losing some revenue[12].

Employees are an especially important constituency to cultivate given that privatization, whether partial or full, is often associated with job losses. Since politicians have considered the public sector enterprises as instrumentalities for bestowing patronage on favored constituencies, the public sector companies are generally overmanned[13]. So, privatization is associated with job losses either before the act of privatization when the government tries to rid the company of surplus labor to realize a higher price, or after privatization when the new management tries employment attrition and retrenchment to improve productivity and profitability. In order to manage the opposition to privatization from trade unions and employees, often a certain percentage of the shares of companies undergoing privatization are reserved for the employees who are sold these shares at a discount to the prevailing price thus providing them an opportunity to make a capital gain immediately after allotment.

Related to the employment issue is the choice between alternative methods of privatization: asset sales and share issue privatization[14]. Worldwide experience shows

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[12] Graham, Carol. 1998. *Private Markets for Public Goods: Raising the Stakes in Economic Reform*. Washington DC: The Brookings Institution

[13] Most public enterprises are encouraged by politicians seeking votes to employ too many people (see, for example, Shleifer, Andrei and Robert W. Vishny. 1994. *Politicians and Firms*. The Quarterly Journal of Economics. Vol. 109, No. 4 (Nov., 1994), pp. 995-1025).

[14] Asset sale refer to the sale of a SOE to an existing private company or a small group of investors while

that for smaller loss-making companies, asset sales represent a more popular method of privatization[15]. However, asset sales are, by definition, privatization with a change in management control, and so the new privatized management has more incentives and authority to right-size the company. This may be the factor responsible for unanimous job losses in assets sales especially in the short-run as in the Indian case study (see Chapter 3). In an environment where formal jobs, both public and private, are extremely scarce as in India, where less than 3 percent of the population have formal employment, the impending job losses associated with asset sales may be an important factor making this variant of privatization excessively politically sensitive and, therefore, not favored by the government.

The extensive use of share issue privatization in India is also related to potential political benefits such as the opportunity to develop support for privatization by preferentially allocating shares to domestic voters[16] at discounted prices. Successful applicants would then have a financial interest in re-electing a market-oriented government[17]. This is consistent with the finding in a large number of studies that privatizing governments frequently are willing to sacrifice revenue in order to achieve broader political and

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share issue privatization refers to sale of an SOE to retail and institutional investors. This is akin to sale in private and public capital markets respectively. While there is change in management control of the SOE in the case of asset sale, the control remains with the government in the case of share issue privatization.

[15] Megginson, William L, Robert C. Nash, Jeffry M. Netter, and Annette B Poulsen. 2004. *The Choice of Private versus Public Capital Markets: Evidence from Privatizations.* The Journal of Finance, Vol. LIX, no. 6, December 2004.

[16] Jones, Steven L, William L. Megginson, Robert C. Nash, Jeffry M. Netter. 1999. *Share issue privatizations as financial means to political and economic ends.* Journal of Financial Economics 53 (1999) 217-253

[17] Bortolotti, Bernardo and Paolo Pinotti. 2003. *The Political Economy of Privatization*

economic objectives. Through these measures, in effect, employees and retail investors become new 'stakeholders' in reforms helping to make privatization irreversible.

As Carol Graham says "… to sustain reforms, governments usually must build political coalitions to support the measures…public enterprise workers in Bolivia, for instance – in which potential opponents of reform were transformed into supporters via stakeholders strategies… One interpretation of East Asia's economic success over several decades is that institutions that spread the benefits of growth policies widely made the reversibility of policies costly…"[18]

'Stakeholder' strategies may not always be efficient from a pure economics perspective, but they may be necessary to make privatization politically feasible. Societies might reasonably choose an initially less efficiency-oriented approach, in order to diminish long-run risks to efficiency and growth that initial resulting inequities would cause (through job losses, for example). It must also be remembered that there is relatively robust evidence on the inverse relationship between initial income inequality and subsequent economic growth[19]. Widespread ownership of shares (as is the case in share issue privatization) is much more equitable than asset sales. So, share issue privatization may produce better results in terms of growth rate over the longer term. Minimizing the

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[18] Graham, Carol. 1998. *Private Markets for Public Goods: Raising the Stakes in Economic Reform*. Washington DC: The Brookings Institution

[19] For example, see Alesina, Alberto and Roberto Perotti. 1994. *The Political Economy of Growth: A Critical Survey of the Recent Literature*. World Bank Economic Review. Volume 8

sometimes real unfairness produced by privatization[20], and—just as important—countering the misperception that privatization is always and inevitably unfair, is worthwhile, so as to preserve the political possibility of deepening and extending reforms. In the end, a democratic government cannot implement reforms when masses of people are in the streets attacking that reform[21].

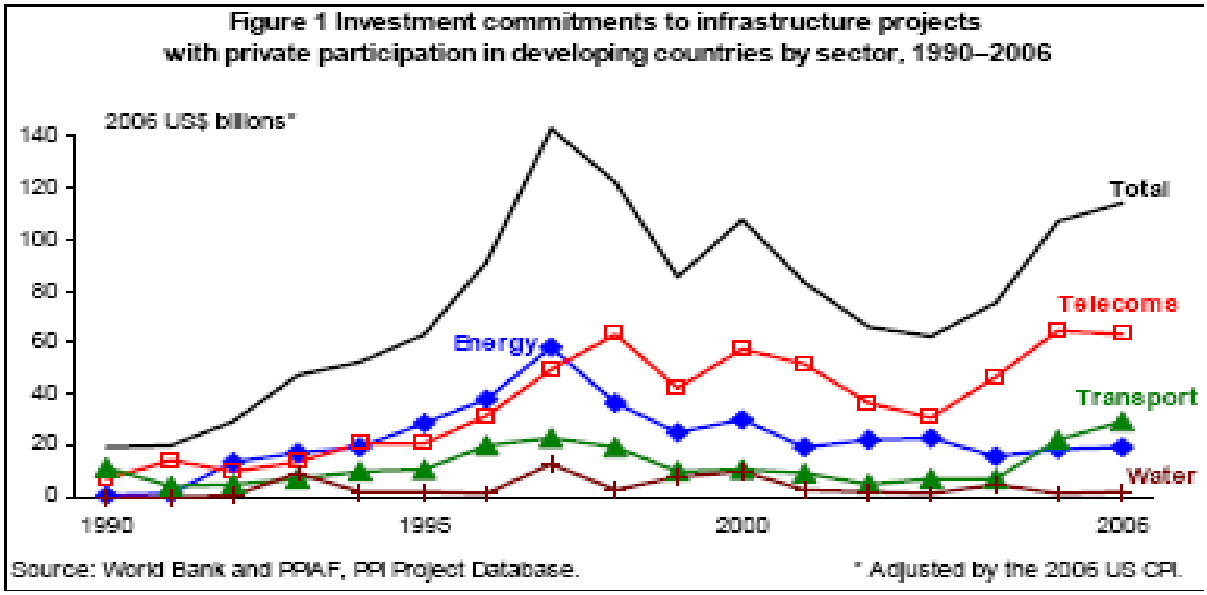
[20] For example, see Birdsall Nancy and John Nellis. 2003. *Winners and Losers: Assessing the Distributional Impact of Privatization*. World Development. Vol. 31 (1), 1617-1633. They opine that "At the heart of popular criticism is a perception that privatization is fundamentally unfair in both concept and implementation: it is seen as harming the poor, the disenfranchised, the workers, and even the middle class; throwing people out of good jobs and into poor ones or unemployment; raising prices for essential services; giving away national treasures – and all this to the benefit of the local elite, agile or corrupt politicians, and foreign corporations and investors. The complaint is that, even if privatization contributes to improved efficiency and financial performance (some question this as well), it has a negative effect on the distribution of wealth, income and political power."

[21] Birdsall Nancy and John Nellis. 2003. *Winners and Losers: Assessing the Distributional Impact of Privatization*. World Development. Vol. 31 (1), 1617-1633.

Chapter 1: What drives private sector exit from infrastructure? An analysis of the cancellation of private infrastructure projects[22]

1: Introduction: The boom, bust and slow recovery of private participation in infrastructure

Fiscal crunch is a persistent reality with governments around the world. As the fiscal deficit becomes large, governments look for ways to divest responsibilities that do not belong to the core function of governance. It is in this context that privatization of non-core activities including provision of infrastructure has received a fillip across the world. Figure 1 shows the remarkable growth in private participation in infrastructure (traditionally a public sector stronghold) in developing countries where it added up to about $1.1 trillion over the period 1990-2006.



As the figure above shows, the trend in privatization is not uniform across years. While private investment in infrastructure projects was close to $20 billion in 1990, it quickly

[22] A summary of this chapter was published by the World Bank (http://www.ppiaf.org/ppiaf/sites/ppiaf.org/files/publication/Gridlines-46-Private%20Sector%20Exit%20-%20CHarris%20KPratap.pdf)

increased during the first part of that decade to peak at $140 billion in 1997. This rapid rise was driven by investment in power projects in East Asia and privatization of telecommunications and electricity utilities in Latin America. The decline in investment began with the East Asian Financial Crisis, which impacted many of the independent power projects that had commenced. Further crises in Russia and Latin America led to a decline almost as swift as the earlier increase. After a period with no real discernible trends, investment levels have increased again over the last 3 years of the period considered (1990-2006). If we look at the composition of the increase, however, we see that the entire increase has come from transport and telecommunication sectors. The level of investment commitments in these two sectors increased from $34.3 billion to $92.8 billion in the period 2003-06, accounting for almost the entire increase across all infrastructure sectors during this period. Energy and water sectors, in particular, have seen little consistent rebound since the beginning of the millennium.

The downswing in investment that occurred in the late 1990s was also accompanied by a number of high profile cancellations of private infrastructure projects. Klein and Roger (1994), observing the surge in private infrastructure in the early 1990s, noted that there had been substantial private investments in infrastructure in the 19th and early 20th century but that, outside of the USA, most of this had ultimately been nationalized. In particular, they highlighted the fact that much of infrastructure was still a "natural monopoly" and that a sustainable regulatory approach that allowed investors satisfactory returns whilst being perceived to charge fair prices to consumers would be challenging. This might over time lead to the exit of the private sector, as a cycle of political pressure

on prices leads to less investment, lower quality of services, further downward pressure on prices and so on until the government steps in to take over the assets and service responsibility. Some of these apprehensions proved credible as private investment in infrastructure showed a downward trend from 1997 to 2003. Subsequently, it stabilized and began to increase, but has not done so in energy and water sectors, where the political economy problems associated with pricing are often the greatest.

Trends in investments are only one side of the story. It is also important to look at whether the private sector is staying on in the projects that it commences: increased levels of exit could indicate concerns about the policy framework, institutional quality, contractual arrangements and risk-sharing, and the impact these factors have on project viability. These project cancellations produce an excessively negative sentiment for privatization, totally disproportionate to the actual number of projects cancelled, besides putting an onerous burden on already stretched public finances, a result dramatically opposite to what was originally envisaged. So, we begin our study of sustainable privatization by looking at the factors that lead to the exit of private sector from infrastructure.

In this chapter we look at trends in the cancellation of infrastructure projects with private participation, and look for factors that might explain why some projects are more likely than others to see cancellation. Section 2 presents information on trends in cancellation and variations by sector and region. Section 3 presents a review of the literature on private sector exit from infrastructure projects in developing countries. Section 4

describes the data used in the analysis, which has been sourced from various publications of the World Bank. Section 5 presents descriptive statistics for the main variables and includes preliminary analysis. Section 6 explains the model, presents the model results and examines robustness of the main explanatory variables. Section 7 investigates what happens to cancelled projects. While most of the projects devolve on the government, about 15% of them are able to find private partners again. Section 8 concludes.

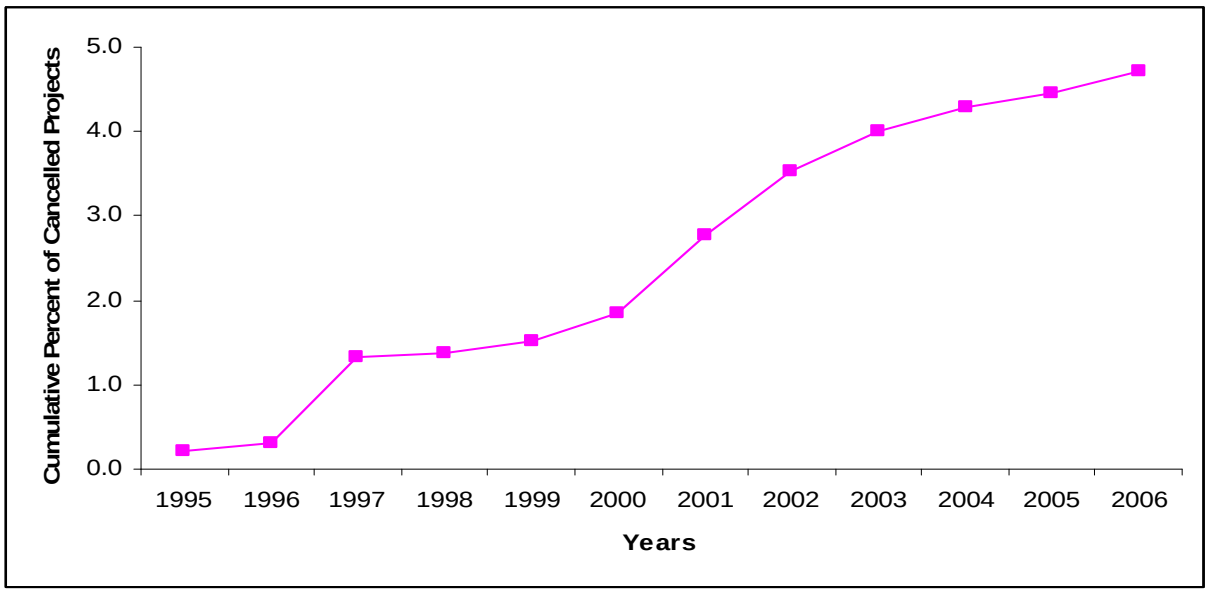
2: Trends in the Cancellation of Infrastructure Projects with Private Participation

The World Bank-PPIAF Private Participation in Infrastructure (PPI) Database shows that out of the 3,835 private infrastructure projects in developing countries that are covered in the Database, 179 projects were canceled[23] up to 2006, representing 4.7% of all projects by number, and 4.9% by investment commitments. On average, projects were cancelled 5.3 years after the date of financial closure.

The percentage of total projects that have been cancelled (by year) is shown in Figure 2. There is an upward trend in the percentage of projects that have been cancelled although there have been variations in the proportion over time. There is a spike in project cancellations in 1997 and 2001-03, both periods corresponding to macroeconomic crises in major regions of the world. It is significant to note that although the rate of cancellation is low (under 5%), it has doubled over the last 5 years of the period considered.

[23] We use the same definition of project cancellation that has been used in the World Bank-PPIAF Private Participation in Infrastructure Database. As per the Database, a project is deemed to have been canceled if one or more of the following events occur before the end of the contract period: the private company physically abandons the project (such as withdrawing all staff); the private company ceases operation or halts construction for 15% or more of the contract's expected life following the revocation of the license or repudiation of the contract by the relevant authority; the private company sells or transfers its economic interest in the project to the public sector.

Figure 2: Percentage of canceled infrastructure projects with private participation in developing countries, by year, 1990-2006



Source: World Bank, Private Participation in Infrastructure (PPI) Project database

There are important inter-sectoral variations in project cancellation as Table 1 shows. Water and sewerage sector projects are most prone to cancellation, both in terms of numbers and investment commitments. About 9% of water projects were cancelled by 2006, representing over a quarter of investment commitments in the sector. This was significantly higher than the overall rate of cancellation for private infrastructure projects in the Database. Distribution and bulk water treatment plants had similar rates of private sector exit.

Transport sector projects have a cancellation rate similar to the overall average, although the ports sub-sector has a low rate of cancellation. On the other hand, energy and telecom projects are least likely to be cancelled (in terms of number of projects and investment commitments respectively). Breaking down the energy sector into sub-sectors, we find that distribution or integrated utility power projects has a relatively high incidence of

cancellation – at over 6%, almost double the average for all energy projects. On the other hand, natural gas projects see very low rates of private sector exit.

Table 1: Canceled infrastructure projects with private participation in developing countries, by sector, 1990-2006

	Projects reaching financial closure		Projects Canceled		Canceled projects as % of total	
Sector	**Number**	**Investment commitment[a]**	**Number**	**Investment commitment[a]**	**By number**	**By investment commitment**
Energy	**1498**	**322.8**	**49**	**11.5**	**3.3****	**3.6****
Electricity generation	836	190.2	23	9.7	2.8**	5.1
Electricity distribution or integrated utilities	328	76.8	20	1.2	6.1	1.6**
Natural gas	334	55.8	6	0.6	1.8**	1.1**
Telecommunications	**797**	**537.3**	**35**	**11.2**	**4.4**	**2.1****
Transport	**994**	**180.2**	**47**	**15.3**	**4.7**	**8.5****
Airports	118	25.6	4	0.9	3.4	3.6
Ports	298	33.1	4	0.5	1.3**	1.5**
Railways	101	36.8	7	4.6	6.9	12.6*
Roads	477	84.7	32	9.3	6.7	10.9**
Water and sewerage	**546**	**53.9**	**48**	**15.3**	**8.8****	**28.4****
Treatment plant	257	11.0	23	1.1	8.9*	9.8**
Utility	289	42.9	25	14.2	8.7*	33.1**
Total	**3835**	**1094.2**	**179**	**53.4**	**4.7**	**4.9**

[a] in current US $ billion
** indicates a significant difference at the 1% level of statistical significance
* indicates a significant difference at the 5% level of statistical significance
Source: World Bank, PPI Project database

Analyzing rates of cancellation by region (Table 2), we find that Sub-Saharan Africa sees the highest rate of cancellation by number of projects, at 8.2% being significantly more than for all low- and middle-income countries. The regional picture is a little different if we look at cancellation in terms of share of investment commitments, since the average size of projects is small in Sub-Saharan Africa. The East Asia and Pacific region saw the highest percentage of investment commitments being cancelled. South Asia, and Europe

and Central Asia, on the other hand, see the lowest rates of cancellation of projects (by number of projects and investment commitments respectively).

Table 2: Canceled infrastructure projects with private participation in developing countries, by region, 1990-2006

	Projects reaching financial closure		Projects Canceled		Canceled projects as % of total	
Region	**Number**	**Investment commitment[a]**	**Number**	**Investment commitment[a]**	**By number**	**By investment commitment**
East Asia and Pacific	1,096	253.5	63	26.3	5.7	10.4**
Europe and Central Asia	745	206.9	20	4.0	2.7**	1.9**
Latin America and the Caribbean	1,212	435.5	58	16.7	4.8	3.8
Middle East and North Africa	111	52.3	6	1.0	5.4	2.0*
South Asia	331	93.5	4	3.2	1.2**	3.4
Sub-Saharan Africa	340	50.6	28	1.5	8.2*	3.0*
Total	**3,835**	**1,092.3**	**179**	**52.7**	**4.7**	**4.8**

[a] in current US $ billion
** indicates a significant difference at the 1% level of statistical significance
* indicates a significant difference at the 5% level of statistical significance
Note: Total may not correspond to Table 1 owing to multi-sectoral projects being classified in more than one sector.
Source: World Bank, PPI Project database

3: Literature Review

There has been relatively little systematic analysis of the cancellation of private infrastructure projects reflecting the still low overall cancellation rate. However, some light on relevant factors is shed by case studies of individual projects or groups of projects as well as the more general literature on foreign investment and privatization.

Vernon[24] (1971) developed the concept of the "obsolescing bargain" to explain why foreign investments are vulnerable to expropriation. He argued that foreign investment is

[24] Vernon, Raymond. 1971. *Sovereignty at Bay: The Spread of U.S. Enterprises*. New York: Basic Books.

welcomed initially for bringing in new technologies, good management and capital. Over time, as the recipient country becomes wealthier, and develops better technological and management skills, its perception of the bargain changes in nature. Outright expropriation may occur, though creeping expropriation, for example, through emphasis on local inputs, might be more likely.

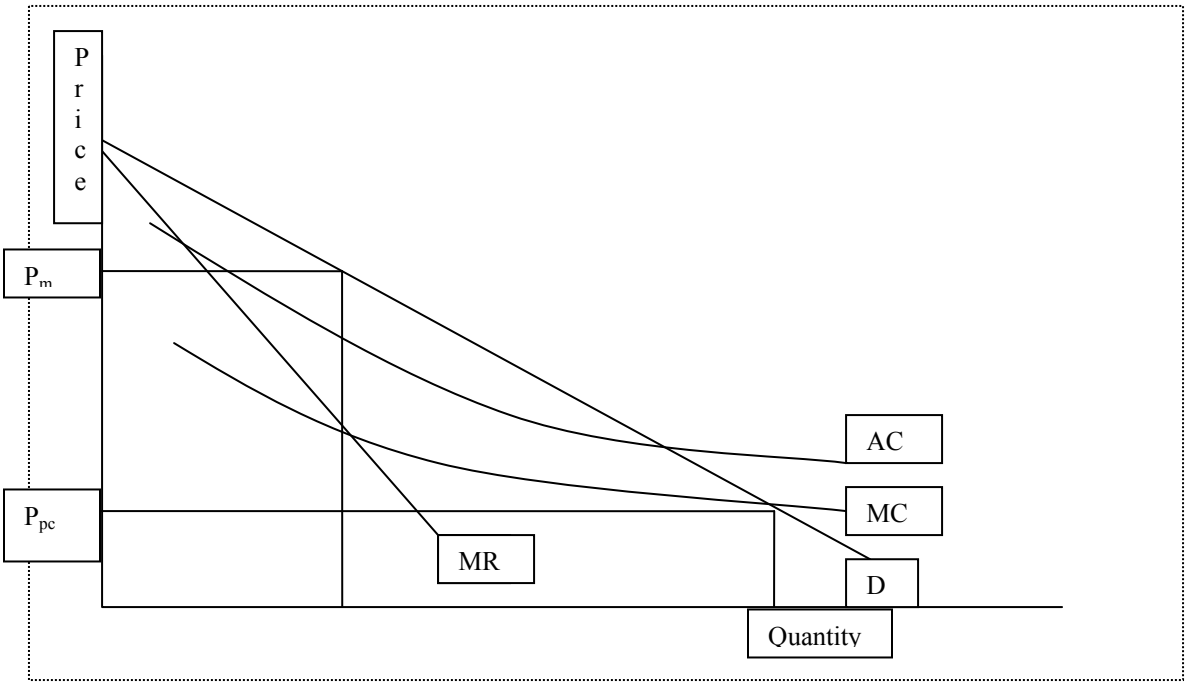
Gomez-Ibanez[25] (1999) reviewed the nationalization of electric utilities in Latin America over the period 1943-1979, covering the experience of Argentina, Brazil, Colombia, Mexico and Venezuela. Foreign private investment in their power sectors was often associated with the development of complex engineering projects (hydroelectric plants) or the large scale of infrastructure finance required. As cities were initially electrified, the investment was welcomed. However, as access to electricity became more widespread, concerns about natural monopolies, and perceptions that investors, in particular foreign investors, were making excess profits grew and began to impact the regulatory framework. He notes that the few electric utilities not nationalized by the 1980s were domestically-owned: all foreign-owned utilities had been nationalized. He also notes that where the sector was regulated at the national level – in Brazil, Colombia and Mexico – the regulatory frameworks were more robust but still not strong enough to provide continued incentives for investment. In Argentina, utilities were regulated by municipalities, and were the first to be nationalized. Finally, he notes the impact of macroeconomic factors on the financial viability of utilities, given the reluctance of regulators to allow prices to rise to reflect inflation and currency devaluation.

[25] Gomez-Ibanez, Jose A. 1999. *The Future of Private Infrastructure: Lessons from the Nationalization of Electric Utilities in Latin America, 1943–1979.* Discussion Paper, Taubman Center for State and Local Government, Kennedy School of Government, Harvard University, Cambridge, MA.

Klein and Roger (1994) note the above factors but also emphasize the role of other factors in nationalization of private infrastructure, including reactions against colonialism, and private investment associated with this in newly-independent countries, and the belief prevalent in the middle of the last century that the public sector could provide these services more efficiently. They highlight the fact that many infrastructure services would continue to be provided in monopoly settings. The regulatory systems designed to oversee these would be vulnerable to political pressure and this could lead to a vicious cycle of a decline in profitability, under-investment and deterioration in services and ultimately nationalization. They highlighted the role that competition for the market could play in reducing demands for this type of regulation, as well as the possible role of repeated competitive bidding of natural monopoly concessions.

Some of the regulatory issues in privatization of infrastructure are illustrated in the figure below.

Figure 3: A facet of regulatory issues in privatization of infrastructure



Many infrastructure firms operate in monopoly markets. Natural monopolies are characterized by a downward sloping marginal cost curve. The socially optimal price is at P_{pc}, where P=MC. While the monopolist would want to set the price at the level of P_m, where MC=MR, the regulator would want to set the price near P_{pc} or at the most where P=AC thus allowing a fair return to the monopolist provider of infrastructure services. These regulatory concerns may eventually lead to the exit of the private sector from infrastructure as has been outlined above.

Case studies of the Mexican toll road program of the 1990s, a number of Indonesian power projects, and water projects in Argentina (see Annex 1, Case Studies 1-3) show that macro-economic shocks have played an important role in project cancellation. The macro-economic crises reduced the demand for services from these projects and increased the cost of financing, as foreign currency loans were extensively used. Private infrastructure projects in Mexico were adversely affected by the 1994 Mexican peso

crisis, in Indonesia by the 1997 Asian Financial Crisis, and in Argentina by the large devaluation of the peso in 2002[26]. Macro-economic shocks were not the only issue with some of these projects. In the case of the Mexican toll roads, Ruster[27] (1997) noted that indirect guarantees by the government to the investors and lenders funding the projects might have reduced the extent of due diligence on these projects. However, it should also be noted that the majority of projects that were subjected to macro-economic shocks in the early years of their existence, survived and were not cancelled. This implies that macro-economic shocks led to private sector exit from mainly the weaker projects.

Water and sewerage projects and power distribution projects that were cancelled encountered problems as a result of opposition to needed price increases, difficulties in getting consumers to pay for services (usually in a situation where they were accustomed to getting the service free) and opposition to the principle of the private sector providing these 'essential' services. Most countries see power and, in particular, water being priced well below costs (Figure 4). Though the private sector may bring in efficiencies, in terms of reducing costs and increasing revenue collections, the initial gap between revenues and costs may be too large to bridge with politically feasible price increases. Gassner *et al*[28] (2007) in their review of the performance of public and private utilities highlight scarce

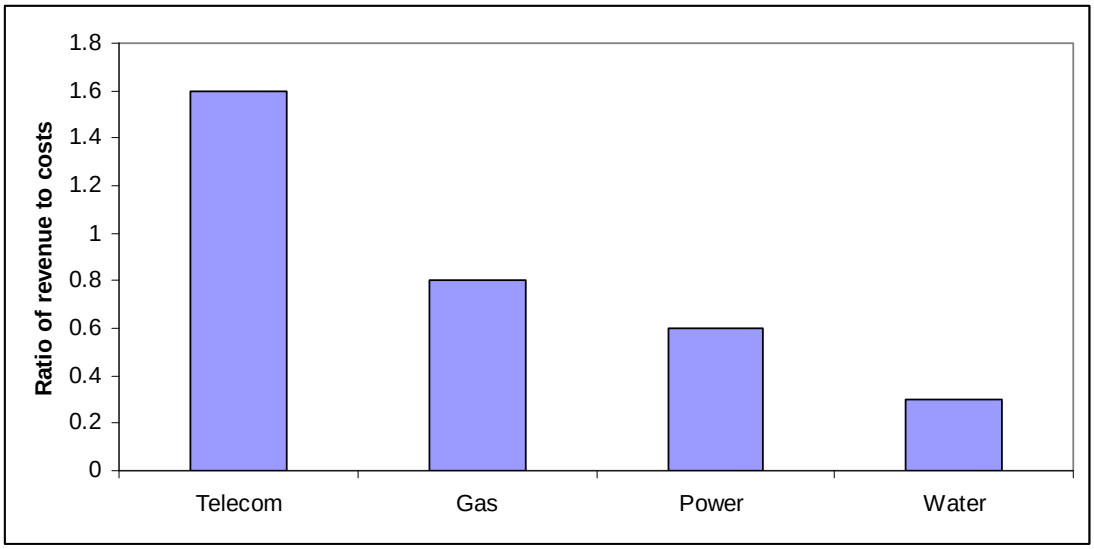
[26]World Bank. Private Participation in Infrastructure Project database (http://ppi.worldbank.org); and Gómez-Ibáñez, José A. 2007. *Private Infrastructure in Developing Countries: Lessons from Recent Experience.* Paper presented to the Commission on Growth and Development at the Workshop on Global Trends and Challenges. New Haven, Connecticut: Yale Center for the Study of Globalization

[27] Ruster Jeff. 1997. A Retrospective on the Mexican Toll Road Program (1989-94). *World Bank Viewpoint Note No.125*. Washington DC: The World Bank

[28] Gassner Katharina, Alexander Popov and Nataliya Pushak. 2007. *An Empirical Assessment of Private Sector Participation in Electricity and Water Distribution in Developing and Transition Countries*. Washington DC: The World Bank

evidence of increase in consumer prices for private water utilities, while Andres *et al*[29] (2006) find limited evidence of an increase in prices of privatized electricity distribution companies. The overall scant evidence of a price rise subsequent to private participation suggests difficulties in increasing prices in these politically sensitive sectors.

Figure 4: Cost Recovery by Public Utilities in Developing Countries: The Early 1990s



Source: World Bank. 1994. *World Development Report 1994: Infrastructure for Development*

The low level of user charges and difficulties in raising prices in the water sector explain the mismatch between internal rate of return and cost of equity in the sector (Table 3). This may, in turn, explain the increased project cancellation (Table 1) and the flat private investment commitments in the water sector in recent years (Figure 1).

Table 3: Cost of Equity and Average Profitability, by Sector, of Privatized and Concessioned Firms in Latin America and Caribbean Countries, 1990-2000 (%)

Sector	Initial cost of equity[a]	IRR (adjusted)[b]
Telecommunications	14.0	26.8
Water and sanitation	15.5	13.0
Energy	14.0	14.0

[a] Cost of equity is evaluated at the time of the transaction.
[b] Internal Rate of Return (IRR) has been adjusted to incorporate management fees.

[29] Andres Luis, Vivien Foster, and José Luis Guasch. 2006. The Impact of Privatization on the Performance of the Infrastructure Sector: The Case of Electricity Distribution in Latin American Countries. *World Bank Policy Research Working Paper 3936*. Washington DC: The World Bank.

Source: Foster and others (2003). As quoted in Guasch, J. Luis. 2004. *Granting and renegotiating infrastructure concessions: Doing it Right.* Washington DC: The World Bank.

In a number of cases, unrealistic project design and poor management of the reform process can be cited for project cancellation: for example, the Tucuman and Cochabamba water concessions required steep tariff increases to pay for large investment programs (Harris, 2003). Some projects that run into difficulty are cancelled even when feasible adjustments might be made because one or more of the parties involved are not strongly Id to the project's success. Gomez-Ibanez[30] (2007) discusses the failure of the Energie du Mali concession where, although the contract stipulated price increases, substitution of generation sources (from thermal to hydro) would have reduced generation costs and called for a price increase lower than originally required. The author attributes its cancellation to a lack of commitment by either side to the long term future of the contract.

Changes in regulatory frameworks are also important and in some cases there is direct evidence of a change in the regulatory framework leading to private sector exit. In 2002, the Chinese State Council decided that guaranteed rates of return were illegal for private utility contracts[31]. As a result, eight water and sewerage projects were sold back to the public sector. Similarly, two water and sewerage contracts in the province of Maldonado (Uruguay) reverted to the public sector (to Obras Sanitarias del Estado, OSE) after 2004 when the electorate approved a constitutional amendment that made access to water a

[30] Gómez-Ibáñez, José A. 2007. *Private Infrastructure in Developing Countries: Lessons from Recent Experience*. Paper presented to the Commission on Growth and Development at the Workshop on Global Trends and Challenges. New Haven, Connecticut: Yale Center for the Study of Globalization

[31] Browder Greg J *et al*. 2007. *Improving the Performance of China's Urban Water Utilities*. Washington DC: The World Bank

fundamental human right[32] and transferred water and sanitation services to the public sector.

Even with good regulatory and policy frameworks we might expect to see some cancellation of projects (see Annex 1, Case Study 4 for an example of cancellation in a difficult sector due to poor performance of the private partner). Commercial discipline and the "freedom to fail" are a major part of the rationale for turning to the private sector. Indeed, the telecommunications sector projects in the PPI Database that were cancelled, were for the most part, cellular services in markets with alternative suppliers, with the projects often failing for commercial reasons.

Work done on the renegotiation of projects can also shed some light on factors that might lead to private sector exit. Guasch[33] (2004) analyzed more than a thousand concessions in Latin America and Caribbean region granted over the period 1985-2000. He found high rates of renegotiation, in particular, for transport and water and sanitation projects (Table 4) and that the average duration between concession award and renegotiation was 2.2 years. Guasch also found that macro-economic shocks increased the likelihood of renegotiation; regulatory arrangements were significant, with the existence of an independent regulatory agency reducing the probability of renegotiation; certain political factors (political cycles, corruption, and opportunism) lead to increased likelihood of

[32] Santos Carlos and Alberto Villareal. 2006. *Uruguay: Direct democracy in defence of the right to water.* (http://www.tni.org/books/wateruruguayrev.pdf)

[33] Guasch, J. Luis. 2004. *Granting and renegotiating infrastructure concessions: Doing it Right*. Washington DC: The World Bank

renegotiations; and aspects of concession design, including risk allocation, and the award criteria also had an impact on renegotiations.

Table 4 shows that projects are far more likely to be renegotiated than cancelled. It could be argued that we would perhaps see higher rates of cancellation but for the willingness of public sector authorities to renegotiate contracts and adjust key project terms. Governments are often keen to avoid cancellations because of concerns about service continuity, possible payments to be made in the event of termination, as well as the negative publicity surrounding these perceived failures. A corollary to this could be that unsuccessful renegotiation may lead to project cancellation as is evident from the case studies [Aguas Argentinas case (Annex 1, Case Study 3) and Dar-es-Salaam Water and Sewerage (Annex 1, Case Study 4), specifically]. This hypothesis is supported by information in Table 4 showing much lower incidence of project cancellation as compared to project renegotiation, and the evidence that the average duration between concession award and renegotiation is 2.2 years (Guasch, 2004), while the average duration between financial closure and project cancellation is 5.3 years (authors' calculations).

Table 4: Incidence of Renegotiation and Cancellation[a], total and by sector

	Total	**Total (excluding telecom)**	**Electricity**	**Transport**	**Water and sanitation**
Percentage of Renegotiated contracts	30	41.5**	9.7**	54.7**	74.4**
Percentage of Canceled projects	4.7	4.7	3.3**	4.7	8.8**

[a] Incidence of renegotiation is only for the Latin America and Caribbean Region for the period 1985-2000 while incidence of cancellation is for all regions for the period 1990-2006.
** indicates a significant difference at the 1% level of statistical significance
Source: Guasch, J. Luis. 2004. *Granting and renegotiating infrastructure concessions: Doing it Right.* Washington DC: The World Bank; and Authors' calculations from the World Bank, PPI Project database

Infrastructure contracts are complex and therefore essentially incomplete because of bounded rationality[34]. Because of transaction specific infrastructure investments, there is high asset specificity[35], which makes the contracting parties bilaterally dependent. These factors are conducive to frequent renegotiations as documented by Guasch. As Williamson says, all complex contracts are unavoidably incomplete, on which account the parties will be confronted with the need to adapt to unanticipated disturbances that arise by reason of gaps, errors, and omissions in the original contract[36]. If human actors are not only confronted with needs to adapt to the unforeseen (by reason of bounded rationality) but are also given to strategic behavior (by reason of opportunism), then costly contractual breakdowns (demands for renegotiation, refusals of cooperation, and possibly private sector exit) may occur.

Broader reviews of privatization shed light on some of the other factors that lead to cancellation. Examining the experience of privatization in the 1980s, Kikeri *et al* (1992) found that "in low-income settings…privatization is more difficult to launch, and the chances of a negative outcome are greater."[37] This could imply a higher project cancellation rate in low-income countries. However, the 'obsolescing bargain' construct recounted earlier may imply a higher project cancellation rate for middle-income

[34] Williamson (1985) stresses bounded rationality and, especially, the inability of individuals to foresee all future contingencies and how they will be met.

[35] A transaction has high levels of asset specificity if, as the trade develops, one side or the other or both becomes more tied to and in the 'power' of the other side (Kreps, David M. 1990. *A Course in Microeconomic Theory*. New Jersey: Princeton University Press)

[36] Williamson, Oliver E. 2002. *The Theory of the Firm as Governance Structure: From Choice to Contract* (http://groups.haas.berkeley.edu/bpp/oew/choicetocontract.pdf)

[37] Kikeri Sunita, John Nellis and Mary Shirley. 1992. *Privatization: The Lessons of Experience*. Washington DC: The World Bank.

countries as they graduate from low- to middle-income status.

Harris *et al*[38] (2003) have also reviewed the extent of the cancellation of private infrastructure projects. They found that over the period 1990-2001, only 48 private infrastructure projects had been cancelled, 1.9% of projects by number, and representing 3.2% of total investment commitments. About one third of the cancellations pertained to the Mexican toll road program. By number of projects, transport projects had the highest rate of cancellation. Water and sanitation had the highest volume of investment associated with cancelled projects.

Given the above literature review, this chapter fills an important gap in the literature. ***The contribution of this chapter would be to quantitatively model many of the factors that have been identified in the literature and assess their contribution to project cancellation. This would be useful as the literature is mainly anecdotal and modeling the factors would provide insight into the relative importance of these factors for project cancellation.***

4: Data description

The general literature on foreign investment and privatization and the case studies of private infrastructure projects suggest that some factors for project cancellation are related to the project characteristics, specifically to its design and contractual structure, some deriving from the sector circumstances, and others that are related to the country

[38] Harris Clive, John Hodges, Michael Schur, and Padmesh Shukla. 2003. Infrastructure Projects: A Review of Canceled Private Projects. *World Bank Viewpoint Note No.252.* Washington DC: The World Bank

economic and institutional circumstances. To empirically model the factors that lead to PPI project cancellation, we have, therefore, identified three sets of variables, the first relating to the project, the second relating to the sector, and the third relating to the country in which the project is located.

The project-specific variables include the following:

- The type of project – whether it is a divestiture, concession of an existing facility, a greenfield project or a management contract. It could be argued that the level of project risk that is borne by the government and the private sector differs by types (least for management contract and greater for others), and also the extent to which the project is creating new assets as in a greenfield project compared to others.
- The level of government granting the contract – federal, state/provincial or local. Locally granted projects may be more fragile as compared to federally granted projects.
- The presence of foreign sponsors in a project - a foreign-sponsored project may be more risky.
- The size of the project, a large project being more visible to the public eye.
- The occurrence of macroeconomic shocks in early life of projects, which can impact their financial equilibrium.

The sector-specific variables include:

- The sector and sub-sector to which the project belongs: although there is variation, in general, the telecommunications sector is highly commercialized (and competitive in most countries) – as are parts of the transport sector, whereas power and water see the most under-pricing of services relative to costs (Figure 3) – particularly water – and also see the most concerns about the presence of the private sector in provision of these "essential" services.

The country-level factors include the following:

- The region in which the country is located.
- The country per-capita income level, which might proxy ability-to-pay of consumers and therefore the ability of the sector and project to sustain adequate cash flows. It might also proxy domestic capability and the play of 'obsolescing bargain'.
- The quality of governance and political and regulatory institutions in the country.

The data for the empirical analysis of cancellation of projects has been sourced from various publications of the World Bank as described below:

- Private Participation in Infrastructure (PPI) Project Database (2008)[39]

[39] The Private Participation in Infrastructure Project Database (http://ppi.worldbank.org) is a joint product of the World Bank's Infrastructure Economics and Finance Department and the Public-Private Infrastructure Advisory Facility (PPIAF). Its purpose is to identify and disseminate information on private participation in infrastructure projects in low- and middle-income countries. To be included in the Database, a project must have reached financial closure, serve the public as opposed to being a captive facility, and be owned or managed by the private sector.

- World Development Indicators (2008)
- World Bank Country Classification data (2007)
- World Governance Indicators (2007)

The PPI database is the primary source of data for the paper. It contains information on more than 3,800 infrastructure projects in low- and middle-income countries dating from 1984 to 2006. However, PPI data for the 1984 to 1989 period is sparse as very few countries had embraced the concept, and even in those that had, there were very few PPI projects (77 PPI projects in all). Therefore, the analysis is restricted to the period 1990 to 2006 and my sample consists of 3,835 PPI projects. The PPI projects have been divided into four primary sectors in the Database: energy, telecommunications, transportation, and water and sewerage. The database contains over 30 variables per project, including country where the project is located, financial closure year, infrastructure services provided, contractual arrangements (type of private participation), technology, capacity, contract duration, private sponsors, and development bank support. Thus, the Database includes a range of relevant information that captures the key issues highlighted in the literature review.

However, the reliance on the Database for project specific information does limit our analysis. For example, while we could model whether a foreign sponsor was present in a particular project using the information in the database, it was not possible to model other ownership factors like shares held by the general public. It could be hypothesized that widespread public ownership could play a role in preventing project cancellation.

However, we could not test this hypothesis because of data limitations. Similarly, while the level-of-government-granting-contract could be a significant explanatory variable, there is such data on only 1,395 projects as compared to the total 3,835 projects in the Database. In the same way, details on the regulatory structure that the project faces (like price-cap, rate of return, or some hybrid of these basic types) could not be accessed from the Database. The literature on private infrastructure projects bears out that risk allocation to the private sector is higher under price-cap regulation vis-à-vis rate of return regulation, which should have an impact on project cancellation.

The nominal exchange rate data has been sourced from the World Development Indicators, 2008. This has been used for modeling the macro-shock variable. The occurrence of a project-specific macro-economic shock has been defined as a 20% or more depreciation in the official exchange rate of a country from the previous year, during the first five years since a project's financial closure. The logic is that a project generally becomes more financially stable with time as demand and debt service stabilize but is especially vulnerable in earlier years. Macro-shocks happening before financial closure would presumably be incorporated in investors' expectations and the terms of the contract or concession agreement.

The World Bank Country Classification data[40] has been used for classifying countries among income groups. While almost all the countries in the database are low or middle income countries, four of them (Barbados, Czech Republic, Estonia, and Trinidad and

[40]World Bank Data – Country Classification. July 2007. (http://www.worldbank.org/data/countryclass/countryclass.html)

Tobago) have been classified as high income countries by the World Bank recently. Therefore, PPI projects located in these four countries have not been analyzed.

Finally, the Worldwide Governance Indicators, 2007[41] has been used to model institutional quality. This data source covers 212 countries and territories (out of which 143 countries are included in the PPI Database and we analyze projects in 139 of them excluding the recently re-classified high income countries in the Database) and measures the following six dimensions of governance over the period 1996 and 2006: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. These indicators are based on a number of specific and disaggregated variables measuring various dimensions of governance, and are taken from 33 data sources provided by 30 different organizations. The data reflect the views on governance of individuals, NGO experts, firms, and public and private sector institutions worldwide.

The scores for institutional variables vary between -2.5 and +2.5, with higher scores corresponding to better outcomes. As explained by the authors, the six institutional variables consist of the following:

[41] Kaufmann Daniel, Aart Kraay, and Massimo Mastruzzi. 2007. Governance Matters VI: Aggregate and Individual Governance Indicators 1996–2006. *World Bank Policy Research Working Paper 4280*. Washington DC: The World Bank

- Voice and Accountability measures the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
- Political Stability and Absence of Violence measures perceptions that the government will be destabilized or overthrown by unconstitutional or violent means, including domestic violence and terrorism.
- Government Effectiveness measures the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
- Regulatory Quality measures the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
- Rule of Law measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence.
- Control of Corruption measures the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests.

Table 5 summarizes the main variables used in the models and provides our expectations, based on the literature review, of their impact on the likelihood of project cancellation.

Table 5: PPI Project Cancellation: Variable Description

Variable	Description	Expected Impact
Dependent Variable		
Project Cancellation	Binary variable that takes a value of unity in case of project cancellation, zero otherwise	
Independent Variables		
Project-specific		
PPI contract type	Dummy variables for the following four PPI contract types: management and lease contracts, concessions, greenfield projects, and divestitures.	Uncertain: Projects involving higher risk (e.g. concessions) might be more likely to be cancelled.
Level of government awarding contract	Dummy variables for federal, local and state/ provincial governments	Positive for local government
Presence of foreign sponsor	Dummy variable taking a value of unity if any of the project sponsors belongs to a country different from the host country, zero otherwise.	Positive
Natural log of Investment	Natural log of total investment commitment in a project.	Positive
Macroeconomic shock	Dummy variable taking a value of unity if the project suffers a macroeconomic shock in the first five years of its existence. Macroeconomic shock has been taken to mean a depreciation of 20% or more in the official nominal exchange rate over the previous year.	Positive
Sector-specific		
Sector	Dummy variables for the following four sectors to which a PPI project belongs: energy, telecom, transportation, and water and sewerage.	Positive for water and sewerage projects
Country-specific		
Region	Dummy variables for the following regions in which the country which hosts the project is located: East Asia and Pacific (EAP), Europe and Central Asia (ECA), Latin America and Caribbean (LAC), Middle East and North Africa (MENA), South Asia (SA), and Sub-Saharan Africa (SSA).	Positive for Sub-Saharan Africa
Country income group	Dummy variables for low income, lower middle income, and upper middle income countries.	Uncertain as it could influence both project cash flows and play of 'obsolescing bargain' producing counter-impacts
Institutional Variables	The following six dimensions of governance have been used: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. These variables serve as proxies for institutional quality.	Negative for all

5: Descriptive Statistics

Tables 6 to 8 show descriptive statistics for the key project-level variables, sector-level

variables and country-level variables respectively. Table 6 shows that some contractual types like divestitures, projects with foreign sponsors, and projects that experience macro-economic shocks in the first five years of their existence, are likely to be significant determinants of project cancellation. Similarly, Table 7 shows that the energy, and water and sewerage sectors are likely to be significant explanatory variables. Finally, Table 8 shows that some regions like Sub-Saharan Africa, upper middle income countries, and some institutional variables like rule of law, and control of corruption are significantly associated with project cancellation.

It is noteworthy that all the institutional variables have a lower mean (higher negative value) for cancelled projects (Table 8). This implies that countries with 'bad' institutions have higher rate of PPI project cancellation. This is intuitive and suggests that countries with poor rule of law, sub-par control of corruption, low 'voice and accountability', and depressed government effectiveness (to name a few institutional dimensions) have higher than average project cancellation rate.

Table 6: Descriptive Statistics for project-level variables

Variable Name	All Projects	Canceled Projects	Not Canceled Projects	T-stat for difference in means	Sample Size (All Projects)
Type of PPI (Concession)	0.224 (0.417)	0.279 (0.450)	0.221 (0.415)	1.81	3835
Type of PPI (Divestiture)	0.199 (0.399)	0.117 (0.323)	0.203 (0.402)	-2.81**	3835
Type of PPI (Greenfield)	0.519 (0.500)	0.520 (0.501)	0.519 (0.500)	0.02	3835
Type of PPI (Management & Lease Contract)	0.058 (0.233)	0.084 (0.278)	0.056 (0.231)	1.54	3835
Government granting contract (federal)	0.184 (0.388)	0.218 (0.414)	0.182 (0.386)	1.20	3835[a]
Government granting contract	0.139 (0.346)	0.173 (0.379)	0.138 (0.344)	1.34	3835[a]

(local)					
Variable Name	**All Projects**	**Canceled Projects**	**Not Canceled Projects**	**T-stat for difference in means**	**Sample Size (All Projects)**
Government granting contract (provincial)	0.040 (0.197)	0.045 (0.207)	0.040 (0.196)	0.30	3835[a]
Project with Foreign Sponsor	0.571 (0.495)	0.669 (0.472)	0.565 (0.496)	2.49*	3136
Log of Total Investment Commitments	3.162 (3.418)	3.457 (3.461)	3.148 (3.415)	1.18	3835
Project experiencing Macro-shock	0.355 (0.479)	0.503 (0.501)	0.350 (0.477)	4.18**	3835

Standard deviations are in parentheses

[a] Though the Database has information about level-of-government-awarding-contract on only 1395 out of the 3835 projects, we include 'zeroes' for missing information on all the 'levels' in order not to constrict the dataset.

