

**INFORMATION, REGULATORY
COMMITMENT AND THE
INVESTMENT DILEMMA**

Ranjan Ghosh

Corresponding Author,
Division of Resource Economics, Humboldt University,
Philippstr. 13, Haus 12, D-10115 Berlin.
Email: ranjan.rgt@gmail.com

Christian Kimmich

Division of Resource Economics,
Humboldt University,
Philippstr. 13, Haus 12, D-10115 Berlin.
Email: christian.kimmich@hu-berlin.de

הפורום הירושלמי Jerusalem Forum
לרגולציה וממשליות on Regulation & Governance
האוניברסיטה העברית The Hebrew University
הר הצופים Mount Scopus
Jerusalem, 91905, Israel
Email: regulation@mscc.huji.ac.il
<http://regulation.huji.ac.il>

Information, Regulatory Commitment and the Investment Dilemma

Ranjan Ghosh & Christian Kimmich

Abstract: Does more information lead to less investment? In the context of de-facto non-independence of regulation, civil society actors produce information and try to change voter strategy. Their aim is to bring about a regime change and hence a new regulatory set-up which will generate more favorable regulation. However, we show using a linked action situation approach through stylized games that in the short run, biased information produced by public interest groups and amplified by media actually tends to reduce regulatory commitment, irrespective of a regime change. This leads to a ‘low investment trap’. We give some indicative support to this claim through one instance of public monitoring of electricity in India. Finally, we argue that in the long-run this dilemma will be solved under a repeated game situation where state regulators make only public interest moves ‘knowing’ that a perennial investment trap would otherwise be created. However, this will be possible only under the condition that an institutional mechanism for information production exists.

Key words: Information, Linked Action Situations, Investment Dilemma

Information, Regulatory Commitment and the Investment Dilemma

I. Introduction

The general motivation for delegation by the government of regulatory powers to an independent agency is based on the principal-agent logic of transaction cost economics (Dubash and Rao, 2008, Levy and Spiller, 1994). This helps the principal i.e. the government, solve commitment issues, overcome information asymmetries as well as insulate itself from the liabilities of unpopular policies (Thatcher and Stone Sweet, 2002). Therefore, unless independent regulation is able to minimize the transaction costs which arise out of the commitment problem, its efficacy will be in doubt.

India made its first attempts towards independent electricity regulation in the early 1990s. Some of the federal states went ahead unbundling the State Electricity Boards (the erstwhile monopoly in the entire electricity supply chain) and introduced management reforms. The regulators were mandated to take over the tariff function of the government and their prime goal was in balancing investor and consumer interests. However, reality turns out to be quite different. Although the government has lost control over tariff setting as a political tool, the regulators are unable to raise tariffs to attract investors (Dubash, 2008). Thus one of the main purposes of setting up regulators, which is to send credible signals for private investment rather than solely protecting consumer interests, is not served. Clearly, in this case, the commitment problem does not seem to have been resolved.

One way out of this is to move towards more stakeholder based models of regulation (Dubash, 2008). The 'responsive' and 'stakeholder' models of regulation (Ayres and Braithwaite (1992); Prosser (1999) predict the presence of a third actor apart from the regulator and the regulated who are an equal stakeholder in the decision process. They could be civil associations or public interest groups. But for this participative model to function formally, it is important that these third actors be entitled to the same information (about the regulated firm's cost structure, contracts etc.) as the regulator, they should be given an equal stake in the negotiation process and should have similar

sanctioning powers as the regulators. These are ambitious ideals in the current institutional environment in India (and most other developing countries) and therefore it is no surprise that the formal stakeholder model hardly exists (Dubash and Rao, 2008). Yet, informally, a quasi form of stakeholder engagement exists. Whenever any special interest move is suspected, public interest groups use an institutional mechanism to produce information and amplify through the media. This way they try to change the voter strategy (as *de-facto*, regulators are not independent from the government). Their aim is to bring about a regime change and hence a new regulatory set-up which will generate more favourable regulation. But what impact does this process have on regulatory commitment? Do investors feel secure and confident? Regime change is not necessarily indicative of increased commitment as the new elected regulatory set-up could also renege on its pre-electoral promise. And if regime change is the only purported solution, then the whole point of having independent regulation seems redundant.

To answer some of the puzzles above, it is important to understand how regulatory commitment is linked to information production by public interest groups. In this paper, we try to do that through stylized games using linked action situations. We explain how this form of informal stakeholder engagement leads to a dilemma situation for the investors and creates a 'low investment trap'. This however, is a short run phenomenon. We provide some tentative empirical illustration by briefly discussing a case of public monitoring of regulation in one region of India. We further argue that in the long-run this dilemma can be solved under a repeated game situation where state regulators make public interest moves knowing that otherwise a persistent investment trap will be created.