** indicates a significant difference at the 1% level of statistical significance

* indicates a significant difference at the 5% level of statistical significance

Source: World Bank, PPI database; World Development Indicators, 2008

Table 7: Descriptive Statistics for sector-level variables

Variable Name	**All Projects**	**Canceled Projects**	**Not Canceled Projects**	**T-stat for difference in means**	**Sample Size (All Projects)**
Primary Sector (Energy)	0.391 (0.488)	0.274 (0.447)	0.396 (0.489)	-3.28**	3835
Primary Sector (Telecom)	0.208 (0.406)	0.196 (0.398)	0.208 (0.406)	-0.41	3835
Primary Sector (Transport)	0.259 (0.438)	0.263 (0.441)	0.259 (0.438)	0.11	3835
Primary Sector (Water & Sewerage)	0.142 (0.349)	0.268 (0.444)	0.136 (0.343)	4.95**	3835

Standard deviations are in parentheses

** indicates a significant difference at the 1% level of statistical significance

Source: World Bank, PPI database

Table 8: Descriptive Statistics for country-level variables

Variable Name	**All Projects**	**Canceled Projects**	**Not Canceled Projects**	**T-stat for difference in means**	**Sample Size (All Projects)**
Region (East Asia & Pacific)	0.286 (0.452)	0.352 (0.479)	0.282 (0.450)	2.01*	3835
Region (Europe & Central Asia)	0.194 (0.396)	0.112 (0.316)	0.198 (0.399)	-2.86**	3835
Region (Latin America & Caribbean)	0.316 (0.465)	0.324 (0.469)	0.316 (0.465)	0.24	3835
Region (Middle East & North Africa)	0.029 (0.168)	0.034 (0.180)	0.029 (0.167)	0.37	3835
Region (South Asia)	0.086 (0.281)	0.022 (0.148)	0.089 (0.285)	-3.12**	3835

Variable Name	All Projects	Canceled Projects	Not Canceled Projects	T-stat for difference in means	Sample Size (All Projects)
Region (Sub-Saharan Africa)	0.089 (0.284)	0.156 (0.364)	0.085 (0.279)	3.27**	3835
Low Income country	0.170 (0.376)	0.174 (0.380)	0.170 (0.375)	0.16	3746
Lower Middle Income country	0.402 (0.490)	0.472 (0.501)	0.399 (0.490)	1.95	3746
Upper Middle Income country	0.423 (0.494)	0.343 (0.476)	0.427 (0.495)	-2.22*	3746
Voice and Accountability (1996-2006)	-0.299 (0.788)	-0.431 (0.748)	-0.292 (0.790)	-2.31*	3832
Political Stability (1996-2006)	-0.419 (0.670)	-0.475 (0.651)	-0.416 (0.671)	-1.14	3832
Government Effectiveness (1996-2006)	-0.094 (0.498)	-0.178 (0.495)	-0.090 (0.498)	-2.30*	3832
Regulatory Quality (1996-2006)	-0.047 (0.553)	-0.123 (0.529)	-0.043 (0.554)	-1.90	3832
Rule of Law (1996-2006)	-0.334 (0.555)	-0.448 (0.475)	-0.328 (0.558)	-2.82**	3832
Control of Corruption (1996-2006)	-0.348 (0.505)	-0.441 (0.435)	-0.343 (0.508)	-2.54*	3832
Governance (1996-2006)	-0.255 (0.515)	-0.348 (0.462)	-0.251 (0.517)	-2.47*	3832
Financial Closure Year * Governance (1996-2006)	-0.214 (0.510)	-0.275 (0.455)	-0.211 (0.513)	-1.64	3832

Standard deviations are in parentheses
** indicates a significant difference at the 1% level of statistical significance
* indicates a significant difference at the 5% level of statistical significance
Source: World Bank, PPI database; World Bank Country Classification data, 2007; World Governance Indicators, 2007.

6: The Model and Results

We use the Linear Probability Model (LPM) and the Probit Model to model the variables shown in Table 5. We use Ordinary Least Squares (OLS) to estimate LPM and Maximum Likelihood Estimation (MLE) to estimate the Probit Model[42].

[42] The most important shortcoming of the Linear Probability Model is that we can get predicted probabilities of less than zero or greater than one (an impossibility) by using certain combinations of values for the independent variables. In addition, the LPM assumes constant marginal effects for the independent variables. These shortcomings are addressed by using a Probit Model which restricts the probability of cancellation between 0 and 1 and implies diminishing magnitudes of the partial effects of independent variables.

The basic model is specified below:

$$P_i = \alpha + X_{1i}\beta_1 + X_{2i}\beta_2 + X_{3i}\beta_3 + X_{4i}\beta_4 + X_{5i}\beta_5 + \beta_6 x_{6i} + \beta_7 x_{7i} + \beta_8 y_{1i} + \beta_9 y_{2i} + \varepsilon_i$$

where P_i is the i^{th} project with values 1 or 0 (1 if cancelled),

X_{1i} is the sector type vector ($x^1_{1i}, x^2_{1i}, x^3_{1i}, x^4_{1i}$) where x^1_{1i} = dummy (1 or 0) for energy, x^2_{1i}, = dummy (1 or 0) for telecom, x^3_{1i} = dummy (1 or 0) for transport, x^4_{1i} = dummy (1 or 0) for water and sewerage (telecom is the excluded sector).

X_{2i} is the contract type vector ($x^1_{2i}, x^2_{2i}, x^3_{2i}, x^4_{2i}$) where x^1_{2i} = dummy (1 or 0) for management and lease contracts, x^2_{2i}, = dummy (1 or 0) for concessions, x^3_{2i} = dummy (1 or 0) for greenfield projects, x^4_{2i} = dummy (1 or 0) for divestitures (divestiture is the excluded contract type).

X_{3i} is the region vector ($x^1_{3i}, x^2_{3i}, x^3_{3i}, x^4_{3i}, x^5_{3i}, x^6_{3i}$) where x^1_{3i} = dummy (1 or 0) for East Asia and Pacific, x^2_{3i} = dummy (1 or 0) for Europe and Central Asia, x^3_{3i} = dummy (1 or 0) for Latin America and Caribbean, x^4_{3i} = dummy (1 or 0) for Middle East and North Africa, x^5_{3i} = dummy (1 or 0) for South Asia, x^6_{3i} = dummy (1 or 0) for Sub-Saharan Africa (South Asia is the excluded region).

X_{4i} is the level of government granting contract vector ($x^1_{4i}, x^2_{4i}, x^3_{4i}$) where x^1_{4i} = dummy (1 or 0) for federal government granted contract, x^2_{4i} = dummy (1 or 0) for local government granted contract, x^3_{4i} = dummy (1 or 0) for state/ provincial government granted contract (state/ provincial government is the excluded level

granting contract).

X_{5i} is the country income group vector ($x^1_{5i,}$ $x^2_{5i,}$ x^3_{5i}) where x^1_{5i} = dummy (1 or 0) for low income group, $x^2_{5i,}$ = dummy (1 or 0) for lower middle income group, x^3_{5i} = dummy (1 or 0) for upper middle income group (upper middle income group is the excluded country income group).

x_{6i} is a dummy variable (1 or 0) identifying foreign sponsorship of the project.

x_{7i} is a dummy variable (1 or 0) identifying macro-economic shock experience of the project.

y_{1i} is the natural log of investment commitment for the project.

y_{2i} is control of corruption score for the country in which the project is located.

ε_i is the error term, which is assumed to be independently and identically distributed (iid).

Total investment commitment is a proxy for project size and has been used in the log form to address the issue of vast range of values for investment commitments. A number of variations of institutional variables were tried. The six proxies for institutional quality were tried individually, as a group, as well as an overall measure of institutional quality

by using the mean of the six proxies for a country. The year of financial closure was also interacted with the average institutional score of the host country for that year. The control of corruption variable had the highest t-statistics in these variations. Further, as may be expected, the six proxies for institutional quality have a high degree of correlation (see Annex 2, Appendix Table 2). The correlation between the overall measure of institutional quality and the average control of corruption in a country was found to be 0.94. Finally, Kaufmann *et al* state that 'changes in our estimates of governance in most countries are relatively small even over the nine-year period…"[43] Given the high degree of correlation between average institutional score and average control of corruption score, we control for institutional quality using the average (1996-2006) of the control of corruption score for a country. Using the average control of corruption score for a country is also justified because a prospective private partner bases his decision to invest in a project in a particular country on the basis of its past institutional performance and future prospects and not on the basis of a single year's control of corruption score for that country.

The correlation matrix for all the variables used in the models is shown in Annex 2, Appendix Table 1. Very few variables have a correlation higher than |0.5|. The variables with a correlation coefficient higher than |0.5| were checked for multicollinearity[44] by dropping the variables (one at a time) and examining the impact on the sign and statistical

[43] Kaufmann Daniel, Aart Kraay, and Massimo Mastruzzi. 2007. Governance Matters VI: Aggregate and Individual Governance Indicators 1996–2006. *World Bank Policy Research Working Paper 4280*. Washington DC: The World Bank

[44] In general, multicollinearity can lead to high standard errors for the coefficients of the correlated variables and a corresponding lack of significance in those coefficients, even though the coefficients will be unbiased. One suggested means to analyze the impact of multicollinearity is to re-estimate the regression, leaving out each of the correlated variables in turn.

significance of the variables of interest. Since there was no significant change in the sign or statistical significance of the variables of interest by following this procedure, it can be assumed that the model does not suffer from any major problem related to multicollinearity.

Table 9 presents regression results with the binary dependent variable (project cancellation=1, otherwise 0). It has 2 result columns - column (1) shows the results of the Linear Probability Model while column (2) shows the results of the Probit Model with marginal effects.

Table 9: Model results with binary dependent variable: Model (1) is a Linear Probability Model. Model (2) is a Probit with marginal effects.

	(1)	(2)[a]
Dependent Variable: Project Status = 1 if Canceled, 0 otherwise		
Primary Sector (Energy)	0.002	-0.000
	(0.17)	(0.02)
Primary Sector (Transport)	0.009	0.008
	(0.53)	(0.56)
Primary Sector (Water and Sewerage)	0.074	0.084
	(3.55)**	(3.75)**
Type of PPI (Concession)	0.009	0.007
	(0.53)	(0.43)
Type of PPI (Greenfield)	0.007	0.005
	(0.63)	(0.45)
Type of PPI (Management and Lease Contract)	0.030	0.030
	(1.17)	(1.15)
Region (East Asia & Pacific)	0.033	0.042
	(1.65)	(1.67)
Region (Europe & Central Asia)	0.006	0.014
	(0.26)	(0.51)
Region (Latin America & Caribbean)	0.023	0.033
	(1.08)	(1.31)
Region (Middle East & North Africa)	0.027	0.052
	(0.87)	(1.28)
Region (Sub-Saharan Africa)	0.055	0.088
	(2.78)**	(2.74)**
Government granting contract (federal)	-0.001	-0.005
	(0.07)	(0.47)
Government granting contract (local)	-0.032	-0.022
	(2.00)*	(2.03)*
Low Income Country	0.021	0.017
	(0.87)	(0.85)

Lower Middle Income	0.009	0.010
Country	(0.63)	(0.90)
Project with Foreign	0.023	0.019
Sponsor	(2.62)**	(2.49)*
Log of Total Investment	0.003	0.003
Commitments	(1.98)*	(1.93)
Project experiencing	0.040	0.037
Macroeconomic Shock	(3.71)**	(4.22)**
Control of Corruption	-0.012	-0.014
	(1.31)	(1.53)
Constant	-0.043	
	(1.53)	
Observations	3027	3027
R-squared/ Pseudo R2	0.03	0.07

* significant at 5%; ** significant at 1%
Robust t and z statistics in parentheses for Model (1) and (2) respectively
[a] dF/dx is for discrete change of dummy variable from 0 to 1

The most interesting, statistically significant and robust explanatory variables are water and sewerage sector, Sub-Saharan Africa (SSA) region, presence of foreign sponsor, project-specific macroeconomic shock experience, and project size (natural log of total investment commitment). Projects in water and sewerage sector are more likely to be cancelled than in any other sector, *ceteris paribus*. The results of the LPM [Model (1)] indicate that, everything else being constant, the probability of cancellation for projects in the sector is 0.07 higher (or 7 percentage points higher) than a telecom project (the excluded sector). There are likely two reasons for this. The water sector sees very low levels of cost recovery (Figure 3): projects that envisage large price increases to support new investments may in practice be hard to sustain. In addition, the very involvement of the private sector in the provision of an essential service such as water can be politically contentious (see Annex 1, Case Study 4 of Dar-es-Salaam Water and Sewerage Services as an example). Our model results suggest (not reported) that project cancellation is strongly associated with water and sewerage projects, regardless of the regression specification, suggesting robustness of this explanatory variable.

Controlling for other variables, we also see that projects in Sub-Saharan Africa are more likely to be cancelled. Model (1) shows that a project located in Sub-Saharan Africa region has a higher probability of project cancellation by 0.055 (or 5.5 percentage points), *ceteris paribus*, relative to a project in South Asia, which is the excluded region and also sees the lowest levels of cancellation. This might reflect weaknesses in institutional capacity that is not being picked up in the control of corruption variable, related to project design, or to the ability to effectively deal with problems in project construction and operation.

The presence of a foreign sponsor and occurrence of a macroeconomic shock increase the probability of project cancellation, *ceteris paribus*. Projects with foreign sponsors (99 of the 148 canceled projects have foreign sponsors; on the balance 31 canceled projects, we do not have project sponsorship information) might possibly be arousing greater political sensitivities and foreign sponsors may also feel more able to abandon a project in difficulty than local sponsors would. In fact, Wells has found that domestic firms are likely to be more accommodative in renegotiations rather than foreign multinational firms and thus projects with domestic sponsors may be less likely to be cancelled even after a macroeconomic crisis as in the case of some of the Indonesian power projects after the 1997 Asian Financial Crisis[45]. In addition, a foreign sponsored project may be more likely to use foreign financing which, since revenues from infrastructure projects are often earned in local currency, can lead to mismatches and stresses within projects.

[45] Wells, Louis T and Rafiq Ahmed. 2007. *Making Foreign Investment Safe: Property Rights and National Sovereignty.* New York: Oxford University Press

The high statistical significance of the positive coefficient on the macro-economic shock variable accords with the importance attached to this variable in the literature on project cancellation (see Annex 1, Case Study 1-3 as examples). Where foreign financing is used, required revenues for servicing foreign debt increase as the domestic currency loses value, but experience indicates it is very difficult to increase user charges for infrastructure services at the time of a macroeconomic shock. The real effect of a macro-shock also reduces demand for infrastructure services causing further financial stress to the affected project.

Larger projects also have a higher likelihood of cancellation [Model (1)], *ceteris paribus*, as they may be more visible to the public eye (see Annex 1, Case Study 5 on the Dabhol power project). In addition, they may impose a larger fiscal burden if risk allocation is not appropriate. Our results indicate that if a project is 10% larger, its probability of cancellation increases by 3 percentage points, everything else being constant.

An interesting model result is the negative and statistically significant coefficient on local government-granted projects. This implies that, everything else being constant, a local government-granted project would have a lower probability of project cancellation by 3.2 percentage points than that granted by the state/ provincial level. The probability of project cancellation seems to be much lower than even the federally granted projects. This runs counter to established thinking: for example, Gomez-Ibanez (2007) opines that "Not only do sub-national governments have fewer skills and resources to resolve disputes but they also have a narrower perspective than the national governments, and

thus may be less concerned about the chilling effect that a serious dispute may have on investments in other sectors or parts of the country."[46] Similarly, it has been stated that "local governments, with their own agendas, break agreements or insist on renegotiations with less concern than central governments over the consequences for the national investment climate[47]."

On the contrary, our results indicate lower probability of cancellation for locally granted projects possibly reflecting local buy-in and political support for such projects. However, our results are subject to the caveat that the Database has information on the level-of-government-that-grants-contracts for only 1,395 projects out of a total of 3,835 projects. Instead of restricting the number of observations to this level, we checked for the robustness of our main explanatory variables without this category (level-of-government-that-grants-contracts) and found the results to be robust.

There might also be an omitted variable in our analysis related to selection of projects granted by local government as compared to the federal government. Possible empirical solution may involve the use of an instrumental variable (IV) that explains why a project is granted at the local level or at the federal level, but isn't related to why a project might be cancelled. To describe this approach, we start with the multiple regression model:

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[46] Gómez-Ibáñez, José A. 2007. *Private Infrastructure in Developing Countries: Lessons from Recent Experience.* Paper presented to the Commission on Growth and Development at the Workshop on Global Trends and Challenges. New Haven, Connecticut: Yale Center for the Study of Globalization

[47] Wells, Louis T and Rafiq Ahmed. 2007. *Making Foreign Investment Safe: Property Rights and National Sovereignty.* New York: Oxford University Press

$$y = \beta_o + \beta_1 x_1 + \beta_2 x_2 + \ldots + u_1$$

where we think that x_1 and u_1 are correlated: $\text{Cov}(x_1, u_1) \neq 0$.

In order to obtain consistent estimators of $\beta_o, \beta_1, \beta_{2 \ldots}$ when x_1 and u_1 are correlated, we need some additional information. The information comes by way of a new variable (Instrumental Variable) that satisfies certain properties: IV should be uncorrelated with u_1 and it should be partially correlated with x_1[48].

One possible IV may be the presence of sovereign guarantees for a project (through which a federal government institution insures all parties against their risk and in turn gains some influence on the project) in that a federally-granted infrastructure project may be more likely to have sovereign guarantees compared to a locally-granted government project. While it can be argued that a project with sovereign guarantees is likely to be more robust and thus less likely to be cancelled, if the contractual structure is fundamentally flawed and there is little due diligence by the various actors, the presence of sovereign guarantees may not prevent project cancellation. This happened in the case of the only cancelled power generation project in India (the Dabhol Power Project), which had sovereign guarantees that were not able to prevent its cancellation. Broadly, it can be said that sovereign guarantees are related to the level-of-government-that-grants-contracts, but isn't related to why a project might be cancelled. After introducing the IV in the multiple regression equation, we solve and interpret it in the usual way.

[48] Wooldridge Jeffrey M. 2006. *Introductory Econometrics: A Modern Approach*. Mason Ohia: Thomson South-Western.

The control of corruption variable has a negative coefficient (though not statistically significant), indicating that countries which have low levels of corruption (higher control of corruption) have a lower likelihood of their private infrastructure projects being cancelled, *ceteris paribus*.

The probit correctly classifies over 95% of the dependent variable observations. The model is statistically significant in terms of the F-statistic (not reported). Though, the r-squared is admittedly low, the high degree of consistency between our results and those found by other researchers (subjectively) when exploring the determinants of project cancellation across regions and time as outlined in the literature review provides validation for our results.

The estimates from the LPM [Model (1) in Table 9] and the Probit [Model (2) in Table 9] tell a consistent story: the sign, size, and significance of the coefficient on independent variables of interest are a close match.

Robustness check 1: Sign, size, and significance of the main explanatory variables across sub-samples

The variables of interest vis-à-vis project cancellation that emerge from our model are: water and sewerage sector, Sub-Saharan Africa region, presence of foreign sponsor, macroeconomic shock, local government granted projects, and project size (log of investment commitment). Though institutional quality as measured by control of corruption variable has a negative coefficient, it is not statistically significant.

We find that cancellation is most strongly associated with project-specific macroeconomic shocks, and water and sewerage projects, regardless of the regression specification, i.e., regardless of what other variables are controlled for (results not reported). This corroborates the importance of these two explanatory variables as evident from the sign, size and significance of their coefficients in our basic model (Table 9, Model 1). To examine the robustness of these explanatory variables further, we compare their coefficient across sub-samples[49] separately. As Table 10 below shows, the coefficient on project-specific macroeconomic shock is positive and significant across all sub-samples[50].

Table 10: Robustness Table: Main Independent Variable – Project-specific Macroeconomic shock

	Primary sector (transport)	Sector other than transport	EAP-LAC countries	Non-EAP-Non-LAC countries	Foreign sponsored Projects	Not Foreign sponsored Projects
	Dependent Variable: Project Status = 1 if Canceled, 0 otherwise					
Macroeconomic Shock	0.082 (4.08)**	0.027 (2.27)*	0.043 (3.59)**	0.039 (2.14)*	0.047 (3.25)**	0.033 (2.55)*
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	845	2182	1895	1132	1701	1326
R-squared	0.07	0.03	0.03	0.04	0.03	0.03

Robust t statistics in parentheses
** indicates a significant difference at the 1% level of statistical significance
* indicates a significant difference at the 5% level of statistical significance
Source: Authors' calculations

As discussed earlier, macroeconomic shocks may cause unbearable financial stress on private infrastructure projects because of, *inter-alia*, high commercial and foreign exchange risk. Thus, we see that when commercial risk is transferred in its entirety to the

[49] This is a widely used method to check robustness of variables (See, for example, Megginson William L., Robert C. Nash, and Matthias van Randenborgh. 1994. *The Financial and Operating Performance of Newly Privatized Firms: An International Empirical Analysis.* Journal of Finance. Vol. 49(2), 403-452).

[50] We have derived these results from our basic model (Table 9, Model 1).

private sector (as happens generally in the transport sector as opposed to energy and water sectors where private infrastructure companies enter into long-term purchase contracts with public sector companies who have to bear the risk of collecting user charges from the ultimate consumers), the likelihood of project cancellation increases considerably (column 2 and 3 of Table 10), *ceteris paribus*.

The East Asia and Pacific (EAP) region experienced a major macroeconomic shock in 1997, while the Latin America and Caribbean (LAC) region experiences such shocks periodically [e.g., Mexico (1994) and Argentina (2002)]. Table 10 shows that the probability of project cancellation due to macroeconomic shocks is higher in these two regions as compared to other regions, *ceteris paribus*.

Reasons for the higher size and significance of the coefficient on macroeconomic shock variable for foreign sponsored projects, as already stated, may be that the presence of a foreign sponsor arouses greater political sensitivities and foreign sponsors may also feel more able to abandon a project in difficulty than local sponsors would. In addition, foreign funding of projects is more likely when a project has foreign sponsors. This would mean that such projects have higher foreign exchange risk and this is reflected in the size and significance of the coefficient on macroeconomic shock in the case of projects with foreign sponsors, where it is higher, as compared to projects which do not have foreign sponsors.

Similar analysis for water and sewerage sector variable shows that its coefficient is

positive and significant across sub-samples in most instances[51] (see Table 11).

Table 11: Robustness Table: Main Independent Variable – Water and Sewerage sector

	Foreign Sponsored Projects	Not Foreign Sponsored Projects	LAC countries	Non-LAC countries	Macro-shock	Non-macro shock
	Dependent Variable: Project Status = 1 if Canceled, 0 otherwise					
Primary sector water	0.101 (3.63)**	-0.005 (0.17)	0.171 (4.26)**	0.020 (0.88)	0.127 (2.85)**	0.045 (2.16)*
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1701	1326	1032	1995	1001	2026
R-squared	0.03	0.03	0.05	0.03	0.04	0.03

Robust t statistics in parentheses
** indicates a significant difference at the 1% level of statistical significance
* indicates a significant difference at the 5% level of statistical significance
Source: Authors' calculations

However, as in the case of project specific macro-economic shocks, it is important to discuss the difference in the size and significance of the coefficient on the water and sewerage variable across sub-samples. Thus, if it is a foreign- sponsored water and sewerage project, the probability of cancellation for the project is significantly higher than when it is not a foreign-sponsored project, *ceteris paribus*. The reason could be related to the low user-charges in the sector vis-à-vis costs (Figure 3). Efforts to increase these charges to cost-recovering levels may be viewed as a sell-out to foreigners, if it is a foreign-sponsored water and sewerage project, thus increasing the risk of project cancellation.

Latin America and Caribbean region has had the most extensive experience in privatization of infrastructure (Table 2). It has also seen a number of high profile cancellations in the water and sewerage sector [e.g., Tucuman (Argentina, 1997), Cochabamba (Bolivia, 2000), La Paz (Bolivia, 2005), and Aguas Argentinas (Argentina,

[51] We have derived these results from our basic model (Model 1 in Table 9).

2006)]. In an environment of dwindling support for privatization[52], the high profile cancellations have created an excessively negative sentiment for private participation in the sector, increasing the probability of cancellation of the water and sewerage projects in the region as compared to other regions, *ceteris paribus*.

Table 11 also shows that the probability of cancellation of projects in the sector is much higher for projects that experience a macroeconomic shock in the early years of their existence as compared to projects that do not experience such a shock, *ceteris paribus*. The statistically significant coefficient on the sector even in non-macroshock cases reflects the high and significant coefficient on the water and sewerage variable for the entire sample of PPP projects (Table 9).

Robustness check 2: Expanding the analysis to include "distressed" projects as a dependent variable

As a second way of looking at the robustness of the results, we changed the dependent variable to include cancelled and distressed projects. Distressed projects are those where either the government or the operator has requested contract termination or are in international arbitration, but have not been canceled yet. There are two caveats that need to be mentioned when we include distressed projects as a dependent variable: one, there is poor information on distressed projects as the arbitration agencies are quite secretive about such projects; two, it is likely that many distressed projects end up being cancelled,

[52] "Latinobarómetero (2005, p.76), which surveys some 19,000 Latin Americans in 18 countries every year, reports that the percentage agreeing strongly or somewhat with the statement that "the privatization of state enterprises has been beneficial for the country" fell from 46 percent in 1998, when the question was first asked, to 21 percent in 2002, at the height of the Argentine financial crisis, and had recovered to only 31 percent by 2005." (Gomez-Ibanez, 2007).

but as per the PPI Database, which has been tracking distressed projects since 2003, so far only 14% of the distressed projects have been cancelled. The regression results with both canceled and distressed projects as the dependent variable are shown in Table 12.

Table 12: Model Results with binary dependent variable (including distressed projects on the LHS). Model (1) is a Linear Probability Model. Model (2) is a Probit with marginal effects.

	(1)	(2)[a]
Dependent Variable: Project Status = 1 if Canceled or Distressed, 0 otherwise		
Primary Sector (Energy)	0.026	0.022
	(1.97)*	(1.70)
Primary Sector (Transport)	0.014	0.013
	(0.80)	(0.76)
Primary Sector (Water and Sewerage)	0.079	0.091
	(3.63)**	(3.69)**
Type of PPI (Concession)	-0.021	-0.014
	(1.00)	(0.98)
Type of PPI (Greenfield)	-0.035	-0.028
	(2.19)*	(2.39)*
Type of PPI (Management and Lease Contract)	0.001	0.004
	(0.03)	(0.19)
Region (East Asia & Pacific)	0.026	0.057
	(1.23)	(1.82)
Region (Europe & Central Asia)	-0.027	-0.000
	(1.02)	(0.01)
Region (Latin America & Caribbean)	0.047	0.077
	(2.07)*	(2.38)*
Region (Middle East & North Africa)	0.020	0.068
	(0.65)	(1.36)
Region (Sub-Saharan Africa)	0.042	0.094
	(1.96)*	(2.54)*
Government granting contract (federal)	0.004	0.000
	(0.32)	(0.03)
Government granting contract (local)	-0.032	-0.025
	(1.91)	(1.94)
Low Income Country	-0.008	-0.004
	(0.31)	(0.18)
Lower Middle Income Country	-0.017	-0.009
	(0.97)	(0.73)
Project with Foreign Sponsor	0.033	0.028
	(3.38)**	(3.31)**
Log of Total Investment Commitments	0.004	0.004
	(2.31)*	(2.15)*
Project experiencing Macroeconomic Shock	0.043	0.038
	(3.52)**	(3.92)**
Control of Corruption	-0.040	-0.037
	(3.68)**	(3.46)**
Constant	-0.009	
	(0.28)	
Observations	3027	3027

R-squared/ Pseudo R2	0.04	0.08

* significant at 5%; ** significant at 1%
Robust t and z statistics in parentheses for Model (1) and (2) respectively
[a] dF/dx is for discrete change of dummy variable from 0 to 1

A comparison of the model results between 'cancelled' and 'troubled' projects (where 'troubled' consists of both 'cancelled' or 'distressed' projects) as the dependent variable proves the robustness of our main result, which is that water and sewerage sector projects, Sub-Saharan Africa region projects, projects with foreign sponsors, larger projects, and projects that experience macroeconomic shocks in the early years of their existence have a significantly higher probability of being cancelled, other things remaining constant.

When comparing Tables 9 (Model 1) and 12 (Model 1), an important difference is that the institutional variable (control of corruption) has become highly significant while preserving its negative coefficient. This highlights the fact that countries with bad institutions (less control of corruption) have a higher likelihood of having troubled projects. If a country improves its position by 1 unit in terms of control of corruption (which translates into a 34% improvement in relative position of the country in a normal distribution), the probability of projects being troubled decreases by 0.04 (or 4 percentage points), everything else being constant. Given the magnitude of the improvement required, this can happen only in the medium-to-long term.

There are also other important differences among the two sets of models. The current model shows that greenfield projects have a significantly lower probability of being 'troubled' vis-à-vis divestitures (the excluded type of PPI), *ceteris paribus*, probably

reflecting the fact that the private sector building a project from scratch has some risk mitigation in terms of reduced baggage of public sector culture that a divested project may suffer from. In addition, "greenfield projects raise fewer problems than brownfield projects because greenfield projects do not involve an incumbent workforce…"[53] The third major difference between the two sets of models is that projects in Latin America and Caribbean region have a significantly higher probability of being 'troubled' vis-à-vis projects in South Asia (the excluded region), *ceteris paribus*, reflecting the higher incidence of distressed projects in the LAC region (53 out of 56 projects).

Robustness check 3: Duration Models – Including time dimension in analysis

Until now, we have conducted a cross-sectional analysis of the data without considering the time dimension. This analysis was useful as it allowed us to identify the most important explanatory variables in project cancellation and estimate the magnitude of their impact. We also found that infrastructure PPP projects that are cancelled have an average time duration of 5.3 years from financial closure before they are cancelled. Clearly, the rate of cancellation of infrastructure projects varies with time (time dependence) and so we use duration or failure time analysis to model this behavior.

The dataset in duration analysis format is described in Table 13 below.

Table 13: Description of the Dataset in Duration Analysis format

		-------------- per subject --------------			
Category	total	mean	min	median	max
no. of subjects*	2421				

[53] Gómez-Ibáñez, José A. 2007. *Private Infrastructure in Developing Countries: Lessons from Recent Experience.* Paper presented to the Commission on Growth and Development at the Workshop on Global Trends and Challenges. New Haven, Connecticut: Yale Center for the Study of Globalization

no. of records	2421	1	1	1	1
(first) entry time		0	0	0	0
(final) exit time		22.8	1	22	108
subjects with gap	0				
time on gap if gap	0				
time at risk	55253	22.8	1	22	108
failures	178	.07	0	0	1

Note: The number of observations has decreased to 2,421 in duration analysis from earlier 3,835 on account of missing data for contract period.

The interesting row in the above table is 'time at risk', which shows that the projects were at risk of failure for a total of 55,253 years. This is the cumulative number of years spanned by the projects in the dataset. The last row reports that there were 178 failures (project cancelations) in our dataset (compared to 179 found earlier because of missing data). The maximum number of failures per project is one, indicating that we have single-failure-per-project data, and the minimum number of failures is zero, indicating the presence of censored observations.

Figure 5 below shows the hazard estimate[54] for infrastructure projects over time. It shows that the probability of project cancelation peaks about 5 years from project financial closure and decreases thereafter. Thus, it captures the varying hazard ratio over the life of infrastructure projects.

Figure 5: Hazard estimate for infrastructure projects

[54] In duration analysis, the risk ratio is called the hazard ratio. Risk ratio = probability (cancelation)/ probability (survival). In effect, it gives the risk of cancelation conditional on survival to time *t*. The baseline hazard corresponds to the hazard rate when all the covariates are set to 0.

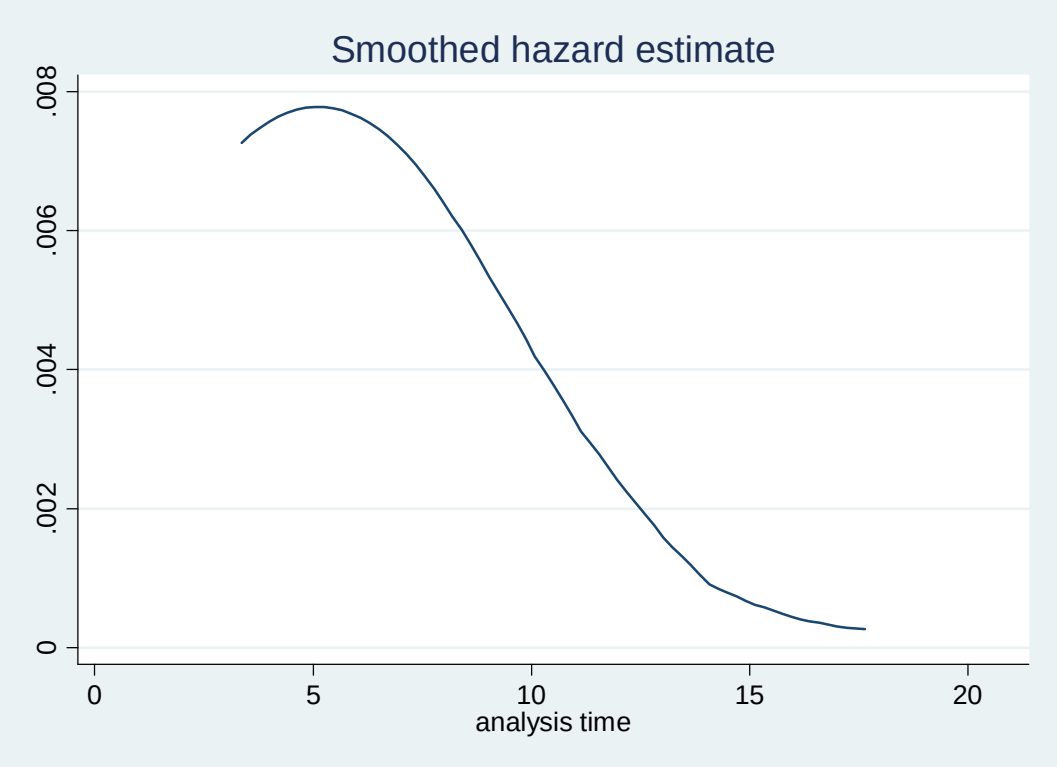
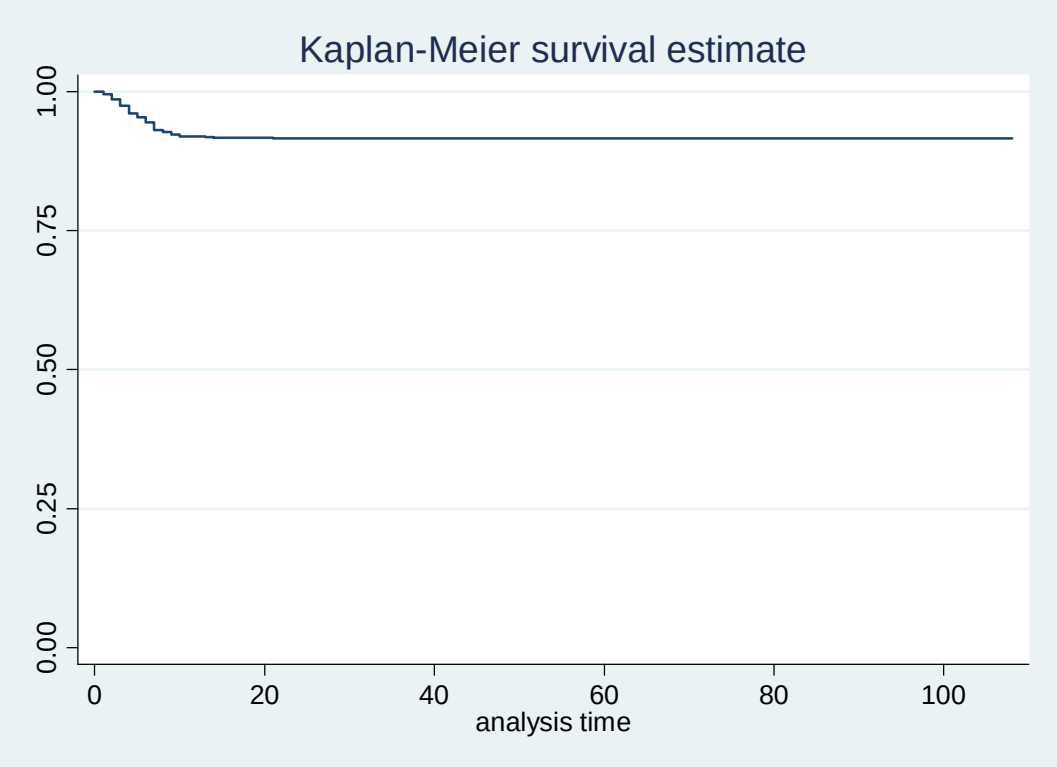


Figure 6 shows the Kaplan-Meier survival estimate[55]. It indicates the unconditional probability that an observation will survive beyond time *t*. It shows that only a small fraction of projects are cancelled and that cancellation is concentrated in early years of the project life.

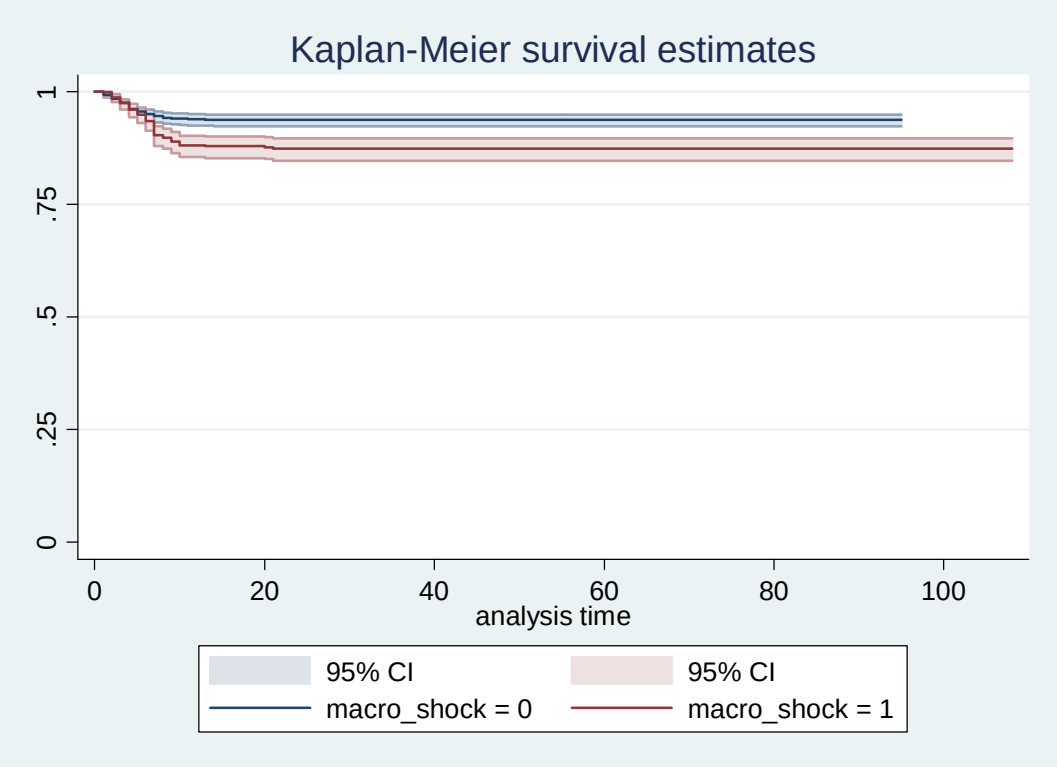
Figure 6: Kaplan-Meier survival estimate

[55] The Kaplan-Meier (KM) estimator is a non-parametric estimate of the survivor function, which indicates the probability of surviving past time *t* (http://homepages.nyu.edu/~mrg217/nonparametric.pdf).



In our earlier analysis (OLS and Probit), we have found that macroeconomic shock is a highly significant explanatory variable for project cancelation. We get similar results in Figure 7 below which shows the significantly different survival (converse of cancellation) estimates of projects that experience a macro-economic shock vis-à-vis that do not.

Figure 7: Different survival estimates of projects that experience macro-economic shock vis-à-vis those that do not



Finally, we use the semi-parametric Cox model to carry out duration analysis. The advantage of the Cox model is that the specific distributional form of the duration times is left unspecified. OLS assumes that the duration times (conditional on the independent variables) are normally distributed. This assumption is nearly always unrealistic in the context of duration data where data often exhibit asymmetry (as in our case).

The Cox model assumes that there is some baseline hazard ratio[56], which is affected by a set of covariates through increase or decrease in the baseline hazard ratio. Thus, a positive coefficient greater than one increases the hazard function (between its bounds of 0 and 1).

[56] In duration analysis, as we have already seen, the risk ratio is called the hazard ratio: Risk ratio = probability (cancellation)/ probability (survival). In effect, it gives the risk of cancellation conditional on survival. The baseline hazard corresponds to the hazard rate when all the covariates are set to 0.

Table 14 below shows the Cox model regression output.

Table 14: Model results with Cox regression – exact marginal likelihood model

	Hazard Ratio
Primary Sector (Energy)	0.819
	(0.69)
Primary Sector (Transport)	0.833
	(0.56)
Primary Sector (Water and Sewerage)	2.429
	(2.45)*
Type of PPI (Concession)	0.291
	(3.36)**
Type of PPI (Greenfield)	0.367
	(3.22)**
Type of PPI (Management and Lease Contract)	0.488
	(1.41)
Region (East Asia & Pacific)	2.892
	(1.72)
Region (Europe & Central Asia)	2.012
	(1.00)
Region (Latin America & Caribbean)	3.060
	(1.74)
Region (Middle East & North Africa)	2.571
	(1.25)
Region (Sub-Saharan Africa)	4.045
	(2.39)*
Government granting contract (federal)	0.905
	(0.39)
Government granting contract (local)	0.494
	(2.32)*
Low Income Country	1.154
	(0.32)
Lower Middle Income Country	1.058
	(0.21)
Project with Foreign Sponsor	1.745
	(2.91)**
Log of Total Investment Commitments	1.037
	(0.99)
Project experiencing Macroeconomic Shock	1.991
	(3.69)**
Control of Corruption	0.579
	(2.27)*
Observations	2141
LR chi2 (17)	88.58

* significant at 5%; ** significant at 1%
Z statistics in parentheses

The duration analysis confirms many of our earlier findings (on the basis of LPM and probit models):

- For water sector projects, the hazard ratio increases by 143%, ceteris paribus;

- For projects in Sub-Saharan Africa, the hazard ratio increases by 305%, ceteris paribus;
- For projects that are granted by local governments, the hazard ratio is lower by 51%, ceteris paribus;
- Projects that experience a macro-economic shock in the first five years of their existence and those with foreign sponsors have a higher hazard ratio of 99% and 75% respectively, other things remaining the same;
- Higher control of corruption, ceteris paribus, is associated with lower hazard ratio of 42%.

However, there are also some important differences from our earlier models:

- Size of the project has no significant impact on the hazard ratio, other things remaining the same;
- Greenfield projects and concessions have a significantly lower hazard ratio. While there is some support for the significantly lower hazard ratio in the case of a Greenfield projects[57], the result in the case of concession is counter-intuitive and is game for future research.

The Cox model is a proportional hazards (PH) model. This assumption implies that covariates will have a proportional and constant impact on the hazard ratio that does not

[57] For example, Gomez-Ibanez says "greenfield projects raise fewer problems than brownfield projects because greenfield projects do not involve an incumbent workforce…" (Gómez-Ibáñez, José A. 2007. *Private Infrastructure in Developing Countries: Lessons from Recent Experience.* Paper presented to the Commission on Growth and Development at the Workshop on Global Trends and Challenges. New Haven, Connecticut: Yale Center for the Study of Globalization)

vary with time. If this assumption is violated, the estimates would be biased, the standard errors would be incorrect, and the inference about the impact of covariates would be faulty.

We tested for the PH assumption using Schoenfeld residuals. Schoenfeld residuals can be thought of as the observed minus the expected values of the covariates at each failure time. If the Schoenfeld residuals exhibit a random pattern at each failure time, then this suggests that the covariate effect is not changing with time, i.e., that the PH assumption holds. If it is systematic, it suggests that the covariate effect is changing with time. One test for PH assumption would be to plot Schoenfeld residuals against time. If the PH assumption holds, then the slope of the Schoenfeld residuals should be zero[58]. We did this for all covariates and found the slope of the Schoenfeld residuals to be very near zero. This suggests that we can use the Cox model for analyzing the cancelation of private infrastructure projects.

7: What happens to canceled projects?

Another method of checking robustness of some variables is to see the pattern of re-privatization after cancellation. It is interesting to note that some of the same factors that explain project cancelation (like sector viability) in the first round of privatization seem to be playing a part in re-privatization as well.

As already stated, commercial discipline and the "freedom to fail" are often a big part of

[58] Introduction to Duration Models (http://homepages.nyu.edu/~mrg217/essex.htm)

the rationale for turning to the private sector, and project cancellations should therefore be expected, since some projects or concessionaires will under-perform. However, there is a reluctance to shut down a private infrastructure project once it has commenced (often manifested in frequent bouts of renegotiations), on account of likely termination payments, service disruptions, reputational issues, as well as an incremental budgeting mindset. However, if governments will not allow projects to fail, there is a high likelihood that they would revert to them following cancellation, often imposing substantial financial burden on them[59]. This outcome is diametrically opposite to what was originally envisaged, as the starting point of many PPP projects is the inability of governments to provide for the infrastructure needs of their citizenry because of the fiscal crunch.

Our survey confirms that after the infrastructure projects are canceled, they are usually taken over by the government, thus demonstrating their reluctance to allow them to be shut down following cancellation. The lenders are unwilling to take over the canceled projects as the project assets do not constitute adequate security for them, and they are hardly equipped to run the infrastructure projects. It is the project revenue stream that is the main constituent of security for infrastructure projects and the government, by taking over the project, tries to harness the project revenues to service the project debt. In many cases, governments try to re-bid the project, but without much success. This is because it

[59] For example, the government of India has paid a high price for the canceled Dabhol Power Project. The total cost of revival of DPC is estimated at Rs.100.38 billion ($2 billion), out of which the 'acquisition price' was Rs.84.85 billion ($1.7 billion) at which RGPPL acquired the assets from the owners of DPC. The price of power in the case of RGPPL, the public sector company that has taken over DPC, is about US 6 cents per kwh compared to the recently awarded ultra mega power projects, each with a capacity of about 4000 MW, with the price of power in the range of US 2.38-4.66 cents per kwh.

is difficult to get the private sector interested again when experience has demonstrated that private operations are not sustainable.

Table 15 shows the fate of projects post- cancelation. The table shows that only 15% of the projects are revived with private sector participation. The majority of the projects (about 84%, leaving out some projects that have been taken over by workers, or abandoned for a variety of reasons) revert to the government following cancellation. The full list of projects revived with private sector participation is in Annex 3, Appendix Table 3.

Table 15: Project ownership status subsequent to cancellation, by sector, 1990-2007

	Number of Canceled projects	Number of projects revived with private sector participation	Percent of projects revived with private sector participation
Energy	49	2	4*
Telecom	35	10	29**
Transport	47	10	21
Water and sewerage	48	5	10
Total	**179**	**27**	**15**

* indicates a significant difference at the 10% level of statistical significance
** indicates a significant difference at the 5% level of statistical significance
Source: Authors' tabulation.

The average duration between cancellation and re-privatization for all 27 re-privatized projects is 3.4 years. There are important sectoral variations though in that telecom, with the highest re-privatization rate, has a low duration of 2.8 years, while energy and transport sector projects take 5 and 5.3 years respectively for finding a new private partner. What is intriguing is the low duration between cancellation and re-privatization for the water sector projects given the low user charges and political sensitivity of the sector. However, it must be recognized that the dataset is quite limited for making broad generalizations.

Sectoral patterns of re-privatization

It is significant to note that only 4% of the canceled projects in the energy sector have been re-privatized. The size of the project and its sub-sector (whether it is an electricity generation or distribution/ integrated project) seems to play a major role in re-privatization. For example, the two projects that have been re-privatized in the energy sector (Puerto Plata Diesel Power Plant and SIIF Accra[60]) were small greenfield generation projects of 69 MW and 32 MW respectively. None of the 20 canceled electricity distribution/ integrated projects were re-privatized. Canceled large generation projects like Dabhol Power Project (Annex 1, Case Study 5) as well as electricity distribution projects remain in government hands possibly because of their high public visibility, which may prevent their re-privatization. However, it is also true that not all canceled small generation projects are re-privatized (for example, Houjie Power Plant – 66 MW – in China), which implies that there are other factors at work too.

Energy sector projects are also prone to international litigation, which may also be a factor in their low rate of re-privatization. The international arbitration awards related to the Dieng, Patuha, and Karaha Bodas power projects in Indonesia make the government liable to pay over $700 million for an additional capacity of only 60 MW, which would definitely have impacted the re-privatization efforts for these projects.

The high fiscal costs associated with cancelled projects are sometimes associated with

[60] The name of the project company may have changed following re-privatization.

inappropriately high level of arbitration awards foisted on developing countries by the international tribunals, when the private investors are compensated not only for the costs incurred, but also the foregone profits over the expected lifetime of the project. The pronouncement of such high awards without taking into account the desperate situation of some countries going in for project cancellations [for example, Indonesia (1997) and Argentina (2002)] and the flawed original contracts in terms of projected returns inconsistent with risk allocation to the private sector, is likely to set up perverse incentives for the private investors, when they would be bothered more about the arbitration award rather than the success of the projects (by seeking risky investments that demonstrate moral hazard issues), and undermine the confidence of the developing countries in the international arbitration system. This calls for reforms, of both procedural and substantive nature, in the international arbitration system. "Failure to reform the system to redress the imbalance between its attention to the legitimate economic and social concerns of host countries and those of investors will surely mean a retreat by those nations from the system"[61].

On the other hand, telecom sector enjoys the highest re-privatization rate mainly because of its high sector viability (see Figure 3) compared to power and water sectors. That sector viability is important in re-privatizations is also evident from the fact that most re-privatizations are concentrated in the mobile phone segment as compared to fixed access. As an example, although ACG Telesystems (Westel) in Ghana had disputes with the regulator as well as the public sector incumbent operator, Ghana Telecom, which

[61] Wells, Louis T and Rafiq Ahmed. 2007. *Making Foreign Investment Safe: Property Rights and National Sovereignty.* New York: Oxford University Press

ultimately led to private sector exit in 2005, the company was re-privatized with majority stake sold to Celtel in 2007. The sector profile shows that Ghana is one of the most attractive markets in Africa with mobile subscribers growing at more than 55% per annum and mobile penetration at a still low rate of around 35%, which would have played a part in its re-privatization.

The attractiveness of the telecom sector for re-privatization is also evident from the repeated re-privatizations [2 projects, Ghana Telecom and Mobile Telecommunications Services Limited (Nigeria)] seen in the sector, the only sector where this has happened. Thus, in February 2002, Ghana Telecom ended the contract with Telekom Malaysia, which had run the company for four years, claiming performance deficiencies, only to award a management contract in February 2003 to Telenor Management Partner (TMP) of Norway that lasted till December 2006. Subsequently, the government signed the deal for sale of 70% shares in Ghana Telecom to Vodafone in July 2008.

Re-privatizations are rare in sectors other than telecom and happen only when there is significant "uplift in sector credit quality" and commensurate reduction in risk perception among private participants. The case in point is the re-privatization of four toll roads in Mexico after a decade of their cancellation. In August 2007, ICA, Mexico's largest construction company, and its partner, Goldman Sachs Infrastructure Partners were awarded four toll road concessions [Aguascalientes-Leon Toll Road (104 km), Guadalajara-Zapotlanejo Toll Road (26 km), Lagos de Moreno-Zapotlanejo Toll Road (119 km), and Maravatio-Zapotlanejo Toll Road (309 km)] at a bid price of US$ 4

billion. The improved credit quality derives from improved bidding parameter (minimum public subsidy instead of minimum concession period earlier), better procurement process (2-stage bidding process), more transparency, better traffic and revenue forecasting, more preparatory work (right of way was secured before the concession was bid out), relative macroeconomic stability in Mexico with improving sovereign credit rating, and top level political commitment and support.

Many characteristics of the water sector, like severe under-pricing of services, dilapidated assets and the need for substantial investments, and high levels of leakage, illegal connections, low billing and payment collection efficiency, and the associated political sensitivity, make it unattractive for private participation. Once a water project gets cancelled, these same factors make its re-privatization difficult as is apparent from the case of Dar-es-Salaam Water (see Annex 1, Case Study 4), the lease contract for which was signed in 2003, which was cancelled in 2005, and was taken over by a government entity, Dar es Salaam Water and Sewerage Corporation (DAWASCO). The private company suffered operating losses of Tanzanian shillings 15.6 billion in its less than two years of operations, which was an important reason for project cancellation. Since the time DAWASCO has taken over operations, revenue collection is up, costs have been cut, and a new billing system has been put in place. However, problems of mismatch between collections and costs remain: DAWASCO collects only about Tanzanian shillings 1.6 billion a month, while its operational costs are 2.2 billion, forcing the government to pick up the tab more than once.

International patterns of re-privatization

Table 16 shows some of the most popular countries for PPPs and how they have fared with regard to cancellation and re-privatization. It is significant to note that although Mexico accounts for a significant chunk of cancelled projects among developing countries (11%), it also accounts for the maximum number of re-privatized projects. On the other hand, countries like Argentina, Philippines, and Indonesia have had limited success in re-privatization.

Table 16: Privatization, cancellation, and re-privatization of infrastructure projects, by country

Country	Number of privatized projects	Projects cancelled	Cancelled projects revived with PSP
China	682	36	0
Brazil	318	5	0
Russian Federation	294	1	0
India	233	4	1
Argentina	190	9	2
Mexico	160	20	5
Philippines	83	5	1
Indonesia	82	11	0

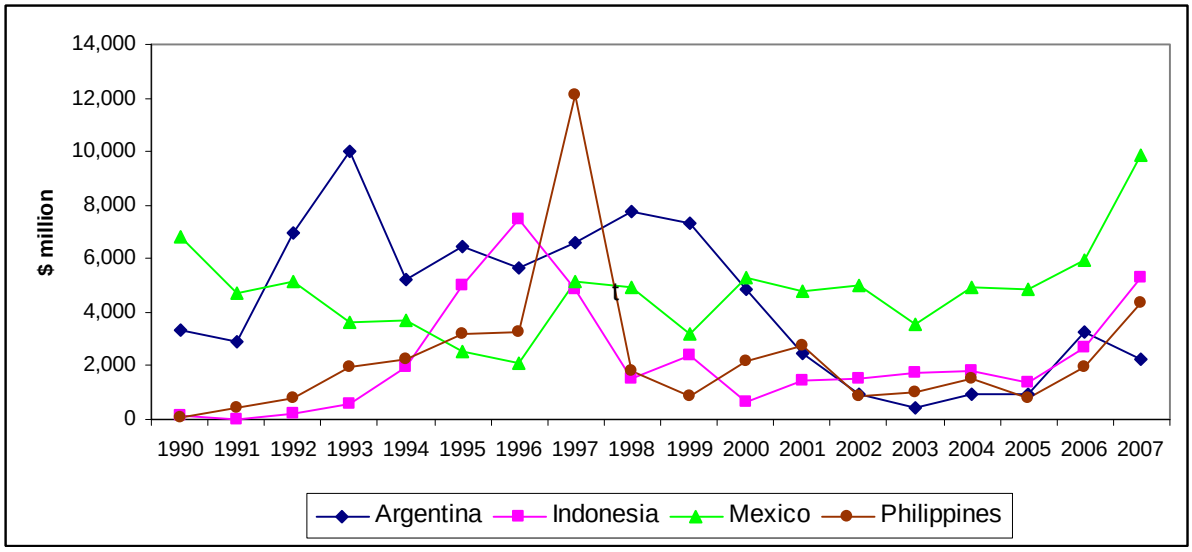
Note: PSP: Private Sector Participation; Privation and cancellation are for 1990-2006 and re-privatization is for 1990-2008.

Project cancellation is interpreted as a negative signal by the government and the private sector for the feasibility and success of public-private partnerships. This may have a prolonged impact on private participation in infrastructure as the private sector becomes apprehensive about government's commitment and the government loses confidence in the robustness and 'value for money' of these arrangements. This is clear in the case of PPI flows in Argentina, Philippines, and Indonesia shown in Figure 8 below. In the case of these countries, the chances of a canceled project remaining in government hands are higher.

The case of Mexico appears to be different, possibly reflecting the high financial

implication of cancelled projects and the government's desire to offload this liability fast. After the Mexican financial crisis (1994), the government agreed to pay the sponsor's debt in exchange for the concession rights for many road projects. Specifically, the government took on about $7.7 billion in debt, two-thirds owed to Mexican banks and one-third to construction companies, which may perhaps explain its keenness for re-privatization by improving the policy framework as we have seen above.

Figure 8: Total Private Investment in Infrastructure Projects, selected countries by year



Source: World Bank, PPI Project database

China's case also seems to be different as regulatory change rather than project economics seems to have played a part in cancellation. In 2002, the Chinese State Council decided that guaranteed rates of return were illegal for private utility contracts, as a result of which many private infrastructure projects (including eight in the water sector) were sold back to the public sector. Guaranteed rates of return reduce the commercial risk of projects and its withdrawal must have made the projects unattractive to the private sector, which may explain why re-privatizations have not taken place in that country.

Sometimes, governments go overboard in providing incentives to private investors to tackle a short-term shortage situation. The resultant high cost of such projects makes them unaffordable to the public sector leading to their cancellation. In the case of the TermoCeara and Macae power projects in Brazil, numerous incentives were provided to the private sector to address the severe energy crisis of late 1990s: guaranteed natural gas supply for 20 years, low-cost long-term financing for the construction of the projects, subsidies for gas transportation costs, and minimum revenue guarantee from the state-owned oil and gas company, Petrobras. However, following the huge drop in the price of power in late 2002 owing to an energy surplus in the country, Petrobras realized that what was supposed to be a temporary support (minimum revenue guarantee) to shield private partners from volatility in the nascent spot market for power had become a permanent subsidy to the project. Petrobras had already paid substantial amounts to the project sponsors in the early years of project operation, and found it cheaper to buy off the private sponsors for US$137 million (TermoCeara, 2005) and $358 million (Macae, 2006) respectively. In these situations, re-privatizations may not be a preferred strategy for the government.

It has been opined that government takeover of private firms may also be associated with increased political interference in their functioning and fund shortage for investment, both of which should be impediments to performance. Performance evaluation of the nationalized firms has not been attempted in this paper and is game for future research.

From the above analysis, one can draw three major conclusions regarding the post-

cancellation status of PPP projects:

- A vast majority of the cancelled projects devolve on the government. Though public-private-partnerships are designed to be a mechanism by which governments are able to divest infrastructure provisioning responsibilities to the private sector, governments may not be able to do so in perpetuity and continue with service provision after the exit of the private sector.
- Only a small percentage of canceled projects are revived through private sector participation. More viable sectors like telecom may support more re-privatization as compared to difficult sectors like water.
- Many of the same factors that explain project cancelation in infrastructure sectors (like sector viability) seem to be playing a part in re-privatization as well.

8: Conclusion

Project cancellation rates, though rising, are still low. Although ownership may change hands, for the most part, the private sector is staying in private infrastructure projects. Although the above empirical analysis confirms the significance of factors identified in project cancellation literature and case studies, it is also the case that the impact of these factors is relatively small. The overall rate of project cancellation is less than 5%. Macroeconomic shocks, the most significant explanatory variable, increase the probability of cancellation by only about 4 percentage points. This reflects reality: many projects in countries which suffered crises in the 1990s and early part of the current century, for example, were not cancelled. Those that were cancelled were probably the

least robust, or possibly, particularly politically contentious.

The 2008-09 financial crisis, however, may accelerate project delays and cancellation as many countries, including Argentina, Hungary and Pakistan, find themselves buffeted with worsening macroeconomic imbalances, large current account deficits, equity market declines, difficulties in access to credit for companies, elevated risk perception and the impact of these factors on interest rate spreads, investment, inflation, and exchange rate, and as a result, shrinking growth rates and demand. The impact of this deterioration in the economic environment may not be apparent immediately as governments and private sector enter into renegotiations to save these projects.

One recent feature of the private infrastructure markets in low and middle income countries has been the increased role of domestic investors – seen in countries such as India, Mexico and Brazil[62]. This will likely make projects more robust to cancellation by reducing concerns about the presence and role of foreign investors profiting from supplying these essential services. Development of local capital markets that is being seen in many developing countries would also play a role in managing foreign exchange risk associated with private infrastructure projects through incentivizing usage of domestic financing in such projects. In addition, since domestic firms are likely to be more accommodative in renegotiations compared to foreign multinational firms, projects with domestic sponsors may be less likely to be cancelled even after a macroeconomic

[62] Pricewaterhouse Coopers. 2008. *Emerging Market Investors and Operators in Infrastructure: Global overview of the rise of emerging market investors and operators in infrastructure provision in developing countries.*

crisis as in the case of some of the Indonesian power projects after the 1997 East Asian Financial Crisis[63].

Although trends in cancellation may not be an issue for private infrastructure projects as a whole, it is a concern in the water and sewerage sector. The high probability of cancellation and relatively low level of fresh investment in the sector suggests a declining role for the private sector in making available this essential service. With cash-strapped governments not in a position to satisfy the need, the net result is deteriorating quantity and quality of water and sewerage services across much of the developing world.

[63] Wells, Louis T and Rafiq Ahmed. 2007. *Making Foreign Investment Safe: Property Rights and National Sovereignty.* New York: Oxford University Press

Annex 1: Case Studies of Canceled Private Infrastructure Projects

Case Study 1: Mexican Toll Roads - Their Cancellation and Re-privatization

In the period 1989-94, the Government of Mexico undertook an ambitious program of constructing about 5,500 kilometers of private greenfield four-lane toll roads. This was crucial for the country to be able to take full advantage of the opportunities provided by North American Free Trade Agreement (NAFTA), which became operational in 1994, and the economic integration of the country. By 1995, 53 contracts had been awarded through competitive bidding entailing an investment of about $13 billion. The mode of implementation was build-operate-transfer (BOT) with the maximum contract period being 30 years. The project companies were typically highly leveraged and the debt provided by domestic banks was mainly at floating rate, both factors increasing the risk of project companies.

The project companies soon ran into problems. Construction costs were frequently under-estimated while traffic was over-estimated in the bids (Standard & Poor's reported that traffic forecasts turned out to be too high in more than 75% of cases[64]). Concessions were often awarded before all permits, approvals, and the right-of-way were secured, introducing delays and exposing concessionaires to community pressures for route realignment – placing further upward pressure on costs. Demand forecasts were also uncertain because, under Mexican laws, a free road had to run parallel to a toll road. The high tariffs (owing to short concession periods initially, some as short as 30 months, the average term being 10 years) compounded difficulties for the private sponsors because of their impact on traffic. The toll rate on the Mexico City-Acapulco road, for example, was 30 cents/km, or 10 times more than the New Jersey Turnpike running between

[64] Standard & Poor's. 2006. *A Credit Review of Mexico's Toll Road Sector: Stable and Strong*

Philadelphia and New York in the US[65].

The problems were further exacerbated after the Mexican peso crisis of 1994 when traffic declined by 12%, domestic interest rates climbed to more than 100% per annum, and foreign currency denominated loans became huge liabilities in terms of domestic currency. As a result, the financial equilibrium of project companies deteriorated sharply to border on bankruptcy. Consequently, the Mexican government (through its entity, Fideicomiso de Apoyo al Rescate de Autopistas Concesionadas, FARAC) took over the 23 most troubled federal highways operated by private concessionaires. The typical deal was that the government agreed to pay the sponsor's debt in exchange for the concession rights. The equity holders are estimated to have lost about $ 3 billion[66] as government offered them no compensation. Once under government control, tariffs on these toll roads were significantly reduced (by 40% for trucks) and commercial users were offered substantial tax discounts to promote asset usage and revenue generation.

The re-privatization: Given the resource crunch, the government has re-privatized some of the toll roads recently. In August 2007, ICA, Mexico's largest construction company, and its partner, Goldman Sachs Infrastructure Partners were awarded four toll road concessions [Aguascalientes-Leon Toll Road (104 km), Guadalajara-Zapotlanejo Toll Road (26 km), Lagos de Moreno-Zapotlanejo Toll Road (119 km), and Maravatio-Zapotlanejo Toll Road – 309 km] totaling 558 km. The consortium made the highest bid of US$ 4 billion. This re-privatization, called FARAC I, entailed awarding 30-year concessions to private partners to build, operate, exploit, conserve, and maintain the four toll roads. To collect the proceeds from the toll road concessions, the

[65] Project Finance International. 1997. *Mexican Toll Roads* (www.pfie.com/story.asp?sectioncode=&storycode=148797)

[66] Ehrhardt David and Timothy Irwin. 2004. Avoiding Customer and Taxpayer Bailouts in Private Infrastructure Projects: Policy toward Leverage, Risk Allocation, and Bankruptcy. *World Bank Policy Research Working Paper No. 3274.* Washington DC: The World Bank

government has launched an infrastructure fund (El Fondo Nacional de Infrastuctura) that will support potential investments in roads and other infrastructure sectors. Some of the money raised through re-privatization would also be used for retiring debt raised when these assets were taken over by the government in the late 1990s.

The bidding process for privatization is in progress, *inter-alia*, for the following projects (under FARAC II): Guadalajara-Tepic Toll Road (168 km), and Mazatlan-Culiacan Toll Road (181 km). The following projects are under preparation for privatization: Cadereyta-Reynosa Toll Road, Chamapa-Lecheria Toll Road, Champoton-Campeche Toll Road, Cordoba-Veracruz and La Tinaja-Cosoleacaque Toll Roads**,** and Monterrey-Nuevo Laredo Toll Road.

The re-privatizations after a decade long hiatus "reflects an uplift in sector credit quality"[67] and commensurate reduction in risk perception among private participants. The improved credit quality derives from improved bidding parameter (minimum public subsidy instead of minimum concession period earlier), better procurement process (2-stage bidding process constituted by technical and financial bids), more transparency, better traffic and revenue forecasting, more preparatory work (right of way is secured before concession is bid out), relative macroeconomic stability in Mexico with improving sovereign credit rating, and top level political commitment and support. The partial risk guarantee from the Inter-American Development Bank for FARAC I, which served as a backstop guaranteeing the revenues of the toll road, also made the projects marketable. What must also have worked in favor of re-privatizations was that all the four re-privatized highway projects were existing highways with predictable cash flows and growth projections rather than greenfield projects where it is more difficult to make accurate traffic forecasts.

[67] Standard & Poor's. 2006. *A Credit Review of Mexico's Toll Road Sector: Stable and Strong*

Case Study 2: The cancellation of Dieng, Patuha, and Karaha Bodas power projects (Indonesia)

The Dieng, Patuha, and Karaha Bodas geothermal power projects were part of the group of 27 private power projects that Indonesia signed up before the 1997 Asian Financial Crisis to meet rising power demand. These projects were contracted under Presidential Decree 37 (1992) that allowed private entities to be involved in power generation, transmission and distribution. Dieng Power Project and Patuha Power Co were majority owned by Mid American Energy Holdings (formerly CalEnergy) and were to be built under a 30-year Build-Operate-Transfer contract to a capacity of 400 MW each. The Karaha Bodas Company (KBC) was a Cayman Islands joint venture among Caithness Energy (40.5%) and Florida Power and Light (40.5%), both of the US, Tomen Corporation of Japan (9%) and PT Sumarah Daya Sakti of Indonesia (10%) for a geothermal project of 400 MW capacity. These foreign sponsored projects entered into 30-year take-or-pay Energy Sales Contracts (equivalent to PPA) with the national utility, PT Perusahaan Listrik Negara (PLN) with dollar-denominated payments. This implied that PLN was bearing most of the commercial and foreign exchange risks of these projects. The first 60 MW of the Dieng Project was commissioned in March 1998.

The Asian Financial Crisis (1997) had a much greater impact on Indonesia as compared to its neighbors. While the impact of the Crisis on per capita income growth (defined as change from average in two years prior to crisis to average in crisis and subsequent year) was (-) 12.7% for Indonesia, it was only (-) 0.4% in the case of Thailand[68]. This was accompanied by a large demand contraction and the collapse of the domestic currency in Indonesia, both of which made

[68] Cline William. 2002. *Financial Crises and Poverty in Emerging Market Economies.* Center for Global Development. Working Paper Number 8.

the dollar denominated debts and payments unaffordable. The severity of the Crisis partly explains the differential incidence of project cancellation across countries in East Asia. In addition, Indonesia suffered more because of dollar-denomination of tariffs, extensive use of foreign currency financing, project award through negotiations rather than competitive bidding (which contributed to higher tariffs), and extensive use of comfort letters to reassure private investors that the national utility power offtaker would abide by its commitments. The reliance on informal procedures like direct negotiations and "letters of comfort" in Indonesia could be explained in terms of the weaker institutional environment in the country[69].

In late 1997 and early 1998, the Indonesian government issued a series of Presidential Decrees under which the three projects were cancelled (owing mainly to their unwillingness to renegotiate lower power rates), following which the foreign sponsors called for international arbitration under the United Nations Commission on International Trade Law (UNCITRAL). The arbitration panel found that PLN had breached the contracts and the duty of good faith and awarded the Dieng and Patuha project companies a total of $572 million in damages in 1999. After PLN failed to pay the awarded damages, OPIC and Lloyds paid in full Mid American Energy Holdings' claims under its political risk insurance policies. Project ownership was transferred from OPIC to Government of Indonesia in August 2001 after the Indonesian Ministry of Finance signed an agreement to pay US$400 million over 14 years, constituted by US$260 million to OPIC and US$140 million to various creditors.

In December 2000, KBC was awarded US$261 million (to cover incurred expenses and lost profits) against Pertamina, the state oil and gas company holding property rights to the geothermal fields, by Swiss arbiters. By August 2005, the debt and penalties had swelled to

[69] Henisz, Witold J. and Bennet A. Zelner. 2001. *The Political Economy of Private Electricity Provision in Southeast Asia*. East Asian Economic Perspectives 15(1):10 – 36.

US$307 million, at which point Pertamina offered to settle the dispute for US$50 million.

In 2008, the Dieng and Patuha projects are being controlled by the state-owned enterprise, GeoDipa. The capacity of the Dieng project remains at 60 MW while the Patuha project remains a publicly controlled quasi-greenfield project. The government did not develop the projects further after takeover, reflecting its own resource crunch and the high cost of power from geothermal projects. In 2008, the KBC project is listed as a publicly-controlled quasi-greenfield project, which is still under dispute[70].

The quantum of the arbitration awards is held to be inappropriately high by some[71]. It is also true that the Indonesian government has paid (or is liable to pay) over $700 million on account of these three projects for an available capacity of only 60 MW, which highlights the deleterious impact that project cancellation can have on public finances.

Case Study 3: The cancellation of Aguas Argentinas project (Argentina)

The state-owned Obras Sanitarias de la Nacion (OSN) was responsible for water and sanitation services in Buenos Aires up to 1993, when the Argentinean government awarded a 30 year build-rehabilitate-operate-transfer concession to Aguas Argentinas (AA). The water services in the Argentinean capital had deteriorated over the years because of OSN's poor performance and little maintenance or new investment. There was high unaccounted-for-water loss (45%), inadequate metering, billing not based on actual consumption, and poor coverage, especially in low-income suburban areas. Politically determined tariffs that failed to recover the cost of providing water left

[70] Project Appraisal Document for Geothermal Power Generation Development Project. 2008. Washington DC: The World Bank

[71] Wells, Louis T and Rafiq Ahmed. 2007. *Making Foreign Investment Safe: Property Rights and National Sovereignty.* New York: Oxford University Press

OSN with little surplus for investment. The situation was worse with regard to sewerage.

In this environment, AA was awarded the concession after a competitive bidding process. AA was a consortium with majority shareholding (at end-2003) of Suez Lyonnaise des Eaux (known as Suez after 2001, 39.9%), the other partners being Aguas de Barcelona, Banco de Galicia y Buenos Aires, Vivendi Universal (known as Veolia Environment as of May 2003), International Finance Corporation, Anglian Water, and Employee Stock Ownership Program. AA promised to cut average consumer water tariffs by 26.9% compared to the tariff charged by OSN. Prior to the privatization of the Buenos Aires water and sewerage services, the public regulatory agency, Ente Tripartito de Obras y Servicios Sanitarios (ETOSS), was created in 1992.

AA's contract entailed a $4 billion investment in rehabilitation and expansion of water services and sanitation over the lifetime of the concession to attain the following targets: increase in water supply coverage from 70% in 1993 to 100% in 2023, increase in sewerage coverage from 58% to 90%, increase in treated wastewater from 4% to 93%, and reduction in unaccounted-for-water from 45% to 25%. About half of the required capital investment was to come from loans denominated in US dollars.

Though the project performed well initially and its perceived success made it the template for a string of privatizations within Argentina (Santa Fe, Cordoba, and projects in the provinces of Mendoza, Buenos Aires, Corrientes, and Formosa) and elsewhere, problems occurred intermittently. AA realized that the infrastructure was in a far worse shape than it had expected. In addition, local governments and communities pressurized the federal government to extend coverage over illegal habitations. To take care of the losses due to new connections, the government authorized renegotiation in February 1997, which allowed, *inter-alia*, for automatic revenue protection against currency devaluation and inflation, and “the right to economic equilibrium” whereby the company had the right to recover all operating costs and expenses,

including financing costs. The net result was water tariff increase: one study reported that between 1993 and 2002, AA asked for and the government allowed successive extraordinary revisions in the tariffs, for a total hike of 88% for residential consumers, while overall increase in prices (inflation) was only 7% during this period[72]. All through the life of the concession, there were allegations of corruption against government officials associated with the renegotiations[73].

From 2001, the credit ratings of Aguas Argentinas steadily declined to parallel the credit ratings of the country. Standard and Poor's cut its ratings for Aguas Argentinas from selective default (SD) to payment default (D) in 2002 following AA's announcement to temporarily postpone the repayment of its project finance debt (estimated at $706 million in end-2001) to dedicate its financial resources toward ensuring continuation of service while renegotiating its tariff agreement with the government. To be sure, Aguas Argentinas was hit hard by the financial crisis of 2001-02, when the country defaulted on its substantial foreign debt: Argentinean national currency depreciated by about three-fourths in the space of five months, GDP declined by 12%, and inflation ballooned to 43%. In an effort to tackle the economic emergency in the country, the government first converted the utility rates (including water) from dollar amounts to devalued pesos and subsequently froze them in 2002 by decree, regardless of earlier agreements with private companies, which led to AA's default in servicing its own dollar-denominated debt.

Meanwhile, the regulatory agency, ETOSS, in its report on the AA concession in 2003, maintained that, while AA had increased tariffs significantly between 1993 and 2002 and enjoyed abnormal profits, it had fallen behind in investments: as against the agreed investment of $2.2 billion in the period, the actual investment was only $1.3 billion, which led to shortfalls in output

[72] As quoted in Corpwatch. 2004. *Argentina Water Privatization Scheme Runs Dry* (http://www.corpwatch.org/article.php?id=10088)

[73] See, for example, Center for Public Integrity. 2003. *The 'Aguas' Tango: Cashing in on Buenos Aires Privatization*. (http://www.globalpolicy.org/socecon/tncs/2003/0206argentinewater.htm)

targets especially in low-income areas. In that year, ETOSS slapped the company with a 55 million peso fine when it discovered that the company had never implemented its construction plans, while it had gone in for water rate hikes in order to finance them[74].

Also in 2003, the major shareholders of Aguas Argentinas, Suez, Vivendi and Aguas de Barcelona filed a claim against the Argentinean government with an international arbitration tribunal (International Centre for Settlement of Investment Disputes, ICSID), demanding US$ 1 billion as compensation for losses to its investments in Argentina due to frozen rates and devaluation of the currency, which the companies maintained, amounted to expropriation of their investment. Later in 2005, as part of its worldwide restructuring whereby it wanted to concentrate on Europe and North American markets, Suez, the main sponsor of Aguas Argentinas, proposed the cancellation of its concession contract after talks on tariff hikes with Argentinean authorities broke down. This would be the most high-profile exit of a foreign-owned utility since Argentina's 2002 economic crisis, though not the only one: by the end of 2004, Argentina faced 32 cases and claims of over $16 billion in damages. In March 2006, the Argentine central government cancelled the concession contract with Aguas Argentinas citing failure to meet contractual obligations and to improve the quality of the water it supplied.

A new group called Agua y Saneamiento Ambiental (AYSA), 90% owned by the state and 10% by workers, took over the Buenos Aires water system after cancellation of the contract with Aguas Argentinas. It was announced in 2006 that AYSA would not increase water rates, and would come out with a new five-year plan that continued with current investment projects. Under the plan, in 2008, Argentina tendered for a US$634 million potable water plant in the Tigre area of Buenos Aires.

[74] Corpwatch. 2004. *Argentina Water Privatization Scheme Runs Dry* (http://www.corpwatch.org/article.php?id=10088)

Case Study 4: The cancellation of Dar-es-Salaam Water and Sewerage (Tanzania)

The water and sewerage services in Dar es Salaam were in a precarious state at the beginning of the current millennium. The system was characterized by high levels of leakage, illegal connections, low billing and payment collection efficiency, and low coverage. The low tariffs historically charged – before 1991 water was provided free to users – had been insufficient to fund maintenance or capital expenditures and had led to a progressive worsening of the system. In this environment, the Government of Tanzania (GOT) awarded the provision of water and sewerage services in the area served by Dar es Salaam Water and Sewerage Authority (DAWASA) to City Water Services Ltd (CWS) under a 10 year lease contract in 2003 through competitive bidding. The 80-20 joint venture between British Biwater International Limited and German HP Gauff Ingenieure GmbH and Co. [Biwater Gauff (Tanzania) Limited, BGT] held a 51% stake in CWS, the operating company, while 49% stake was held by the local partner, Super Doll Trailer Manufacture Co. (T) Limited (STM).

As a prelude to the bidding of the Project, the Energy and Water Utilities Regulatory Authority (EWURA) was established in 2001 to regulate the provision of water supply and sanitation services and audit the private operators in relation to their license. Following a significant delay in the appointment of members of the Authority, the Minister in-charge in Tanzania took on the role and functions of EWURA in respect of DAWASA and City Water as the "Interim Regulator", by an amendment to the DAWASA Act in May 2003[75]. However, this step created problems of credibility for the regulatory authority.

[75] International Centre for Settlement of Investment Disputes. 2008. Award of ICSID Case No. ARB/05/22: Biwater Gauff (Tanzania) Ltd. (Claimant) vs. United Republic of Tanzania (Respondent)

City Water began providing services in August 2003 and almost immediately, serious difficulties began to be experienced by both City Water and DAWASA in their respective performance of the Lease Contract. Overall, although City Water made improvements to the water system in difficult operating conditions, and repeatedly emphasized that improvements should not be expected overnight, its performance "had been pretty poor"[76]: cash collections had clearly deteriorated substantially over the course of the contract period and were worse than that of DAWASA. Following the failure of renegotiations, in May 2005, the Tanzanian government terminated the 10-year contract with City Water, claiming the company had made less than half the required investment (US$4.1 million out of US$8.5 million), had failed to meet revenue collection targets or improve water supply services, and attain other performance conditions described in the contract.

Post-cancellation, the foreign sponsors of the project filed for arbitration at International Centre for Settlement of Investment Disputes (ICSID). However, ICSID was of the opinion that "BGT had seriously underestimated the amplitude of the task. It had submitted a poorly structured bid, and then failed to perform as anticipated …with the consequence that it encountered serious financial problems at a very early stage."[77] ICSID dismissed BGT's claims for damages in the final award dated 24 July 2008[78].

The new entity, the state-owned Dar es Salaam Water and Sewerage Corporation (DAWASCO), took over City Water's responsibilities in June 2005. Since the time DAWASCO has taken over operations, revenue collection is up, costs have been cut, and a new billing system has been put in

[76] Dr. Tony Ballance, the expert mediator in the 2005 renegotiation of the project.

[77] International Centre for Settlement of Investment Disputes. 2008. Award of ICSID Case No. ARB/05/22: Biwater Gauff (Tanzania) Ltd. (Claimant) vs. United Republic of Tanzania (Respondent)

[78] International Centre for Settlement of Investment Disputes. 2008. Award of ICSID Case No. ARB/05/22: Biwater Gauff (Tanzania) Ltd. (Claimant) vs. United Republic of Tanzania (Respondent)

place. However, problems of mismatch between collections and costs remain and this has forced the government to pick up the tab more than once[79].

Case Study 5: Dabhol Power Company (India)

India embarked on liberalization of its industrial licensing and investment regime in the early 1990s as a solution, *inter-alia*, to persistent infrastructure deficit in the country. Faced with limited fiscal resources, private investment was encouraged to bridge the financing gap in infrastructure. The Dabhol power project, situated in the Indian state of Maharashtra, was initiated in 1992 as a greenfield build-own-operate project following an amendment to the energy law [Electricity (Supply) Act (1948)], which allowed private and foreign investment in the power sector. The government rapidly cleared eight "fast-track" projects, which were awarded through direct negotiation rather than competitive bidding, of which the Dabhol power project was the largest.

This was the flagship project of the now bankrupt Enron Corporation, which executed the project along with project partners, Bechtel Enterprises (primary contractor for the engineering, procurement and construction of the project) and General Electric (supplier of the project's turbines). The project company was known as the Dabhol Power Company (DPC), had a capacity of 2,184 MW spread over two phases, and was to be built at a total cost of $2.9 billion. A 20-year Power Purchase Agreement (PPA) was signed in 1993 between DPC and the Maharashtra State Electricity Board (MSEB) with guaranteed off-take through a take-or-pay contract. The first phase of 740 MW became operational in 1999.

[79] Reuters. 2008. *How to water a parched city: a Tanzanian tale*

The project faced considerable difficulties right from inception and went through protracted renegotiations. Many believed that the capital costs of the project were inflated, the foreign currency denomination of tariff payments led to high price of power, that there were unresolved environmental questions, and that there were human right violations in project implementation. In addition, there were allegations of lack of transparency and corruption against the project. Because of these problems, the project had become especially politically contentious and controversial. These problems became compounded with the naptha price spike of 2000 (naptha was the feedstock for the project at that time).

The project was cancelled in 2001 as MSEB stopped drawing the expensive power from the project: total tariff payments by MSEB from May 1999 to December 2000 were Rs.29.31 billion, at an average of Rs.4.69 per kilowatt hour[80] (kwh), compared to the projected tariff of Rs.2.40 per kwh and Rs.1.89 per kwh at the time of signing the original PPA and the amended PPA in 1993 and 1996 respectively claimed by the proponents of DPC[81] as also Rs.2.20 per kwh that MSEB was paying[82] for power sourced from other sources. The tribulations of the project have been succinctly put in the following words by *The Economist* "Since its conception … the Dabhol power project in the Indian state of Maharashtra has generated more problems than power."[83]

The project remained dormant in the period 2001-04 as the federal government, the state government and the MSEB became embroiled in a number of lawsuits and arbitration

[80] Rao S L. 2001. *Dabhol, Godbole Report and the Future*. Economic and Political Weekly.

[81] Prayas Energy Group. 2001. *Godbole Committee on Enron Project: Expose and Way Out*. Economic and Political Weekly.

[82] Lamb, Peter M. 2006. *The Indian Electricity Market: Country Study and Investment Context* (Working Paper # 48). Center for Environmental Science and Policy, Stanford Institute for International Studies, Stanford University, Stanford, CA

[83] The Economist. 2001. *Enron in India: Generation Gaps*.

proceedings in India and abroad filed by the foreign shareholders and lenders of DPC. However, as there was excess demand of electricity in the state of Maharashtra (18% overall shortage and 23% peaking shortage in 2005-06[84]) and no new generation capacity had come up in the state in the period 2000-05, government has tried to revive the project after settling the claims of foreign sponsors (Bechtel and GE, which had bought the stake of the bankrupt Enron in 2004), OPIC and the offshore lenders.

Ratnagiri Gas and Power Private Limited (RGPPL), the project special purpose vehicle, has taken over the assets of DPC in 2005 to operate the power project. RGPPL is currently owned by Indian energy companies (NTPC and GAIL, 28% each), Indian financial institutions (28% divided among IDBI Ltd, SBI, ICICI Bank and Canara Bank) and the MSEB Holding Co Ltd (15%). RGPPL has signed a 25-year PPA with Maharashtra State Electricity Distribution Company Ltd in April 2007 for supply of power from the project using liquefied natural gas as fuel. The price of power has been set at Rs.3 per kilowatt hour (kwh)[85] (about US 6 cents per kwh).

The government of India has paid a high price for this project. The total cost of revival of DPC is estimated at Rs.100.38 billion ($2 billion), out of which the 'acquisition price' was Rs.84.85 billion ($1.7 billion) at which RGPPL acquired the assets[86] from the owners of DPC. The price of power in the case of RGPPL, as already stated, is about US 6 cents per kwh compared to the recently awarded ultra mega power projects, each with a capacity of about 4000 MW, with the price of power in the range of US 2.38-4.66 cents per kwh[87]. One conclusion that can be drawn is

[84] Ministry of Power. 2007. *Power Sector Profile: Western Region* (http://powermin.nic.in/indian_electricity_scenario/pdf/WR1007.pdf)

[85] As per an answer given by the Indian Minister of Power in the Indian Parliament (Rajya Sabha Unstarred Question number 243 answered on August 13, 2007).

[86] As per an answer given by the Indian Minister of Power in the Indian Parliament (Lok Sabha Unstarred Question number 536 answered on Nov 24, 2006).

[87] Government of India. 2008. Economic Survey 2007-08; Project Finance International (www.pfie.com)

that a cancelled infrastructure PPI project, instead of providing support for strained fiscal resources may end up accentuating the fiscal crunch.

Annex 2: Correlation Matrix

Appendix Table 1: Correlation Matrix

	sector_ energy	sector_ transport	sector_ water	ppi_conce ssion	ppi_green field	ppi_manag ement	region_ EAP	region_ ECA	region_ LAC	region_ MENA
sector_energy	1.00									
sector_transport	-0.46	1.00								
sector_water	-0.33	-0.28	1.00							
ppi_concession	-0.31	0.44	0.16	1.00						
ppi_greenfield	0.14	-0.25	-0.17	-0.65	1.00					
ppi_management	-0.11	-0.01	0.27	-0.15	-0.27	1.00				
region_EAP	0.06	-0.02	0.18	0.03	0.13	-0.10	1.00			
region_ECA	-0.06	-0.16	-0.04	-0.16	-0.04	0.09	-0.26	1.00		
region_LAC	0.05	0.08	0.01	0.14	-0.17	-0.05	-0.45	-0.30	1.00	
region_MENA	-0.02	0.00	-0.03	-0.04	0.04	0.06	-0.12	-0.08	-0.13	1.00
region_SSA	-0.08	-0.01	-0.08	-0.03	0.00	0.14	-0.21	-0.14	-0.24	-0.06
govt_federal	-0.05	0.03	-0.11	0.01	-0.02	0.07	-0.14	-0.03	-0.18	0.09
govt_local	-0.07	-0.20	0.56	0.06	-0.01	0.13	0.42	-0.06	-0.20	-0.05
low_income	-0.06	0.06	-0.16	-0.04	0.10	0.04	-0.22	-0.16	-0.33	-0.05
lower_mid_inc	0.07	-0.07	0.16	0.02	0.05	-0.03	0.60	-0.21	-0.19	0.13
foreign_sponsor	0.19	-0.21	-0.05	-0.15	0.03	0.01	0.05	0.09	-0.08	0.08
log_investment	0.10	0.01	-0.28	-0.01	0.15	-0.52	-0.04	-0.03	0.12	0.03
macro_shock	-0.08	0.00	-0.07	0.02	-0.04	-0.01	-0.12	0.17	0.17	-0.07
average corruption	0.03	0.09	0.05	0.07	-0.11	-0.05	-0.08	-0.01	0.25	0.04

	govt_ federal	govt_ local	low_ income	lower_ mid_inc	foreign_ sponsor	log_ investment	macro_ shock	average corruption		
govt_federal	1.00									
govt_local	-0.23	1.00								
low_income	0.34	-0.19	1.00							
lower_mid_inc	-0.16	0.35	-0.39	1.00						
foreign_sponsor	-0.02	0.01	-0.05	0.17	1.00					
log_investment	-0.01	-0.22	-0.06	-0.06	0.04	1.00				
macro_shock	-0.16	-0.19	-0.17	-0.15	-0.05	0.11	1.00			
average corruption	-0.11	-0.03	-0.33	-0.23	-0.06	0.11	-0.03	1.00		

Appendix Table 2: Correlation among institutional variables

	avvoice	avpol	avgov	avreg	avlaw	avcorruption	avgovern
avvoice	1.00						
avpol	0.41	1.00					
avgov	0.51	0.72	1.00				
avreg	0.68	0.64	0.90	1.00			
avlaw	0.61	0.73	0.90	0.82	1.00		
avcorruption	0.61	0.72	0.91	0.86	0.92	1.00	
avgovern	0.75	0.80	0.92	0.92	0.93	0.94	1.00

Legend:

- Colored cells represent a correlation greater than |0.5|
- avvoice: Average score for 'Voice and Accountability' for a country over the period 1996-2006
- avpol: Average score for 'Political Stability and Absence of Violence' for a country over the period 1996-2006
- avgov: Average score for 'Government Effectiveness' for a country over the period 1996-2006
- avrel: Average score for 'Regulatory Quality' for a country over the period 1996-2006
- avlaw: Average score for 'Rule of Law' for a country over the period 1996-2006
- avcorruption: Average score for 'Control of Corruption' for a country over the period 1996-2006
- avgovern: Average score for all the six governance variables for a country over the period 1996-2006

Annex 3: Canceled infrastructure projects that have been revived with private participation in developing countries, 1990-2007

Project	Sector	Country	Year of Cancellation	Year of revival with private participation
Puerto Plata Diesel Power Plant	Electricity generation	Dominican Republic	2002	2007
SIIF Accra	Electricity generation	Ghana	2001	2006
International Telecommunications Limited	Telecommunications	Belize	2004	2007
ACG Telesystems (Westel)	Telecommunications	Ghana	2005	2007
Ghana Telecom	Telecommunications	Ghana	2002 2006	2003 2008
Koshika Telecom Limited	Telecommunications	India	2002	2003
France Telecom Mobile Liban	Telecommunications	Lebanon	2001	2004
Liban-Cell	Telecommunications	Lebanon	2001	2004
Citifon Sdn Bhd	Telecommunications	Malaysia	1999	2007
Mobile Telecommunications	Telecommunications	Namibia	2004	2006
Mobile Telecommunications Services Limited	Telecommunications	Nigeria	1996 2005	2003 2006
Nigerian Telecommunications Ltd	Telecommunications	Nigeria	2005	2006
Rosario Port Concession	Port	Argentina	2000	2002
Beirut Container Terminal	Port	Lebanon	2001	2004
Aden Container Terminal	Port	Yemen	2003	2004
Transportes Metropolitanos San Martin	Railroads	Argentina	2004	2005
Transgabonais	Railroad	Gabon	2003	2005
Aguascalientes-Leon	Toll Road	Mexico	1997	2007
Guadalajara-Zapotlanejo	Toll Road	Mexico	1997	2007
Lagos de Moreno-Zapotlanejo	Toll Road	Mexico	1997	2007
Maravatio-Zapotlanejo	Toll Road	Mexico	1997	2007
Ferihegy Airport Terminal 2 Expansion	Airport	Hungary	2001	2005
Puerto Vallarta Wastewater Plant	Sewerage	Mexico	2004	2005
Maynilad Water Services	Water and sewerage	Philippines	2005	2006
Litoral Sur	Water and Sewerage	Chile	2000	2000
Sabanagrande and Santo Tomas	Water and Sewerage	Colombia	2004	2004
Thu Duc Water Project	Potable Water	Vietnam	2003	2004

Source: Authors' compilation

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Cheung Kong Infrastructure website (www.cki.com.hk)

China Resources Power Holdings Co. Ltd. website (www.crc.com.hk)

China Water Company website (www.chinawater.com.hk)

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Chapter 2: Value for Money in Public-Private Partnerships in Infrastructure

1: Introduction

The public sector has traditionally been providing infrastructure services (telecom, electricity, roads, ports, airports, water and sewerage) because of their public good characteristics, large externalities, massive investment requirements, and long gestation periods. However, the fiscal resource crunch, the growing demand gap for infrastructure services, and the low quality of publicly provided infrastructure services has forced governments to invite the private sector to provide these services. It is felt that the private sector can augment infrastructure without using up fiscal resources, provide these services more speedily and efficiently, and be more responsive to the needs of the consumers.

Private provision of public services has taken the form, most often, of Public-Private Partnerships (PPPs) in infrastructure. Sustainable PPPs should provide substantial value for money to the government rather than just being vehicles for moving liabilities into the future through revenue or rate-of-return guarantees to the private sector. It is in this context that we examine value-for-money in PPPs in a major developing country (India). ***The specific question that the chapter tries to address is: Do Public-Private Partnerships provide Value for Money to the Government of India?***

The rest of the chapter is organized as follows: Section 2 looks at the salient features of Public-Private Partnerships. Section 3 is the literature review section and looks mainly at the international evidence on value for money. Section 4 describes the data used in the

study and Section 5 elucidates the methodology. Section 6 presents the sector-wise analysis and results for value-for-money in PPPs. Section 7 concludes.

2: Theoretical Framework

What are Public-Private-Partnerships?