In Section 2, we discuss the problem of regulatory commitment in greater detail and the role of information. We also discuss the basic elements of a formal stakeholder model of regulation. In Section 3 we lay down the structure and explain the dilemma situation using ordinal, linked games. We further discuss the conditions under which this dilemma can be solved in the long run. In section 4, we present some illustration of our predictions using an example from India.

II. Regulatory Commitment, Information and Stakeholder Models

Whether a regulatory design is adequate or not can be judged by the credibility of its commitments to investors as well as consumers i.e. voters. Because the interests from either side are in conflict, regulation becomes inherently political. When consumers cannot exit the system in the event of being dissatisfied, they voice their protest through voting mechanisms and other voice mechanisms, such as public discourse through media (Hirschman, 1970). And if the investors are not sure about the safety of their investments, they do not make the required level of investments (Newbery, 1999). Therefore the problem of regulatory commitment is central to understanding whether attempts for deregulation and competition will be successful or not in the developing context. The basic idea of having independent regulators stems from the principal-agent logic where the state, being a principal, delegates regulatory decision making to an agent, who can even take a politically unfavourable decision without implicating the principal. This helps the principal, i.e. the government, solve commitment issues, overcome information asymmetries as well as insulate itself from the liabilities of unpopular policies (Thatcher and Stone Sweet, 2002). In other words, delegation is meant to reduce certain political transaction costs (Majone, 2001).

Majone (2001) develops a positive theory of non-majoritarian institutions using a Coasean logic. The question he concerns himself with is: why do non-majoritarian institutions exist, when they are not directly accountable to voters? The reason is political transaction costs; which can be understood as the cost of reaching and enforcing political agreements. This is an explanation for why independent non-majoritarian agencies exist. But this is no explanation for why the government does not delegate all its policymaking to independent agencies. According to the Coasean explanation, therefore, only that part of policy making which has high political transaction costs, will be delegated. The type of political transaction cost that North (1990) deals with is the lack of instrumental rationality i.e. inability of the participants in the political process to know exactly how their world operates. This is due to insufficient information feedback. So his explanation is that policies fail because the policy makers do not adequately understand the consequences of such policy

completely. However, Dixit (1996) identifies another important form of political transaction cost and that is, the problems policymakers face in providing long term credible commitments. This he calls the ‘technology of commitment’ problem (Majone, 2001). In a strategic interaction between the voters and policymakers, there is no incentive for the policymaker to offer a policy which will make the voter better off in the present and the next periods, if that does not guarantee voting by them in the next period. Therefore they try to tie up their policies in a way that voters do not become independent. Similarly, voters knowing this strategy would use their political power to extract short term benefits. Dixit (1996) explains this using the example of labour compensation in declining industries. While the ideal policy would be to make a lump sum compensation and leave the labour to find their best alternative, doing this will not guarantee votes in the next electoral period. Therefore, the policy would be for a stream of payments. However, now the labour is not sure that politicians would not renege on this stream of payments by behaving opportunistically, or due to a change in the government. So there is a double credibility problem from both sides and the outcome would be that labour continues in the declining industry with state help. This is however, a socially inefficient solution.

Dixit (1996) identifies the problem of commitment or time consistency as an important transaction cost. Majone (2001) explains that this time inconsistency problem of policy will happen when there is a disjunction between the long-term and short-term policy objectives of a government, thereby creating an incentive to renege on the long term promises. One way to solve this would be to have independent regulators who are non-political. For example, in the case of utilities, they would allow a fair rate of return along with the credibility that it won’t renege over the short run. Delegation, or in other words transfer of political property rights to non-majoritarian institutions, then appears to be a solution to the commitment problem. He further states that due to the growing importance of contractual incompleteness and mutual trust, agency theory is not sufficient to explain delegation. Although the core aspects of hidden action and hidden information between a principal and agent persist, he proposes that the fiduciary principle i.e. a trustee-property-duty relationship provides a better framework to reduce the commitment problem.