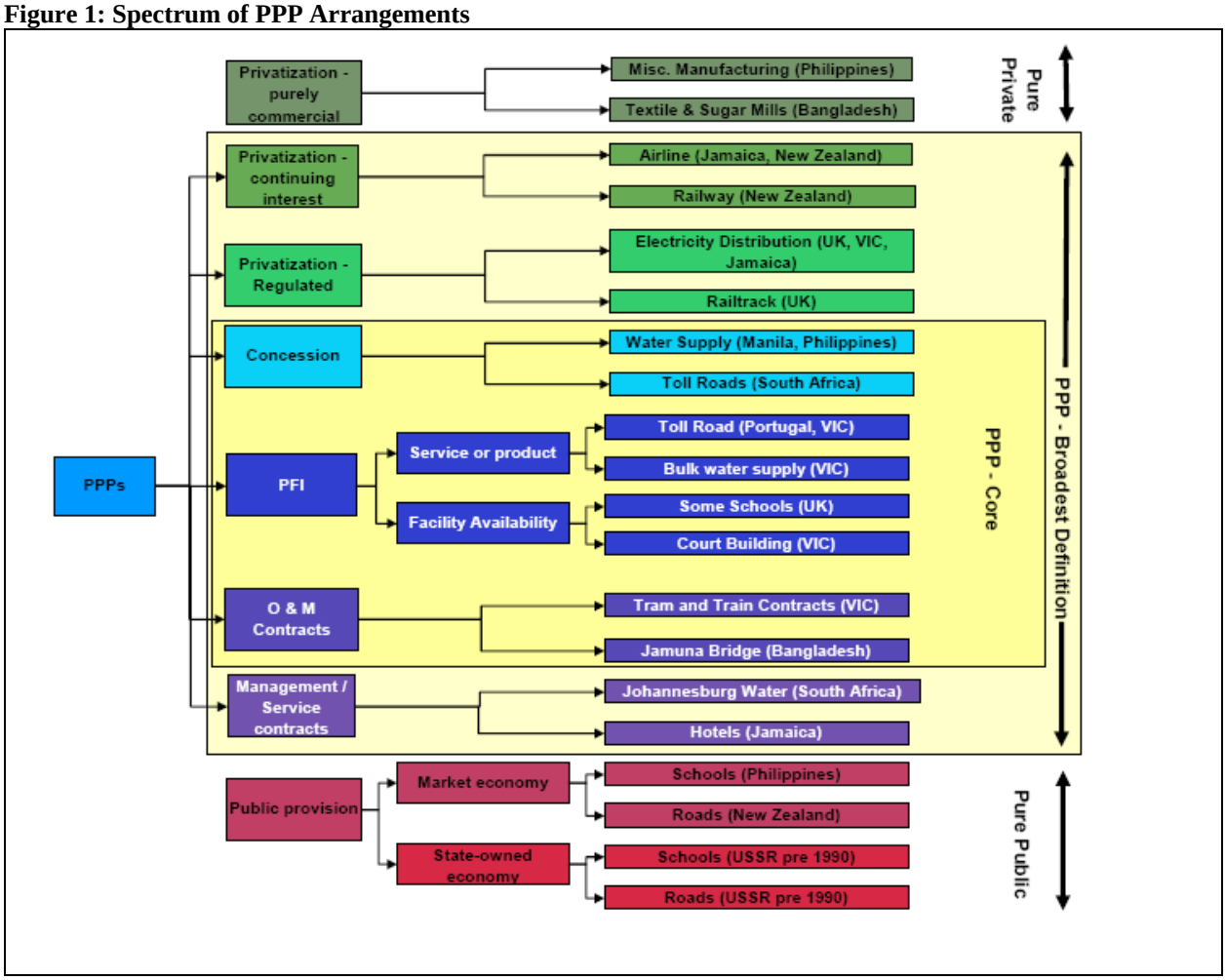
One of the most common ways in which private provision of public services has taken place in recent years is through the government inviting the private sector to invest in infrastructure and share the associated risks and returns. The returns are spread over a number of years and are governed by the contractual structure between the government and the private sector. In this context, Public-Private Partnerships (PPPs) have been loosely defined as cooperative institutional arrangements between public and private sector actors[88]. They differ from outright privatization in that government retains a substantial role as the purchaser of the infrastructure service, or as the ultimate service provider if private sector exits the contract, or to which the asset reverts after the concession period. They differ from contracting out in that the private sector shares substantial operational risk of the project with the government as it is, most often, responsible for both building and operating the asset.

Public-Private Partnerships recognize that both the public sector and the private sector have certain advantages relative to the other in the performance of specific tasks. By allowing each party to do what it does best, infrastructure services can be provided in the most economically efficient manner. The relationship between the public and the private

[88] Greve, Carsten and Graeme Hodge (2005) in *The Challenge of Public-Private Partnerships: Learning from International Experience* by Graeme Hodge and Carsten Greve (edited). UK: Edward Elgar Publishing Limited

sectors is regulated by a contract that allocates responsibilities, rights, risks and rewards between the parties[89]. In practice, PPPs refer to a family of contractual relationships between the public and the private sector rather than a single approach. The figure below shows the range of PPPs used in different countries. As would be apparent, PPPs fill the space between conventionally procured government projects and full privatization[90].

Figure 1: Spectrum of PPP Arrangements



Source: Castalia Strategic Advisors. 2007. *Advice on Fiscal Management of Infrastructure PPPs in Pakistan*

[89] Fitzgerald Peter. 2004. *Review of Partnerships Victoria Provided Infrastructure*

[90] Grimsey, Darrin and Mervyn K Lewis. 2005. *Are Public-Private Partnerships value for money? Evaluating alternative approaches and comparing academic and practitioner views.* Accounting Forum 29 (2005) 345-378.

The UK Private Finance Initiative (PFI) has driven much of the world's thinking about Public-Private Partnerships. Many countries borrowed heavily from the UK's PFI program in shaping their own PPP programs. Some countries limit their definition of PPPs by transaction type, sector, value, or whether users or the government pay directly for the services provided by the operator. For example, until 1994, South Korea limited its definition of PPPs to Build-Transfer-Operate (BTO) and Build-Own-Operate (BOO) contracts. In Portugal, the term PPPs are limited to partnerships involving the present value of payments to private parties of more than 10 million euros or an investment of greater than 25 million euros.

The following PPP definitions have been used in the various policy documents of the Government of India:

- Partnership between a public sector entity (sponsoring authority) and a private sector entity (a legal entity in which 51% or more of equity is with the private partner) for the creation and/or management of infrastructure for public purpose for a specified period of time (concession period) on commercial terms and in which the private partner has been procured through a transparent and open procurement system[91].
- Public-Private Partnership Project means a project based on a contract or concession agreement, between a Government or statutory entity on the one side

[91] Government of India, Ministry of Finance (Department of Economic Affairs). *Scheme and Guidelines for India Infrastructure Project Development Fund*

and a private sector company on the other side, for delivering an infrastructure service on payment of user charges[92].

Summing up, PPPs involve a commercial transaction between a public and a private party by which the private party:

- performs a function traditionally performed by the public sector or assumes the use of public property;
- assumes related construction, commercial, and operational risks; and
- receives a benefit in exchange of the above, either by way of public authority paying from its budget or revenue, or users or customers paying charges or fees for the service provided to them; or a combination of these.

Contracting mechanisms in PPPs

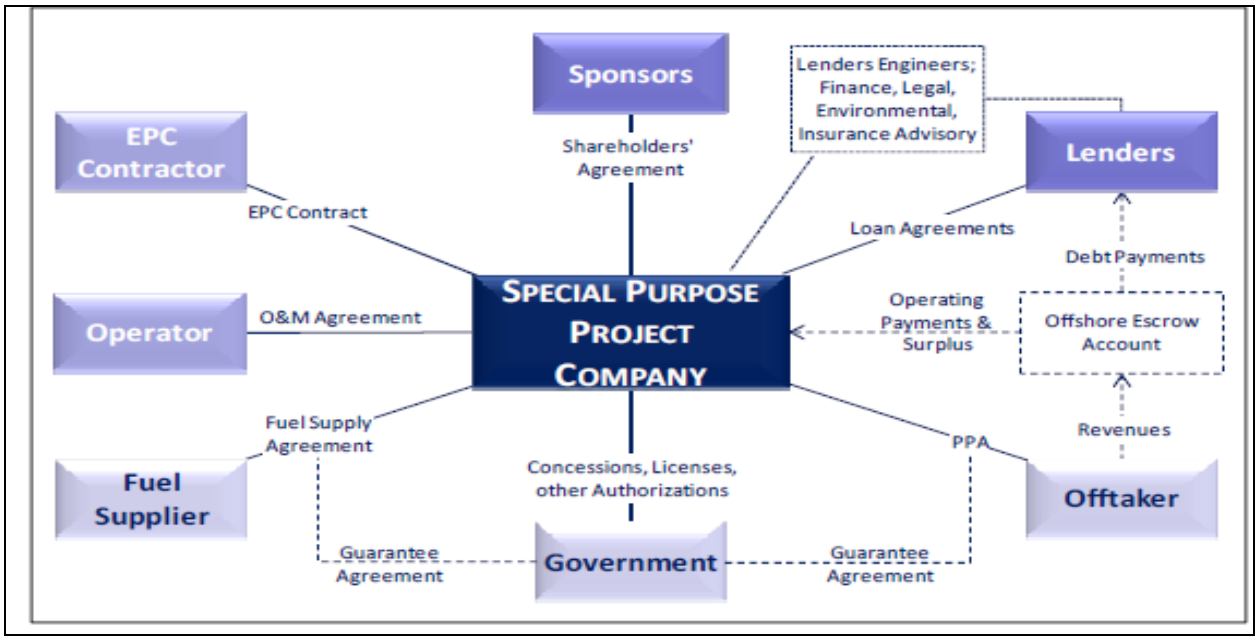
There are two principal aspects of the contractual structure associated with PPPs in infrastructure: first, the type of the project itself – whether it is a management contract, lease contract, concession, greenfield project, or a divestiture; and second, the mechanics of project implementation and operation as also what happens to the project at the end of the contract period – whether it is a BOO (Build-Own-Operate), BOOT (Build-Own-Operate-Transfer), DBFO (Design-Build-Finance-Operate), DBO (Design-Build-Operate), or a BOT (Build-Operate-Transfer) project. A BOT project would be transferred to the government at the end of the contract period, while the private sector may operate a BOO project indefinitely.

[92] Government of India, Ministry of Finance (Department of Economic Affairs). 2008. *Scheme and Guidelines for Financial Support to Public Private Partnerships in Infrastructure*

Although BOT may be the most popular PPP type, it is a complex contract because of the presence of different actors with different goals, objective functions and interests, the need to reconcile or harmonize these varying objectives to meet a particular infrastructure goal, the presence of many risks affecting BOT projects and the need for the different actors to agree on risk sharing allocation and the use of risk management techniques to minimize those risks.

PPP projects generally get financed on non-recourse basis: the lenders and investors to the project have to depend on the cash-flows generated by the project without having recourse to the sponsors' balance sheet. Thus, in the figure below, which shows a project finance contractual structure, the project implementing company is a Special Purpose Vehicle specially created for implementing the project. The loans to the project are most commonly non-recourse loans, which are secured by the project assets and paid entirely from project cash flow, rather than from the general assets or creditworthiness of the project sponsors. This increases the complexity of the contracts as they have to be watertight so that the interests of various stakeholders are protected.

Figure 2: Project Finance Contractual Structure



Source: Taylor DeJongh. 2009. *Assessing the Impact of Recent Credit Constraints on Energy Sector Investment Requirements in Bangladesh*, a study commissioned by the World Bank

Under a BOT (toll) project, the private sector meets the cost of construction and expenditure on annual maintenance. The private sector recovers the entire investment from the user fee collections during the concession period. The contracting agency specifies the project requirements based on the Detailed Project Report. A capital grant may be provided by the contracting agency to make the project viable. This may be made the bidding parameter to conserve fiscal resources. There may be risk-sharing between the public and the private sectors on the basis of a Model Concession Agreement.

To mitigate the traffic risk falling on the private partner, a variation of the BOT project in the form of BOT (annuity) may be used. Here also, the private sector meets the entire cost of construction and annual maintenance. No grant is paid by the contracting agency. The private sector recovers the investment through pre-determined annuity payments made by the contracting agency, determined through competitive bidding. The government retains the right to levy a user fee on the beneficiaries of the facility.

Appropriate packaging of BOT (annuity and toll) projects can help capture the benefits arising out of allocation of construction and maintenance risks to the concessionaire.

Another type is the Design-Build-Finance-Operate (DBFO) contract. PFI in the UK has mostly consisted of DBFO contracts, which typically last 20-30 years[93]. Here the private sector meets the cost of design and construction, and recurring cost of operation and maintenance. The private sector recovers the entire investment from user fee collection during the pre-determined concession period. The contracting agency lays out the core project requirements based on a feasibility study. A capital grant may be provided by the contracting agency to maker the project viable. There may be risk-sharing between the public and the private sector on the basis of a Model Concession Agreement. Ownership of the asset remains with the private partner during the concession period, but may revert to the public sector at its conclusion. In this contracting method, bidders are encouraged to use innovative designs while remaining accountable for performance.

Other important aspects of PPPs

Competitive bidding: Though some infrastructure projects, by their very nature, may enjoy monopoly in the delivery of services (for example, rural roads and energy transmission projects), competitive bidding would ensure ***competition for the market,*** besides ensuring transparency, and thus is expected to compete away the monopoly rent available to such service providers. Competitive bidding would assign provision of

[93] Castalia Strategic Advisors. 2007. *Advice on Fiscal Management of Infrastructure PPPs in Pakistan*

services to the party that is able to provide them most efficiently. However, competitive bidding produces the most efficient outcome if there are a sufficient number of bidders. It is, therefore, necessary to aim for a balance so that there is sufficient competition even as appropriate pre-qualification norms for bidders ensures that only credible and capable bidders are invited to submit financial bids. Market power may also be addressed by crossholding restrictions as was done in the two water contracts for Metro Manila, which were given to two separate companies. Similarly, GMR-led consortium was the only technically qualified bidder (originally) for both the Delhi and the Mumbai airport concessions in India, but it was not awarded both the concessions to encourage innovation and allow for competitive benchmarking.

Bidding parameter: The bid parameters in infrastructure PPPs usually are: the lowest tariff to be charged to consumers, the lowest subsidy that the government must provide to offer a commercially viable service, the highest price to be paid for the assets, the shortest duration of the concession, the lowest cost to the government for constructing or operating services or facilities, the lowest income guarantee requested from the state, the largest amount of new investment to be undertaken by the operator, the highest revenue offered to the state for existing infrastructure (either a share, or a flat offer), or the lowest present value of future revenue streams. A new bidding parameter being used in the road sector is the least present value of revenue (LPVR), which endogenously adjusts the concession period to changes in demand, thus mitigating demand risk in road sector concessions.

Some of these parameters may put excessive risk on the concessionaires. In the first phase of the Mexican toll road program, the bid parameter was the shortest duration of the concession. However, following the collapse of demand after the Mexican economic crisis of 1994, many of these projects reverted to the government as the concession period was too short to recoup the investment. In 2007, Mexico re-privatized some of these roads employing an improved bidding parameter (minimum public subsidy instead of minimum concession period). In general, *ceteris paribus*, there should be a single bidding parameter, lending transparency to the bidding process.

Risk allocation: The key to designing an optimal concession structure is in terms of risk allocation between the public and the private sector. The objective should be balanced risk-sharing rather than seeking to transfer all risks to the private partner. This is because the private partner may charge a premium for accepting risks that are within the control of the government reducing the value for money to the public sector. The guiding principles for risk allocation are:

i) Risk should be assigned to the agency that has more control over the risk factor;
ii) The agency that is more able to bear the risk (less risk-averse) should be assigned the risk.

Under these guidelines, the different types of risk associated with infrastructure projects and the agency which should generally bear them is shown in the table below.

Table 1: Types of risk and their normative allocation in a typical infrastructure PPP project

Type of Risk	Who should Bear It
Political risk including expropriation, non-convertibility or non-transferability	Government should bear the risk. In case of contract termination on account of government default, compensation should be paid by the government.
Concession design or development risk	Government should bear the risk.
Construction risk *(within private partner's control)*	Private partner should bear the risk through fixed price construction contracts plus liquidated damages.
Construction risk *(outside private partner's control: government action that delays the project like delays in obtaining approvals or permits)*	Government should bear the risk.
Commercial risk *Operation and maintenance risk* *Demand risk*: lower than expected demand *Payment risk*: Customers do not pay the originally agreed tariffs	Private partner should bear the risk.
Competition risk	Private sector should bear the risk. But, government may mitigate it by giving the private partner the right of first refusal to a competing route/ facility.
Financial risk *Exchange rate risk* *Interest rate risk*	Very often private partner insists on tariff indexation on account of exchange rate depreciation and inflation. However, private partner should bear the risk. Government can help through macroeconomic stability.
Solvency risk	Private partner should bear the risk. Government debt guarantees may lead to higher solvency risk through increased leverage.
Unexpected event risk *(Acts of God like floods, earthquakes, etc.)*	Insurer's risk, if risk is insured. Otherwise, risk should be borne by private partner.
Unexpected event risk (policy risk) *(Changes in legal or contractual framework directly affecting the project)*	Government should bear the risk.
Regulatory risk (*Tariff risk* is the most common type, and refers to the risk that the regulator will not enforce cost-recovering level of tariffs)	Private partner bears this risk. Government should set up autonomous regulatory institutions to mitigate this risk.
Renegotiation risk	Government bears this risk. Government should design proper concession agreements and regulatory framework to mitigate this risk.
Unsolicited proposal risk	Both the Government (through association with corruption) and the prospective partner (through the probability of rejection) bear this risk.

Source: Author's tabulation from various sources

The level of risk borne by the private partner depends on the type of contract. In the case of a management contract, the private party shares minimal risks with the public sector.

In lease contracts, private parties take on only the operating and collection risks. In BOT contracts, the private partners also take on investment and financing risks.

The private partner may pass on some risks to other private sector firms that can manage them better (see Figure 2). The private partner will typically sign separate contracts with:

- An Engineering, Procurement and Construction (EPC) contractor who takes on construction risk through a fixed-cost contract with provision for liquidated damages for delay in construction attributable to the EPC contractor;
- An operating and maintenance contractor who takes on certain operating risks;
- A lender (for example, a bank or private equity firm) who takes on financial risk associated with the loan or equity invested in the project;
- The private partner may also source specialized insurance coverage—for example, Political Risk Insurance from the Multilateral Investment Guarantee Agency.

However, there is nothing sacrosanct about the risk allocation given in Table 1: it would also depend on a host of factors like the level of private sector participation (PSP) in the country. For a country that is starting PSP from scratch, there may be a need for sharing even demand risk initially (through minimum revenue guarantee, for example), otherwise PSP may not be forthcoming. However, as the PPP arrangements mature, the need for the government to take on risks that should optimally be transferred to the private sector may

come down. This is apparent from the evolution of private power policy of many countries including India and Pakistan.

3: Literature Review

This section surveys the experience of countries where PPPs have been extensively used in the provision of infrastructure. The UK is the pioneer in using PPPs in the provision of infrastructure where it began in 1992 as Private Finance Initiative (PFI) and this became the preferred option for public procurement since 1994. Till end-2004, the total investment in PFI projects was £43 billion and now typically constitutes 15-20% of the UK government's capital budget each year. In Korea, PPP investment is 10-15% of total public investment[94]. In India, the contribution of the private sector to total infrastructure investment in the Tenth Plan period (2002-07) was 25%. This percentage is likely to go up to 36% in the Eleventh Plan period (2007-12)[95] and projected to be 50% in the Twelfth Plan period (2012-17).

The UK experience suggests that PPP projects deliver average savings of 17% compared to traditional public sector delivery[96]. PPP projects, therefore, appear to offer excellent value for money (a financial comparison of the NPVs of the cash flows of the public sector option compared to the PPP option). As per this study (sample size: 29

[94] Government of India, Planning Commission (Secretariat for Infrastructure). 2010. *Report of the Task Force on Ceiling for Annuity Commitments.*

[95] Haldea, Gajendra. 2010. *Presentation on Building Transmission Systems: Challenges and Opportunities* at the Conference on PPP in Transmission of Electricity. India: New Delhi

[96] Arthur Andersen and Enterprise LSE. 2000. *Value for Money Drivers in the Private Finance Initiative*, a report commissioned by The Treasury Taskforce. The 17% Value-for-Money figure was dominated by two large projects, with individual project savings varying between 0.7% and 45% across the sample.

projects), there are six key drivers of value for money in PPP projects: risk transfer, the long term nature of contracts (including whole life costing), the use of an output-based specification, competition, performance measurement and incentives, and private sector management skills.

This study maintains that if risk transfer is to deliver value for money, then the level of risk transfer must be optimal. It has become a truism to say that risk transfer can only offer value for money if risk is transferred to the party best able to manage or mitigate it, but the point remains worth emphasizing. Projected savings of 17% in PPP projects are sensitive to risk transfer valuation that accounted for 60% of the forecasted cost savings. The risk that attracted the highest valuation is that of construction cost overruns.

The study emphasizes that a long-term contract is a key condition for delivering value for money. There are a number of reasons for this, including: the need for investment to be recovered over a reasonably long period if a project is to be affordable; the scope that a long contract period gives to invest in alternative approaches to service delivery; and the incentives that long contracts give to service providers to focus on whole life costing as they have to construct and operate the project over the concession period. This is an area in which the public sector has traditionally performed badly. Whole life costing can achieve optimization between capital costs and operating and maintenance costs, a realistic projection of total cost of ownership, and a way of comparing competing designs on a like-with-like basis. With public sector procurement, whole life costs have either been given insufficient priority in determining the design and specification of assets or

cash has not been made available to maintain assets to their original built standard. The study observes that while we would expect to drive on a PPP road in 20 years time and find a well-maintained asset still performing to the original specification, we would not have the same confidence if the asset had been conventionally procured.

As per the study, the following elements are important for delivering a successful PPP competition:

- A pool of actively interested suppliers;
- Engagement with the market place. As the PPP market begins to grow, it is inevitable that bidders will prioritize resources towards the projects they believe offer the best opportunities. Market perception is therefore important and needs to be influenced through active marketing by the procuring body, both before and during the procurement process;
- Clear and thorough project documentation. Bidders can only compete on price if they have a clear understanding of the procuring authority's requirements and priorities; and
- Maintenance of price pressure during the bidding process. In some PPP cases, it may not be possible to develop sufficient competition without reimbursing bid costs.

The study opines that on performance measurement, a lot more work needs to be done on gathering operational information. This should cover several areas:

- The level of penalties being incurred by contractors in relation to performance that is deemed to be below the required standard. This will help understanding of whether incentives are working in practice;
- Logging the performance of individual contractors and making it known to other procuring authorities who are the best and worst performers (benchmarking). It is in the public sector's interest that success should breed success and that the lessons learnt are captured and fed into the procurement of new projects;
- Capturing information on actual costs and benefits compared to the business case assumptions; and
- Sharing practical information on best practice in measuring and incentivizing performance.

On private sector management skills, the study maintains that the success of private sector managers is illustrated by the consistent record of PPP consortia in delivering projects on or ahead of time. The National Audit Office (UK) has found that in contrast to traditionally procured projects, the ***Private Finance Initiative (PFI) projects were largely being delivered on time*** (76% versus 30%) ***and on budget*** (78% versus 27%)[97]. Moreover, the public sector did not bear the costs of construction cost-overruns in the PFI projects in contrast to conventionally procured projects as that risk is generally transferred to the private sector on account of fixed price construction contracts.

[97] Comptroller and Auditor General, UK. 2003. *PFI: Construction Performance*

In another study reviewing large public procurement in the UK[98], a representative sample of projects procured traditionally and through the PFI route and implemented over the previous 20 years (with values exceeding £40 million at 2001 prices) were compared. ***The 'optimism bias' level for conventionally procured projects was found to be higher than that for PFI projects.*** Optimism in project estimates arises from underestimating project costs and duration or overestimating project benefits. In order for projects to be delivered on time and cost, the optimism in project estimates has to be minimized. The difference in optimism bias between conventionally procured projects and PFI projects is attributed to the negotiated transfer of project risks from the public sector to the private sector, where project risks are passed to the party best placed to manage them consistent with achieving value for money and quality. The reasons for lower optimism bias in PFI projects could be related to the high level of diligence demanded in PFI procurement to establish the business case (e.g. by defining the project scope clearly and/or addressing stakeholders' interests specifically), which was not observed for conventional procurement and may have contributed to the inadequacy of the conventional project business cases used in the study. Further, for PFI projects, a long-term relationship is developed between the service provider and the client, thus allowing potential problems to be resolved early. In addition, PFI procurement requires the projects to be defined around their benefits/requirements and not just project deliverables. Adopting this approach of defining a project based on its benefits may help ensure full delivery of benefits. This study reiterates that all project business cases need to be based on correct and reliable project intelligence (e.g. reliable information about ground conditions).

[98] Mott Macdonald. 2002. *Review of Large Public Procurement in the UK*. London: Mott-Macdonald

Under conventional procurement, with limited levels of risk transfer, the optimism bias remains at the contract award stage. The study emphasizes that the problem is accentuated in politically important projects: if it is believed that once given the go-ahead a project cannot be allowed to fail, there remains a strong incentive for optimism bias, even if applied implicitly.

Department of Treasury and Finance (Government of Victoria, Australia) had commissioned an independent external evaluation of eight PPP projects which was undertaken in January 2004[99]. The review concluded that the eight projects examined (of which two were actually completed), provided tangible evidence of the benefits available from harnessing private sector skills and innovation of design in infrastructure. Other positive aspects were seen as timeliness of delivery, certainty of price, and a whole-of-life approach to maintenance. The evaluation found that the ***weighted average saving of a PPP project was 9 per cent against the risk adjusted public sector comparator (PSC) using the then prevailing discount rate.***

The value for money calculation of PPP procurement in this study involved the following steps:

[99] Fitzgerald, Peter. 2004. *Review of Partnerships Victoria Provided Infrastructure*. Melbourne, Australia: Growth Solutions Group.

- The Net Present Cost (NPC) of the PSC. This is the net cost (taking into account any project revenues) estimated by the public sector of undertaking a project itself and producing the same or similar outputs under conventional procurement. The NPC should include an estimate of the risk that would be retained by the public sector compared to the PPP option;

- The NPC of the PPP option. This is the cost to the public sector of making payments to the service provider over the life of the contract. The payment profile should assume that no deductions are made for poor performance;

- The estimated saving/ cost to the public sector in NPC terms of entering into the PPP contract. This is the difference between the NPC of the Public Sector Comparator and the NPC of the PPP option. The estimated cost saving could be expressed as a percentage of the NPC of the Public Sector Comparator.

However, the Fitzgerald report opines that the Public Sector Comparator (PSC) should be reformed to become just one factor in procurement decisions and conclusions as to value for money. In addition, the use of a PSC should be discontinued in circumstances where public provision has not been done in the past and is not a reasonable option going forward. In such circumstances, the analytic comparison should be against a reference case or a range of benchmarks.

There are obvious limitations in using PSCs[100]: inaccuracy because of poor data availability, omitted risks like that of contract renegotiation, no consensus on discount rate[101], and inappropriate benchmark when the public sector does not have the resources to implement the project. Thus, it should be kept in mind that value for money calculations using the PSC approach provide a useful, though incomplete, method to evaluate the utility of PPPs. It should be emphasized that recourse to PPPs in infrastructure projects should not solely be based on the value for money numbers, and should be supplemented by qualitative assessment of evidence from past projects[102].

It has also been found that there is very poor public information on PPPs. This has been emphasized by the Public Accounts and Estimates Committee (Government of Victoria) when it observes that in the absence of public documentation, the Committee cannot conclusively state whether or not PPP policy is generally delivering value for money over the life of projects compared with traditional procurement methods. Public accountability needs to be improved through prompt disclosure of contracts on the government's website and providing Parliament with a schedule of payments to the private partner[103]. In addition, PPP procurement has been criticized on account of locking-in costs for many

[100] Leigland, James, and Chris Shugart. 2006. *Is the Public Sector Comparator Right for Developing Countries?* The World Bank: PPIAF Gridlines

[101] Indeed, opposite conclusions were reached when using a 8.65% discount rate (leading to the conclusion that the PPP mechanism was 9% cheaper than traditional delivery in the Fitzgerald report) compared to an evaluation adopting a 5.7% discount rate (when the PPP mechanism was 6% more expensive).

[102] Government of Victoria (Australia), Public Accounts and Estimates Committee. 2006. *Report on Private Investment in Public Infrastructure*

[103] Government of Victoria. 2006. Public Accounts and Estimates Committee Seventy First Report to the Parliament. *Report on Private Investment in Public Infrastructure*. (http://www.partnerships.vic.gov.au/CA25708500035EB6/WebObj/PAECReport/$File/PAEC%20Report.pdf)

years and thus 'mortgaging the future' for near-term gains.

Another study[104] comparing the performance of PPP projects with that of traditionally procured infrastructure projects in Australia (sample size: 67 projects) found that:

- PPPs delivered projects for a price that is far closer to the expected cost than if the project was procured in traditional manner (less optimism bias in cost terms);
- Over the period from initial announcement of a project to when it is finally commissioned, PPPs and traditional projects are delivered with the same confidence in the likely overall time performance. One interesting observation in this study was that during the period prior to project execution, PPP projects are frequently delayed (average 15%). However, once PPP projects reach financial closure, there was only, on average, a further 2.6% delay to these projects. This indicates that ***PPP projects are well developed prior to release to market and changes after financial closure are minimal. This is in contrast to traditionally procured projects, where financial closure is faster than anticipated, but the project suffers from major time over-run after that stage.***

In a 2002 study of some prisons in South Africa[105] built and operated on PPP basis, it was found that:

- Construction was completed on-time and on-budget;

[104] Duffield, Colin. 2008. *Report on the Performance of PPP projects in Australia when compared with a representative sample of traditionally procured infrastructure projects*. Melbourne: The University of Melbourne.

[105] Government of South Africa (Department of Correctional Services, National Treasury, Department of Public Works). 2002

- Operating costs per inmate per day was broadly comparable with the public sector's operating costs;
- There was significantly higher quality of facilities and levels of service in PPP prisons compared to public prisons.

On the cost of service, a Partnerships UK study (sample size: 450 PFI projects) found that cost of service for PFI projects was higher. However, private service providers received high performance rating by users and contract managers. In another UK study (2007) on benchmarking and market testing[106] the ongoing services component of PFI projects, it was found that 11 PFI projects had gone through a benchmarking/ market-test, out of which 5 projects were found to have achieved value for money (VfM), while in the case of the balance 6 projects, the VfM was uncertain. Specifically, it was found that:

- Two telecommunication projects which had completed value testing had achieved value for money through price reductions of 19% and 37% after using benchmarking to take account of falling prices in the very competitive telecommunications sector.
- In the seven building projects NAO examined, five of which were hospitals, where value testing had been completed, the final price adjustments were mainly -

[106] National Audit Office. 2007. *Benchmarking and market testing the ongoing services component of PFI projects*. (http://www.nao.org.uk/publications/nao_reports/06-07/0607453.pdf). Benchmarking is the process by which the project company compares its costs against the market price of equivalent services. If the costs are higher than market prices, a reduction in the price charged to the public sector should be made on an agreed cost-sharing basis to reflect the differential. If costs are lower than market prices, the project company must justify any price increase. Market Testing means the re-tendering by the project company of the relevant service so that the authority can test the value for money of that service in the market. Any increase or decrease in the cost of such a service following market testing should be reflected by an adjustment in the price charged to the authority. Benchmarking is an alternative to market testing if the prospect of strong competition between suppliers is not there. It can also be completed quickly and be cheaper than a market test.

2 to + 6% although in one school project the final price increase was 14%. The authorities had been involved in negotiations to arrive at these price changes after the value tests initially suggested that, in most cases, upward price changes would be required, with the changes mainly in the range -1 to +19%.

- For the potential benefits of market testing to be realized, there needs to be strong competition.

In Japan also, under government guidelines, the public sector must construct a PSC and demonstrate that the PPP option provides better VfM, before adopting a PPP project, and is required to disclose the extent of VfM, either in the form of percent or absolute amount[107].

The perceived superior performance of PPPs has been attributed to the same factors that are thought to produce superior results on account of privatization[108]. There is also some discussion in the literature as to the relative attractiveness of the various contracting mechanisms [like BOT (annuity) versus BOT (toll)]. Hodge and Greve[109] referring to the BOT (annuity) variant say that the early claim that private financing of public infrastructure reduces pressure on public sector budgets and provides more infrastructure

[107] Grimsey, Darrin and Mervyn K Lewis. 2005. *Are Public-Private Partnerships value for money? Evaluating alternative approaches and comparing academic and practitioner views*. Accounting Forum 29 (2005) 345-378.

[108] For example, first, it is a means of resolving agency problems, which arise due to the divergence between ownership and control of assets, and are easier to manage in the private sector through managerial incentives and market discipline. Second, the transfer of risk to the private sector provides an incentive for private entities to maximize efficiency. Third, resources are more efficiently allocated in cases where clear markets for property rights can be established. [Grimsey, Darrin and Mervyn K Lewis (2005)].

[109] Hodge, Graeme A., and Carsten Greve. 2007. *Public-Private Partnerships: An International Performance Review*. Public Administration Review, Volume 67, Issue 3.

than is otherwise achievable is seen to be largely false. A mechanism through which governments may turn a large, once-off capital expenditure into a series of smaller, annualized expenditures has simply been provided. On the other hand, they find better payoffs for the government in BOT (toll) projects: "In the case in which a government enters into an infrastructure deal requiring users or citizens to pay directly, such as tolls on a new road, it is clear that there is little impact on public budgets. Such an arrangement does reduce pressure on public sector budgets…" Broadly interpreted, this would imply a higher value for money to the government in BOT (toll) projects compared to BOT (annuity) projects. However, the counterfactual in the BOT (toll) case would have to include an estimate of the amount of the tolls given up by the government in favor of the private sector, which we shall attempt in Section 5. This adjustment would provide a better estimate of the value for money to the government from BOT (toll) projects and their relative attractiveness vis-à-vis BOT (annuity) projects.

Overall, the literature suggests the following positives from PPPs:

- Off-balance sheet infrastructure financing, augmentation of capital spending without increasing public debt, and thus reduced pressure on government budgets;
- Better defined and improved quality services through tight contracts, improved efficiency, output-based service specification, strengthened monitoring and accountability;
- Public services provided more cost-effectively and quickly (within budget and on-time delivery);

- Value for money to the government is estimated at 17% for UK and 9% for Australia;
- Transfer of design, construction, financing, and operation risks to the private sector; promotes innovations in design;
- Business-friendly, which promotes investor confidence and can provide electoral dividends to government; with the private sector implementing projects, any given project is less likely to be selected only for political reasons.
- To the extent that the public sector is being benchmarked against private sector companies, PPPs are likely to improve public sector efficiency also.

PPPs have also been vociferously opposed on many counts. It has been alleged that with PPPs, government's role has changed from traditional stewardship to mutually conflicting roles of policy advocacy, commercial signatory to the contract, and regulator over the contract life. Some have castigated PPPs as "Problem, Problem, Problem" (Bowman, 2000) and in the UK, private project sponsors have been branded by some as "evil bandits running away with all the loot". The reasons for the negative assessment of PPPs are:

- Internationally, there have been many high-profile PPP project failures like some portions of the London Underground rail transportation project (UK), Aguas Argentinas (Argentina water project), Mexican toll road debacle, and the Indian Dabhol Power Project exemplifying cases where PPPs, instead of providing fiscal help, may turn out to being a drain on it. There is also a tendency for governments to be unwilling to “pull the plug” on PPP projects once under way for service

continuity, reputational, and termination liability reasons, increasing the costs of a future consumer or taxpayer bailout.

- Many PPPs are characterized by over-optimistic bids, subjecting governments to the risk of renegotiation after private partner bags the contract. More often than not, the outcome of the renegotiation is favorable to the private sector vis-à-vis the public sector or the customers[110].
- Ultimately the risk transfer to the private sector is limited, as government has the overriding obligation to provide public services: 85% of the canceled PPP projects revert to the government[111].
- Because of poor availability of public information on PPP projects (leading to low transparency and associated potential for corruption), such procurement has eroded democratic accountability;
- Annuity payments are liability of the government, but not shown in government accounts. This may lead to locking in of public resources over a long-time period as many PPP contracts are for 30 years (for the UK, according to one author, the total government commitments to future payments of around 670 PFI contracts are estimated at £141 billion over 26 years[112]), reducing flexibility in the face of changing needs, and burdening future generations. There is also a lack of public sector contract management skills especially at the sub-national level, where such

[110] Guasch, J. Luis. 2004. *Granting and renegotiating infrastructure concessions: Doing it Right*. Washington DC: The World Bank

[111] See chapter 1 of this dissertation.

[112] As quoted in Pollitt, Michael. 2005. *Learning from UK Private Finance Initiative Experience* in The Challenge of Public-Private Partnerships: Learning from International Experience by Graeme Hodge and Carsten Greve (edited). UK: Edward Elgar Publishing Limited

problems may be more acute.

- PPPs are characterized by poor competition, time consuming bidding process, high deal complexity and transaction costs, and high asset specificity. In situations involving long term lease of public assets to the private sector, there is a real possibility of under-pricing of public assets[113].
- In terms of value for money calculations, there are problems associated with the PSC[114] and the associated discount rate[115]. Besides, the following should also be factored in VfM calculations: commercial borrowing rates are higher than government borrowing rates and there may be affordability issues because the cost of service may rise under such procurement. It has also been pointed out that outcomes for long-term contracts are always uncertain and current results are early perceptions because the concession period has ended for few of the sampled projects.

Overall, it would appear that the financial, economic, and political basis for PPPs in infrastructure is still quite uncertain (some have suggested 'caveat emptor'). ***The present study is expected to lessen some of the uncertainty by adding to the PPP evaluation literature. In addition, what is missing from the above literature review***

[113] For example, it has been observed that the State of Indiana (USA) received an amount equal to only 40% of the actual economic value of the physical asset from the lease of the Indiana Toll Road (see Mullins, Daniel and Marvin Ward Jr. 2009. *Violating the Golden Rule: Fleecing the Next Generation from the Backs of the Past.* School of Public Affairs of American University: Center of Public Finance Research)

[114] A PSC is the estimated cost of a conventionally procured project delivering the same output as the PPP project.

[115] In the Fitzgerald study, as has already been noted, when the discount rate was reduced from 8.65% to 5.7%, the value for money went down from 9% to -6%.

is value for money analysis of PPPs in developing countries (except some analysis for South Africa). India has made PPPs the main method of public procurement in most infrastructure sectors. The sectoral spread of PPP projects in India may be seen in Table 2. In the period 1990-2007, India has entered into 306 PPP contracts accounting for an investment of $96 billion. India is also among the first five developing countries both by number of PPP projects and the associated investment. ***So, it is important to fill this gap in literature and to carry out a value for money analysis for PPPs in India to help validate their use in infrastructure provision in developing countries.***

Table 2: Private Participation in Infrastructure in India (1990-2007)

Sector	Number of Projects	Investment ($ billion)
Energy	97	33.9
Telecom	34	43.1
Transport	166	18.9
Water and Sewerage	9	0.3
Total	306	96.2

Source: World Bank and PPIAF, PPI Project Database. (http://ppi.worldbank.org)

It should also be remembered that the UK Private Finance Initiative (PFI), which has driven much of the world's thinking about Public-Private Partnerships, and Japan require that before the PPP mode is adopted, a careful evaluation is undertaken to establish that the government is likely to get the value for its money. In addition, governments also apply a Public Sector Comparator to establish that the cost to the exchequer would be lower in the case of PPP-based procurement as compared to the conventional mode of procurement. However, 'no such analysis is presently being done in India before approval …of…PPP projects.'[116] ***This makes this study a pioneering study for India and one that***

[116] Government of India, Planning Commission (Secretariat for Infrastructure). 2010. *Report of the Task Force on Ceiling for Annuity Commitments.*

directly contributes to policy making with regard to private participation in infrastructure.

4: Data description

Some India related PPP project data is publicly available over the internet (http://www.pppindiadatabase.com). In addition, some project-level financial information is also available in a Price Waterhouse Coopers report entitled 'Public-Private-Partnership Financing in India' (2007, report prepared for the World Bank). This has been supplemented by information from the relevant ministries, annual reports of ministries, answers to parliament questions, presentations of government officials, audit reports of the Comptroller and Auditor General of India, and websites of project companies.

The PPP database (http://www.pppindiadatabase.com) has provision to provide information on individual projects relating to location of the projects, capacity/ size, type of PPP, contracting authority, contract period, project status, some bidding information (including contract award method, bid criteria, number of bids, financial closure date, date of commencement of construction, date of commencement of operation), project benefits and costs (including estimated project cost, amount of government support), legal instruments (including risk allocation and dispute resolution mechanism), and some financial information. While this was supposed to be the main source of information for the current study, most of the data under the above headings is missing for many projects in the database, which implies that data has to be supplemented from various other

sources mentioned above.

Data collection for this chapter posed many challenges as much of this data is not public. In addition, the data used in the analysis is real-time data which poses additional collection difficulties. Some of the data used is from newspapers which posed problems of reliability and consistency and had to be validated from multiple sources.

In addition, data availability in terms of level of detail has limited our ability to draw sharper conclusions. Thus, in the case of BOT (toll) roads, we had to use the national average toll collection rate as the value of tolls foregone by the government in favor of the concessionaire, which could possibly have led to a higher value for money from such projects. If we had more detailed information (i.e., project-specific toll collection rate), it would have been possible to use a more realistic counterfactual, which could have led to a better value for money estimate.

The data that has been used in this chapter relates mainly to India. The basic idea in using this data was to carry on in-depth analysis of Value for Money of a few projects for which data could be accessed rather than attempt a multinational study which would suffer from more methodological complications and problems associated with missing data. The latter was also attempted for road projects with data from Project Finance International (www.pfie.com) but was abandoned because of missing data for crucial parameters.

5: Methodology

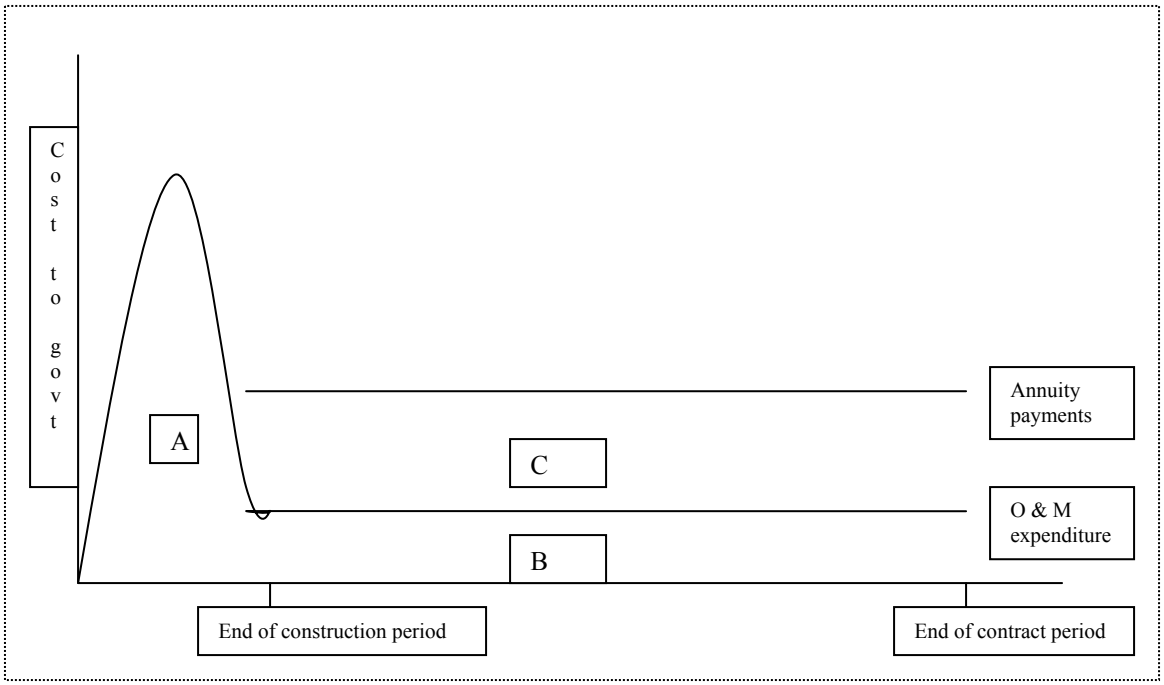
Taking into account the methodology used for calculating value for money in PPPs in the UK, Australia, and South Africa, this study tries to ***establish the counterfactual by relying on the concept of Public Sector Comparator (PSC). The discounted incremental cost of the PPP option is compared to that of traditional public procurement (based on PSC) to arrive at the value for money to the government in such transactions.***

To illustrate, the following methodology has been used to calculate the Value for Money to the government in BOT (annuity) projects:

- Value for Money to the government = Present Value of (estimated Project Cost + estimated O&M expenditure over the life of the contract – Annuity payments).

This methodology is illustrated in the figure below. The government, instead of making lumpy investments at the start of the project for constructing it (area A in Figure 3) and subsequently making small Operation & Maintenance expenditures (area B), is making annuity payments for the duration of the contract (area C). Value for money is given by the area (A+B-C).

Figure 3: Value for Money in BOT (annuity) road projects



Obviously, the above estimation would be based on assumptions about project cost, discount rate, etc. I would examine the robustness of these assumptions through a ***sensitivity analysis*** of my results obtained by changing the important assumptions of my models.

In addition, this study uses ***a variety of other methods for benchmarking PPP offers*** for calculating value for money, depending on availability of concrete information, rather than relying on too many questionable assumptions. There is support in the literature too for benchmarking PPPs. For example, Fitzgerald[117] maintains that the use of a PSC should be discontinued in circumstances where public provision is not a reasonable option going forward (because of, say, fiscal crunch). In such circumstances, the analytic comparison should be against a reference case or a range of benchmarks. The National

[117] Fitzgerald, Peter. 2004. *Review of Partnerships Victoria Provided Infrastructure*. Melbourne, Australia: Growth Solutions Group

Audit Office (2007), UK also benchmarked the ongoing services component of PFI projects. Benchmarking, as used in this study, is the price comparison of the PPP offer against the public sector/ reserve price of equivalent services.

There are obvious limitations in using PSCs[118]: inaccuracy because of poor data availability, subjectivity and dependence on assumptions (sometimes dealt by using a range of estimates through sensitivity analysis rather than using point estimates), omitted risks like that of contract renegotiation, no consensus on discount rate, long-term nature of the contract and the associated uncertainty, and inappropriateness of the benchmark when the public sector does not have the resources to implement the project. These limitations should be kept in mind while evaluating the results of this study.

Overall, the PSC approach is itself not a 'first best' approach but a cost-effective compromise between a full cost-benefit analysis of all project options (as in Germany) and simply selecting the 'best' private bid (as in France) which at the same time ensures that all projects are treated in a like for like way and are subjected to a broadly similar and systematic test for VfM[119]. It would be important to keep in mind that value for money calculations provide a useful, though incomplete, method to evaluate the utility of PPPs. It follows, therefore, that recourse to PPPs in infrastructure projects should not

[118] Leigland, James, and Chris Shugart. 2006. *Is the Public Sector Comparator Right for Developing Countries?* The World Bank: PPIAF Gridlines

[119] Grimsey, Darrin and Mervyn K Lewis. 2005. *Are Public-Private Partnerships value for money? Evaluating alternative approaches and comparing academic and practitioner views.* Accounting Forum 29 (2005) 345-378.

solely be based on the value for money numbers, and should be supplemented by qualitative assessment of evidence from past projects[120].

6. Sector-wise calculation of Value for Money in Indian PPPs

PPP projects would seem to provide immense value for money to the Indian government as the average draw-down on fiscal resources on account of government grants in Indian PPPs is only 4% of project costs[121] *(as against the maximum permissible grant of 40%)****, while a functional asset is created.*** However, some anecdotal evidence is out of sync with this hypothesis. In the case of the Dabhol power project (now known as Ratnagiri Gas and Power Private Limited), the government of India shelled out about $2 billion to buy out a PPP project of about 2000 MW capacity in 2005 and has contracted for power from the project at about US 6 cents per kilowatt hour (kWh). Even now, the project is only partially operational owing to shortage of feedstock. Meanwhile, the project cost is increasing relentlessly imposing a substantial burden on the public sector. As against this, the power price contracted for the ultra mega power projects[122] (UMPPs) is only about US 2.4-4.7 cents per kWh in the 4 UMPPs awarded to

[120] Government of Victoria (Australia), Public Accounts and Estimates Committee. 2006. *Report on Private Investment in Public Infrastructure*

[121] Price Waterhouse Coopers. 2007. *Public-Private-Partnership (PPP) Financing in India*. Report prepared for the World Bank.

[122] Ultra Mega-Power Projects (UMPPs) are large-sized coal-based power projects of about 4,000 MW capacity each being developed on a Build-Own-Operate basis through PPPs involving a capital outlay of about $4 billion. To expedite the implementation of these projects, the Government of India has created shell companies with all pre-implementation clearances (including land acquisition and environmental clearance) and then opened these companies for tariff-based competitive bidding by private parties. The pre-implementation clearances in UMPPs have reduced the project development risks of private parties. UMPPs are expected to use supercritical technology and would be based on pithead (captive blocks) or imported coal (coastal blocks). 4 UMPPs have been awarded to-date.

date[123]. So, the Dabhol project is not value for money to the government.

Similarly, the Delhi-Noida toll bridge project provides a guaranteed annual 20% return on total project cost (TPC), and the TPC has been left open-ended. The project cost has already doubled in the first five years of operations, owing to shortfall in guaranteed returns. A simulation exercise undertaken using the traffic and associated revenue projections for the project showed that starting with a total project cost of Rs. 9.53 billion in 2006, and even if the entire operating surplus were allocated to payment of returns, there would still be a shortfall in returns each year, with the result that the total project cost in 2021 could be about Rs. 118.18 billion[124]. To re-emphasize the point, a project worth $80 million[125] when it was commissioned in 2001 would become a white elephant worth $2.4 billion in 2021 imposing substantial burden on the public sector, and in turn the tax-payers and the customers. This underscores the need for optimal risk sharing between the public and private sectors in PPP contracts and returns to be commensurate with the risks borne by the stakeholders. As the Delhi-Noida toll bridge case study illustrates, PPPs can impose substantial financial burden on the public sector and commensurately result in negative value for money.

Given the above anecdotal evidence, the study attempts a more structured analysis for calculating value for money in some infrastructure sectors of the Indian economy.

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[123] Source: Project Finance International (www.pfie.com)

[124] Government of India (Planning Commission). 2007. *Concession for the Delhi Noida Bridge case study*

[125] An exchange rate of $1 = Rs.50 has been assumed.

Road sector

There was a major move away from 'item rate' contracts to Public-Private-Partnerships (PPP) under build-operate-transfer (BOT) mode for implementing road projects since the beginning of the decade so that scarce budgetary resources could be leveraged to access a larger pool of private capital. In addition, it was also expected that PPP projects would be delivered on time without cost overruns, and the quality of service would improve. To further streamline the mode of implementation of road projects, the Government of India decided in April 2007 that all new projects under different phases of the National Highways Development Program (NHDP) would be taken up on PPP basis by awarding them first on BOT (toll), failing which on BOT (annuity), failing which on engineering-procurement-construction (EPC) basis[126].

On-time and cost effective service delivery are major concerns in Indian road projects. As per the Project Implementation Status Report of Central Sector Projects costing Rs. 0.20 billion and above[127], out of the 211 projects under implementation in the road sector in India, 82 are within time and cost, 125 projects are suffering from time-overrun of 1 month to 92 months, while 19 projects have cost-overruns of an average of 20%. 110 projects are within cost but with time overrun, 4 projects are within time but with cost overrun, and 15 projects are with time and cost overrun.

[126] Government of India, Ministry of Road Transport and Highways. 2009. *Annual Report 2008-09*

[127] Government of India (Ministry of Statistics and Programme Implementation). 2008. *Project Implementation Status Report of Central Sector Projects costing Rs. 20 crore and above (July-September 2008).* (http://mospi.nic.in/mospi_pi_status_report.htm)

As per the Project Implementation Status Report, the main factors contributing to occurrence of time overrun in the road projects have been - adverse law and order situation in states like Bihar and Jharkhand; difficulties experienced in land acquisition in Maharashtra , Karnataka, and Tamil Nadu; difficulty in getting forest clearance in Orissa, UP, and Jammu & Kashmir; removal of large number of structures including places of worship from the alignment of various packages in case of UP, Tamil Nadu and Andhra Pradesh and also removal of various utilities such as water mains, electrical lines, sewer lines, telephone lines, wind mills in Bihar, Karnataka, Maharashtra, West Bengal and Tamil Nadu; pending court cases in West Bengal and Gujarat; slow progress on the part of contractors and non-availability of quarry stone of the desired grade in Bihar and Karnataka; award of contracts without completing formalities of land acquisition, delay in obtaining approval for rail over bridges (ROBs), changes in the design and alignment subsequent to award of contract due to factors such as local soil and geology of the region; inadequate deployment of qualified skilled labor and engineers by contractors at project – sites; poor cash flow position of the contractors due to sharp rise in prices of cement and steel, and difficult geology of the region as in case of packages undertaken in the Deccan region of Maharashtra.

To address some of the reasons for such delays in project implementation, the new Model Concession Agreement for roads in India stipulates that 60% land acquisition and utilities clearance be done by the contracting agency, National Highway Authority of India (NHAI), and passed on to the road developer before the financial closure of the project.

In addition, the NHAI Board in its meeting held in May 2009 decided to award contracts only after Notification under Section 3D(1) of the National Highways Act 1956 is issued for all land to be acquired from private landowners. This Notification vests the land absolutely in the Central Government.

The two major methods for implementing BOT road projects are BOT (annuity) and BOT (toll). The major difference between these two relates to allocation of traffic risk, which is assumed by the government in the former to make the project attractive to the private sector, while it remains with the concessionaire in the latter case.

BOT (annuity) projects: In such projects, construction, operation, and maintenance are to be performed by the concessionaire who gets annuity payments determined by competitive bidding to recover his investment. Annuity payments are borne by the public sector in the form of deferred budgetary payments and the concessionaire receives a fixed sum directly from the contracting agency, NHAI, biannually for the services provided by the road over the life of the contract. At present, 24 BOT (annuity) projects have been executed/ are under execution for a total road length of 1,340 km in India. The total cost of these projects is estimated at Rs.92.06 billion (see Table 3).

Table 3: BOT (Annuity) based projects in India

	Awarded				Completed	
Category	No. of contracts	Length (km)	Total Project Cost (Rs. billion)	Annuity (Rs. billion)	No. of contracts	Length (km)
NHDP-I	8	476	23.54	2.88	8	476
NHDP-II	16	864	68.52	6.02		
Total	24	1340	92.06	8.90	8	476

NHDP: National Highways Development Program is the flagship program for the development of roads of the Government of India. NHDP Phase I connects the four mega-cities of Mumbai, Chennai, Kolkata, and Delhi. NHDP Phase II connects the East-West and North-South extremities of the country.
Source: Government of India (Department of Road Transport & Highways). 2007. Presentation on PPPs in

We have analyzed all 8 BOT (annuity) projects under NHDP Phase I that are under operation. The following assumptions have been made in the value for money (VfM) analysis for BOT (annuity) road projects using the simplified Public Sector Comparator (PSC) method:

- The estimated project cost by NHAI is increased by 25% on account of optimism bias[128]. Project implementation is spread over three years ending in the planned year of completion in the ratio 1:2:2.
- Operation and maintenance (O&M) costs is Rs.1 million per km per year[129] at constant prices.
- The project revenues for the concessionaire consist of annuity only[130].The annuity payments are made for 15 years after the construction period of 3 years, unless otherwise stated.
- Discount rate is 11% (6% on account of time value of money[131], corresponding to the yield on treasury bonds of comparable maturity at the time the projects were

[128] Column 4 of tables 4 and 5 show the estimated project cost by the contracting agency, NHAI. Optimism bias in project estimates arises from underestimating project costs and duration or overestimating project benefits. We assume (conservatively) an optimism bias of 25% in the NHAI estimates on the basis of data on 4 projects [2 BOT(annuity) projects and 2 BOT (toll) projects] where the average difference between the estimated project cost and the cost at financial closure was 39.5%. These projects are: Nellore Bypass (optimism bias 19%), Maharashtra Border-Belgaum (78%), Nellore-Tada (15%) and Tumkur - Neelmangala (46%); see Report of the Core Group on Financing of the National Highway Development Programme (http://www.pppinindia.com/pdf/NHDP.pdf) for phasing of the construction cost.

[129] Report of the Core Group on Financing of the National Highway Development Programme (http://www.pppinindia.com/pdf/NHDP.pdf) page 23.

[130] Government of India (Department of Road Transport and Highways). *Model Concession Agreement for Annuity-Based Projects* (http://www.nhai.org/annuity.pdf)

[131] The UK public sector authorities also assessed projects with a 6% real discount rate until recently.

awarded, plus 5% on account of inflation, which corresponds to the actual historical rate of inflation in the country).

We do not account for toll collection after completion of these BOT (annuity) projects as the tolling option would be available to the government even with conventional procurement of the project. The asset residual value of PPP project is not taken into account because it is assumed to be the same as under the PSC option to keep the VfM estimate conservative. We do not adjust for differential taxation and transaction costs of the PPP projects for simplification.

As already stated, the following methodology has been used to calculate value for money to the government in BOT (annuity) projects:

- Value for Money to the government = Present Value of (estimated Project Cost + estimated O&M expenditure over the life of the contract – Annuity payments).

The results of the analysis are presented in Table 4 below. Overall, there is a positive value for money to the government from these 8 projects (about 8% of the present value of estimated project and O&M costs).

Table 4: Value for Money in NHDP Phase I for BOT (annuity) projects

Road Stretch	State	Road length (km)	Project cost (Rs. million)	Semi-annual annuity payments (Rs. million)	Value for money (Rs. million)	Value for money (as % of PV of project and O&M costs)	Date of commencement of construction	Due for completion	Date of completion
Ankapalli – Tuni	Andhra Pradesh	59	2,832	294.8	911	23%	May 2002	Nov 2004	Jan 2005
Tuni – Dharmavaram	Andhra Pradesh	47	2,319	279.1	329	10%	May 2002	Aug 2005	Aug 2005

Dharmavaram – Rajahmundry	Andhra Pradesh	53	2,060	296.2	-48	-2%	May 2002	Mar 2005	Mar 2005
Nellore Bypass*	Andhra Pradesh	17	1,432	129.6	421	22%	Oct 2002	Oct 2004	Sep 2004
Maharastra Border-Belgaum**	Karnataka	77	3,320	505.1	-482	-10%	June 2002	Dec 2004	Oct 2004
Tambaram – Tindivanam***	Tamil Nadu	93	3,750	418.6	964	17%	May 2002	Nov 2004	Oct 2004
Panagarh – Palsit	West Bengal	64	3,500	555	-1,011	-21%	June 2002	Dec 2004	June 2005
Palsit – Dankuni	West Bengal	65	4,324	400	1542	27%	Oct 2002	Feb 2005	July 2005
Total for 8 projects		476	23,537	2,878	2,624	8%			

* Contract period of 17 years with construction over 2 years and O&M over the next 15 years.
** Contract period of 15 years with construction over 2.5 years and O&M over the next 12.5 years.
*** Contract period of 17.5 years with construction over 2.5 years and O&M over the next 15 years.
Source: India PPP Database (http://www.pppindiadatabase.com); Comptroller and Auditor General of India. 2008. Union Audit Reports: *Public-Private Partnership in implementation of road projects of National Highways Authority of India* (Performance Audit - Report 16 of 2008). (http://www.cag.gov.in/html/reports/commercial/2008_PA16com/contents.htm); NHAI website - NHAI Contracts with BOT-Annuity Funding (http://203.200.117.60/CPISWeb/Reports/ViewReport.aspx). Value for money calculations are those of the author.

The estimate of the value for money to the government is conservative for a number of reasons. Though we have assumed an optimism bias of 25% in the cost estimates of NHAI, the actual optimism bias could be higher. In the case of Nellore Bypass project, the estimated project cost was Rs.1,432 million, while the project cost at financial close was Rs.1,700 million (an optimism bias of 18.7%). Similarly, estimated project cost for Maharashtra Border-Belgaum project was Rs.3,320 million, while the project cost at financial close was Rs.5,905 million (an optimism bias of 77.9%). If there is optimism bias, area A of Figure 2 would be larger than what it is with a concomitant positive impact on VfM.

In addition, conventionally procured road projects are routinely delayed (59% projects are delayed, with delays of 1 month to 92 months)[132], while the timeliness of delivery of the BOT (annuity) projects seems to be better. 3 projects were delivered before their scheduled delivery time (Nellore Bypass, Maharastra Border-Belgaum, and Tambaram - Tindivanam road) for an average of 1.67 months while 3 suffered slippages (Ankapalli – Tuni, Palsit – Dankuni, and Panagarh – Palsit) of an average of 5.67 months, and the balance 2 were delivered on time. Even here, the Comptroller and Auditor General (CAG) of India has observed[133] that in the case of Panagarh-Palsit project, there was a delay of 5 months in making the required land available and finalizing the issue of change of scope orders. So, this may not be treated as a case of concessionaire default.

As stated earlier, 9% of the traditionally procured projects are suffering from cost-overruns of an average of 20%. But, the incidence of cost-overruns could be higher. As per a recent World Bank study[134], the average cost-overrun was 24% in 28 recently completed national and state highway projects. The risk of cost-overrun to the government under PPP procurement may be limited as construction cost risk is transferred to the private sector. As per the pioneering UK study[135], projected savings of

[132] Government of India (Ministry of Statistics and Programme Implementation). 2008. *Project Implementation Status Report of Central Sector Projects costing Rs. 20 crore and above (July-September 2008).* (http://mospi.nic.in/mospi_pi_status_report.htm)

[133] Comptroller and Auditor General of India. 2008. Union Audit Reports: *Public-Private Partnership in implementation of road projects of National Highways Authority of India* (Performance Audit - Report 16 of 2008). (http://www.cag.gov.in/html/reports/commercial/2008_PA16com/contents.htm)

[134] World Bank. 2008. *Indian Road Construction Industry: Capacity Issues, Constraints, and Recommendations.* Washington DC: The World Bank

[135] Arthur Andersen and Enterprise LSE. 2000. *Value for Money Drivers in the Private Finance Initiative*, a report commissioned by The Treasury Taskforce.

17% in PPP projects are sensitive to risk transfer valuation that accounted for 60% of the forecasted cost savings. The risk that attracted the highest valuation is that of construction cost overruns.

Consolidating over 14 studies for UK, Australia, France, and Norway, Bain[136] finds that the average construction cost overrun in PPPs (at 13%) is around half that observed in conventionally procured projects, and the range of outturn costs is significantly narrower (see Table 5 below). Even this construction cost overrun does not represent a risk to the public sector as Bain finds that experienced PPP contractors with strong balance sheets and reputations will complete their obligations as intended and at their own risk. To illustrate the point, Bain says that in the case of Spencer Street Station PPP in Melbourne, the contractor (Leighton) admitted that it had suffered significant losses yet it completed the works with no additional payments from the public sector.

Table 5: Construction cost overrun (conventional procurement vs PPPs) consolidated over 14 studies

	Conventional procurement	PPPs
Maximum	98%	20%
Average	25%	13%
Minimum	-9%	-4%

Source: Bain, Robert. 2010. *Construction Risk - What risk?* Project Finance International (www.pfie.com)

All these factors (optimism bias in cost estimates, timeliness of delivery, and limited risk of cost-overrun) would improve the overall VfM. Finally, given the fiscal crunch, it may not have been possible for the government to undertake all these projects. So, the overall economic benefits should be much higher.

We also carried out sensitivity analysis of value of money to changes in discount rate and

[136] Bain, Robert. 2010. *Construction Risk - What risk?* Project Finance International (www.pfie.com)

optimism bias. We found that the value of money in BOT (annuity) projects is very sensitive to discount rates (see Table 6 below). With an assumed optimism bias of 25%, the VfM increases to 20% from 8% if we increase the discount rate from 11% to 13%, while it decreases to -7% if we decrease the discount rate to 9%. This is because of the impact of the discount rate on large future annuity liabilities in such PPPs.

Table 6: Sensitivity Analysis of VfM in BOT (annuity) projects

		Optimism bias		
		15%	**25%**	**35%**
Discount rate	**9%**	-14%	-7%	-1%
	11%	2%	8%	13%
	13%	15%	20%	25%

This disproportionate impact of discount rate on VfM is in line with what was found in the Australian evaluation[137] of PPPs where opposite conclusions were reached when using a 8.65% discount rate (leading to the conclusion that the PPP mechanism was 9% cheaper than traditional delivery) compared to an evaluation adopting a 5.7% discount rate (when the PPP mechanism was apparently 6% more expensive).

BOT (toll) Projects: BOT (toll) projects are the preferred mode of implementing PPP road projects in India apparently because no annuity payments need to be made and the traffic risk is borne by the concessionaire [as opposed to BOT (annuity) projects where traffic risk is borne by the government]. In these projects, the concession includes construction, operation and maintenance by the concessionaire and the investment is recovered through toll revenues. Budgetary support is restricted to an upfront grant to the concessionaire determined through competitive bidding and is up to a maximum of 40%

[137] Fitzgerald, Peter. 2004. *Review of Partnerships Victoria Provided Infrastructure*

of the project cost. This upfront grant is expected to compensate the concessionaire for undertaking projects that are economically viable but fall below financial viability threshold because of externalities that the market is not able to capture.

So far 94 projects valued at about Rs.381.70 billion have been awarded on BOT (toll) basis. Out of these, 43 projects have been completed and 51 projects are under progress[138]. We have analyzed all 9 BOT (toll) projects under NHDP Phase I that are under operation. It is important to choose operational projects as promised benefits may not always materialize. Thus, the BOT (annuity) and BOT (toll) road projects analyzed in this chapter constitute the entire universe of such projects implemented under NHDP Phase I. Selection bias in projects considered for analysis is addressed by considering all BOT (annuity) and BOT (toll) projects implemented under NHDP Phase I. But, only the more viable projects may have been considered for bidding out, so selection bias remains.

The assumptions used in the analysis are the same as for BOT (annuity) projects presented above, except the following additional assumptions about tolls and upfront grant (viability gap funding):

- Tolls are foregone by the government in favor of the concessionaire in such projects. Toll collection has been assumed to be Rs.4 million per km per annum[139]

[138] Government of India (Ministry of Road Transport and Highways). 2009. *Annual Report 2008-09*

[139] Total toll collection during Indian financial year 2008-09 was Rs.26.13 billion. The average annual collection made through toll roads works out to Rs.4.06 million per km. [Reply to Rajya Sabha (Upper House of Indian Parliament) Question No. 539; replied on July 08, 2009]. Data availability in terms of level of detail has limited our ability to draw sharper conclusions. In the case of BOT (toll) roads, we had to use the national average toll collection rate as the value of tolls foregone by the government in favor of the concessionaire, which could possibly have led to an over-estimation of value for money from such projects on this count. If we had more detailed information (i.e., project-specific toll collection rate), it would have

(in constant terms[140]). The growth rate of toll revenue has been assumed to be 6% per annum on account of traffic growth. 60% of the potential toll receipts have been considered[141].

- Equity brought in by the concessionaire is spread over 3 years in proportion to progress in construction of the project and is assumed to be in the ratio 1:2:2. Since viability gap funding (upfront grant) is released in proportion to the equity brought in by the concessionaire, we assume the same spread for it.

The methodology for calculating VfM stands slightly modified given the nature of BOT (toll) projects wherein the toll receipts are the returns to the concessionaire instead of annuity payments from the government:

- Cost savings to government = Present value of (estimated Project Cost + estimated O&M expenditure over the life of the project – Viability Gap funding)
- Value for Money to the government = Cost savings to government - present value of potential toll receipts.

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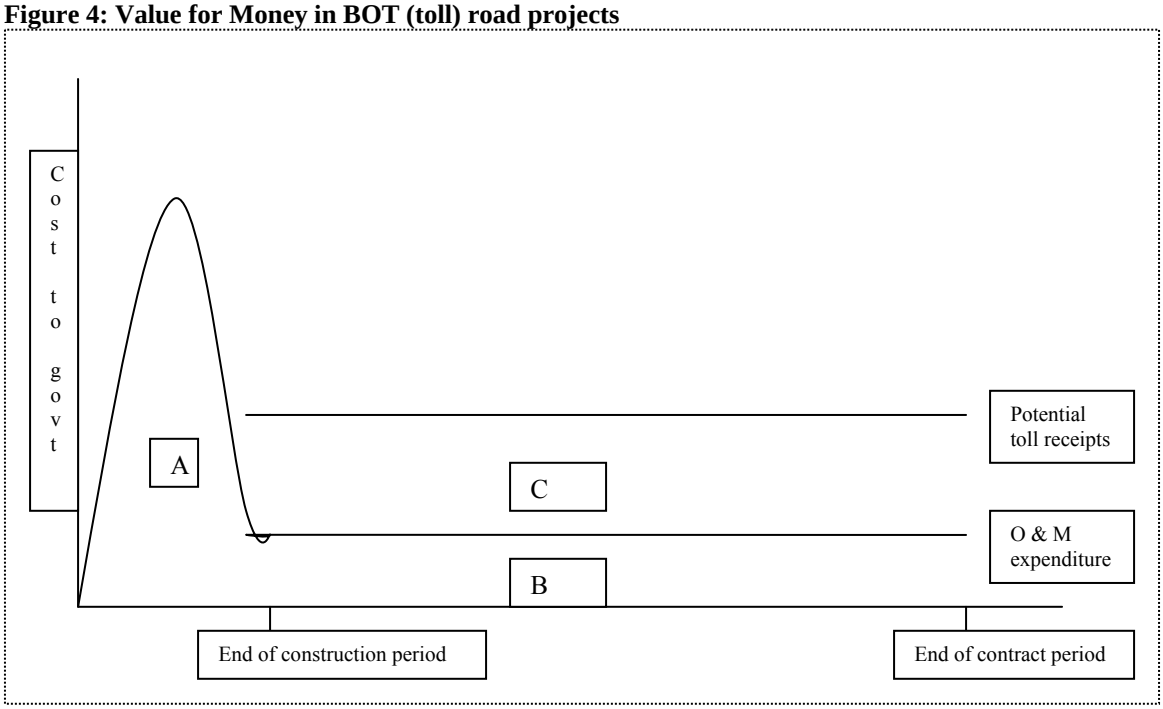
been possible to use a more realistic counterfactual, which could have led to a better value for money estimate.

[140] The annual increase in toll rates is to the full extent of the inflation rate as can be inferred from the following: The fee collection on Delhi-Gurgaon BOT project started from 25.01.2008 on the basis of Wholesale Price Index (WPI) of December, 2006 (208.40). The fee rates have since been increased twice. The first revision of 3.98% increase was made from 1st April, 2008 (based on WPI of 216.7 for the week ending on or nearest to 31st December, 2007). The second revision of 5.77% increase has become effective from 1st April, 2009 (based on WPI of 229.20 for the week ending on or nearest to 31st December, 2008). [Reply to Rajya Sabha (Upper House of Indian Parliament) Question No. 542; replied on July 08, 2009].

[141] As quoted in The Economic Times. May 1, 2009. According to the Committee on Infrastructure (Government of India), NHAI could put up toll facilities only on 58.7% of 11,037 km of completed highways across the country. In our sample of 17 BOT projects, while the private sector could put up toll facilities in all 9 BOT (toll) projects, the public sector was able to put up toll facilities on only 4 of the 8 BOT (annuity) projects, with no toll facilities on the following projects: Tuni-Dharmavaram, Dharmavaram-Rajahmundry, Nellore Bypass, and Panagarh-Palsit projects. [Reply to Lok Sabha (Lower House of Indian Parliament) Question No. 1869; replied on December 1, 2009].

The methodology is illustrated in Figure 3 below. The government, instead of making lumpy investments at the start of the project for constructing it (area A in Figure 3) and subsequently making small O&M expenditures (area B), is giving up the option of tolling these roads for the duration of the contract (area C) in favor of the concessionaire. Adjustment is made to the project cost on account of viability gap funding sought from the government. Value for money is given by (A+B-C).

Figure 4: Value for Money in BOT (toll) road projects



The results of the analysis are presented in Table 7 below.

Table 7: Value for Money in NHDP Phase I BOT (toll) projects

Road Stretch	State	Road length (km)	Project cost (Rs. million)	Viability Gap Funding (Rs. million)	Value for money (Rs. million)	Value for money (as % of PV of project and O&M costs)	Date of commencement	Due for completion	Date of completion
Nandigama - Vijayawada	Andhra Pradesh	35	1386.50	402	-145	-6%	Aug 2001	Dec 2003	June 2004
Nellore - Tada (AP-7)	Andhra Pradesh	110.5	6213.50	1273	1,570	16%	Aug 2001	Dec 2003	Feb 2004
Tumkur - Neelmangala	Karnataka	32.5	1550	248.3	722	32%	June 2002	Dec 2003	Dec 2003

Satara - Kagal	Maharashtra	133	6000	2400	-514	-5%	Feb 2002	Aug 2004	May 2006
Mahapura (near Jaipur) - Kishangarh	Rajasthan	90.38	6440	2110	3,106	36%	April 2003	Sep 2005	March 2005
Rail Over Bridge at Kishangarh	Rajasthan	1	180	166.60	53	25%	March 1998	Feb 2000	Feb 2000
Vivekananda Bridge and Approach	West Bengal	6	6410	1200	5,802	80%	Sept 2002	Apr 2007	June 2007
Durg Bypass	Chhattisgarh	18	700	0	94	8%	March 1999	Jan 2001	Jan 2001
Delhi-Gurgaon Highway	Delhi	28	7100	(-) 610	7,728	93%	Apr 2002	July 2005	Jan 2008
Total for 9 projects		454	35,980	7189.30	18,416	36.4%			

Source: India PPP Database (http://www.pppindiadatabase.com); Comptroller and Auditor General of India. 2008. Union Audit Reports: *Public-Private Partnership in implementation of road projects of National Highways Authority of India* (Performance Audit - Report 16 of 2008). (http://www.cag.gov.in/html/reports/commercial/2008_PA16com/contents.htm); NHAI website - NHAI Contracts with BOT Funding (http://203.200.117.60/CPISWeb/Reports/ViewReport.aspx). Value for money calculations are those of the author.

We find that the Value for Money in our sample of BOT (toll) projects is 36.4% of the present value of estimated project and O&M costs. However, this estimate of VfM in BOT (toll) road projects is conservative for the same reasons as in BOT (annuity) projects:

- Higher than assumed optimism bias in cost estimates: There was an optimism bias in cost estimates of 15% and 46% respectively in at least two of these projects (Nellore-Tada and Tumkur - Neelmangala) given by the difference in the NHAI project cost estimate and the cost at financial closure;
- Timeliness of delivery of PPP projects: We find that traditionally procured road projects are routinely delayed (59% projects are delayed, with delays of 1 month to 92 months)[142]. Out of the 9 BOT (toll) projects considered, we find that 1 was

[142] Government of India (Ministry of Statistics and Programme Implementation). 2008. *Project Implementation Status Report of Central Sector Projects costing Rs. 20 crore and above (July-September 2008).* (http://mospi.nic.in/mospi_pi_status_report.htm)

delivered before time, 3 were delivered on time, while 5 suffered a time overrun of an average of 12.2 months. However, the CAG report[143] observes that in the case of the Satara - Kagal road, out of the overall delay of 21 months, there was delay of 9 months in execution of additional items of work and the balance delay of 12 months in completion of the project was due to deficient performance of the concessionaire. In the case of Delhi-Gurgaon Highway, failure to provide land to the concessionaire in time and delay of 26 months in issuing orders for change of scope of work for Rs.1466.20 million by the NHAI contributed to the delay in completion of the project. If allowance for such delays that were not a result of deficient performance of the concessionaire is made, the time over-run in the case of the entire sample of BOT (toll) projects decreases to just over 2 months.

- As stated earlier, the risk of cost-overrun in PPPs may be limited as construction cost risk has been transferred to the private sector.

All these factors (higher than assumed optimism bias in cost estimates, timeliness of delivery, and limited risk of cost-overrun) would improve the overall VfM. Finally, given the fiscal crunch, it may not have been possible for the government to undertake all these projects. So, the overall economic benefits should be much higher.

We also carried out sensitivity analysis of value for money over potential toll receipts and optimism bias. The results are presented in the table 8 below. If we assume collection of

[143] Comptroller and Auditor General of India. 2008. Union Audit Reports: *Public-Private Partnership in implementation of road projects of National Highways Authority of India* (Performance Audit - Report 16 of 2008). (http://www.cag.gov.in/html/reports/commercial/2008_PA16com/contents.htm)

100% potential toll receipts, *ceteris paribus*, the VfM from BOT (toll) projects declines to just 2.5% at the assumed optimism bias of 25%.

Table 8: Sensitivity Analysis of Value for Money in BOT (toll) projects

		Collection ratio of potential tolls		
		60%	**80%**	**100%**
Optimism bias	**15%**	32.2%	14.0%	-4.1%
	25%	36.4%	19.4%	2.5%
	35%	40.2%	24.2%	8.2%

The weighted average VfM from 8 BOT (annuity) projects and 9 BOT (toll) projects that constitutes the entire universe of such projects in NHDP Phase I is 25.1%. This will increase with increasing optimism bias and discount rate. However, it will decrease, ironically, with increase in the collection ratio of potential tolls. But, this stands to reason as increased efficiency of government (reflected in increased collection ratio of potential tolls) would reduce the differential advantage of the private sector performing the same tasks.

The Government of India assigns priority to BOT (toll) mode of procurement of road projects over BOT (annuity) projects[144]. Our results confirm this priority on the basis of value for money to the government.

Overall, the following conclusions follow from our analysis of road PPP projects:

- There is value for money to the government in road PPP projects (average 25%). However, not all PPP projects provide positive value for money. So, government

[144] See, for example, Government of India (Planning Commission). 2006. *Report of the Core Group on Financing of the National Highway Development Programme.* (http://www.pppinindia.com/pdf/NHDP.pdf)

should be mindful of the six key drivers of value for money in PPP projects[145] [risk transfer, the long term nature of contracts (including whole life costing), the use of an output-based specification, competition, performance measurement and incentives, and private sector management skills], which should be harnessed to improve VfM from PPP projects. The CAG has also emphasized that there is room for improvement in the following areas by the contracting authority, NHAI, so as to be able to realize increased VfM: monitoring and taking corrective action for timely project execution and ensuring that agreement clauses relating to levy of penalty are implemented in spirit[146].

- PPP projects perform significantly better in terms of timeliness of delivery: 59% of projects are delayed in conventional procurement while 47% of projects are delayed in PPPs. Another important point to note is that a quarter of the PPP projects in our sample were delivered before their due date. In addition, the delay in many cases is due to factors not in the control of the concessionaire. BOT (annuity) projects perform significantly better than BOT (toll) projects in terms of timeliness of delivery.
- There is limited problem of cost-overrun in PPPs as construction cost risk is passed on to the private sector. As per the policy of the government, escalation due to delays is paid as per contract provision. In case the project is delayed due to reasons attributable to the concessionaire, liquidated damages are imposed and

[145] Arthur Andersen and Enterprise LSE. 2000. *Value for Money Drivers in the Private Finance Initiative*, a report commissioned by The Treasury Taskforce.

[146] The CAG report points out that although concession agreements provide for levy of penalties for deficient/ nonperformance, NHAI failed to impose penalty of Rs.282.30 million due in three out of eight projects test-checked. Also, the NHAI did not incorporate the clause for recovery of penalty towards non-achievement of financial closure and target dates for individual milestones in BOT (annuity) projects.

no escalation is paid. Escalation is paid only in case where the delay is beyond the control of the concessionaire[147].

- One of the important reasons for involving the private sector in infrastructure provision was to ensure superior quality service. As per the CAG Report[148], quality checks conducted by Central Road Research Institute (India) in six road projects revealed that the pavement surface condition was generally found to be satisfactory in all the projects.
- Sensitivity analysis of our results shows that value for money to the government in PPPs increases with increasing discount rate (owing to large future annuity liabilities in such PPPs) and optimism bias, and, ironically, reduction in the assumed efficiency of toll collection by the government.

However, the value for money calculations in the road sector is subject to an important caveat. It is not true that the selection of projects to be implemented by the public sector and the private sector is a random process. If there is a qualitative difference between the projects that are implemented by the public sector and the private sector, we cannot be sure that the 'net benefits' from PPP projects are for real or merely reflecting qualitative differences among projects in the sense that the private sector is cherry-picking the better projects for implementation. This endogeneity issue has not been dealt in this chapter and is game for future research (more on this later).

[147] Reply to Lok Sabha (Lower House of Indian Parliament) Question No. 1371; replied on 07.14.2009.

[148] Comptroller and Auditor General of India. 2008. Union Audit Reports: *Public-Private Partnership in implementation of road projects of National Highways Authority of India* (Performance Audit - Report 16 of 2008). (http://www.cag.gov.in/html/reports/commercial/2008_PA16com/contents.htm)

Power sector

Cost- and time-overruns are major issues in the power sector. As per the Project Implementation Status Report of Central Sector Projects costing Rs. 0.20 billion and above[149], out of the 66 projects under implementation in the power sector, 29 are within time and cost, 21 projects have cost-overruns of an average of 13% while 31 projects are suffering from time-overrun of 1 month to 68 months. 6 projects are within time but with cost overrun, 15 projects are within cost but with time overrun, and 16 projects are with time and cost overrun. As per the Report, even the strongest public sector undertaking, NTPC has many projects that are suffering from time overruns (Koldam Hydroelectric – 23 months; Kahalgaon Thermal – 19 months; Sipat Thermal Stage I – 3 months; Sipat Thermal Stage II – 8 months; Barh Thermal – 19 months). Time overruns could be related to land acquisition problems, financing issues, fuel availability and linkages (shortage of coal), delays in environmental and forest clearances, and fragmentation of authority between states and the federal government with regard to environmental clearance, etc.

One of the new initiatives in the power sector is the setting up of Ultra Mega Power Projects (UMPPs). UMPPs are large-sized power projects each of about 4,000 MW capacity being developed on a Build-Own-Operate basis involving a capital outlay of

[149] Government of India (Ministry of Statistics and Programme Implementation). 2008. *Project Implementation Status Report of Central Sector Projects costing Rs. 20 crore and above (July-September 2008).* (http://mospi.nic.in/mospi_pi_status_report.htm)

about $4 billion each and are being developed without any guarantees as opposed to the power policy in the mid-1990s when guarantees were extensively used. To reduce project development risks, shell companies with most pre-implementation clearances (including land-acquisition, fuel and water linkage, and environmental clearance) are first created for these coal-based UMPPs and then these companies are opened for tariff-based competitive bidding by private parties. These shell companies (special purpose vehicles, SPVs), are subsequently transferred to the successful bidder. UMPPs are expected to use supercritical technology resulting in higher fuel efficiency and lower greenhouse gas emissions and would be based on pithead (captive blocks) or imported coal (coastal blocks).

The price bid of NTPC, a state-owned enterprise, in UMPPs can provide a benchmark for the value for money calculations in the power sector. NTPC submitted bids for the Sasan UMPP and the Tilaiya UMPP (both awarded to Reliance Power). So, we can use the price of the winning bidder vis-a-vis that of NTPC to arrive at an estimate of the value for money in power sector PPPs.

Table 9: Value for money in Power sector PPPs

	Public Sector Comparator (NTPC Ltd)	Winning bidder (Reliance Power Ltd)	Percent saving as compared to PSC
Sasan UMPP (levelized tariff Rs./ kwh)	2.13	1.20	44
Tilaiya UMPP (levelized tariff Rs./ kwh)	2.30	1.77	23

Source: For Sasan UMPP, Rajya Sabha Unstarred Question No. 1624 answered on August 27, 2007; For Tilaiya UMPP, newspaper reports.

There appears to be clear value for money in the power sector from private participation (at least 23% cost saving as compared to the public sector comparator). However, one

would have to wait and watch whether the private projects become operational at these tariffs. It may just be a case of aggressive bidding and the private sector may think that it may be possible to renegotiate tariffs after award. Here it may be useful to remember that Maharashtra State Electricity Board bought power in the period May 1999 to December 2000 at an average rate of Rs.4.69 per kWh[150] from the Dabhol Power Company (the only canceled PPP power generation project in India) compared to the projected tariff of Rs.2.40 per kWh and Rs.1.89 per kWh at the time of signing the original Power Purchase Agreement (PPA) and the amended PPA in 1993 and 1996 respectively. In this regard, it may also be useful to remember that Guasch[151] has found the incidence of renegotiation to be 30% for infrastructure projects in the Latin America and Caribbean region granted over the period 1985-2000. So, the results after commencement of operations would have to be watched.

However, what is making the deal credible is that the Rs.145 billion ($2.9 billion) debt facility for the 4,000 MW Sasan UMPP of Reliance Power was inked on April 21, 2009. The project has been funded on a debt equity ratio of 75:25. This is the second UMPP that has achieved financial close, after that of Mundra UMPP of Tata Power. SBI Capital is leading the financing of the domestic facilities, which have tenors ranging from 15 to 20 years, slightly longer than the earlier 13 to 19 years maturity. Interest rate stays at

[150] Rao S L. 2001. *Dabhol, Godbole Report and the Future*. Economic and Political Weekly.

[151] Guasch, J. Luis. 2004. *Granting and renegotiating infrastructure concessions: Doing it Right*. Washington DC: The World Bank

11.75%, which is based on the SBI Prime Lending Rate. It is the largest project finance deal in India and the largest project to-date under the PPP route[152].

The tariffs in the four UMPPs bid out till now may be seen in the table below. It would appear that there is substantial value for money to the government from these power projects as the tariffs of the winning bidders are in the range of US 2.40 cents to US 4.66 cents per kWh, which is clearly low.

Table 10: Tariffs in Ultra-Mega Power Projects

Project	Capacity (MW)	Sponsor	Location	Fuel	Offtaker	Tariff (Rs/ kWh)	Status
Mundra UMPP	4,000	Tata Power	Gujarat	Imported coal	Multiple states	2.26	Under construction
Sasan UMPP	4,000	Reliance Power Ltd	Madhya Pradesh	Pit-head captive coal	Multiple states	1.20	Under construction
Krishnapatnam UMPP	4,000	Reliance Power Ltd	Andhra Pradesh	Imported coal	Multiple states	2.33	Financial close due
Tilaiya UMPP	4,000	Reliance Power Ltd	Jharkhand	Captive coal	Multiple states	1.77	Financial close due

Source: Project Finance International (www.pfie.com)

Port sector

In consonance with its economic liberalization policy, the Government of India has opened up its major ports for private sector participation in a big way to augment resources, induct latest technology, improve managerial practices, and speed up creation of capacities. Foreign direct investment up to 100% under automatic route is permitted for construction and maintenance of ports and harbors. In the port sector, 16 private projects worth about Rs.43 billion are already operational. These 16 projects include 6 container terminals, 4 liquid cargo berths, 5 dry bulk cargo berths, and a container freight station (Kandla).

[152] Project Finance International (www.pfie.com)

The problem of time and cost-overruns in the Indian port sector is quite severe and widespread. As per the Project Implementation Status Report of Central Sector Projects costing Rs. 0.20 billion and above[153], out of the 41 projects under implementation in the shipping and ports sector, 15 are within time and cost, 13 projects have cost-overruns of an average of 50% while 19 projects are suffering from time-overrun of 4 months to 96 months. 7 projects are within time but with cost overrun, 13 projects are within cost but with time overrun, and 6 projects are with time and cost overrun.

Some of the Chennai Port Trust projects have suffered a time overrun of 74 months while the number is 79 months for Cochin Port Trust projects. Similar delays in other port projects have been reported: Kolkata Port Trust (23 months delay), Jawaharlal Nehru Port Trust (4 months delay), Kandla Port Trust (96 months delay and 80% cost overrun), Mormugao Port Trust (94 months delay), New Mangalore Port Trust (24 months delay), Paradeep Port Trust (19 months delay and 64% cost overrun), Tuticorin Port Trust (8 months delay and 11% cost overrun), and Visakhapatnam Port Trust (24 months delay and 50% cost overrun).

Some of the private sector terminals are running side-by-side with the public sector facilities. One can estimate the counterfactual by looking at the capital and operating costs of the private and public sector facilities. The Jawaharlal Nehru Port Trust (JNPT), Mumbai granted a contract for the construction, operation and maintenance of a new 600

[153] Government of India (Ministry of Statistics and Programme Implementation). 2008. *Project Implementation Status Report of Central Sector Projects costing Rs. 20 crore and above (July-September 2008).* (http://mospi.nic.in/mospi_pi_status_report.htm)

meter length container terminal for a period of 30 years on Build, Operate and Transfer (BOT) basis to Nhava Sheva International Container Terminal (NSICT). This facility is running side-by-side with the JNPT public sector terminal. The total project cost of NSICT is Rs. 9.75 billion. The bid criteria were Minimum Guaranteed Throughput and Royalty per TEU (Twenty Feet Equivalent Unit). Royalty per TEU varies from Rs.47 in year 3 to Rs. 5,610 in year 30.

One of the 2005 orders of Tariff Authority for Major Ports (TAMP[154]) implied that the operating costs of NSICT were considerably lower compared to the public sector terminal operated by JNPT. However, the benefit from lower operating costs was appropriated by the private sponsors of NSICT through higher than warranted tariffs[155]. Thus, no net VfM accrued to the government or the users on account of lower operating costs of the PPP project. The VfM appropriated by the sponsors was manifested in supernormal returns to the private investor as shown in the table below:

Table 11: Return on equity (%) in Nhava Sheva International Container Terminal

	2000-01	2001-02	2002-03	2003-04	2004-05
Actual Return on Equity earned	22	62	103	102	104

Source: Government of India, Planning Commission. 2007. *Case Study on Concession for Nhava Sheva International Container Terminal.*

NSICT had derived surplus revenue of Rs. 4.73 billion during 2000-01 to 2004-05, which was to be set off in the revision of tariff. Had TAMP initiated *suo-moto* revision prior to 2005, the tariff would have been reduced by 30% due to setting off of entire surplus

[154] TAMP has been set up under the Major Port Trusts Act, 1963 as an independent statutory authority to fix user tariffs and scale of rates for the facilities and services in the major ports.

[155] See Planning Commission (2007) *Case Study on Concession for Nhava Sheva International Container Terminal,* where it is stated that despite admitting that a reduction of 30% in NSICT tariff is warranted, Tariff Authority for Major Ports (TAMP) reduced the tariffs by only 14% to bring it to JNPT level.

revenue of Rs. 4.73 billion, but the tariffs were reduced only by 14%. In addition, the TAMP in its order dated 22 July 2005 allowed entire royalty paid by NSICT to JNPT during 2000-01 to 2004-05 as cost in computation of revised tariff in 2005. Thus the entire burden of paying the royalty was transferred to the port users and the NSICT got undue gain. When the Ministry of Shipping objected to the order of TAMP allowing entire royalty as cost, TAMP revised its order and further reduced the tariff by 12%. However, undue benefit, accrued during 2005-06 due to wrong computation of tariff, was allowed to be retained by the NSICT[156].

This excess return to the project sponsors reflects poor regulatory capacity. When the bid criterion was the Royalty per TEU paid to the exchequer, allowing this as a pass through by the regulator, "signals a serious breach of law and contract in that the original selection criterion was changed ex post, to the benefit of the licensee, after awarding the tender,"[157] and to the detriment of the users. The Planning Commission study goes on to say that "the markup in tariff as a result of the unrequited payments would be in the vicinity of 60%. In other words, for every TEU handled, port users paid a rate that was nearly 60% higher than that permissible."

As per the pioneering UK study[158], there are six key drivers of value for money in PPP projects: risk transfer, the long term nature of contracts (including whole life costing), the

[156] Reply to Lok Sabha (Lower House of Indian Parliament) Question No. 2802; Replied on 12.07.2009

[157] Planning Commission. 2007. *Case Study on Concession for Nhava Sheva International Container Terminal.*

[158] Arthur Andersen and Enterprise LSE. 2000. *Value for Money Drivers in the Private Finance Initiative*, a report commissioned by The Treasury Taskforce.

use of an output-based specification, competition, performance measurement and incentives, and private sector management skills. However, as per the Planning Commission case study, the NSICT Concession Agreement did not specify any performance norms or delivery standards to protect user interests. Moreover, no penalties have been levied for shortfalls in performance.

To analyze the matter further, a comparison of container charges between JNPT and NSICT was carried out (see Table 12 below). NSICT's charges were found to be uniformly higher than JNPT despite its costs being lower (as seen earlier). However, this is with the caveat that the tariffs for the major federal government-run ports are set by the Tariff Authority for Major Ports (TAMP) every three years.

Table 12: Charges for Normal Containers (From Ship to Container yard or vice versa) [Rate per TEU (in Rs.)]

	Foreign Container		Coastal Container	
	Loaded	Empty	Loaded	Empty
JNPT	2210	1785	1326	1071
NSICT	2700	2181	1620	1308
Excess of JNPT over NSICT	(-) 22%	(-) 22%	(-) 22%	(-) 22%

Source: Jawaharlal Nehru Port Trust website (http://www.jnport.com/); NSICT website (http://www.nsict.co.in)

The picture that emerges in the port sector is that there is value for money through private participation manifested in lower operating costs of the private entity compared to the public sector. However, this was not passed on to the consumers. On the contrary, the tariffs at the private facility are significantly higher producing super-normal profits for the private entity. However, the quality of services at the private facility should be better than at the public sector entity so as to enable the private facility to charge higher tariffs and earn super-normal profits. Overall, we assign a value for money of nil for this

project.

Airport sector

In common with other infrastructure sectors, the public sector projects suffer from high time and cost-overruns in the airport sector. Besides, there is a fiscal crunch, which precludes large investments from the government to meet growing demand for infrastructure services. So, the government decided to invite the private sector in the hope that this would help bridge the demand gap in the sector as well as complete the projects within time and budget.

As per the Project Implementation Status Report of Central Sector Projects costing Rs. 0.20 billion and above[159], out of the 31 projects under implementation in the civil aviation sector, 8 projects have cost-overruns of an average of 29% and 21 projects are suffering from time-overrun of 2 months to 50 months. 1 project is within time but with cost overrun, 14 projects are within cost but with time overrun, and 7 projects are with time and cost overrun. All these projects are being implemented by the public sector entity, Airports Authority of India.

In the airport sector, while Delhi (estimated cost: Rs.89.75 billion and the project was to be ready by March 2010) and Mumbai (Rs.98.02 billion by December 2012) are being

[159] Government of India (Ministry of Statistics and Programme Implementation). 2008. *Project Implementation Status Report of Central Sector Projects costing Rs. 20 crore and above (July-September 2008).* (http://mospi.nic.in/mospi_pi_status_report.htm)

restructured through the PPP route, Kolkata (Rs.19.42 billion by April 2011; will handle 20 million passengers; work awarded in October 2008) and Chennai (Rs.18.08 billion by November 2010; will handle 23 million passengers; work awarded in September 2008) are being restructured by the public sector (Airports Authority of India, AAI).

In January 2006, the Delhi International Airport Limited (DIAL) consortium was awarded the concession to operate, manage and develop the IGI Airport (Delhi) following an international competitive bidding process. DIAL entered into Operations, Management and Development Agreement (OMDA) on April 4, 2006 with the AAI. The initial term of the concession is 30 years extendable by a further 30 years. The contract has been awarded on lease-develop-operate-transfer (LDOT) basis.

DIAL is a joint venture consortium of GMR Group (50.1%), Airports Authority of India (26%), Fraport and Eraman Malaysia (10% each) and IDF (3.9%). GMR is the lead member of the consortium, and Fraport AG is the airport operator. DIAL has to share 45.99% of its gross revenue with AAI. The year-wise break-up of revenue received by AAI on this account is: 2006-07: Rs.2.72 billion; 2007-08: Rs.4.02 billion; and 2008-09 (till Sept. 2008): Rs.2.13 billion. The original bids of the bidders were: Reliance-ASA (45.99%); GMR-Fraport (43.64%); DS Construction-Munich (40.15%); Sterlite-Macquarie-ADP (37.04%); Essel-TAV (bid not opened). The minimum revenue share had been set at 5%, so the difference between the actual and the minimum revenue share can be a measure of the value for money, which was substantial at 40.99%.