In short, commitment through independent regulation has two core components: agency and transaction costs. Both have strong elements of the information problem, though there is a difference in the assumptions about it (Scharpf, 1997). The agency view holds that there is hidden information between the principal and the agent thereby reducing the level of effort. The transaction cost view holds that this information problem will eventually lead to incomplete contracting. In the discussion by Scharpf (1997) about hierarchical coordination, he also uses the Hayekian logic that although local information is very important, it is very difficult to transfer it to the central decision makers. Apart from this, he also stresses on the motivation problem. Even if there is adequate information, the benevolent motivation of actors cannot be taken for granted. In transaction cost economics, the owner- manager solves this problem by maximizing economic efficiency of the firm but only as long as the owner and manager do not have separate identities. When this happens the interests of the owner and the manager diverge and lead to lower effort levels. This can theoretically be solved by enforcing the incentive compatibility constraints, or agency contracts. But however mathematically sophisticated such solutions are, they fare poorly in terms of realism and practicability (Jensen, 1983). In the sphere of public policy too such principal-agent relations exist, between voters (principals) and elected government (agent) or between the government (principal) and bureaucrats (agent). In the case of regulatory agency, things become more complicated when we see that there are in fact multiple principals (government and the self interest groups) who compete to gain the favour of the regulators (Spiller, 1990), where the interests among the principals may not converge. The result is that both would like to control and influence the regulator. In the next paragraph we discuss whether involving the stakeholders more directly in the regulation process, at least theoretically, can reduce the multiple principal dilemma.

One way of stakeholder involvement is what Ayres and Braithwaite (1992) call tripartism. It is defined as a policy where active participation of civil society through public interest groups or NGOs is allowed. Ayers and Braithwaite present a game theoretic model of capture and tripartism and show the conditions under which harmful capture can be prevented, efficient capture can be encouraged and regulatory goals through democracy can be furthered. There are three requirements for this model to work: first, the public interest groups have to be given all the information the

regulator has; second, the public interest groups have to be given an opportunity to participate directly in the negotiation process; third, they should have the same prosecution powers as the regulators. But these are institutional conditions. The realization of these theoretical institutional conditions seems to be more unlikely in those environments which do not favour regulatory independence. Our contention is that the institutional environment which facilitates sharing of information, equal opportunity in decision making and same prosecution powers to third actors like the public interest groups may as well not allow capture at the first place. Yet, even if formal tripartism does not exist so frequently, civil society actors still play the role of information producers. An environment where information is no more private to the key decision makers in the regulatory game could change the game through the mechanism of party competition for votes. But how does this affect the regulatory commitment? This will become clearer in Section 3.

III. An Actor-Centered Game Based Illustration

Arguably, the most well known form of the regulatory game tries to capture the conflict which arises over the sharing of rents between the investor and the social agent i.e. the regulator (Newbery, 1999) and hence the problem of commitment. There are two players in the game, the utility and the regulator whose payoffs are affected by each other's strategies. The advantage of using a game structure to study interactions between rational agents is that their behaviour can be observed under a situation when they know each other's strategies. However, the approach is limited by the difficulty to define the possibility set of the agents' actions and to include all the important aspects of interactions between the agents. For example, Newbery (1999) contends that there are a number of players whose actions may affect the investor's return (payoff) like the fuel suppliers, worker union, politicians, consumers, environmental groups etc. But he includes only two players, the utility and the regulator as players in the game for the purposes of simplification and understanding a particular phenomenon, which in this case is commitment.

In Newbery's model the utility's payoff is given by the profit it earns $\pi_t = R_t - bQ_t - rK_t$, where R_t is the revenue, Q_t is the quantity sold and K_t is the tariff. The regulator's payoff is given by $U_t + \theta\pi_t$, where U_t is the consumer surplus, π_t is the

investor profit and θ is the weight on profits relative to consumer benefits. It is also assumed that $\theta < 1$ implies the regulators will serve the interests of the local consumers first as compared to the investors, who may not serve as local voters. This also means that the regulator can behave opportunistically with respect to sunk investments. The sequence of the game is such that first the utility chooses capital i.e. the amount of investment; then the demand is realized; then the regulator chooses a reward or tariff to be offered and finally, the payoffs are realized. For this one shot game, assuming regulators have no legal restrictions on their freedom to decide whether to pay or not, Newbery finds out that in the Nash equilibrium regulators set price equal to the variable cost and the utility does not invest. However, when the game is repeated and the concept of sub game Nash equilibrium is used, the condition under which the utility has the best outcome of making positive investment is derived as $(1 - P)(c - b) > r$, where $(1 - P)$ is the probability of high demand, $(c - b)$ is the extra cost of losing out on the utility's investment and r is the level of investment. This condition means that a certain rate-of-return needs to be offered for the utility to be able to invest and this rate of return acts as a restraint on regulatory discretion and prevents opportunistic behaviour. Such restraints are good for regulatory commitment, and the regulatory governance literature (Levy and Spiller, 1994) too maintains that it is a critical aspect of the total regulatory design.