The first phase of the airport is designed to handle 60 million passengers per annum

(mppa). Total passenger traffic was 22.84 million and total cargo movement was 0.43 million tonnes in 2008-09. The first phase was slated to be completed by March 2010. The cost of the first phase is about Rs.89.75 billion (debt-equity ratio is 79:21). The ultimate design capacity of the airport would be 100 million passengers per annum.

The airport at Delhi has now become the first airport with three operational runways, with the new runway nearly doubling peak-hour capacity from 35–40 to 70 aircraft movements per hour[160]. However, the government has allowed the operator of the Delhi airport to charge each international traveler Rs.1,300 and each domestic passenger Rs.200 as airport development fee for a period of 36 months to bridge the funding gap of Rs.18.27 billion (which is also the net present value of the airport development fee). The amount raised through the development fee would also not be shared with the AAI. The gross collection of Development Fee for the period from March 01, 2009 to January 31, 2010 is Rs.5.03 billion. So, the original VfM derived from AAI share of the DIAL gross revenue would have to be adjusted downwards on account of the airport development fee (see Table 13).

Mumbai International Airport Limited (MIAL): The Master Plan incorporates passenger traffic capacity of 40 mppa by 2012. The contract period is 30 years. Contract Award Method was International Competitive Bidding. The Airport was handed over to the private entity in May 2006. Six consortia submitted their bids and their revenue sharing percentages were: GVK-ACSA (38.70%); Reliance-ASA (21.33%); GMR-Fraport

[160] Infrastructure Development Finance Company. 2009. *India Infrastructure Report*. New Delhi: Oxford University Press

(33.03%); DS Construction-Munich (28.12%); Sterlite-Macquarie-ADP (bid not opened); Essel-TAV (bid not opened). The project was awarded to GVK-ACSA consortium who agreed to share 38.70% of the revenue for each year. The year-wise break-up of revenue received by Airports Authority of India (AAI) on this account is: 2007-08: Rs.3.32 billion; and 2008-09: Rs.3.70 billion[161]. The minimum revenue share had been set at 5%, so the difference between the actual and the minimum revenue share can be a measure of the value for money, which was substantial at 33.70%.

The project promoters are: GVK Industries Ltd (37%), Bidvest Group (27%), Airport Company South Africa (10%), and AAI (26%). Debt-equity ratio is 72:28. In addition of the annual fee (38.70% of the revenue for the year), the Joint Venture Company shall pay to the AAI an upfront fee of Rs 1.50 billion by the Effective Date of the Agreement.

In Mumbai, international passengers pay Rs.600 and domestic passengers Rs.100 for four years to bridge the funding gap of Rs.15.43 billion. The airport development fee came into effect from March 1, 2009. The amount collected as Development Fee by MIAL is Rs. 1.85 billion up to end-January 2010. At the Hyderabad airport which has been built by the GMR Group, the airport development fee is Rs.1,000 for international passengers and Rs.375 for domestic passengers while in Bangalore, the fee is Rs.1,070 for international passengers and Rs.260 for domestic passengers. The levy of airport development fee after the concession was signed would clearly decrease the value for money of the projects (see Table 13).

[161] GVK Power and Infrastructure Limited (Annual Report 2008-09). (http://www.gvk.com/i/GVKPIL-15th%20AR%202008-09.pdf)

The annual passenger handling capacity of the new Bangalore Airport is 11.5 million in Phase I (ultimate capacity: 50 mppa). The passenger traffic in Bangalore for the 12-month period ending June 30, 2007 was 9.1 million.The Airport is a BOT based greenfield international airport and the concession period is 30 years (concession agreement was signed in July 2005). The 30 year period excludes construction period of 33 months from financial close. The contract was awarded through international competitive bidding (2 financial bids were received). BIAL shall, in consideration for the grant by Government of India (GoI) of the Concession, pay to GoI a fee amounting to 4% of Gross Revenue annually as Concession Fee. The project partners include AAI and Karnataka Government (13% each), Siemens Germany (40%), Unique Zurich Switzerland (17%), and Larsen & Toubro India Ltd (17%). Total Project Cost is Rs.19.30 billion. There is a state support of Rs.3.50 billion as interest free loan for 10 years. Debt-equity ratio is 83:17. The Airport became operational in May 2008.

In Phase I, Hyderabad International Airport would be capable of handling 12 million passengers per annum. This phase became operational in March 2008. Ultimate capacity would be 40 mppa. The project was awarded through international competitive bidding (6 financial bids were received). Project promoters are AAI and Government of Andhra Pradesh (13% each), GMR Group (63%), and Malaysian Airport Holding Berhard (11%). It is a BOOT project. The contract period is 30 years. The 30 year period excludes construction period of 36 months from financial close. Estimated project cost is Rs.24.78 billion. Cash grant by Government of Andhra Pradesh is Rs.1.07 billion. There is an

interest-free loan of Rs. 3.15 billion with a moratorium of 15 years for payment. Debt-equity ratio is 84:16. HIAL shall, in consideration for the grant by the GoI of the Concession, pay to GoI a fee amounting to 4% of Gross Revenue annually as Concession Fee.

The risk allocation to the private partner is broadly in line with the following guidelines: risk should be assigned to the agency that has more control over the risk factor; the agency that is more able to bear the risk (less risk-averse) should be assigned the risk. Thus, construction, operational, commercial, and financial risks are being borne by the HIAL while pre-construction risk is borne by the government.

We calculated the Value for Money from airport PPPs as in the table below with the limited data at our disposal.

Table 13: Value for Money in the Airport Sector

	Delhi Airport	Mumbai Airport
Initial Value for Money	40.99%	33.70%
Revenue in 2007-08	Rs.8.6 billion*	Rs.9.6 billion**
Projected revenue for 2009-10***	Rs.8.6 billion	Rs.10.0 billion
Increase in user charges in 2009-10 that is out of revenue-sharing formula	Rs.5.5 billion	Rs.2.0 billion
Final value for Money	25%	28.1%

* Newspaper reports (Business Standard, 20 January, 2009)
** GVK Power and Infrastructure Limited (Annual Report 2008-09). (http://www.gvk.com/i/GVKPIL-15th%20AR%202008-09.pdf). Revenue is for 2008-09
***The growth rate in domestic passenger traffic in 2007, 2008, and 2009 (Jan-Oct) was 32.5%, -4.7%, and 3.3% respectively (reply to Lok Sabha Question No. 126; replied on 11/19/2009). We have assumed that the revenue for the respective airports will increase in the same proportion for 2008 and assumed that the revenue would increase by 5% in the full year 2009-10 to arrive at the projected revenue of 2009-10.

This could be an underestimate of the VfM as there were quality improvements in the airports. As per Operation, Management and Development Agreement executed between AAI and Joint Venture companies (JVCs) of Delhi and Mumbai Airports, i.e. DIAL and

MIAL, the JVCs have to make best efforts to ensure improvement of the airport and the target rating after completion of stage 2 shall be 3.75, on the scale of 0-5. Delhi Airport has recently been rated the 14th best airport in the world in the Airport Council International's airport service quality (ASQ) survey for 2010[162]. The Mumbai Airport has achieved average ASQ rating of 4.05 on the scale of 0-5 for Quarter 3 (July-September) of year 2009[163]. In addition, some facilities were delivered on time (like the Bangalore Airport), which have not been accounted for in our calculations.

Telecom sector

Indian telecom sector has experienced rapid growth in recent years. With more than 441 million connections (April 2009), India's telecommunication network is currently the third largest in the world. Tele-density has increased to 38% in April 2009 as compared to 1.1% in 1995 and 3.6% in 2001. This is much more than the target of 15% tele-density by 2010 envisaged in the New Telecom Policy 1999. About 113 million telephones, at the rate of more than 14 million subscribers every month, were added during the 8 months of 2008-2009 (as compared to 2.2 million additions in the whole of the financial year 1995-96). Indian telecom is the fastest growing telecom sector in the world, ahead of even China[164]. The private sector is playing a major role in these developments with its

[162] In the category of 25-40 million passengers per annum, the Delhi airport has been rated 4th, behind Seoul's Incheon, Singapore's Changi, and Shanghai's Pudong. Hyderabad's new airport retained its top position in the 5-15 mppa airport category. In 2010, Delhi Airport scored 4.49 on the survey (up from 3.02 in 2006) while Hyderabad Airport scored 4.51. The ASQ survey comprises a list of 34 questions that include features like access, check-in, security, airport facilities, and airport environment. Passengers need to rate the airport on a scale of 1-5. (Source: Times of India dated 17 February 2011).

[163] Reply to Lok Sabha Question No. 1279. Replied on 11/26/2009

[164] *India Infrastructure Report.* 2008. Oxford University Press: New Delhi.

share in total telephone connections in the country increasing from 39% in 2004 to 79% in February 2009. Telecom tariffs, which were among the highest in the world a few years ago, have also dipped to be among the lowest. With increasing telecom access and falling rates, the benefit to the government from private sector participation in telecom seems to be substantial.

However, low rural tele-density remains a challenge (urban tele-density in January 2009 was 84%, compared to rural tele-density of 14%). To address the problem of low rural tele-density, the government has created a Universal Service Obligation Fund into which all telecom service providers would provide 5% revenue share. The rural areas were auctioned to infrastructure providers and telecom service providers on the basis of least subsidy demanded. The results show that the government received substantial value for money from privatization even in rural areas. The total amount of subsidy 'saved' for infrastructure providers segment was Rs.2.28 billion annually for five years, being the difference in amount between the total benchmark costs and the total bid amounts. The final actual subsidy to be paid by the government was nearly 71% less than the estimated benchmark value. This shows that privatization based on competitive bidding resulted in substantial value for money to the government as the winning bids were far lower than the benchmark[165].

Contingent liabilities in Indian PPPs[166]

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[165] *India Infrastructure Report.* 2008. Oxford University Press: New Delhi.

[166] This section borrows from Irwin, Tim and Clive Harris. 2008. *Managing the Fiscal Implication of PPPs*.

The 13th Finance Commission of the Government of India has deliberated on the issue of liabilities created by PPPs. It differentiates between explicit liabilities (like annuity payments over a multi-year horizon) and implicit contingent liabilities (obligation to compensate the private sector partner for contingencies such as breach of obligations) and calls for their inclusion in the budget documents[167]. It emphasizes that the fiscal fallout of PPPs could reflect on the health of the aggregate balance sheet of the public sector and may create demands for enhanced budgetary support to the public sector entities contracting such liabilities.

As per a study on Managing the Fiscal Implications of PPPs for the Government of India, the net present value of the expected loss to government on account of termination payments (the main contingent liability), after taking account of the value of the concession it takes over after termination, is small (about 1% of the total project cost). As per this study, the Indian central public sector is taking on new financial obligations as part of its growing program of PPPs. These include obligations to pay for services (for example, annuity payments in road projects) and obligations to compensate PPP companies for various things, including change orders, breach of public-sector obligations, and early contract termination for force majeure or contractor default. The authors of the study state that termination payments are perhaps the most useful variable to monitor for a number of reasons. They represent the worst case scenario – the

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Washington DC: The World Bank (unpublished)

[167] Government of India, Planning Commission (Secretariat for Infrastructure). 2010. *Report of the Task Force on Ceiling for Annuity Commitments.*

government's maximum exposure. They are relatively easy to measure and report at the time the government enters into the contract. And, in contrast to some possible causes of payments, payments for termination for force majeure and for contractor default cannot be controlled by the government. The amount the contracting authority must pay depends on the reason for the early termination of projects. The model concession agreement for toll roads, for example, requires NHAI to pay 90% of the concessionaire's outstanding debt in case of termination for concessionaire default.

Another approach to measuring the value of contingent liabilities would be to value it empirically. As per the PPI database of the World Bank[168], only 4 of the 306 PPI projects have been cancelled in India by 2007. The Government of India has paid about $2 billion in the case of the canceled Dabhol Power Project to buy off the stakes of the lenders and sponsors of the project. Assuming that the value of the assets of Dabhol Power Project is at least 50% of this amount, the net loss to the government could be assessed at $1 billion. Given that the size of the PPP program in India is $96 billion, the loss on account of early termination of the project is roughly 1% of the size of the PPP program in India.

7: Conclusion: Overall Value for Money in Indian PPPs

Table 14 shows that a rough estimate of the overall value for money in Indian PPPs is about 30%.

Table 14: A rough estimate of the overall Value for Money in Indian PPPs

[168] World Bank and PPIAF, PPI Project Database. (http://ppi.worldbank.org)

Sector	Value for Money	Total Project Cost (TPC) (Rs. billion)	VfM*TPC/ TPC of all projects
Road			
Annuity-based	8%	23.54	0.28%
Toll-based	36.4%	35.98	1.98%
Power			
Sasan UMPP	44%	200	13.31%
Tilaiya UMPP	23%	200	6.96%
Port			
NSICT	0%	9.75	0.00%
Airport			
Delhi	25%	89.75	3.39%
Mumbai	28.1%	98.02	4.17%
Telecom			
Rural Telephony	71%	3.92	0.42%
Weighted Average Value for Money			30.52%
less Contingent Liabilities			1%
Overall Weighted Average Value for Money from PPPs			**~ 30%**

Note: A variety of methods have been used for calculating value for money across sectors. For the road sector, the discounted incremental cost of the PPP option is compared to that of traditional public procurement. PPP offers have been benchmarked through other methods in other sectors. Benchmarking, as used in this study, is the price comparison of the PPP offer against the public sector/ reserve price of equivalent services.
Source: Author's calculations

However, this valuation is subject to a number of caveats. One, the total cost of projects in the sample is only 14% of the cost of all PPP projects in India. Two, while attempt has been made to analyze only the operational projects for calculating VfM (as in the annuity and toll-based projects in the road sector), the big-ticket projects in the power sector (contributing about two-thirds to the overall value for money) are in early stages of implementation. So, one cannot be sure that these projects would actually deliver on their promises. To the extent that there are slippages in implementation, the value for money to the government from PPPs would come down.

Three, and more broadly, while we find that there are net benefits (value for money) to the government from PPP projects, and these projects perform better in terms of timeliness of delivery and within-cost implementation vis-à-vis the public sector, it is not true that the selection of projects to be implemented by the public sector and the private

sector is a random process. If there is a qualitative difference between the projects that are implemented by the public sector and the private sector, we cannot be sure that the 'net benefits' from PPP projects are for real or merely reflecting qualitative differences among projects in the sense that the private sector is cherry-picking the better projects for implementation. This endogeneity issue[169] has not been dealt in this chapter and is game for future research.

[169] The Instrumental Variable (IV) approach addresses endogeneity concerns about the non-random selection of projects for private sector participation, which might lead to biased estimates. Proper IV would be related to project selection for implementation by the public and the private sectors, or implementation as toll or annuity variants with private sector participation, but not related to the error term. One possible IV could be a district-wise index of infrastructure development, which would be related to project selection, but not with the value for money that these projects generate. For districts with high index value, it can be assumed that they will be able to support the toll variant of private sector participation. For districts with low index value, annuity based variant, where the government bears the traffic risk, may be chosen. For districts where the risk perception is very high, the public sector may itself be called upon to implement the project.

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Chapter 3: Does privatization lead to benign outcomes? Case study of privatization in India[170]

1: Introduction

The inception of traditional privatization (or sale of state-owned enterprises to private agents) is usually associated with the Thatcher Government of the United Kingdom in early 1980s. Thatcher adopted the label 'privatization', which was originally coined by Peter Drucker and which replaced the term 'denationalization'[171]. Since then, a vast majority of countries across the world have adopted privatization and about $1.2 trillion had been raised from privatization till 2000. Most of the privatizations have occurred after 1990, with about $1 trillion raised between 1990 and 2000. In the same vein, privatization has picked up in recent years and in 2007, 51 developing countries carried out 236 privatization transactions, valued at US$132.6 billion. This was 26% more than 2006 and 150% more than 2005, marking 2007 as a record year in privatization transactions in nominal terms[172]. The objectives of privatization have broadly been similar across countries: raise resources, improve efficiency and profitability, reduce government interference in enterprises, promote wider share ownership, introduce competition, expose state-owned enterprises (SOEs) to market discipline, and develop the capital market.

[170] An abridged version of this chapter was published in Vol 2, Issue 1 of the Sanford Journal of Public Policy (Duke University, USA).

[171] Megginson William L. and Jeffrey M. Netter. 2001. *From State to Market: A Survey of Empirical Studies on Privatization.* Journal of Economic Literature. Vol 39, 321-389.

[172] Kikeri, Sunita and Verena Phipps. 2008. Privatization Trends. *Viewpoint Note Number 321*. Washington DC: The World Bank

The theoretical argument for privatization is based on the fundamental theorem of welfare economics: under strong assumptions, a competitive equilibrium is pareto-optimal. Welfare theory argues that privatization tends to have the greatest positive impact in cases where the role for government in lessening market failure is the weakest, i.e., for SOEs in competitive markets or markets that can readily become competitive[173].

The agency problems are also expected to be lesser if SOEs are privatized as the multiple layers of principals and agents in the public sector are substituted by agile shareholder-owners who are expected to exercise their powers over the manager-agents through the market for corporate control whereby inefficient managers would be replaced by more efficient ones. This also implies that multiple and sometimes conflicting objectives of the SOEs (promote balanced regional development, employment creation and affirmative action, be model employers, diversify industrial activity, and progress towards self-sufficiency through import substitution, etc[174]) would be forged into a unified objective of profit maximization. Together with this, there would be greater autonomy for SOEs with a lower percentage of shares with the government and less political interference in the day-to-day functioning of these firms. All these forces, it is felt, would tend to improve incentives, efficiency and profitability of enterprises after their privatization. In addition, the act of selling the loss-making SOEs to the private sector would generate resources for the public sector, instead of bleeding the state through a 'soft-budget' constraint.

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[173] Megginson William L. and Jeffrey M. Netter. 2001. *From State to Market: A Survey of Empirical Studies on Privatization.* Journal of Economic Literature. Vol 39, 321-389.

[174] More generally, public enterprises pursue political goals, which may conflict with profit maximization (see, for example, Shleifer, Andrei and Robert W. Vishny. 1994. *Politicians and Firms*. The Quarterly Journal of Economics. Vol. 109, No. 4 (Nov., 1994), pp. 995-1025.

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Privatization in India was a part of the reforms package initiated in 1991 that also included structural changes in industrial policy, foreign trade and investment regime, along with a program of macroeconomic stabilization. At that point, the country was in grave economic crisis with inflation above 15 percent and foreign exchange reserves that could fund less than a fortnight's imports. There was an urgent need for conserving resources. It was realized that public sector companies were not generating adequate returns and may have strayed into activities that are not strategic and should have remained with the private sector. In this context, the two main objectives of privatization in India are: to raise resources to ease the fiscal crunch, and to improve the efficiency and competitiveness of the privatized public sector companies. Therefore, this chapter of the dissertation would concentrate on assessing the outcomes of privatization in India in terms of resources raised, profitability, and efficiency. In addition, it would also try to assess the social impact of privatization, particularly in terms of employment in the privatized firm.

Privatization in India took place in two main forms: partial privatization (sale of shares without transfer of management control), and full privatization (strategic sale leading to transfer of management control in the divested firm to the private sector). As compared to the OECD countries and the transition economies, the Indian privatization program is small. A total of 50 companies have been privatized in India in the period 1991 to 2008: 36 companies have been partially privatized while 14 companies have been fully privatized. The latter category includes many hotels belonging to Indian Tourism

Development Corporation and Hotel Corporation of India. The total amount raised through partial and full privatization has been about $12.9 billion (at current exchange rates). By way of comparison, there are 242 Central Public Sector Enterprises (CPSEs) with a cumulative investment (historical costs) of about Rs.4.5 trillion ($91 billion) in India presently. These SOEs contribute about 11% to GDP (at market prices).

The main objective of including this chapter in a dissertation on 'Sustaining Privatization' is to examine whether privatization has led to benign outcomes in a major developing economy and whether that would be enough to sustain it. The answer is that while some outcomes of privatization are benign in India (e.g., profitability and efficiency), others are not (e.g., employment). However, ***the benign outcomes of privatization on some aspects may not be enough to sustain traditional privatization in India owing to political economy reasons.*** Privatization requires a lot of political support for its sustenance and weak coalition governments may not have the political power to continue with it even though its utility in terms of profitability and efficiency outcomes may be well-established. We will see that this has been the case in India especially in the period 2004-08 when the ruling coalition was quite weak.

The rest of the chapter is organized as follows: Section 2 deals with literature review where we find that there is considerable literature on privatization in general but limited literature on privatization in India. In the context of privatization in India, though some work has been done on selected aspects of privatization, there are gaps (analysis of asset sales in conjunction with share issue privatization to compare the outcomes of these two

methods of privatization and segregation of the impact of privatization on firm performance from other initiatives like liberalization and deregulation of the economy). Section 3 interprets the history of privatization in India through models of political economy. This is useful because it demonstrates that political support for privatization is at least as important as outcomes of privatization for its sustenance. Section 4 describes the data and section 5 elaborates on the methodology. Section 6 analyzes the results of privatization. Section 7 concludes.

2: Literature Review

There is extensive literature on privatization in general, and that specific to developed, developing and transition economies. In their award-winning paper, Megginson, Nash and Randenborgh[175], looked at pre- and post-privatization performance of 61 companies from 18 countries and 32 different industries during the period 1961 to 1990. They compared 3-year average post-privatization performance ratios to 3-year pre-privatization values. Their main finding is that "the mean and median profitability, real sales, operating efficiency, and capital investment spending of … sample firms increase significantly (in both statistical and economic terms) after privatization." The results are quite robust as they are supported when the data is partitioned into various sub-samples [between full and partial privatizations, between firms operating in competitive versus noncompetitive (regulated) industries, between 'control' privatizations and 'revenue' privatizations, or

[175] Megginson William L., Robert C. Nash, and Matthias van Randenborgh. 1994. *The Financial and Operating Performance of Newly Privatized Firms: An International Empirical Analysis.* Journal of Finance. Vol. 49(2), 403-452.

industrialized and developing country privatizations]. However, this study does not control for business-cycle effects. There is also the problem of selection bias as the sample tends to be biased towards larger firms. The authors themselves acknowledge this when they state that "our sample reflects the actual experience of at least the largest and most important recent privatizations." If only the larger and better firms are selected for analysis of privatization and the smaller ones are left out, there is likely to be selection bias and one cannot generalize about the impact of privatization on an average.

Boardman and Vining (1989)[176] compare the performance of private, mixed, and state-owned enterprises using a sample of 500 largest non-US firms in 1983 (based on *Fortune 500* data). In this study, dependent variables (like profitability and efficiency measured by variables like Return on Sales, and Sales per Employee) are regressed against independent variables (sales, assets, number of employees) and dummy variables for market concentration, industry, country, and ownership form. They find that the coefficients for mixed and state-owned enterprises are negative and statistically significant in all equations, which indicate that, on average, mixed and state-owned enterprises are significantly less profitable and less efficient than private corporations after controlling for the factors discussed above. They conclude that the consistent direction and magnitude of the estimates across all equations provides robust evidence that state-owned enterprises and mixed enterprises are less profitable and less efficient than private corporations.

[176] Boardman, Anthony E. and Aidan R. Vining. 1989. *Ownership and Performance in Competitive Environments: A Comparison of the Performance of Private, Mixed, and State-Owned Enterprises.* Journal of Law and Economics Vol. XXXII (April 1989)

The positive economic impact of privatization is corroborated by a large number of other studies in different economic settings. Djankov and Murrell (2002)[177], reviewing more than a hundred empirical studies on the privatization experience in transition economies, find that "the aggregate effects of privatization are positive"; structure of ownership matters [privatization to outsiders produces better results than privatization to insiders (managers and workers)]; better outcomes occur when the new owners are concentrated; state ownership in partially privatized firms is surprisingly effective (producing more restructuring than enterprise insiders and non-block-holder outsiders); increased product market competition has a significant effect in improving enterprise performance in Eastern Europe; and privatization, which is associated with hard budgets, is conducive to enterprise restructuring. However, the authors add that while privatization done in the right way, or under the right circumstances, can have positive effects, privatization can also be hugely detrimental. The different results of privatization across transition economies could partly be explained by the level of development of supportive institutions (courts for promoting rule of law, adoption of sound competition and corporate governance policies, etc).

Gassner *et al* (2007)[178], in their analysis of 302 utilities with private sector participation (PSP) and 928 utilities without PSP in 71 developing and transition countries in

[177] Djankov Simeon and Peter Murrell. 2002. *Enterprise Restructuring in Transition: A Quantitative Survey*. Journal of Economic Literature Vol. XL

[178] Gassner Katharina, Alexander Popov and Nataliya Pushak 2007. *An Empirical Assessment of Private Sector Participation in Electricity and Water Distribution in Developing and Transition Countries*. Washington DC: The World Bank

electricity distribution and water and sanitation services find that PSP has a strong impact on the efficiency and profitability of utility operations in terms of an increase in the number of connections, labor productivity, and collection rates. There is also evidence of an improvement in the quality of service in terms of reduction in distribution losses in electricity and increase in hours of daily service in the water sector. However, there is a decline in employment subsequent to PSP. In addition, the authors find no conclusive evidence of a change in consumer prices as a result of PSP, highlighting "the economic and political difficulties to align prices with costs in a large number of developing countries".

As claimed by the authors, the study improves upon earlier privatization research in three ways. First, the analysis of PSP is disaggregated by contract types: The improvements in efficiency unequivocally occur in the case of divestitures (partial or full) in the case of electricity utilities, while such improvements occur in the case of concession contracts in the case of water and sewerage sector. Thus, higher degrees of private participation are associated with stronger gains in productivity and service improvements. Second, the Instrumental Variable procedure is used to extract the endogenous element of PSP. And finally, the Difference-in-Differences analysis has been used to remove the influence of factors other than private sector participation in gauging the change in the performance of utilities. The difference-in-differences analysis has been carried out using nearest-neighbor matching procedure based on propensity scores. This ensures that the control group is restricted to those SOEs that are most similar to the utilities with PSP. If the utilities are not matched, one can arrive at greatly diverging results about the impact of

PSP on utility performance.

Andres, Foster, and Guasch[179] analyze the impact of privatization on the performance of 116 electric utilities in 10 Latin American countries. Their analysis covers a longer time frame, and evaluates three stages - before, transition and after - allowing for the identification of the short- and long-run effects of privatization. They employ two different methodologies for assessing the impact of privatization: i) calculation of means and medians from each period and testing the significance of the changes between periods; ii) use of an econometric model that captures firm fixed effects, firm-specific time trends, and corrects the model for heteroscedasticity. The results suggest that changes in ownership generate significant improvements in labor productivity, efficiency, and product/service quality, and that most of those changes occur in the transition period. Improvements in the post transition period - beyond two years after the change in ownership - are much more modest.

It has generally been found that the distributional impact of privatization is not benign. This is reflected most obviously in the decrease in employment at companies that have undergone PSP as we have seen, inter-alia, in the work of Gassner *et al*[180]. Indeed,

[179] Luis Andres, Vivien Foster, and José Luis Guasch. 2006. The Impact of Privatization on the Performance of the Infrastructure Sector: The Case of Electricity Distribution in Latin American Countries. *World Bank Policy Research Working Paper 3936.* Washington DC: The World Bank.

[180] Gassner Katharina, Alexander Popov and Nataliya Pushak 2007. *An Empirical Assessment of Private Sector Participation in Electricity and Water Distribution in Developing and Transition Countries*. Washington DC: The World Bank

Kikeri[181] says that" Selling state-owned enterprises with the labor force intact is not an option for firms and industries that have large numbers of redundant workers or difficult labor relations at the time of privatization." And it is true that there is large scale labor redundancy at SOEs as politicians and bureaucrats use them for bestowing patronage. So, it is inevitable that there would be retrenchment before or following privatization.

Birdsall and Nellis[182] develop the argument further by saying that "At the heart of popular criticism is a perception that privatization is fundamentally unfair in both concept and implementation: it is seen as harming the poor, the disenfranchised, the workers, and even the middle class; throwing people out of good jobs and into poor ones or unemployment; raising prices for essential services; giving away national treasures – and all this to the benefit of the local elite, agile or corrupt politicians, and foreign corporations and investors. The complaint is that, even if privatization contributes to improved efficiency and financial performance (some question this as well), it has a negative effect on the distribution of wealth, income and political power." They go on to suggest that the social impact of privatization is ultimately an empirical issue depending on initial conditions, the sale event, and the post-privatization political and economic environments (better distributional outcomes are associated with competition enhancement and better regulatory regime).

[181] Kikeri Sunita. 1999. Labor Redundancies and Privatization: What should governments do? *Viewpoint Note No. 174*. Washington DC: The World Bank

[182] Birdsall Nancy and John Nellis. 2003. *Winners and Losers: Assessing the Distributional Impact of Privatization*. World Development. Vol. 31 (1), 1617-1633.

La Porta and Lopez-de-Silanes[183] (1999) come up with similar findings. They find that the former 218 Mexican SOEs that they study rapidly close a large performance gap with industry-matched private firms that had existed prior to divestment. These firms go from being highly unprofitable before privatization to being highly profitable thereafter: firms achieved a 24 percentage point increase in operating profitability, eliminating need for subsidies equal to 12.7% of GDP. However, the privatized firms reduce employment by half, but those workers who remain are paid significantly more. Real wages experience large increases in the post-privatization period probably because those workers who are retained are required to work hard and are paid accordingly.

The negative social impact of privatization may cause it to be shelved prematurely. As Carol Graham[184] puts it, "In many countries there is increasing concern that short-term costs will make it difficult to sustain public support for reforms long enough for them to yield results." Graham advocates 'the stakeholders approach' to make reforms sustainable. "This means changing the design of the reforms so that significant parts of society benefit if they are carried out, for example, through the acquisition of shares in public companies or improvements in the education system and so that the beneficiaries are motivated to take steps such as voting, lobbying, and protesting to prevent the reversal of reforms. In essence they become stakeholders in the reform. Programs that merely compensate people or give away benefits at well below their market costs are far

[183] La Porta, Rafael and Florencio Lopez-de-Silanes. 1999. *Benefits of Privatization - Evidence from Mexico.* Quarterly Journal of Economics. 114:4, pp 1193-242

[184] Graham Carol. 1998. *Private Markets for Public Goods: Raising the Stakes in Economic Reform*. Washington DC: The Brookings Institution

less successful at generating long-term stakes in reform…"

Privatization in India

Ram Mohan[185] has studied revenue privatization in India in the period 1991 – 2000. He has compared the profitability and efficiency ratios for private and public sector companies as well as for performance pre- and post-privatization. Ram Mohan finds a positive impact of revenue privatization on the profitability and efficiency of companies. Ram Mohan concludes that 'it is now well recognized that, broadly, two conditions need to be satisfied for successful outcomes to result from privatization. The first is the prior existence of a market-friendly macroeconomic environment, supported by institutional and regulatory capacity, while the second is openness of the economy to competition. In many LDCs[186], neither of these conditions may be met adequately…Under these circumstances, private ownership cannot be expected to produce high standards of performance.'

In another similar study, discussing the impact of revenue privatization in India, Nandini Gupta[187] states that it is widely contended that partial privatization has little impact on performance. However, she finds a positive and statistically significant impact of partial privatization on performance of state-owned companies in India. Gupta separates the political and managerial perspectives on agency issues and finds that partial privatization

[185] Ram Mohan, TT. 2005. *Privatisation in India: Challenging Economic Orthodoxy*. New York: Routledge Curzon.

[186] LDC: Less Developed Country

[187] Gupta Nandini. 2005. *Partial Privatization and Firm Performance.* The Journal of Finance Vol. LX, No.2.

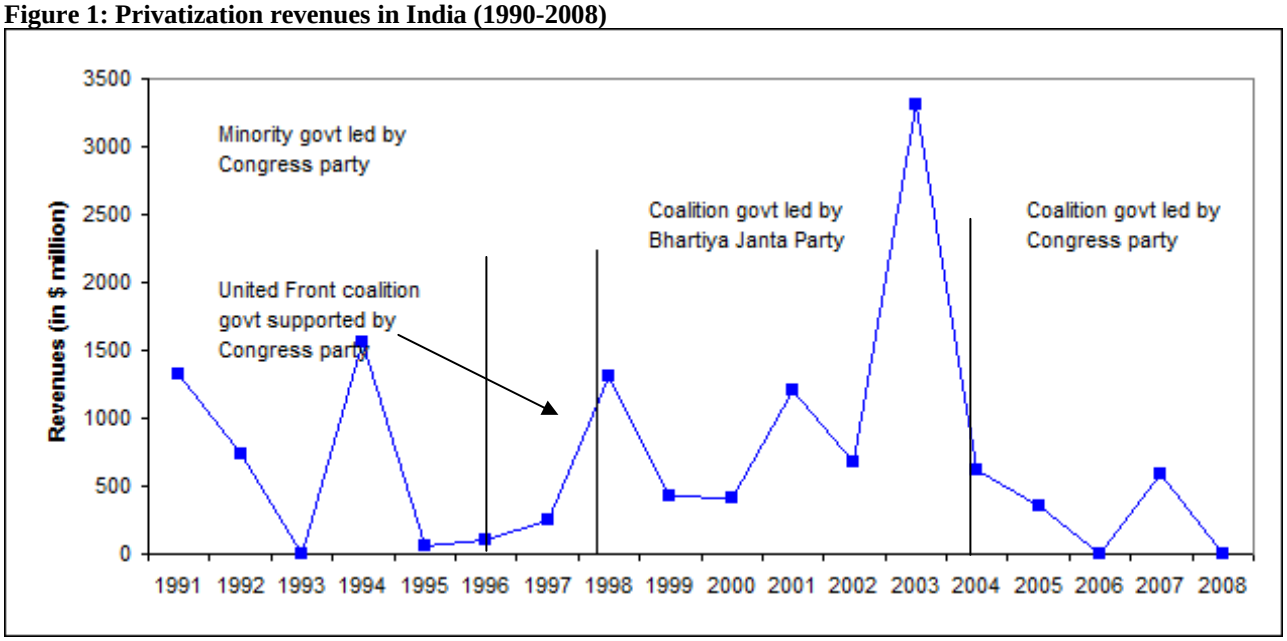
enables stock price information on the company to improve managerial incentives and thus reduce agency problems, while these managers are still subject to political interference. In addition, Gupta finds that the effects of competition and privatization may be complementary, so that reducing government ownership is necessary to improve productive efficiency, while competitive pressures increase the allocative efficiency of firms.

The literature on privatization in India does not deal with the impact of strategic sale (asset sales leading to transfer of management control in the divested firm) on enterprise performance rigorously. If ownership *matters*, the impact of strategic sale on enterprise performance should be analyzed. In addition, it is important to separate out the impact of deregulation and economic liberalization from the impact of change in ownership on enterprise performance as also the impact due to differences in pre-privatization attributes of enterprises. All these aspects can be addressed by using a difference-in-differences model. This chapter endeavors to fill these gaps in literature (analyzes the influence of strategic sale on firm performance, compares the influence of strategic sale and partial privatization on enterprise performance, and uses difference-in-differences method to separate the influence of change of ownership from other changes taking place simultaneously) and thus enrich the literature on privatization in general, and developing countries, in particular. In addition, this chapter uses firm fixed effects model to control for unobserved time-constant firm characteristics to isolate the impact of privatization on firm performance.

3: History of Privatization in India interpreted through Models of Political Economy

We need to analyze privatization in terms of the models of political economy (rational actor, organizational behavior, and government politics models), to evaluate whether the process would be sustainable, notwithstanding its immense scope. The figure below shows the resources garnered from privatization of SOEs in India over the years. The vertical lines separate the resource mobilization effort chronologically by dominant political parties.

Figure 1: Privatization revenues in India (1990-2008)



Rational Actor Model (the 'classical' model)

The Rational Actor Model (RAM) interprets governmental actions in the same way as that of an individual. In the classical consumer theory, an individual would choose a course of action that would maximize his utility and his equilibrium would occur at the point of tangency of the highest indifference curve given the budget constraint. As per

RAM, there exists an objective function for nations just like an individual. There are alternative courses of action and the nation chooses that course of action that maximizes its objective function. In other words, the RAM attempts to explain national actions based on the aims and calculations of governments. As would be apparent, this model assumes a rational, unified, national actor.

We will see that RAM is consistent with the inception of the privatization policy in 1991 and its subsequent change of course from share issue privatization to assets sales. India launched the privatization program in 1991 when inflation was above 15% per annum and the foreign exchange reserves came down to a level that could finance only about a fortnight's imports. These were tough times and the government was looking for ways to put its public finances in order. Privatization of public sector enterprises offered an easy option of continuing to spend irresponsibly (like making unproductive expenditures on subsidies), which is financed, *inter-alia*, by selling the SOEs. Improving the efficiency of the public sector enterprises through unlocking their productive potential was only a subsidiary objective. It is only to be expected that difficult policy measures like privatization are launched in periods of grave crisis as organized labor, entrenched political interests and bureaucratic inertia prevent these policies from being launched in normal times.

The privatization policy became rule-based and came to be supported by a focused institution with the coming in power of the right-wing Bhartiya Janata Party (1998), whose vote bank was the rapidly growing Indian middle class. A new Department of

Disinvestment (DoD) was created in 1999 to deal with all matters relating to disinvestment (privatization of SOEs in India is called disinvestment). Subsequently, DoD was made a separate Ministry of Disinvestment (MODI) in 2001 [however, after the fall of the Bhartiya Janta Party (BJP) government in 2004, the Department of Disinvestment is one of the departments under the Ministry of Finance]. In the budget speech of 1998-99, it was announced that government's shareholding, in most SOEs, would be brought down to 26% and subsequently the government went on to classify the SOEs into strategic and non-strategic segments, with privatization limited to the latter segment. Thus, the privatization policy became rule-based. The BJP sought to use the privatization policy to expand its vote bank so that the vast Indian middle class becomes a 'stakeholder'[188] in the privatization program as the owner of discounted shares of the public sector enterprises. The percentage of the population who became shareholders of divested public sector enterprises rose exponentially during this period (1998-2004).

While some effort was made to sell shares to the workers [for example, in CMC (6.07% of its shares sold to workers), VSNL (1.85%), HZL (1.46%), and IPCL (4.58%)] to reduce their opposition to privatization, it was not as widespread as in, say, Chile in the 1980s, where many companies became entirely employee-owned. So, workers could not become 'stakeholders' in the Indian privatization program to the same extent as in countries like Chile. Similarly, the creation of a National Investment Fund in 2005 with corpus generated from privatization proceeds of SOEs was too little too late and did not contribute to increased spending on health and education, which was the intent of the

[188] Graham Carol. 1998. *Private Markets for Public Goods: Raising the Stakes in Economic Reform*. Washington DC: The Brookings Institution

Fund. The frequent policy volatility experienced in divestment of public sector assets in India bears out that efforts to build political coalitions in its favor have been quite fragile. All this may have played a part in limiting popular support (and stakeholders) to privatization, with consequent impact on privatization policy and receipts as we shall see later.

However, it was also realized that there would be retail interest in the shares of only the profitable SOEs. To be able to sell loss-making SOEs, which was also necessary to improve the state of public finances, it was imperative that asset sales take place whereby controlling interest in the company passes on to the private sector. It was thought that private ownership would reduce agency problems (property rights school), and re-direct efforts towards a single dominant objective (profit-maximization) as compared to multiple and often conflicting objectives that the public sector managers have to meet[189], which would make these companies profitable. The first such transaction was that of Modern Foods Industries Limited (MFIL), which was sold to Hindustan Levers Limited in January 2000 for Rs.1.05 billion ($24.5 million). In all, 24 loss-making enterprises (including 19 ITDC and 3 HCI hotels, including subsidiaries of companies) were sold to the private sector through asset sale during this period (constituting about 75% of the total number of SOEs sold in the period 2000-03). However, in the era of only share issue privatization (1991-1999), the proportion of loss-making enterprises in the total number of enterprises sold was minimal (about 5%)[190].

[189] Wilson, James Q. 1989. Bureaucracy: *What Government Agencies Do and Why They Do it (page 317-18)*. Basic Books, Inc.

[190] Out of the 39 companies (including subsidiaries of companies) sold through share issue privatization in

This broadening of the privatization policy to include asset sales was beneficial to the public finances in at least two ways. One, it allowed the sale of loss-making enterprises who would have bled government finances in the future if they had not been sold off. Two, it allowed the government to receive control premium from the private sector. Thus, in the case of Maruti Udyog Limited, the government received a control premium of Rs. 10 billion ($204.1 million) when it transferred management control to the private sector in 2002-03. In some other cases though, it is doubtful whether the government was able to maximize its privatization receipts through asset sale given the low number of bidders (for example, in the case of CMC asset sale, there was only one bidder).

However, while the RAM is consistent with the inception of the privatization policy, its evolution from share issue privatization to include asset sales, and the rise in privatization revenues (especially in 2003-04), it does not explain the change of course again to share issue privatization that has taken place now. As Allison and Zelikow put it, "the RAM needs to be supplemented by frames of reference that focus on the government machine – the organizations and political actors involved in the policy process."[191] This is what we turn to now.

Organizational Behavior Model

The RAM explains governmental behavior as action chosen by a unitary, rational

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the period 1991-99, only 2 were loss-making SOEs.

[191] Allison Graham and Philip Zelikow. 1999. *Essence of Decision: Explaining the Cuban Missile Crisis.* Addison-Wesley Educational Publishers Inc.

decision-maker. But, a government is not an individual. It is a vast conglomerate of loosely allied organizations, each with a substantial life of its own. Government leaders sit formally on top of this conglomerate. Government behavior can be understood, according to this model, less as deliberate choices and more as outputs of large organizations functioning according to standard patterns of behavior. This model emphasizes the distinctive logic, capacities, culture, and procedures of the large organizations that constitute a government[192].

While RAM is consistent with the broadening of the privatization policy to include asset sales, more light on this shift can be shed by seeing it from the organizational behavior perspective. As already stated, under asset sales, the controlling interest in SOEs is passed on to the private sector. There was opposition to this policy shift even within the government. After all, how could the government of a country whose constitution proclaimed it to be a "sovereign *socialist* secular democratic republic"[193] (italics mine) sell its assets in a way that the controlling interest would pass on to the private sector. Again, the first Industrial Policy Resolution of the government (1956) talked of the commanding heights of the economy to be in the public sector. The implication was that the private sector could not to be trusted with the reins of the economy. Thus, asset sale of public enterprises seemed to be going against the basic economic structure of the country.

[192] Allison Graham and Philip Zelikow. 1999. *Essence of Decision: Explaining the Cuban Missile Crisis.* Addison-Wesley Educational Publishers Inc.

[193] The Preamble to the Constitution of India (http://indiacode.nic.in/coiweb/coifiles/preamble.htm)

The concerned ministries [Ministry of Heavy Industries and Public Enterprises (MoHI&PE), Ministry of Disinvestment, Ministry of Finance, and parent ministries of SOEs] had differing views on the subject depending on their mandate. The MoHI&PE would see its turf shrink if it were to let go of SOEs to be sold to the private sector. After all, there would be no MoHI&PE if there are no enterprises left in the public sector. Its interests clashed headlong with that of the Ministry of Disinvestment, which was specially created in 1999 to carry-out the sale of non-strategic SOEs. The act of creating a separate ministry for privatization (Ministry of Disinvestment) emphasized the seriousness of the intent of the government.

The Ministry of Finance would have liked any help it could possibly get to ease the resource crunch. Thus, it would be on the side of the Ministry of Disinvestment to promote privatization. Then, there would be parent ministries of SOEs like Ministry of Petroleum and Natural Gas (parent ministry of the wealthy oil sector SOEs), Ministry of Civil Aviation (parent ministry of national carriers like Air India and Indian Airlines), Ministry of Steel (parent ministry of public sector steel companies), etc. All the parent ministries would oppose privatization as the power of patronage would be reduced with dwindling number of SOEs under their control.

However, the differing views on the subject were ironed out in the Cabinet headed by the Prime Minister, who was very committed to privatization as he expected it to pay, *inter-alia*, fiscal and electoral dividends. The standard operating procedure of major government policies to be put up to the Cabinet for approval made this paradigm shift in

the privatization policy possible. Here, the Prime Minister along with his supportive colleagues in the Ministry of Finance and Ministry of Disinvestment, was able to 'persuade'[194] others about the necessity of widening the ambit of privatization to include asset sales. It also helped that the government was carrying out share-issue privatization for more than seven years by then. This is in keeping with the organizational behavior paradigm, which holds that if a nation performs an action of a certain type today, its organizational components must yesterday have been performing an action similar to today's action.

Like in most policy measures, there were gainers and losers from privatization. The losers of privatization are concentrated (unionized workers who would now have to perform to retain their jobs, politicians and bureaucrats who would no longer be able to use SOEs for showering patronage) while the gainers are diffused across the population (general public who would see that their tax contributions are no longer being wasted on inefficient SOEs, which is expected to have an impact on the price level in the medium term). However, "modest average real price declines thrill economists, but not voters."[195] The diffused gainers would not take out rallies to support privatization while the losers would take action to oppose it. Thus, the time was ripe for derailing the privatization program of the country.

[194] Neustadt, Richard E. 1990. *Presidential Power And The Modern Presidents.* New York: The Free Press

[195] Nellis John. 2006. Back to the Future for African Infrastructure? Why State-Ownership is no more promising the Second Time Around. *Working Paper No 84*. Washington DC: Center for Global Development.

The courts played a decisive role in the narrowing of the domain of privatization policy (share-issue privatization only) from its broader domain (share-issue privatization plus asset sale of enterprises) after 2003. Groups who lack the political power or access to influence the policy-making decisions of the executive may present their policy objectives as legal claims in order to seek the intervention of the judiciary[196]. The interest groups approached the courts to stall the privatization process. While the Supreme Court upheld the privatization of a company called BALCO as being in the exclusive domain of the executive, it nearly stalled the privatization process through asset sale by ruling that a company which has come into being by parliamentary approval cannot be privatized without the approval of parliament. Since the parliament represented a medley of interest groups with no single political party holding a majority, it was a foregone conclusion that approval for privatization through asset sale of any company would be extremely difficult. Therefore, share-issue privatization (as distinct from asset sales) again became the flavor of the day.

The de-facto reversion from a broader (asset sale plus share-issue privatization) to a narrower (share-issue privatization only) privatization policy because of the influence of organizations like courts on public policy is at variance with the predictions of the rational actor model. If the objective of privatization was to secure resources for the government, the broader form of the policy was helping it by getting rid of loss-making SOEs and so, the nation, as a rational actor, would have continued with it. However, the ruling of the courts forced the government to narrow the canvass of privatization policy

[196] Smith, Christopher E. 1993. *Courts and Public Policy (page 3*). Chicago: Nelson-Hall Publishers

to share-issue privatization only.

Governmental Politics Model (GPM)

In contrast with RAM, "the Government Politics Model sees no unitary actor but rather many actors as players: players who focus not on a single strategic issue but on many diverse intra-national problems as well; players who act in terms of no consistent set of strategic objectives but rather according to various conceptions of national, organizational, and personal goals; players who make government decisions not by a single, rational choice but by the pulling and hauling that is politics."[197]

In May 2004, a new coalition government led by the Congress Party came to power. The major props of the government were the left-leaning Communist parties who opposed privatization vociferously. Besides the impact of privatization on employment, their opposition to privatization was also because of what privatization has come to symbolize[198]: as an essential component of the 'Washington Consensus' policies, privatization symbolized the imperialistic power of countries like the United States, acting through multilateral institutions like the World Bank and the IMF, to subjugate the economic systems of developing countries. It did not help that one of the most prominent policy honchos of the present government is the Deputy Chairman of the Planning Commission, who is an ex-senior staffer of the World Bank and IMF.

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[197] Allison Graham and Philip Zelikow. 1999. *Essence of Decision: Explaining the Cuban Missile Crisis.* Addison-Wesley Educational Publishers Inc.

[198] Mayer, Fredrick W. 1998. *Interpreting NAFTA: The Science and Art of Political Analysis.* New York: Columbia University Press

The government is led by an economist Prime Minister (with a PhD in Economics from Oxford) who played a major role in initiating the privatization program of the country in his previous *avatar* as the Finance Minister between 1991 and 1996, and is seen as the architect of India's economic reforms. The Prime Minister's preference would be to take the privatization process forward by getting rid of most SOEs, other than the strategic ones. However, under the GPM, knowledge of the leader's initial preference is rarely a sufficient guide for action as authoritative power is shared among players.

The coalition comprised of, besides the Congress and the Communist parties, regional parties whose leaders had secured ministerial berths as a reward for supporting the government. The ministers protected their turfs, including the public sector enterprises under the control of their ministries. Thus, the choice between getting rid of poorly performing state-owned enterprises through privatization and securing the longevity of the government was clear – give short shrift to difficult policy measures like privatization by adopting a case-by-case approach to privatization, which may be seen from the major tenets of the then privatization policy[199]:

- Generally, profit-making companies will not be privatized.
- All privatizations will be considered on a transparent and consultative case-by-case basis.
- Public sector companies and nationalized banks will be encouraged to enter the capital market to raise resources and offer new investment avenues to retail investors.

[199] Government of India (Department of Disinvestment, Ministry of Finance). 2007. *White Paper on Disinvestment of Public Sector Enterprises.* New Delhi

The case-by-case approach to privatization gave a virtual veto to every minister for even share-issue privatization of SOEs. Once the Department of Disinvestment (now within the Ministry of Finance, downgraded from a separate Ministry of Disinvestment earlier) made a proposal for privatizing a company, the concerned ministers, unionized workers, and other interest groups, would join together to scuttle the move. As a result, the government, in July 2006, decided to keep all privatization decisions and proposals on hold, pending further review. Since then, government has sold some of its equity stake piggy-backing on the Initial Public Offering (IPOs) of public sector power companies, but privatization revenues have been small (till 2008). In other words, the diverse nature of the coalition government delayed the decision to privatize, which was also reflected in meager privatization receipts during this period[200].

The resultant privatization policy, as outlined above, was a compromise resulting from bargaining among players in the federal government. The communists would not want to alienate the unionized working class by subjecting them to market discipline, which privatization will entail. The Congress (dominant party of the coalition government) would give-in rather than risk the fall of the government, which could have happened if the communists withdrew support. This compromise allowed the public sector to raise money from the market by issuing new shares but forbade asset sales (de-facto) and transfer of management control to the private sector. This muddled version of privatization policy is reflected in the meager receipts from privatization from 2004 to

[200] Bortolotti, Bernardo and Paolo Pinotti. 2003. *The Political Economy of Privatization*

2008 (see Figure 1). There was a vicious circle of a muddled policy enabling all those opposed to privatization to come together to protect SOEs from privatization leading to meager receipts from privatization.

The Congress party came back to power in mid-2009. It had a surprisingly strong showing and is now no more dependent on communist ('left') support, giving rise to expectations about major initiatives on furthering privatization. And true to this expectation, the actual privatization receipts in 2009-10 have been over $5 billion though the government has budgeted only Rs.11 billion ($243 million) from privatization in 2009-10.

Future of privatization policy

The Rational Actor Model would call for a clear enunciation of the privatization policy. It would have to be rule-based to counter the possibility of vested interests mobilizing themselves against each privatization proposal before it took effect. There would be no bar on transfer of management control to the private sector (asset sales) of even profitable SOEs. There would also be a schedule for privatization of SOEs. Such enunciation of privatization policy would produce solid results in terms of revenues and would prevent loss-making SOEs from bleeding the government exchequer in the future.

However, given the current (till 2008) political milieu, the privatization policy would be based on compromises among various interest groups. The result would be a muddled privatization policy characterized by a case-by-case approach and is not expected to

achieve results in terms of sustainable improvement in public finances. So, even if the post-privatization performance of SOEs improves significantly, the political realities would make it difficult to sustain privatization. This is partly because the privatization program in India did not create strong 'stakeholders'[201], be it retail investors, or workers, or the masses, to be able to make the program politically sustainable.

4: Data description

The data used in the analysis has been sourced from the following sources:

- Prowess database of the India-based market research company, Centre for Monitoring Indian Economy (CMIE). The database provides detailed financial information for companies for the period 1988-89 to 2008-09[202].
- The website of the Department of Disinvestment, the nodal department in the Government of India which deals with privatization.
- Public Enterprises Survey (various issues) of the Department of Public Enterprises, Government of India.
- The websites of the Bombay Stock Exchange, the Economic Times, and the individual companies.

Though there has been sale of government stake in banks, we concentrate on privatization of non-financial companies. As per the above sources of data, 14 companies had undergone strategic sale with transfer of management control, while 36 companies had

[201] Graham Carol. 1998. *Private Markets for Public Goods: Raising the Stakes in Economic Reform*. Washington DC: The Brookings Institution

[202] The Indian financial year is from 1st April to 31st March.

undergone sale through public offer or other methods. These 50 non-financial companies constitute the entire universe of companies that have undergone traditional privatization in India in the period 1990-2008.

An attempt was made to gather financial data from 1989-90 to 2008-09 for each of the privatized companies in India. This data was located for 37 companies from the above data sources. 13 companies were left out because sufficient information was not available. This leaves a potential for selection bias as it is more likely that there would be insufficient information for loss-making companies, so better-performing firms would be over-represented in empirical analysis. This also reduces the size of the sample, limiting the ability to find statistically significant results and making generalizations.

Most of the companies that have been privatized have undergone 'share issue privatization' and the government has management control both before and after the share issue as only minority stakes were sold. The main purpose of such privatizations was just to raise revenue for the government without surrendering control. There was a change in privatization policy in the period 2000-2003, when 14 companies were sold with transfer of management control to the private sector (asset sale).

Some of the share issue privatizations were very large. For example, the ONGC issue that raised about Rs.105.6 billion ($2.2 billion) in 2003-04 was one of the largest share issues in India. While in some cases, the government rode piggyback on the Initial Public Offerings (IPOs) of the firms (with the government and the firms both having capital

inflows), many others represented revenue generating exercise for the government in which its stake was sold off without any capital flows to the firm itself.

A look at the privatization transactions in India would make it apparent that there was some effort to manage the political economy so as to make the privatization process irreversible:

- A certain percentage of the shares were reserved for the employees who were sold these shares at a discounted price to the prevailing price thus providing them an opportunity to make a capital gain immediately after allotment. For example, in the case of a company called CMC, the offer of shares to the employees was completed in June/July 2002 at a price of Rs.66 ($1.3) per share, which was about one-third of the asset sale price of Rs.197. In the case of VSNL, the employees were offered shares at Rs.47.85 (~$1) per share against the asset sale price of Rs.202 per share in February 2002. The objective was to get employee support for privatization. Another employee promotion measure was their job protection for at least a year following asset sale (full privatization), and subsequently the terms of lay off could not be worse than that provided by government.

- Retail investors were provided an incentive in many cases (DCI, GAIL, IBP, ONGC) to get the shares at a 5% discount to the regular share price. This was mainly to increase the number of shareholders so that privatization gets the necessary political support and becomes irreversible.

- Under-pricing of issues so that the issues are over-subscribed and the investors who are allocated the shares have an opportunity to make an immediate capital gain. Under-pricing of issues is a usual practice in privatization initial public offerings (PIPOs) across the world as has been shown by a number of studies[203].

- Restrictions on foreign ownership of the shares, mainly for political economy reasons. Thus, while the divestment of government equity in central SOEs started in 1991-92 in India, the shares were sold to foreigners through the Foreign Institutional Investor (FII) route and Global Depository Receipts (GDR) route only from 1994-95 and 1996-97 respectively. In the case of asset sales (2000-2003), there was insufficient effort to attract foreign buyers, which may have reduced the privatization receipts.

- The government created a National Investment Fund to which disinvestment proceeds were credited, the returns from which were to be used for funding selected social sector schemes in education, health, and employment.

5: Methodology

We have used the following methodology in carrying out the analysis:

[203] For example, see Paudyal, K., B. Saadouni, and R. J. Briston. 1998. *Privatization Initial Public Offerings in Malaysia: Initial Premium and Long-Term Performance.* Pacific-Basin Finance Journal. 6. pp. 427-51. This study examined initial and long-term returns offered to investors in 18 Privatization IPOs (PIPOs) and 77 private sector IPOs in Malaysia during 1984-95. The finding was that Malaysian PIPOs offer market-adjusted initial returns of about 104% (median 80%), significantly greater than the private sector IPO initial returns of 53% (median 29%).

- Comparison of mean and median performance parameters before and after privatization and testing the significance of the change. The following performance parameters have been used:
    - Profitability: Return on Sales = Net Income/ Sales; Return on Assets = Net Income/ Total Assets; Return on Equity = Net Income/ Equity.
    - Efficiency: Sales Efficiency = Sales/ Number of Employees; Net Income Efficiency = Net Income/ Number of Employees.
    - Output: Real Sales = Sales adjusted with the Wholesale Price Index.
    - Employment: Total Number of Employees.

In addition, we also look at the following parameters to see whether there is any change in them following privatization:

- Leverage: Total Debt/ Total Assets; Debt-Equity Ratio.
- Dividend payout: Dividend Paid or Proposed (Provision)/ Sales; Dividend Paid or Proposed (Provision)/ Net Income.

The value of these ratios was calculated over a 9-year period divided into three 3-year sub-periods: pre-privatization period: 4 years before privatization to 1 year before privatization (*t-4 to t-1*); transition period: 1 year before privatization to 1 year after privatization including the year of privatization (*t-1 to t+1*); and post-privatization period: 1 year after privatization to 4 years after privatization (*t+1 to t+4*). The mean of each performance variable is calculated for pre- and post-privatization periods for each partially privatized firm and fully privatized firm. We then use the Wilcoxon signed-rank

test (tests whether the median difference in variable values between the pre- and post-privatization samples is zero) and t-test to see the significance of the change. The above analysis would help us gauge whether there has been any significant change in the levels of mean and median performance variables post-privatization. Since both the pre-privatization period and the post-privatization period is 3-years long, we can think of this analysis as showing the change over the short-term.

- We also check for robustness of our results by comparing the same pre- versus post-privatization performance variables for sub-samples of firms privatized through asset sales and firms privatized through methods other than asset sales.

- As a further check on robustness of our results, we look at performance change in the entire period (1989-2008) for which we have data, i.e., we look at all years from 1989 to the year before the year of privatization for calculating the pre-privatization experience and all years after the year of privatization to 2008 for assessing the post-privatization experience. The average pre-privatization period for companies is 7 years while the average post-privatization period for companies is 12 years in this time period. The longer time period for analysis (instead of 3 years before privatization and 3 years after privatization that we looked at earlier) should ensure that short-term effects of privatization are not interpreted as sustainable improvements. We also compare the same pre- versus post-privatization performance variables for sub-samples of firms privatized through asset sales and firms privatized through methods other than asset sales.

- Difference-in-differences analysis to remove the influence of factors other than privatization on performance (control group is the set of all firms in the same industry as the privatized firm). The improvement in performance after privatization could have happened because of any of the other changes that are taking place simultaneously like deregulation and liberalization of the Indian economy. In addition, there could be bias because of the pre-privatization characteristics of the divested firms and business cycles. Therefore, it would be necessary to use difference-in-differences analysis to say anything deterministic about the impact of privatization on enterprise performance.

  We do the difference-in-difference analysis both in terms of comparison of means and medians as well as OLS. We use the industry-adjusted performance variables (defined as firm performance variables - industry performance variables) for the difference-in-differences analysis. For the analysis in terms of means and medians, we compare the industry-adjusted performance variables over the period 4 years before privatization to 1 year before privatization (pre-privatization period) with the performance over the period 1 year after privation to 4 years after privatization (post-privatization period) for each of the 35 firms for which we have data (we could not locate industries for 2 privatized firms, namely HMT and Engineers India Limited, from the Prowess database). We also divide the sample into two sub-samples according to whether they were privatized through asset sales or other methods as a check for robustness of our results. For the analysis in

terms of OLS, we examine the size, sign, and significance of the privatization dummy.

- We use Ordinary Least Squares regression with the performance parameters as dependent variable after controlling for size of the firm. We also control for unobserved time-constant firm characteristics with firm fixed effects.

- Comparison of actual privatization revenues with target and fiscal deficit. In addition, analysis has been done to establish whether there has been any major under-valuation of government equity in both asset sales and share issue privatization.

Finally, when privatization was effected in several tranches, the initial year of privatization is used as the privatization date for our analysis (except for BHEL because substantial privatization revenue was realized only in 1994-95).

The table below shows the performance measures that have been used in some of the important studies on privatization. As would be apparent, we have used similar measures for assessing performance of the privatized firms in India.

Table 1: Performance measures used in some important privatization studies

Author, sample description, study period, methodology	**Performance Measures**
Megginson, William L., Robert C. Nash, and Matthias van Randenborgh (1994). Compares 3-year average post-privatization performance ratios to 3-year pre-privatization values for 61 firms from 18 countries and 32	**Profitability**: Return on Sales = Net Income/ Sales; Return on Assets = Net Income/ Total Assets; Return on Equity = Net Income/ Equity. **Operating Efficiency**: Sales Efficiency = Sales/ Number of Employees; Net Income Efficiency = Net Income/ Number of Employees.

industries in the period 1961-89. Tests significance of median changes in post- versus pre-privatization periods. Binomial tests for percent of firms changing as predicted.	**Capital investment spending**: Capital expenditure/ Sales **Output** = Real sales adjusted by CPI **Employment**: Total Employment = Total Number of Employees **Leverage** = Total debt/ Total assets **Dividends** = Cash dividends/ Sales
Boardman, Anthony E. and Aidan R. Vining (1989). Compares performance of private, mixed, and state-owned enterprises using a sample of 500 largest non-US firms in 1983; based on *Fortune 500* data. Dependent variables were regressed against independent variables (sales, assets, number of employees) and dummy variables (market concentration, industry, country, ownership form)	**Profitability**: Return on Equity, Return on Assets, Return on Sales, Net Income. **Efficiency**: Sales per employee; Sales per asset; Assets per employee.
Frydman, Roman, Cheryl W. Gray, Marek Hessel, and Andrzej Rapaczynski (1999). Studies the impact of private ownership on corporate performance in transition economies.	**Sales revenues** **Employment** **Labor Productivity** = Revenue per employee Material Costs per unit of revenue
La Porta and Lopez-de-Silanes (1999). Studies the impact of privatization on 218 Mexican state-owned firms, privatized between 1983 and 1991. Also compares performance with industry-matched firms.	**Profitability**: Operating Income/ Sales; Operating Income/ Fixed Assets; Net Income/ Sales; Net Income/ Fixed Assets. **Operating Efficiency:** Cost per unit (Cost of Labor and Intermediate Inputs/ Sales); Log (Sales/ Fixed Assets); Log (Sales/ Number of Employees); Operating Income/ Number of Employees. **Capital investment**: Log (Fixed Assets); Log (Fixed Assets/ Number of Employees); Investment/ Fixed Assets; Investment/ Sales; Investment/ Employee. **Total Output:** Log (Real Total Sales). **Employment and Wages:** Log (Total Employment); Log (Blue-Collar Employment); Log (White-Collar Employment); Average Real Wage per Worker; Average Real Wage per Blue-Collar Worker; Average Real Wage per White-Collar Worker. **Prices and taxes:** Index of Real Prices (Paasche); Net Taxes (Corporate Income Tax - Direct Subsidies); Net Taxes/ Sales.

Our methodology suffers from selection bias with only 37 of the 50 firms that have been privatized in India being analyzed because of poor data availability. If only the better firms (because they are expected to have better data availability) are analyzed, one cannot be deterministic about the impact of privatization on performance in general. More specifically, we could not locate data on financial performance of the specific hotels of ITDC and HCI, which could have made our analysis richer because there is anecdotal evidence that most of these hotels were in poor financial shape before privatization.

6: Results of Privatization

Privatization revenues

Privatization in India is of recent origin, being initiated in 1991-92 when the country was in throes of an economic crisis. Since then, 36 SOEs have seen partial privatization, while 14 SOEs have been completely privatized (strategic sale accompanied by transfer of management control to the private entity). The total amount raised through partial and full privatization has been about $12.9 billion[204] (Rs. 516.09 billion converted to USD at current exchange rates). The table below shows the revenue raised, by method of sale.

Table 2: Privatization revenues in India, by method of sale (1991-2008)

Method of sale	Number of companies*	Revenue receipt (Rs. billion)
Share issue privatization	41	352.99
Asset sale	14	63.44
Sale of one SOE to another	6	59.61
Other related transactions	9	40.05
Total	**50**	**516.09**

* Will not add up as the same company may be represented in a number of categories
Source: Government of India, Department of Disinvestment website (www.divest.nic.in)

The predominant method of sale of SOEs that has been employed in India is share issue privatization (SIP), which accounts for more than two-thirds of the total privatization receipts. Asset sales, which were quite popular in the period 2000 to 2003, have accounted for only about an eighth of the total privatization receipts[205]. Annex table 1 shows the details of privatization revenues (by firm/ transaction) in India.

[204] See Annex 1 for firm-wise break-up of the $12.9 privatization revenues.

[205] In India, share issue privatizations represented a majority of privatization transactions as well as receipts. This is in contrast to worldwide trends. For example, see Megginson, William L, Robert C. Nash, Jeffry M. Netter, and Annette B Poulsen. 2004. *The Choice of Private versus Public Capital Markets: Evidence from Privatizations.* The Journal of Finance, Vol. Lix, no. 6, December 2004. They have analyzed 2,457 privatization transactions from 1977 to 2000 spread over 108 countries that raised $1.2 trillion. Out of this, SIPs were a minority, 931 (38%) by number of transactions but raised $744 billion (63%) of revenues. The balance 62% of transactions represented asset sales, which raised 37% of revenues.

The table below shows year-wise privatization revenues (target, actual, and compared to the central government fiscal deficit).

Table 3: Privatization revenues in India compared to the fiscal deficit

Year	Target (Rs. billion)	Receipts (Rs. billion)	Fiscal deficit (Rs. billion)	Receipts/ Fiscal deficit (%)
1991-92	25	30.38	363.25	8.4%
1992-93	25	19.13	401.73	4.8%
1993-94	35	0	602.57	0.0%
1994-95	40	48.43	577.04	8.4%
1995-96	70	1.68	502.53	0.3%
1996-97	50	3.80	560.62	0.7%
1997-98	48	9.10	732.05	1.2%
1998-99	50	53.71	895.60	6.0%
1999-2000	100	18.60	1047.16	1.8%
2000-01	100	18.71	1188.16	1.6%
2001-02	120	56.58	1409.55	4.0%
2002-03	120	33.48	1450.72	2.3%
2003-04	145	155.47	1232.72	12.6%
2004-05	40	27.65	1257.94	2.2%
2005-06	No target fixed	15.70	1464.35	1.1%
2006-07	No target fixed	0	1425.73	0.0%
2007-08	No target fixed	23.67	1269.12	1.9%
2008-09	No target fixed	0	3265.15	0.0%
Total	**968.00**	**516.09**	**19645.99**	**2.6%**

Source: Government of India, Department of Disinvestment website (www.divest.nic.in) (accessed: 23 August, 2009); Government of India, Ministry of Finance. *Economic Survey* (various issues)

The following inferences can be drawn:

- While privatization has been able to raise $12.9 billion, it has been able to bridge only about 2.6% of the central government fiscal deficit over the last 18 years. So, it has not been a major source of revenue for the government. In addition, there is considerable variation with the privatization receipt to fiscal deficit ratio in 2003-04 being as high as 12.6% and 3 years having no privatization receipts.

- To the extent that privatization receipts have been used to bridge the current fiscal

deficit, and not used for creating a sustainable decrease in it through reducing the public debt, it would have encouraged more unproductive expenditure. However, since average privatization receipts as a proportion of the central fiscal deficit is low (2.6%), this impact should be small.

- To the extent that the amount raised from privatization would have to be raised by the government through bonds (counterfactual), the annual interest cost represents the saving to the government. The loss to the government is on account of the dividend foregone in the case of asset sales. Thus, the government raised about Rs.63.44 billion in the period 2000-2003 from 14 companies sold through asset sale. Saving on account of interest on this sum of Rs.63.44 billion is Rs.6.34 billion, assuming an interest rate of 10%. As against this, the average dividend per annum received from these companies was only Rs.0.5 billion[206]. So, even the limited privatization in India seems to have produced highly positive results when analyzed on the basis of counterfactual.

- Privatization receipts have been able to meet just over half (53%) of the target. There have been only four years (out of eighteen) in which the targets have been exceeded. Privatization receipts in a single year (2003-04) accounts for about a quarter of total privatization receipts till 2008.

- The above-mentioned privatization receipts may represent their direct impact on

[206] Government of India, Ministry of Disinvestment (2003).

government revenues. However, privatization may have more durable indirect effect on government revenues by reducing the need for annual subsidies to loss-making government companies and from subsequent increased tax revenues from more profitable and productive private enterprises. Governments as diverse as Mexico, Cote d'Ivoire and Mozambique received, in the first few years following sales, more from privatized firms in taxes than from direct proceeds of sales[207].

- There is considerable scope for further privatization. There were 242 central SOEs in the country. The value of the shares held by the government in the listed central SOEs (44 of the 242) as on 24 July, 2009 was over $200 billion at current exchange rates[208]. As if to emphasize the scope of privatization in the country, the government has prescribed the following: Revitalize the disinvestment[209] program and plan to generate at least Rs. 250 billion per year. Complete the process of selling of 5-10% equity in previously identified profit making SOEs. List all unlisted public sector enterprises and sell a minimum of 10% of equity to the public. Auction all loss making SOEs that cannot be revived. For those in which net worth is zero, allow negative bidding in the form of debt write-off[210].

[207] Birdsall Nancy and John Nellis. 2003. *Winners and Losers: Assessing the Distributional Impact of Privatization*. World Development. Vol. 31 (1), 1617-1633.

[208] For listed SOEs, see Government of India, Department of Disinvestment (Ministry of Finance). 2007. *White Paper on Disinvestment of Central Public Sector Enterprises.* New Delhi. The share price was obtained from Bombay Stock Exchange website (www.bseindia.com).

[209] Privatization in India is referred to as disinvestment.

[210] Government of India, Ministry of Finance. 2009. *Economic Survey 2008-09*.

There is the issue of under-pricing of shares, which implies that government received less in privatization revenues in trying to make privatization politically palatable. Under-pricing of issues helps in their over-subscription and the investors who are allotted the shares have an opportunity for an immediate capital gain, which makes privatization more politically acceptable: when retail investors are offered shares at a discount, they are likely to support the initiative, thus generating political support for privatization. More formally, the allocation of underpriced shares is an inducement for median-class voters to align their interests with those of the market-oriented government[211] at the cost of some revenues.

Under-pricing is a usual practice in privatization initial public offerings (PIPOs) across the world as has been shown by a number of studies. In a study on Malaysian privatization IPOs, for example, Paudyal[212] *et al* found that Malaysian PIPOs offer market-adjusted initial returns of about 104% (median 80%), significantly greater than the private sector IPO initial returns of 53% (median 29%). This study examined initial and long-term returns offered to investors in 18 PIPOs and 77 private sector IPOs in Malaysia during 1984-95. In addition, this study found the extent of over-subscription to be a significant explanatory variable for high initial returns from IPOs.

The table below shows that average over-subscription in privatization offers for sale in

[211] Jones, Steven L, William L. Megginson, Robert C. Nash, Jeffry M. Netter. 1999. *Share issue privatizations as financial means to political and economic ends.* Journal of Financial Economics 53 (1999) 217-253.

[212] Paudyal, K., B. Saadouni, and R. J. Briston. 1998. *Privatization Initial Public Offerings in Malaysia: Initial Premium and Long-Term Performance.* Pacific-Basin Finance Journal. 6. pp. 427-51.

India was about 8.7 and the average discount for retail bidders was 3.75%. Both these factors imply that government received less in privatization revenues than what it could have, and could be interpreted as the price of making the initiative politically acceptable. A rough estimate of the revenue loss is 23.3%, which is on the lower side compared to the Malaysian study outlined above but comparable to some other studies[213]. But, this is with the caveat that some of these offers for sale are seasoned offerings rather than IPOs and so may have been priced much closer to the market price.

Table 4: Under-pricing of privatization offer for sale - illustrative cases

Company name	Bid date	Floor price per share/ price band (Rs.)	Ratio of bids received to shares offered	Final price per share (Rs.)	Price close on opening day	Discount for retail bidders
MUL IPO	June 2003	115	8.92	125	164.05	0%
IPCL	Feb 2004	170	4.9	170	NA	5%
CMC	Feb 2004	475	9.6	485	564.80	5%
DCI	Feb-Mar 2004	385-400	17.78	400	588.70	5%
GAIL	Feb-Mar 2004	185	6.71	195	230.15	5%
IBP	Feb-Mar 2004	620	2.66	620	Merged	5%
ONGC	Mar 2004	680-750	5.88	750	788.80	5%
NTPC IPO	Oct 2004	52-62	13.14	62	75.55	0%

Source: Government of India, Department of Disinvestment (Ministry of Finance). 2007. *White Paper on Disinvestment of Central Public Sector Enterprises.* New Delhi; Bombay Stock Exchange website (www.bseindia.com).

The low estimate of revenue loss due to under-pricing in the case of Indian privatizations appears credible from the experience of $1.25 billion NHPC IPO that took place in August 2009. NHPC IPO had a Price to Earnings Ratio (PE ratio, an important valuation parameter) of 38.3, which is very high, and was priced at Rs.36 per share. The NHPC share closed at Rs.36.70, showing a first day gain of just about 2%. The table below

[213] Jones, Steven L, William L. Megginson, Robert C. Nash, Jeffry M. Netter. 1999. *Share issue privatizations as financial means to political and economic ends.* Journal of Financial Economics 53 (1999) 217-253. In this study, the mean (median) level of under-pricing was 34.1% (12.4%) for the initial SIPs and 9.4% (3.3%) for seasoned SIPs. The sample size for this study consisted of 630 share issue privatizations (SIPs) spread across 59 countries with total proceeds of over $446 billion during the period 1977-1997.

shows the PE Ratio of the recent SOE share issues in India, which also shows the high level of PE ratios of many of these issues.

Table 5: Price to Earnings Ratio in recent Indian SOE share issues

Company	PE ratio	Company	PE ratio
NHPC	38.3	NTPC	9.2
PTC	29.6	Power Finance Corp	9.0
CMC	15.3	GAIL	8.8
Power Grid Corp	14.7	MUL	7.3
ONGC	12.3	DCI	6.8
REC	9.6		

Source: Economic Times, September 3, 2009

Similarly, when employees were issued shares at a price lower than the market price, there was a cost to the government, which could be interpreted as the price of making them a 'stakeholder' in the privatization program of the government. The average level of discount allowed for gaining the support of the employees appears to be substantial (~73%) in the table below. The table also makes a rough estimation of this cost to the government.

Table 6: Estimated cost to the government on account of sale of shares to employees at discounted prices

Company	Number of employees	Average number of shares allotted per employee	Price per share to employees (Rs.)	Price per share in asset sale (Rs.)	Cost to Government (Rs. million)
CMC	3,208	287	66	197	120.40
VSNL	2,991	1,760	47.85	202	811.50
HZL	2,848	2,173	10	40.50	188.80
IPCL	12,272	927	57	231	1,978.50
Total	21,319				3,099.20

Source: Government of India, Department of Disinvestment (Ministry of Finance). 2007. *White Paper on Disinvestment of Central Public Sector Enterprises.*

However, given that the government received over Rs.88,141.60 million from privatization of these companies over the period 1990-2008, the cost to the government on account of selling shares to the employees at discounted prices does not appear substantial (only 3.5%).

In order to calculate the possible loss to the government on account of asset sale, we look at the valuation of these companies through various methods and compare such valuation to the actual sale price. From the table, it is apparent that there is very little evidence of undervaluation except in the case probably of PPL. However, one criticism that is leveled is that leaving out foreign investors in asset sales reduced the number of bidders and would have adversely affected revenue generation. We have not been able to establish the authenticity of this criticism.

Table 7: Valuation of companies sold through asset sale

Company	Year of sale	Advisors valuation for 100% equity (Rs. million)				Percent equity sold	Reserve price for equity sold (Rs. million)	Sale price (Rs. million)
		BV	AVM	CC	DCF			
MFIL	1999-2000	285.1	681.8	785.5	Negligible	74	-	1054.5
BALCO	2000-2001	5972-6819	10723	5870-9090	6512-9947	51	5144	5515
CMC	2001-2002	727.4	375.8	1025.3	2134.9	51	1088.8	1520
HTL	2001-2002	574.7	527.9	403.2	524.4	74	388	550
VSNL	2001-2002	40185	53010	58710	48735	25	12183.8	14392.5
IBP	2001-2002	6080	4450	9720-13820	11240	33.8	3770	11536.8
PPL	2001-2002	489	2062.5-4950	NA	1118	74	1760.9	1517
HZL	2002-2003	11869	16190	10230-14420	10730-13560	26	3531.7	4450
IPCL	2002-2003	25544	36737	36489	32518	26	8450	14908.4
JCL	2003-2004	(-) 178.2	306-602.8	NA	135	72	120	181.8

Note: 1. BV - Book Value; AVM - Asset Valuation Method; CC - Comparable Companies or Transaction Multiple; DCF - Discounted Cash Flow. 2. Indian Financial Year is from April - March. 3. Does not contain information on individual hotels of ITDC and HCI.
Source: Government of India, Department of Disinvestment (Ministry of Finance). 2007. *White Paper on Disinvestment of Central Public Sector Enterprises.*

From the above analysis, it can be concluded that there has been little under-valuation of SOEs in privatization transactions relating to both share-issue privatizations and asset sales.

Other results of privatization

We discuss the changes in various performance parameters in the full sample of privatized firms in India in Table 8. We also discuss the changes in the parameters of two sub-samples, i.e., partially privatized firms and compare them with firms that have seen asset sale (strategic sale with change in management control) in Table 9. The results show that there is an increase in profitability, efficiency, and real output following privatization. Employment, on the other hand, decreases after privatization. Other significant results are: an increase in dividend payout and a decrease in leverage post-privatization.

Profitability change

The profitability of public sector companies is poor because, *inter-alia*, they have multiple objectives like serving as a model employer, promoting employment and balanced regional development, etc. In the early years of Indian independence, public sector companies were not supposed to make profits. After privatization, these multiple objectives have given way to the pre-dominant objective of profit maximization. While there are other objectives like sales maximization (managerialism), profit maximization becomes the pre-dominant objective even after share issue privatization as one the determinants of share prices is the profitability of the company. That this happens in practice is apparent from the weight assigned to profitability in the annual Memorandum of Understanding signed by BHEL, a public sector company that has been partially privatized, with its parent ministry, which increased from 30% in the early 1990s to 50% now.

We use three indices of profitability, i.e., Return on Sales (PAT/ Sales), Return on Assets (PAT/ Total Assets), and Return on Equity (PAT/ Equity). The first one of these indices is the best as both the numerator and the denominator consist of flows and thus would be more appropriate to reflect the current achievements of the firm, while the other two indices have stock variables in the denominator. The stock variables are more likely to be influenced by past actions and therefore are less preferable for measuring the current achievements of the firm.

Table 8: Summary Results of Privatization in India (full sample)

Performance Variables	N	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	Z-statistic for Difference in Medians (After-Before)	Percentage of Firms That Changed As Predicted	Z-Statistic for Significance of Proportion Change
PROFITABILITY							
Return on sales	37	0.0382 (0.0432)	0.0752 (0.0564)	0.0370 (0.0132)	1.99[b]	67.6	2.14[b]
Return on assets	37	0.0357 (0.0310)	0.0414 (0.0619)	0.0057 (0.0309)	1.65[c]	64.9	1.81[c]
Return on equity	37	1.1600 (0.3242)	1.6574 (0.6014)	0.4974 (0.2772)	2.33[b]	70.3	2.47[b]
EFFICIENCY							
Sales efficiency	31	2.9098 (0.5615)	4.3576 (1.1498)	1.4478 (0.5883)	4.11[a]	87.1	4.13[a]
Net income efficiency	31	0.1545 (0.0303)	0.5825 (0.1176)	0.4280 (0.0873)	2.93[a]	77.4	3.05[a]
OUTPUT							
Real sales	37	2960.7 (917.1)	4328.9 (880.3)	1368.2 (-) (36.8)	3.35[a]	78.4	3.45[a]
EMPLOYMENT							
Total employment	31	20920 (8925)	19793 (8603)	(-) 1127 (-) (322)	2.18[b]	71.0	2.33[b]
LEVERAGE							
Debt to assets	37	0.3015 (0.2295)	0.2514 (0.1772)	(-) 0.0501 (-) 0.0523	2.33[b]	70.3	2.47[b]
Debt to equity	37	1.0606 (0.7750)	0.5672 (0.3733)	(-) 0.4934 (-) 0.4017	3.35[a]	78.4	3.45[a]
DIVIDENDS							
Dividends to sales	37	0.0099 (0.0027)	0.0215 (0.0100)	0.0116 (0.0073)	2.97[a]	70.3	2.47[b]

Dividend to net income	37	0.1332 (0.0909)	0.1859 (0.1292)	0.0527 (0.0383)	1.90[c]	62.2	1.48

[a] Indicates significance at the 1 percent level

[b] Indicates significance at the 5 percent level

[c] indicates significance at the 10 percent level

Source: Author's calculations

Table 8 shows that the mean return on sales nearly doubles and the median return on sales increases by over 30% after privatization. Even the median change in return on sales is significant at the 5% level. More than two-thirds of the privatized firms experience an increase in return on sales and this proportion of firms experiencing a change in the predicted direction is also significant at the 5% level. Similarly, the return on assets and return on equity of privatized firms also experience a significant increase after privatization. The mean return on equity increases by about 43% emphasizing the importance of the objective of profit maximization on firm and managerial behavior post-privatization.

Table 9 compares the changes in performance variables in the sub-samples of firms that have undergone asset sales vis-à-vis those that have been privatized through other methods. While the returns increase after privatization in both the sub-samples for each of the profitability indices (except mean return on assets for firms that have been privatized through asset sale), the increase is not significant, reflecting the small size of the sub-samples. In contrast, the firms experienced a significant increase in profitability after privatization for each of the profitability indices for the full sample (see Table 8).

Table 9: Comparison of Performance Changes for Privatization Through Methods Other Than Asset Sale Versus Privatization Through Asset Sale

Performance Variables and Subsamples	N	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	Z-statistic for Difference in Medians (After-Before)	Percentage of Firms That Changed As Predicted	Z-Statistic for Significance of Proportion Change
RETURN ON SALES							
Privatization Through Methods Other Than Asset Sale	24	0.0704 (0.0524)	0.0994 (0.0782)	0.0290 (0.0258)	1.43	66.7	1.63
Privatization Through Asset Sale	13	(-) 0.0182 (0.0369)	0.0367 (0.0510)	0.0549 (0.0141)	1.11	69.2	1.39
RETURN ON ASSETS							
Privatization Through Methods Other Than Asset Sale	24	0.0446 (0.0410)	0.0587 (0.0652)	0.0141 (0.0242)	1.02	62.5	1.22
Privatization Through Asset Sale	13	0.0265 (0.0289)	0.01 (0.0519)	(-)0.0165 (0.023)	0.55	61.5	0.83
RETURN ON EQUITY							
Privatization Through Methods Other Than Asset Sale	24	1.4760 (0.3539)	1.5022 (0.6717)	0.0262 (0.3178)	1.43	66.7	1.63
Privatization Through Asset Sale	13	1.2467 (0.3551)	1.3666 (0.3703)	0.1199 (0.0152)	1.11	69.2	1.39
SALES EFFICIENCY							
Privatization Through Methods Other Than Asset Sale	20	2.6721 (0.5556)	3.1832 (0.7740)	0.5111 (0.2184)	3.01[a]	85.0	3.13[a]
Privatization Through Asset Sale	11	4.2947 (0.7928)	6.1606 (3.4281)	1.8659 (2.6353)	1.84[c]	81.8	2.11[b]
NET INCOME EFFICIENCY							
Privatization Through Methods Other Than Asset Sale	20	0.2033 (0.0339)	0.5795 (0.1398)	0.3762 (0.1059)	2.52[b]	80.0	2.68[a]
Privatization Through Asset Sale	11	0.3208 (0.0513)	0.6902 (0.1351)	0.3694 (0.0838)	0.60	63.6	0.90
REAL SALES							
Privatization Through Methods Other Than Asset Sale	24	3920.7 (1088.7)	5684.3 (1119.5)	1763.6 (30.8)	2.72[a]	79.2	2.86[a]
Privatization Through Asset Sale	13	1449.5 (569.4)	1760.4 (495.0)	310.9 (-) (74.4)	0.55	61.5	0.83
EMPLOYMENT							
Privatization Through Methods Other Than Asset Sale	20	29434 (17991)	28243 (15896)	(-) 1191 (-) (2095)	1.12	65.0	1.34
Privatization Through Asset Sale	11	5251 (2903)	3482 (2322)	(-) 1769 (-) (581)	3.29[a]	100.0	3.32[a]
DEBT TO ASSETS							
Privatization Through Methods Other Than	24	0.3075 (0.2825)	0.2342 (0.1754)	(-) 0.0733 (-) (0.1071)	2.72[a]	79.2	2.86[a]

Asset Sale							
Privatization Through Asset Sale	13	0.2671 (0.1494)	0.2805 (0.1718)	0.0134 (0.0224)	0.55	38.5	0.83
DEBT TO EQUITY							
Privatization Through Methods Other Than Asset Sale	24	1.0657 (0.9342)	0.9696 (0.4567)	(-) 0.0961 (-) (0.4775)	3.16[a]	83.3	3.27[a]
Privatization Through Asset Sale	13	1.0013 (0.1133)	(-)0.1801 (0.08)	(-) 1.1814 (-)(0.0333)	0.55	61.5	0.83
DIVIDEND TO SALES							
Privatization Through Methods Other Than Asset Sale	24	0.0117 (0.0038)	0.0286 (0.0148)	0.0169 (0.0110)	3.54[a]	83.3	3.27[a]
Privatization Through Asset Sale	13	0.0091 (0.0054)	0.0107 (0.0047)	0.0016 (-)(0.0007)	0.00	46.2	0.28
DIVIDEND TO NET INCOME							
Privatization Through Methods Other Than Asset Sale	24	0.1301 (0.0792)	0.2239 (0.1759)	0.0938 (0.0967)	3.01[a]	79.2	2.86[a]
Privatization Through Asset Sale	13	0.1704 (0.1551)	0.1208 (0.0882)	(-)0.0496 (-)(0.0669)	0.29	30.8	-1.94

[a] Indicates significance at the 1 percent level

[b] Indicates significance at the 5 percent level

[c] indicates significance at the 10 percent level

Source: Author's calculations

Efficiency change

By concentrating on the pre-dominant objective of profit maximization, the firm is expected to become more efficient in utilizing its resources (including human resources). In the Indian privatization story also, efficiency improvement is an important objective. Thus, the then Minister of Disinvestment of the Government of India, in a *suo motu* statement made in both Houses of Parliament on 9 December 2002, stated that "The main objective of disinvestment is to put national resources and assets to optimal use and in particular to unleash the productive potential inherent in our public sector enterprises."[214] This implies that efficiency improvement of privatized SOEs is an important objective.

[214] Department of Disinvestment (Ministry of Finance, Government of India). 2007. *White Paper on Disinvestment of Central Public Sector Enterprises.* New Delhi.

We measure efficiency change by using the following indices: sales efficiency (real sales/ number of employees) and net income efficiency (net income/ number of employees). The first measure can also be interpreted as a measure of labor productivity as it reflects the average contribution of each employee to real sales. Both these measures show a significant improvement after privatization. This is true of mean and median change in efficiency, as also the proportion of firms experiencing change in the predicted direction. In fact, the improvement in sales efficiency shows the most significant results across all our performance measures.

This positive change is also reflected in the sub-samples, with both sales efficiency and net income efficiency improving after privatization. While the increase is significant for both our sub-samples for sales efficiency, in the case of income efficiency, the increase is significant only in the case of firms that have been privatized by methods other than asset sale, reflecting the small size of the other sub-sample. It is also significant to note that sales efficiency improves the most in the case of asset sales in absolute terms reflecting the ability of asset sales in unshackling the productive potential of these enterprises.

Output change

Improvement in productive efficiency would be reflected in higher level of output being produced with the same level of inputs. Thus, one would expect to see improvement in output subsequent to privatization. We use real sales (sales adjusted with wholesale price index) as an index of output change. However, it may be noted that some of the observed

output gains may reflect redistribution away from customers that obtained the SOE's output at very low prices because of corruption or sheer incompetency[215]. However, we have no way to quantify the importance of this factor in our sample.

Mean yearly real sales increase by about 50% after privatization (though the median sales experience a slight decrease for our sample of firms). About four-fifths of the firms experience an increase in real sales after privatization and this is significant at the 1% level of statistical significance. The significant increase in real sales post-privatization is also reflected in the sub-samples (with the caveat that the number of firms sold through asset sale may be small to produce significant results).

It is also important to note that the average size of the firms undergoing assets sales is much smaller (and less profitable) than those privatized through methods other than asset sale. This could be reflecting the more difficult political economy problems associated with asset sales, whereby it is easier to privatize the smaller and less profitable firms using this method compared to the larger firms.

Employment change

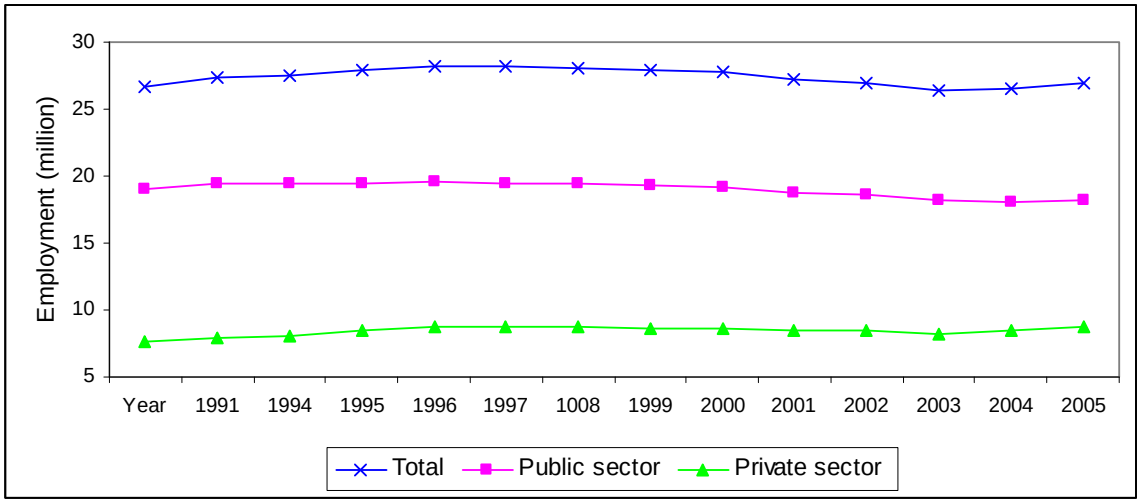
Perhaps the most politically problematic aspect of privatization is the impact it has on employment at the firm level. Since the public sector is also seen as an instrument for promoting employment, the public sector firms are generally over-manned. So, it is expected that they would shed jobs once they are privatized so as to become profitable,

[215] La Porta, Rafael and Florencio Lopez-de-Silanes. 1999. *Benefits of Privatization - Evidence from Mexico.* Quarterly Journal of Economics. 114:4, pp 1193-242

efficient, and competitive. The impact of privatization on employment is the main reason for it to be universally opposed across countries by the trade unions.

In India, employment impact of privatization is a more sensitive issue than in many other countries. Only 2.7% (constituted by 1.8 percentage points in the public sector and 0.9 percentage points in the private sector) of the 1.03 billion population (2001 census figures) is employed in the organized sector. There has been hardly any growth in employment in the organized sector of the economy in the last 16 years as Figure 2 below shows. In fact, the public sector has shed jobs (4.6%) while the private sector has added a little more than the number of jobs lost in the public sector (14.2%) to produce a small net increase in jobs (less than 1%) in the organized sector over the last 16 years. Therefore, losing a public sector job, which frequently occurs following privatization, is a very sensitive matter in the country. The figure below shows the growth of employment in the organized sectors in India since 1991.

Figure 2: Employment in the Indian Organized Sector (1991-2006)



Note: 1. Coverage in construction, particularly on private account, is known to be inadequate; 2. Employment in private sector relates to non-agriculture establishments in private sector employing 10 or

more persons. Employment in public sector relate to all establishments irrespective of size; 3. May not add-up due to rounding off.

Source: Government of India (Ministry of Finance). *Economic Survey 2008-09*

We use the average employment figures as the index for assessing employment change in the privatized firms. We find that both the mean and median employment in the privatized firms decreases after privatization. The median decrease in employment is significant as also the proportion of firms that experience an employment decrease (over 70 percent). This decrease in employment occurs even though the typical shareholders' agreement in the case of asset sales in India includes clauses designed to protect employment after privatization. These clauses relate to protection of jobs of the employees at least for a year, and subsequently, the terms of lay off, if that becomes necessary, cannot be worse than the terms of lay off provided by government. Given the significant decrease in employment in privatized firms in general, there is reason why trade unions, as a particularly vocal interest group in a democracy, oppose privatization.

However, it is not that every firm that undergoes privatization sheds jobs: in the case of about 30 percent of the privatized firms in India, there was an actual increase in employment after privatization. So, while there is a tendency towards reduction in labor force in the over-manned public sector firms, employment may not necessarily decrease if the output from these firms increases so much that it neutralizes the increase in labor productivity to produce an actual increase in employment subsequent to privatization.

We get the same result of a decrease in employment after privatization in both our sub-samples of firms. However, there is one result that stands out: each and every one of the

firms that was divested through asset sale saw a decrease in employment and this proportion was obviously highly significant. For this sub-sample, even with a small sample-size, the decrease in employment subsequent to privatization is highly significant. This also explains why the asset sale variant of privatization is especially opposed by the trade unions and why it is politically more problematic.

Other significant results of privatization relate to decrease in leverage post-privatization and increase in dividend payout ratio.

Leverage change

Privatization is likely to result in a decrease in leverage of firms. Public sector enterprises have lower access to equity capital for which they have to solely depend on the government, where there is a perpetual resource crunch. So, SOEs are perforce dependent on debt for funding their capital requirements. There is also a moral hazard problem because of low risk of bankruptcy in SOEs (government will not let them fail, or the 'soft budget policy regime'), which leads banks to keep on financing them without required due diligence. All these things change when a SOE is privatized, causing leverage to decrease after divestiture.

We measure leverage using the debt to total assets ratio and debt to equity ratio. There is a significant decline in both these ratios after divestiture for our entire sample of firms as Table 8 shows. Over 70% of the privatized firms show a change in the predicted direction, which again is a significant change.

In the sub-samples too, the decrease in leverage is highly significant for firms that have undergone privatization through methods other than asset sale. For firms that have been privatized through asset sale, though the direction of change is essentially as per prediction, the results are not significant because of the small sample size.

Dividend change

It is expected that dividend payout will increase after privatization as the firms become more responsive to their owners. We measure dividend change through two measures: Dividend to Sales ratio [Dividend paid or proposed (i.e., provision)/ Sales] and Dividend to Net Income [Dividend paid or proposed (i.e., provision)/ PAT]. Both these measures show an increase in dividend payout. In the case of the Dividend to Sales ratio, the mean (median) improved from 0.99% (0.27%) in the pre-privatization period to 2.15% (1%) in the post-privatization period. The difference in the medians is significant at the 1% level of statistical significance. Over 70% of the firms in our sample show an increase in dividend payout based on this measure, which is a significant proportion. We get similar results (though weaker) for the second measure of dividend payout that we use.

In the case of the sub-samples, both the measures of dividend change demonstrate significantly higher dividends after privatization for firms that have been divested by methods other than asset sale. In the case of asset sale, the mean dividend to net income ratio decreases after privatization possibly because the new owners re-deploy the firms' profits back into the firms rather than frittering them away as dividends.

The above findings can be summarized intuitively. With the increase in real output and a decrease in employment, the labor productivity and efficiency improves, resulting in a significant improvement in profitability in the post-privatization period.

Performance changes over longer time period

As a robustness check to our results, we look at performance change in the entire period (1989-2008) for which we have data, i.e., we look at all years from 1989 to the year before the year of privatization for calculating the pre-privatization experience and all years after the year of privatization to 2008 for assessing the post-privatization experience. The average pre-privatization period for companies is 7 years while the average post-privatization period for companies is 12 years in this time period. The longer time period for analysis (instead of three years before privatization and three years after privatization that we looked at in the previous section) should ensure against interpreting short-term effects of privatization as sustainable improvements. The results are in Table 10 below.

Table 10: Summary Results of Privatization in India (full sample and long time period)

Variables	N	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	Z-statistic for Difference in Medians (After-Before)	Percentage of Firms That Changed As Predicted	Z-Statistic for Significance of Proportion Change
PROFITABILITY							
Return on sales	36	0.0469 (0.0377)	0.0773 (0.0603)	0.0304 (0.0226)	0.18	52.8	0.33
Return on assets	37	0.0337 (0.0370)	0.0378 (0.0632)	0.0041 (0.0262)	0.66	56.8	0.82
Return on equity	37	1.0812 (0.2625)	1.7887 (1.3298)	0.7075 (1.0673)	3.01[a]	75.7	3.12[a]
EFFICIENCY							

Sales efficiency	36	2.7746 (0.9655)	6.3177 (2.3378)	3.5431 (1.3723)	5.20[a]	100	6.00[a]
Net income efficiency	36	0.1260 (0.0588)	0.8590 (0.3094)	0.7330 (0.2506)	4.11[a]	81.5	4.33[a]
OUTPUT							
Real sales	37	2734.3 (914.9)	5923.3 (1311.7)	3188.9 (396.8)	3.72[a]	81.1	3.78[a]
EMPLOYMENT							
Total employment	36	18708 (8377)	15276 (5855)	(-) 3432 (-) 2522	(-) 2.53[a]	72.2	(-) 2.67[a]
LEVERAGE							
Debt to assets	37	0.3052 (0.2700)	0.2435 (0.1981)	(-)0.0618 (-)0.0719	(-) 2.67[a]	73.0	(-) 2.79[a]
Debt to equity	32	0.9956 (0.8692)	0.6843 (0.3641)	(-)0.3113 (-)0.5051	(-) 2.70[a]	75.0	(-) 2.83[a]
DIVIDENDS							
Dividends to sales	37	0.0088 (0.0031)	0.0265 (0.0138)	0.0177 (0.0107)	3.43[a]	75.7	3.12[a]
Dividend Payout	37	0.1185 (0.0856)	0.2187 (0.2552)	0.1002 (0.1696)	2.75[a]	70.3	2.47[b]

[a] Indicates significance at the 1 percent level

[b] Indicates significance at the 5 percent level

[c] indicates significance at the 10 percent level

Source: Author's calculations

The most significant finding that emerges from the above table is that the results found earlier for a shorter time period are robust. Thus, the improvement in efficiency and real output post-privatization is significant at the 1% level of statistical significance. Similarly, the decrease in employment and leverage after privatization is significant. Dividends also increase significantly after privatization both as a proportion of sales and net income. The profitability ratios improve after privatization, but the improvement is significant only for return on equity[216].

[216] While carrying out the analysis for profitability, we have disregarded a company that is an extreme outlier so as not to vitiate the results. Thus, we have not considered HTL for return on sales, as its post-privatization return on sales was less than (-) 337%. While carrying out the analysis for leverage, we disregard companies that have a negative debt-equity ratio after privatization (as well as one extreme outlier, HMT, whose post-privatization debt-equity ratio increases to 16.7), as their inclusion would have vitiated the results.

Table 11 shows the results of the analysis after breaking up the sample into sub-samples of privatization through asset sale and through methods other than asset sales. The direction of change is consistent for both the subsamples: privatization improves efficiency, real output, and dividend payout, while it decreases employment and leverage. There is a tendency towards improvement in profitability, though only one ratio (return on equity) produces significant results. Because of the small sample size for companies that have been sold through asset sales, very few of the ratios generate significant results for that sub-sample.

Table 11: Comparison of Performance Changes for Privatization through Methods Other Than Asset Sale Versus Privatization Through Asset Sale (longer time period)

Performance Variables and Subsamples	N	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	Z-statistic for Difference in Medians (After-Before)	Percentage of Firms That Changed As Predicted	Z-Statistic for Significance of Proportion Change
RETURN ON SALES							
Privatization Through Methods Other Than Asset Sale	24	0.0660 (0.0453)	0.0950 (0.0630)	0.0290 (0.0177)	0.20	54.2	0.41
Privatization Through Asset Sale	12	0.0058 (0.0270)	0.0481 (0.0603)	0.0423 (0.0333)	0.29	58.3	0.58
RETURN ON ASSETS							
Privatization Through Methods Other Than Asset Sale	24	0.0413 (0.0388)	0.0582 (0.0654)	0.0169 (0.0266)	0.61	58.3	0.82
Privatization Through Asset Sale	13	0.0214 (0.0370)	0.0041 (0.0593)	(-) 0.0173 (0.0223)	0.00	53.8	0.28
RETURN ON EQUITY							
Privatization Through Methods Other Than Asset Sale	24	1.4098 (0.3288)	2.0136 (1.5908)	0.6038 (1.262)	1.85[c]	70.8	2.04[b]
Privatization Through Asset Sale	13	0.7283 (0.2254)	1.6056 (1.1265)	0.8773 (0.9011)	1.11	69.2	1.39
SALES EFFICIENCY							
Privatization Through Methods Other Than Asset Sale	24	2.8395 (1.2598)	6.6124 (2.3378)	3.7729 (1.078)	4.26[a]	100.0	4.90[a]
Privatization Through Asset Sale	12	2.9412 (0.6265)	5.6349 (2.6088)	2.6937 (1.9823)	2.73[a]	91.7	2.89[a]

NET INCOME EFFICIENCY							
Privatization Through Methods Other Than Asset Sale	24	0.1574 (0.1006)	1.0142 (0.4827)	0.8568 (0.3821)	3.72[a]	87.5	3.67[a]
Privatization Through Asset Sale	12	0.1401 (0.0390)	0.5888 (0.3387)	0.4487 (0.2997)	2.07[b]	83.3	2.31[b]
REAL SALES							
Privatization Through Methods Other Than Asset Sale	24	3708.9 (1242.3)	8113.2 (1469.4)	4404.3 (227.1)	2.72[a]	79.2	2.86[a]
Privatization Through Asset Sale	13	1052.5 (561.3)	1873.9 (697.8)	821.4 (136.5)	1.11	69.2	1.39
EMPLOYMENT							
Privatization Through Methods Other Than Asset Sale	24	25419 (10351)	20812 (11419)	(-) 4607 (1068)	1.85[c]	70.8	2.04[b]
Privatization Through Asset Sale	12	5237 (3692)	3653 (3150)	(-) 1584 (-) (542)	1.45	75.0	1.73[c]
DEBT TO ASSETS							
Privatization Through Methods Other Than Asset Sale	24	0.3163 (0.3207)	0.2057 (0.1994)	(-) 0.1106 (-) (0.1213)	2.72[a]	79.2	2.86[a]
Privatization Through Asset Sale	13	0.2755 (0.2217)	0.3124 (0.1181)	0.0369 (-) (0.1036)	0.55	61.5	0.83
DEBT TO EQUITY							
Privatization Through Methods Other Than Asset Sale	23	1.0749 (1.0000)	0.8316 (0.4800)	(-) 0.2433 (-) (0.5200)	2.11[b]	73.9	2.29[b]
Privatization Through Asset Sale	9	0.7660 (0.8692)	0.3057 (0.3641)	(-) 0.4603 (-)(0.5051)	0.66	66.7	1.00
DIVIDEND TO SALES							
Privatization Through Methods Other Than Asset Sale	24	0.0103 (0.0057)	0.0340 (0.0191)	0.0237 (0.0134)	3.72[a]	87.5	3.67[a]
Privatization Through Asset Sale	13	0.0075 (0.0044)	0.0140 (0.0034)	0.0065 (-) (0.0010)	0.00	46.2	0.28
DIVIDEND TO NET INCOME							
Privatization Through Methods Other Than Asset Sale	24	0.1244 (0.0864)	0.2623 (0.2874)	0.1379 (0.2010)	2.72[a]	79.2	2.86[a]
Privatization Through Asset Sale	13	0.1245 (0.1280)	0.1367 (0.1222)	0.0122 (-) (0.0058)	0.60	38.5	0.83

[a] Indicates significance at the 1 percent level

[b] Indicates significance at the 5 percent level

[c] indicates significance at the 10 percent level

Source: Author's calculations

From the above table, it is also apparent that firms that undergo asset sales are smaller and less profitable both in mean and median terms than firms that undergo privatization

through other methods, possibly reflecting the political problems of privatizing the bigger and the more profitable SOEs through asset sale.

With a longer time period, the conclusion about the employment impact of asset sale would have to change. To reiterate, we had earlier found that all firms that underwent asset sale shed employees in the short-run. In contrast, in the longer time period, CMC, IPCL, and VSNL which underwent asset sale went on to increase employment. In the longer term, their real output increased disproportionately, and so, they had to hire more workers. In the other 10 companies for which we have data, employment shrunk after asset sale because the real output growth was not as much. So, even with asset sales, decrease in employment is not a foregone conclusion: in the longer time period, there may be an actual increase in employment in at least some of the firms that experience a sharp surge in output causing them to hire more workers even with rising labor productivity.

Difference-in-Differences analysis

Difference-in-differences analysis is necessary to remove the influence of factors other than privatization on performance (control group is the set of all Indian firms in the same industry as the privatized firm). The improvement in performance after privatization could have happened because of any of the other changes that are taking place simultaneously with privatization like deregulation and liberalization of the Indian economy. Privatization is very often only one component of a larger deregulation package (relaxation of price controls, de-licensing of both imports and capacity,

encouragement to foreign direct investment, and trade liberalization, etc), as in India, that tends to stimulate economies and improve firm performance. In addition, there could be bias because of the pre-privatization characteristics of the divested firms. Finally, difference-in-differences analysis removes the influence of business cycles on performance. Therefore, it would be necessary to use difference-in-differences analysis to say anything deterministic about the impact of privatization *per se* on enterprise performance. We calculate the industry-adjusted ratio (firm ratio - industry ratio) for all the performance variables for the difference-in-differences analysis[217]. While in the Tables 12 and 13, the analysis is in terms of comparison of means and medians, in Table 14, It Is In OLS format. Here the results are much more modest as shown in the table below.

Table 12: Summary Results of Privatization in India (full sample after adjustment with industry ratio)

Variables	N	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	Z-statistic for Difference in Medians (After-Before)	Percentage of Firms That Changed As Predicted	Z-Statistic for Significance of Proportion Change
PROFITABILITY							
Return on sales	35	(-)0.0184 (0.0050)	(-)0.0001 (-)(0.0028)	0.0183 (-)(0.0078)	(-) 1.36	37.1	(-)1.52
Return on assets	35	(-)0.0019 (0.0014)	0.0042 (0.0176)	0.0061 (0.0162)	0.34	54.3	0.51
Return on equity	35	0.3390 (0.0207)	0.9192 (0.2268)	0.5802 (0.2061)	1.70[c]	65.7	1.86[c]
OUTPUT							
Real sales	35	(-)11110.7 (-)(3176.6)	(-)17734.0 (-)(6304.1)	(-)6623.3 (-)(3127.5)	(-)4.11[a]	8.6	(-)4.90[a]
LEVERAGE							
Debt to assets	35	(-)0.0691 (-)(0.0752)	(-)0.0573 (-)(0.0882)	0.0118 (-)0.0130	0.34	54.3	0.51
DIVIDENDS							
Dividends to	35	(-)0.0042	(-)0.0021	0.0021	(-)0.34	45.7	(-)0.51

[217] Our sample size decreases to 35 firms for this analysis as we could not locate industries for 2 privatized firms, namely HMT and Engineers India Limited, from the Prowess database.

sales		(-)(0.0038)	(-)(0.0039)	(-)(0.0001)			
Dividend Payout	33	(-)0.0827 (-)(0.0345)	(-)0.0219 (-)(0.0288)	0.0608 (0.0057)	0.35	54.5	0.54

[a] Indicates significance at the 1 percent level

[b] Indicates significance at the 5 percent level

[c] indicates significance at the 10 percent level

Note: 'N' refers to only the privatized firms and not the total number of firms in the industry.

Source: Author's calculations

Most industry-adjusted profitability ratios improve after privatization and so do mean dividends. This mirrors the findings above (when we do not adjust the firm performance variables with industry performance variables). However, very few of the changes are statistically significant. We were not able to carry out industry-adjusted analysis for efficiency because of absence of industry data for employment.

One result that is highly significant is that the real output relative to the industry improved in only 3 of the 35 firms. Thus, while privatization was associated with a significant increase in real output as we saw in the previous section, the industry output increased even more. This would imply that the mean proportion of the industry output constituted by the output of the privatized firms decreased after privatization. So, the fear that privatization would be associated with exploitation of monopoly power (and to that extent would have negative impact on consumers) does not follow from our data. This is in line with the findings of La Porta and Lopez-de-Silanes for Mexican privatization that monopoly power does not play an important role in explaining the increased profitability of privatized firms[218].

[218] La Porta, Rafael and Florencio Lopez-de-Silanes. 1999. Benefits of Privatization - Evidence from Mexico. *Quarterly Journal of Economics*. 114:4, pp 1193-242

The table below shows the results of the analysis for the sub-samples.

Table 13: Comparison of Performance Changes for Privatization Through Methods Other Than Asset Sale Versus Privatization Through Asset Sale (industry-adjusted)

Performance Variables and Subsamples	N	Mean Before (Median)	Mean After (Median)	Mean Change (Median)	Z-statistic for Difference in Medians (After-Before)	Percentage of Firms That Changed As Predicted	Z-Statistic for Significance of Proportion Change
RETURN ON SALES							
Privatization Through Methods Other Than Asset Sale	22	0.0167 (0.0065)	0.0141 (0.0014)	(-)0.0026 (-)(0.0051)	(-)1.94[c]	27.3	(-)2.13[b]
Privatization Through Asset Sale	13	(-)0.0747 (-)(0.0334)	(-)0.0162 (-)(0.0160)	0.0585 (0.0174)	0.55	61.5	0.83
RETURN ON ASSETS							
Privatization Through Methods Other Than Asset Sale	22	0.0116 (0.0079)	0.0155 (0.0208)	0.0039 (0.0129)	0.21	54.5	0.43
Privatization Through Asset Sale	13	(-)0.0143 (-)(0.0064)	(-)0.0397 (-)(0.0017)	(-) 0.0254 (0.0047)	(-)0.55	46.2	(-)0.28
RETURN ON EQUITY							
Privatization Through Methods Other Than Asset Sale	22	0.4343 (0.0909)	0.7207 (0.4488)	0.2864 (0.3579)	1.50	68.2	1.71[c]
Privatization Through Asset Sale	13	0.8539 (0.0461)	0.6256 (0.2268)	(-)0.2283 (0.1807)	0.00	53.8	0.28
REAL SALES							
Privatization Through Methods Other Than Asset Sale	22	(-)11411.7 (-)(3257.2)	(-)15787.8 (-)(5237.6)	(-)4376.1 (-)(1980.4)	(-)3.72[a]	0.09	(-)3.84[a]
Privatization Through Asset Sale	13	(-)10897.9 (-)(4257.7)	(-)22649.8 (-)(6417.1)	(-)11751.9 (-)(2159.4)	(-)2.92[a]	0.08	3.05[a]
DEBT TO ASSETS							
Privatization Through Methods Other Than Asset Sale	22	(-)0.0737 (-)(0.0560)	(-)0.1017 (-)(0.1007)	(-) 0.0280 (-) (0.0447)	0.64	59.1	0.85
Privatization Through Asset Sale	13	(-)0.0652 (-)(0.1766)	0.0110 (-)(0.0931)	0.0762 (0.0835)	(-)1.11	30.8	(-)1.39
DIVIDEND TO SALES							
Privatization Through Methods Other Than Asset Sale	22	(-)0.0012 (-)(0.0021)	0.0048 (0.0007)	0.0060 (0.0028)	0.00	50.0	0.00
Privatization Through Asset Sale	13	(-)0.0094 (-)(0.0107)	(-)0.0111 (-)(0.0099)	(-)0.0017 (0.0008)	(-)0.55	46.2	(-)0.28
DIVIDEND TO NET INCOME							
Privatization Through Methods Other Than Asset Sale	20	0.0307 (-)(0.0295)	(-)0.0143 (-)(0.0238)	(-)0.0450 (0.0057)	0.67	60.0	0.89

Privatization Through Asset Sale	13	(-)0.1530 (-)(0.0496)	(-)0.1094 (-)(0.1092)	0.0436 (-)(0.0596)	(-)0.55	46.2	(-)0.28

[a] Indicates significance at the 1 percent level

[b] Indicates significance at the 5 percent level

[c] indicates significance at the 10 percent level

Note: 'N' refers to only the privatized firms and not the total number of firms in the industry.

Source: Author's calculations

In the table above, most of the profitability ratios change in the predicted direction (8 out of 12), across sub-samples. Like in the industry-adjusted table for the full sample, one result that is highly significant is that very few firms increased their real output relative to the industry. Thus, while privatization was associated with increase in real output, the industry output increased much more for both sub-samples of privatized firms. None of the other results are statistically significant.

We do a modified difference-in-differences analysis in OLS format. 'Treatment group' is the set of firms privatized in India. 'Control group' is the industry to which the privatized firm belongs. The modification to the traditional difference-in-difference method is that in the absence of data from industry-matched firms, we use the whole industry to which the privatized firm belongs as the control variable. We difference the firm-specific value with the industry mean on both the LHS and in the RHS for each time period in the data set. We estimate the following equation:

$$y_{it} = \beta_0 + \beta_{1it} D_i priv + \beta_{2it} sales + \beta_{3it} assets + u_{it} \quad [1]$$

where y_{it} is the differenced performance variable (firm specific value - industry specific value) for company i at time t, $D_i priv$ is a dummy variable taking the value 1 for all years after privatization and 0 for all years before privatization for company i, *sales* are the

differenced sales of company *i* in year *t*, *assets* are the differenced assets of company *i* in year *t*, βs are the corresponding coefficients, and u_{it} is the idiosyncratic error.

Table 14: OLS Regression Results for Difference-in-Differences analysis

	(1)	(2)	(3)
	Return on sales (differenced)	Return on assets (differenced)	Return on equity (differenced)
$D_i priv$ *(privatization dummy)*	-0.1160 (2.30)*	-0.123 (1.27)	0.7726 (4.17)**
Controls	Yes	Yes	Yes
R-squared	0.14	0.30	0.42
F-Statistic	1.82	0.76	6.26
Observations	621	621	621
Absolute value of t-statistics in parentheses			
* significant at 5% level; ** significant at 1% level			

Note: 'Treatment group' is the set of firms privatized in India. 'Control group' is the industry to which the privatized firm belongs. For the 'Treatment group', data relates to 37 Indian State-Owned Enterprises privatized through share issues or asset sales since 1991. For the 'Control group', data relates to the industry comprising of varying number of firms (ranging from 176 firms for the industrial machinery industry to 12 firms for the crude oil and natural gas industry) to which the privatized firm belongs. Data has been sourced from the Prowess database of the Centre for Monitoring Indian Economy. Industry group for 2 firms privatized in India could not be found. Values in the table report Ordinary Least Squares regression results with firm fixed effects.
Source: Author's calculations

The results of the difference-in-differences analysis are ambiguous. Privatization dummy has a negative and significant coefficient for return on sales, while it is positive and significant for return on equity. These results corroborate the results found earlier on the basis of difference-in-difference comparison of mean and median. We could not do analysis for the impact of privatization on efficiency through the difference-in-differences method because of lack of employment data for the Control group.

Linear Regression with Firm Fixed Effects

The equation that we estimate is:

$$y_{it} = \beta_0 + \beta_{1it} D_i priv + \beta_{2it} sales + \beta_{3it} assets + \beta_{4it} employees + u_{it} \qquad [2]$$

where y_{it} is the performance variable for company i at time t, $D_i priv$ is a dummy variable taking the value 1 for all years after privatization and 0 for all years before privatization for company i, *sales* are the sales of company i in year t, *assets* are the assets of company i in year t, *employees* are the number of employees in company i in year t, βs are the corresponding coefficients, and u_{it} is the idiosyncratic error. The unobserved company fixed effect is absorbed in the dummy variable.

Table 15 below shows the OLS Regression Results with Firm Fixed Effects. In our analysis, privatization is a dummy variable with a value of '0' for the entire time period before the year of privatization and a value of 1 for the entire time period after the year of privatization. This is an unbalanced panel as some firms have missing data on some of the variables for certain years. It is apparent that privatization has a positive and statistically significant impact on return on sales, return on equity, sales efficiency, and net income efficiency, while it has a negative and statistically significant impact on employment. Thus, following privatization, return on sales increases by 3.2 percentage points, return on assets increases by 1.5 percentage points, while return on equity increases by a whopping 51.8 percentage points, *ceteris paribus*. Similarly, there was an improvement in efficiency. We find that the sales efficiency increases by about Rs.2 million ($40,000[219]) per employee and net income efficiency increases by over Rs.0.6 million ($12,000) per employee following privatization, other things remaining the same. Employment decreases by a significant 2,827 employees following privatization, *ceteris paribus*. We do not compare the results of privatization through asset sale with

[219] Assuming an exchange rate of $1 = Rs.50.

privatization through methods other than asset sale because of the small sample size of companies privatized through asset sale.

Table 15: OLS Regression Results with Firm Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)
	Return on sales	Return on assets	Return on equity	Sales efficiency	Net income efficiency	Number of employees
Whether_ privatization	0.032 (2.03)*	0.015 (1.61)	0.518 (2.03)*	1.988 (4.66)**	0.619 (5.03)**	-2827.11 (3.99)**
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Constant	0.032 (1.41)	0.047 (3.50)**	1.193 (3.21)**	1.066 (1.72)*	-0.167 (0.93)	20434.02 (40.60)**
R-squared	0.42	0.32	0.44	0.80	0.70	0.96
F-Statistic	1.82	2.52	8.80	103.29	29.44	11.19
Observations	537	537	537	537	537	537
Absolute value of z-statistics in parentheses						
* significant at 5% level; ** significant at 1% level						

Note: Model results with privatization as a dummy variable taking a value of '0' for the entire time period before the year of privatization and a value of '1' for the entire time period after the year of privatization. Data relate to 37 Indian SOEs privatized through share issues or asset sales since 1991 and has been sourced mainly from the Prowess database of the Centre for Monitoring Indian Economy. Values in the table report Ordinary Least Squares regression results with firm fixed effects to control for unobserved time-constant SOE characteristics.
Source: Author's calculations

The firm fixed effects control for unobserved time-constant firm characteristics. It is significant to note that even with controls, which control for the size of the firms and firm fixed effects, the consistent direction of change across equations implies that privatization does have a positive impact on performance of firms in terms of profitability and efficiency, and a negative impact on employment. This confirms our findings above based on summary statistics.

Comparison of performance of privatization through asset sale with that of privatization through share issue privatization: An example

In the Indian privatization saga, two aluminum producing companies have been privatized, one through asset sale (BALCO) and the other through share issue

privatization (NALCO). This is an unnatural experiment because these companies were not picked up randomly for privatization through a particular method. However, even then, we may use their performance parameters to compare the outcomes of different methods of privatization. We compare the industry-adjusted performance of these two companies before and after privatization to see whether there is a differential impact of the method of privatization on the performance of these companies.

Table 16: Comparison of industry-adjusted privatization performance of BALCO and NALCO

Performance Variable	BALCO		NALCO		Better performance
	Before	After	Before	After	
Return on Sales (short-term)	(-) 4.2%	(-) 6.0%	(-) 1.7%	7.2%	NALCO
Return on Sales (long-term)	1.3%	(-) 6.2%	(-) 0.4%	9.6%	NALCO
Return on Assets (short-term)	(-) 0.6%	(-) 3.1%	(-) 4.0%	0.4%	NALCO
Return on Assets (long-term)	(-) 1.9%	(-) 3.4%	(-) 3.0%	3.6%	NALCO
Return on Equity (short-term)	(-) 32.4%	(-) 85.3%	(-) 11.5%	(-) 13.0%	NALCO
Return on Equity (long-term)	(-) 15.4%	(-) 122.3%	(-) 8.8%	(-) 33.8%	NALCO
Firm as share of industry (short-term)	11.8%	7.3%	26.9%	28.3%	NALCO
Firm as share of industry (long-term)	13.6%	10.2%	27.9%	23.6%	Even

Note: 1. Short-term refers to four years to one year (*t-4* to *t-1*) before privatization and one year to four years (*t+1* to *t+4*) after privatization; 2. Long-term refers to 1989 to all years before privatization and all years after privatization to 2008. Since BALCO was privatized in the year 2000-01, long-term (before) would refer to 1989 to 1999 and long-term after would refer to 2001 to 2009.
Source: Author's calculations

As is apparent from the above table, the performance of NALCO has been better compared to the performance of BALCO post-privatization. This would imply that the outcomes of asset sale may not always be better than the outcomes of share-issue privatization.

Results of this study compared to those of others

Most results of privatization that have been obtained in this study (study of privatization in India) are in consonance with those obtained in other studies as seen in Table 17 below. However, one result that stands out in the case of India is the loss of employment in the short-run in all firms undergoing asset sale. As already mentioned, this makes privatization through asset sale especially contentious in India.

In addition, Boardman and Vining (1989) opine that partial privatization may be worse, especially in terms of profitability, than complete privatization or continued state ownership. This finding does not find support in many of the other studies including this one (e.g., see case study of BALCO and NALCO above). Partial privatization enables the monitoring of the actions of managers through the stock market and may be reducing the agency costs, thus producing benign profitability and efficiency outcomes.

Table 17: Comparison of Findings of Some Privatization Studies

Study	Main Findings
Megginson William L., Robert C. Nash, and Matthias van Randenborgh (1994).	1. Significant increases in profitability, output per employee (adjusted for inflation), capital spending, and total employment. 2. Financial policies of these former SOEs begin to resemble the lower leverage and higher dividend payout ratios typically associated with private, entrepreneurial companies. 3. Results are generally robust when data are partitioned into various subsamples. 4. There is greater performance improvement for the group of firms that experience 50 percent or greater turnover in directors than for the group of firms experiencing less dramatic changes in directors after privatization.
La Porta, Rafael and Florencio Lopez-de-Silanes (1999).	1. Privatization in Mexico is followed by a 24-percentage-point increase in the mean ratio of operating income to sales as privatized firms catch up with industry-matched control groups. 2. Privatized firms reduce employment by half, but those workers who remain are paid significantly more. Real wages experience large increases in the post-privatization period probably because those workers who are retained are required to work and are paid accordingly. 3. Transfers from laid-off workers are an important source of increased profitability. 4. Survey respondents believed that the firing of the old management is one of the most important success factors.
Boardman, Anthony	1. Coefficients for mixed and state-owned enterprises are negative and statistically

E. and Aidan R. Vining (1989).	significant in all equations, which indicate that, on average, mixed and state-owned enterprises are significantly less profitable and less efficient than private corporations after controlling for firm size, market concentration, industry, and country. 2. Partial privatization may be worse, especially in terms of profitability, than complete privatization or continued state ownership.
Ram Mohan, TT (2005)	1. Post-privatization profitability improved in 21 out of 36 firms studied in India. 2. The amounts raised through privatization have been paltry.
Gupta, Nandini (2005)	1. Partial privatization has a positive impact on profitability, productivity, and investment in India. 2. Partial privatization leads to an increase in the productivity of labor and output without layoffs.
This study of privatization in India	1. Privatization leads to significant improvement in profitability, efficiency, and real output of firms. It also leads to decline in leverage and increase in dividend payout. 2. The impact of privatization on employment is negative in general, and more severe in the case of asset sale. This makes privatization a very sensitive issue in the country. 3. The results are robust when the data are partitioned according to whether the firms have been privatized through asset sale or otherwise.

Many studies, especially in transition countries, have shown that privatization to outsiders produces better results than privatization to insiders (managers and workers)[220]. Frydman *et al*[221], also find that the performance effects are significantly different depending on the type of owners to whom control is transferred during the privatization process. In the case of Mexico, La Porta and Lopez-de-Silanes opine that firing of the old management is one of the most important success factors in privatization. Arguably, management change can occur most frequently in the case of asset sales. However, we have already seen that privatization through asset sale does not necessarily produce better results in India (see Table 16). Important considerations while evaluating the methods of privatization in India are: asset sales were popular only in the period 2000-2003 and even during this period, there was insufficient interest to court foreigners to bid for SOEs.

[220] For example, see Djankov Simeon and Peter Murrell. 2002. *Enterprise Restructuring in Transition: A Quantitative Survey*. Journal of Economic Literature Vol. XL

[221] Frydman, Roman, Cheryl W. Gray, Marek P. Hessel, and Andrzej Rapaczynski. 1999. *When Does Privatization Work? The Impact of Private Ownership on Corporate Performance in the Transition Economies.* Quarterly Journal of Economics, Vol. 114, pp. 1153-1191, November 1999.

While both these factors would have decreased the potential receipts from privatization, they could also have restricted the improvements in profitability and efficiency post-privatization.

Avenues for future research

The social impact of privatization on employees and consumers needs to be studied more rigorously for India. If privatization is associated with job losses in the company undergoing privatization and price increases, then a judgment on the overall outcome of privatization would have to counter-balance the profitability and efficiency increases due to privatization with its ill-effects on employees and consumers due to job losses and price increases. In addition, the economy-wide impact on employment should be examined to see whether the profitability and efficiency increases at the firm level translate to employment gains for the economy to compensate for the job losses at the firm-level.

Another interesting area would be the study of Chinese SOE performance. The Chinese SOEs improved performance through a combination of greater autonomy and better incentives through a contract-responsibility system. Chinese privatization, mostly, has involved transfer of ownership of only the smaller SOEs, while the larger ones representing a substantial proportion of state ownership over business enterprises remained in government hands. So, an interesting question for analysis would be whether managerial incentives and turnover can be a substitute for privatization for generating the same improvements in SOE performance.

We have not dealt with the issue of endogeneity[222] explicitly: why were the privatized firms dealt with in this study were the ones chosen for privatization? Though we have used difference-in-differences analysis and firm fixed effects in an effort to get unbiased estimates of the impact of privatization on firm performance, it is also necessary to fully understand the determinants of privatization and whether there was something unobservable and potentially time varying that led the government to choose these firms for privatization that might have made the results sanguine. Similar issues of endogeneity arise in the case of firms selected for asset sale as compared to partial privatization. The issue of endogeneity[223] has not been adequately addressed in this study and is game for future research.

Then there is the issue of selection bias. Though 50 companies were privatized in India in the period 1990-2008, we have analyzed the performance of only 37 of them and the balance 13 companies were left out because of insufficient information. This leaves a potential for selection bias as it is more likely that there would be insufficient information for poorly performing companies, so better-performing firms would be over-represented in the analysis. This also reduces the size of the sample, limiting the ability to find statistically significant results and making generalizations. So, the next stage of analysis should emphasize data collection and analysis of the entire universe of privatized SOEs

[222] Besley, Timothy and Anne Case. 2000. *Unnatural experiments? Estimating the Incidence of Endogenous Policies.* The Economic Journal. Vol. 110, No. 467.

[223] Privatization pressure on the government (based on its fiscal deficit for that year) may serve as an Instrumental Variable for privatization dummy in equation [2] to get an unbiased estimate of the impact of privatization on firm performance.

in India.

7: Conclusion

This chapter examines the impact of privatization on firm level performance in India. The finding is that privatization leads to significant improvement in profitability, efficiency, and real output of firms. In addition, it provides some fiscal boost to the government through privatization receipts. It also leads to decline in leverage and increase in dividend payout. However, the impact on employment is negative, especially after asset sales in the short-run. The results are robust when the data are partitioned according to whether the firms have been privatized through asset sale or not. Thus, the positives from privatization in terms of productivity, efficiency, and real output (and the negative in terms of employment) occur even in the case of partial privatization through share issue privatization.

One result that stands out is that in all cases of asset sale, there has been a loss of employment (in the short term). In the Indian context, where less than 3% of the population is employed in the organized sector, it would appear that partial privatization may be a better strategy as job losses associated with asset sales may make the social discontentment unmanageable for any kind of reform, given poor availability of social security nets.

However, it is necessary for the government to have all methods of privatization in its

arsenal rather than being dogmatic about one or the other method. Though not examined in this chapter, the size of the company and its profitability status should be important considerations in deciding the method of sale [whether partial privatization through share issues or full privatization through asset sale]. For example, to prevent a loss-making company to continue bleeding the state, government should be open to the option of asset sale of the company as is apparent from the cases of Jessop and Company Limited and Lagan Engineering Company Limited that have turned the corner after asset sale[224]. With their loss making status at the time of privatization and given their small-size, they were eminently suitable for asset sales. By the same token, the partial privatization of ONGC in 2003-04 was appropriate given its size and profitability status. The positive changes in its profitability and efficiency since partial privatization demonstrate the effectiveness of this method in motivating positive change.

However, the positive outcomes of privatization in terms of profitability and efficiency may not be enough to sustain privatization in India because of political economy reasons. Privatization requires a lot of political support for its sustenance and weak coalition governments may not have the political power to continue with it even though its utility in terms of profitability and efficiency outcomes may be well-established. We have seen that this was the case in India especially in the period 2004-08 when the ruling coalition was quite weak.

[224] The return on equity improved from -62.5 percent (short-run, pre-privatization) to +37 percent (short-run, post-privatization) and -63.2 percent (long-run, pre-privatization) to +26.9 percent (long-run, post-privatization) in the case of Jessop & Company Limited. Corresponding numbers in the case of Lagan Engineering Company Limited were -34 percent, and +4 percent in the short-run, and -12.5 percent and +14.1 percent in the long-run. [Source: author's analysis.]

Annex Table 1: Privatization revenues (by firm) in India, 1990 – 2008

Company Name	Industry	Issue Date	Receipts (in Rs. m)	Receipts (in $ m)	Government Shareholding (%)		Comments
					Before Issue	After Issue	
Andrew Yule & Company Limited	Medium and Light Engineering	1991-92					9.6% shares sold. SOE-wise receipts not available as shares were sold in bundles.
Bharat Aluminium Company Limited	Aluminium and aluminium products	1999-2000	2,754.2	64.1			Capital reduction and special dividend
		2000-01	5,515.0	122.6	100%	49%	Asset Sale in 2000-01
Bharat Earth Movers Limited	Heavy Engineering	1991-92			100%	80%	SOE-wise receipts not available as shares were sold in bundles.
		1994-95	482.7	15.6	80.00%	60.1%	
Bharat Electronics Limited	Medium and Light Engineering	1991-92			100%	80%	SOE-wise receipts not available as shares were sold in bundles.
		1994-95	471.7	15.2	80%	75.86%	
Bharat Heavy Electricals Limited	Heavy Engineering	1991-92			100%	80%	SOE-wise receipts not available as shares were sold in bundles.
		1992-93	82.1	3.2	80%	79.54%	
		1994-95	3,013.4	97.2	79.46%	67.72%	
Bharat Petroleum Corporation Limited	Petroleum	1991-92			100%	80%	SOE-wise receipts not available as shares were sold in bundles.
		1992-93	3,311.8	127.4	80%	70%	
Bongaigaon Refinery & Petrochemicals Limited	Petroleum	1991-92			100%	80%	SOE-wise receipts not available as shares were sold in bundles.
		1992-93	454.0	17.5	80%	74.60%	
		2000-01	1,488.0	33.1			74.46% equity divested to IOC
Chennai Petroleum Corporation Limited	Petroleum	2000-01	5,093.3	113.2			51.81% equity divested to IOC
CMC Limited	Computer software	1991-92			100%	83.31%	SOE-wise receipts not available as shares were sold in bundles.
		2001-02	1,520.0	32.3	83.31%	32.31%	Asset sale
		2002-03	60.7	1.2	32.31%	26.25%	6.06% sold to employees
		2003-04	1,904.4	40.5	26.25%	0%	
Container Corporation of India Limited	Transportation services	1994-95	997.1	32.2	100%	80%	
		1995-96	141.2	4.4	80%	76.92%	
		1998-99	2,216.5	54.1			Domestic issue
Dredging Corporation of India	Transportation services (shipping)	1991-92			100%	98.56%	SOE-wise receipts not available as shares were sold in bundles.
		2003-04	2,212.0	47.1	98.56%	78.56%	

Company Name	Industry	Issue Date	Receipts (in Rs. m)	Receipts (in $ m)	Government Shareholding (%)		Comments
					Before Issue	After Issue	
Engineers India Limited	Industrial Development & Technical Consultancy Services	1994-95	675.3	21.8	100%	94.01%	
Fertilizers & Chemicals Travancore Limited	Fertilizer	1991-92					1.54% shares sold. SOE-wise receipts not available as shares were sold in bundles.
		1992-93	13.0	0.5	97.46%	97.35%	
GAIL (India) Limited	Petroleum	1994-95	1,941.2	62.6	100%	96.63%	
		1998-99	6,718.6	163.9			includes cross-holding of Rs. 4,900.80 m by ONGC, IOC
		1999-2000	9,450.0	219.8			GDR issue
		2003-04	16,273.6	346.2	67.35%	57.35%	
Hindustan Cables Limited	Medium and Light Engineering	1991-92					3.64% shares sold. SOE-wise receipts not available as shares were sold in bundles.
Hindustan Copper Limited	Minerals and Metals	1992-93	80.7	3.1	100%	98.88%	
Hindustan Organic Chemicals Limited	Chemicals and Pharmaceuticals	1991-92					20% shares sold. SOE-wise receipts not available as shares were sold in bundles.
Hindustan Petroleum Corporation Limited	Petroleum	1991-92					SOE-wise receipts not available as shares were sold in bundles.
					100%	80%	
		1992-93	3,318.5	127.6	80%	70%	
		1994-95	5,631.1	181.6	69.72%	60.25%	
Hindustan Photo Films Mfg. Co. Ltd.	Consumer Goods	1991-92					16.05% shares sold. SOE-wise receipts not available as shares were sold in bundles.
Hindustan Teleprinters Limited	Medium and Light Engineering	2001-02	550.0	11.7	100%	26%	Asset Sale
Hindustan Zinc Limited	Mineral and Metals	1991-92					SOE-wise receipts not available as shares were sold in bundles.
					100%	80%	
		1992-93	815.5	31.4	80.04%	75.93%	
		2002-03	4,450.0	90.8	75.92%	49.92%	Asset Sale in 2002-03
		2002-03	61.9	1.3	49.92%	48.45%	1.47% sold to employees
		2003-04	3,238.8	68.9	48.45%	29.53%	
HMT Limited	Medium and Light Engineering	1991-92					5.43% shares sold. SOE-wise receipts not available as shares were sold in bundles.
		1992-93	233.8	9.0	95.14%	90.32%	

Company Name	Industry	Issue Date	Receipts (in Rs. m)	Receipts (in $ m)	Government Shareholding (%)		Comments
					Before Issue	After Issue	
Hotel Corporation of India Limited	Tourist services	2001-02	1,595.1	33.9	100%	0%	Asset Sale
		2002-03	830.0	16.9			
IBP Company Limited	Petroleum	2001-02	11,536.8	245.5	59.8%	26%	Asset Sale in 2001-02
		2003-04	3,506.6	74.6	26%	0%	IBP merged with IOC in June 2007
Indian Oil Corporation Limited	Petroleum	1994-95	10,336.5	333.4	99.88%	96.08%	
		1998-99	12,089.6	294.9			Cross-holding by ONGC
		1999-2000	1,627.9	37.9			Cross holding by ONGC
Indian Petrochemicals Corporation Limited	Chemicals and Pharmaceuticals	1991-92					20% shares sold. SOE-wise receipts not available as shares were sold in bundles.
		2002-03	14,908.4	304.3	59.95%	33.95%	Asset sale
		2003-04	12,028.5	255.9	33.95%	5%	
		2004-05	648.1	14.4	5.00%	0%	4.58% sold to employees
Indian Railway Construction Company Limited	Contract and Construction services	1991-92					0.27% shares sold. SOE-wise receipts not available as shares were sold in bundles.
India Tourism & Development Corporation Limited (18 hotels)	Tourist services	1994-95	519.9	16.8	100%	90%	
		2001-02	1,319.5	28.1	89.97%	0%	Asset sale in 2001-02
		2001-02	394.1	8.4			Lease-cum-management contract
		2002-03	2,728.1	55.7	89.97%	0%	Asset sale in 2002-03
Indian Telephone Industries Limited	Medium and Light Engineering	1991-92			100.00%	80%	SOE-wise receipts not available as shares were sold in bundles.
		1992-93	156.3	6.0	79.72%	77.79%	
Jessop & Co Ltd	Heavy Engineering	2003-04	181.8	3.9	99%	27%	Asset sale
Kochi Refineries Limited	Petroleum	1991-92					10.01% equity sold. SOE-wise receipts not available as shares were sold in bundles.
		2000-01	6,591.0	146.5	55.04%	0%	55.04% of equity divested to BPCL; KRL merged with BPCL in Sept 2006
Kudremukh Iron Ore Company Limited	Minerals	1994-95	114.0	3.7	100%	99.03%	
Lagan Jute Machinery Company Limited	Heavy Engineering	2000-01	25.3	0.6	100%	26%	Asset Sale in 2000-01
Madras Refineries Limited	Petroleum	1991-92					20% equity sold. SOE-wise receipts not available as shares were sold in bundles.

Company Name	Industry	Issue Date	Receipts (in Rs. m)	Receipts (in $ m)	Government Shareholding (%)		Comments
					Before Issue	After Issue	
Mahanagar Telephone Nigam Limited	Telecommunication services	1991-92			100%	80%	SOE-wise receipts not available as shares were sold in bundles.
		1994-95	13,221.7	426.5	80%	67.18%	
		1995-96	1,359.0	42.5	67.18%	65.73%	
		1997-98	9,100.0	252.8			GDR issue
Maruti Udyog Limited	Transportation Services	2002-03	10,000.0	204.1		45.79%	Control premium given by Suzuki Motor Co.
		2003-04	9,933.4	211.3	45.79%	18.28%	IPO
		2005-06	15,676.0	356.3	18.28%	10.28%	8% sold to FIs
		2005-06	20.8	0.5	10.28%	10.27%	0.01% sold to employees
		2006-07	23,669.4	526.0	10.27%	0%	Sold to FIs and mutual funds
Minerals & Metals Trading Corporation	Trading and marketing services	1991-92			100%	99.33%	0.67% equity sold. SOE-wise receipts not available as shares were sold in bundles.
Modern Food Industries (India) Limited	Bakery products	1999-2000	1,054.5	24.5	100%	26%	Asset sale
		2002-03	440.7	9.0	26%	0%	Residual sale of equity
National Aluminium Company Limited	Aluninium and aluminium products	1991-92			100%	97.28%	SOE-wise receipts not available as shares were sold in bundles.
		1992-93	2,442.0	93.9	97.28%	87.20%	
		1994-95	1.0	0.0	87.19%	87.15%	
National Fertilizers Limited	Fertilizer	1991-92			100%	97.72%	SOE-wise receipts not available as shares were sold in bundles.
		1992-93	7.2	0.3	97.72%	97.66%	
		1994-95	2.8	0.1	97.66%	97.65%	
National Mineral Development Corporation Limited	Minerals	1992-93	178.8	6.9	100%	98.38%	
National Thermal Power Corporation Limited	Power Generation	2004-05	26,840.7	596.5	100%	94.75%	
Neyveli Lignite Corporation Limited	Coal and Lignite	1991-92					5% equity sold. SOE-wise receipts not available as shares were sold in bundles.
		1992-93	704.3	27.1			2.26% equity sold

Company Name	Industry	Issue Date	Receipts (in Rs. m)	Receipts (in $ m)	Government Shareholding (%)		Comments
					Before Issue	After Issue	
Oil & Natural Gas Corporation Limited	Petroleum	1994-95	10,515.2	339.2			2% sold
		1995-96	51.6	1.6			0.2 m shares sold
		1998-99	24,849.60	606.1			Cross-holding by GAIL, IOC
		1999-2000	2,964.80	68.9			Cross-holding by GAIL, IOC
		2003-04	105,584.0	2,246.5	84.11%	74.11%	
Paradeep Phosphates Limited	Fertilizers	2001-02	1,517.0	32.3	100%	26%	Asset sale in 2001-02
Rashtriya Chemicals & Fertilizers Limited	Fertilizers	1991-92					5.64% equity sold. SOE-wise receipts not available as shares were sold in bundles.
		1992-93	303.6	11.7			1.85% equity sold.
Shipping Corporation of India Limited	Transportation services (shipping)	1991-92			100%	80%	SOE-wise receipts not available as shares were sold in bundles.
		1994-95	280.8	9.1	81.49%	80.12%	
State Trading Corporation of India Limited	Trading and Marketing services	1991-92			100%	92.02%	SOE-wise receipts not available as shares were sold in bundles.
		1992-93	22.5	0.9	92.02%	91.02%	
		2001-02	400.0	8.5			Special dividend
Steel Authority of India Limited	Steel	1991-92			100%	95%	SOE-wise receipts not available as shares were sold in bundles.
		1992-93	7,001.0	269.3	95.01%	89.49%	
		1994-95	226.6	7.3	89.45%	89.04%	
		1995-96	133.0	4.2	89.04%	88.93%	
Videsh Sanchar Nigam Limited	Telecommunication services	1991-92			100%	80%	SOE-wise receipts not available as shares were sold in bundles.
		1996-97	3,796.7	108.5	82.02%		GDR issue
		1998-99	7,836.8	191.1			GDR issue
		1999-2000	750.0	17.4			Domestic issue
		2001-02	22,500.0	478.7			Dividend and dividend tax
		2001-02	14,392.5	306.2	52.97%	27.97%	Asset Sale
		2001-02	251.9	5.4	27.97%	26.12%	1.85% sold to employees
			484,337.6[a]	11,533[b]			

[a] Total receipts from disinvestment excludes Rs.30,380 m received in 1991-92 (SOE-wise receipts are not available for this year as shares were sold in bundles). Total may not correspond with Table 1 because of statistical discrepancy; [b] Total receipts from disinvestment excludes $1,320.9 m received in 1991-92 (SOE-wise receipts are not available for this year as shares

were sold in bundles).

Source: Government of India, Department of Disinvestment website (www.divest.nic.in); Government of India, Department of Disinvestment. 2007. *White Paper on Disinvestment of Central Public Sector Enterprises*; Ram Mohan, TT. 2005. *Privatisation in India: Challenging Economic Orthodoxy*. New York: Routledge Curzon; Naib, Sudhir. 2004. *Disinvestment in India*: *Policies, Procedures, Practices.* New Delhi: Sage Publications; Exchange rate used to convert Indian rupees to US dollars is from World Bank. *World Development Indicators*.

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