There are some limitations to the basic regulatory game explained above. Firstly, the number of agents is limited to only two thereby restricting the scope of strategic interactions. While θ shows that the actions of the regulators are guided by its implication on the voting behaviour, the voter is not considered to be an active player. The fact that electricity is very political in nature, especially in the developing context where satisfying basic needs and demand is still an unfulfilled objective, suggests that voting behaviour cannot be overlooked to understand how regulation works. Similarly the government is not included as an active player, thereby overlooking the role of party competition. Secondly, there is an assumption of information completeness. That is direct fallout of the fact that the regulatory process is not the basis of setting up the game. The purpose of this game is to find out when restraints on regulatory discretion are needed so as to increase commitment.

We try to extend the basic regulatory game with an actor-centred approach. The nature, structure, resources and interests of the actors do have an influence on the design and the outcomes of games (Klijn and Koppenjan, 2000). Institutions or ‘rules of the game’ determine how the game is played and may vary from one game to the other (Scharpf, 1997). In short, games differ when actors and institutions differ. Therefore, the actor-centred institutional approach offers a more detailed possibility to study the strategic interactions between players in a regulatory game. It is so because the core assumption of actor-centred institutionalism is that any analysis of structures independent of the reference to the actors involved is incomplete and vice versa (Mayntz and Scharpf, 1995). By maintaining a sharp distinction between institutions and observable action by actors, this approach combines methodological individualism and institutionalism (Scharpf, 1997).

We use a linked action situation approach (Kimmich, 2013) because we study the interactions between two games. Such an approach has been proposed with the concept of Networks of Adjacent Action Situations (NAAS), where “an action situation X_i is *adjacent* to Y if the outcome of X_i directly influences the value of one or more of the working components of Y ” (McGinnis, 2011). McGinnis proposes an extension of the Institutional Analysis and Development framework that builds on the seven sets of rules developed by Elinor Ostrom to identify related types of adjacent action situations. The theoretical relevance of the concept of NAAS has been demonstrated with several empirical cases (Dutton et al., 2012, Lubell et al., 2010, McGinnis, 2011). The empirical cases are instructive examples showing the complexity of the networks of situations that condition each other. With the extension of analysis from the focal situation to the adjacency network, the researcher is increasingly confronted with different types of outcome. While the outcome of the focal situation in the given context is a certain level of regulatory commitment, the outcome of an adjacent situation is a working component of the focal situation (McGinnis, 2011). This outcome can be physical in nature, but is often an institution. Depending on the type of institution, the underlying situation can be the singular legislation of a law or a highly repetitive and long-lasting situation of reproducing habits and norms of behaviour. Thus, especially in the case of the latter, the outcome is part of an underlying and persistent institutional structure that shapes the focal situation.

Context and Setting

In this section we explain our game model using simple ordinal payoffs with three heterogeneous actors in the regulatory process; the regulator (which includes both the regulatory agency and government, given our assumption of regulatory non-independence in a developing context), the generation utility (investor), and the voter. It is based on the party competition model of Scharpf (1997). In the first game, information about special interests is private and not known to voters. In the second game we introduce information produced by public interest groups (PIGS) about the suspected special interest motives of the regulator.

We start with the regulator deciding to increase the production capacity in electricity generation. It expresses an interest that private investors should come and set up their own power plants (utilities) and produce electricity which they should sell to distribution utilities on a long-term basis for a rate of return decided by it. Through this the government aims to satisfy the median voter (an assumption we will remove later) who will be happy to see that the peak demand is met. However, the government has two choices. Either it gives concessions (examples are captive coal mines or generous take-or-pay fuel contracts) which have an opportunity cost in terms of budgetary adjustments or it does not give any special concession. Accordingly the utility decides whether and how much to invest. However, the key concern for the utility will be whether the regulator sticks to its commitments about concessions and rate of return so that their investments are secure and they can appropriate rents. The voter plays another game with the utility where it observes the move of the utility and decides to vote in or vote out the incumbent government based on whether it perceives reliable electricity at affordable prices. With this background we explain the game structure below:

Set of players

SR: State Regulator; includes combined decision making by state government and the regulatory agency

U: Utility; in this case the independent power producer (IPP) or the investor

V: Voters (consumers)

Set of actions and choices

SR: Invites private investment and either offers a Concession (*C*) or No-Concession (*NC*)

U: Decides to make high investment (Inv^h) or low investment (Inv^l)

V: Vote for (V^y) or Vote against (V^n) the incumbent government based on levels of investment by U

Stage 1: Private Information

State Regulator (SR) and Utility (U) Game

There is a set of legislated formal institutions where the government has to invite private investments through an open tender (competitive bidding) procedure. And the government can change the composition of the regulatory agency. This justifies our strong assumption that both government and regulatory agency have a common strategy. Therefore, SR represents the entire set of regulatory decision makers, including the government. In this game information is only shared between the players: regulator (SR) and utility (U)¹. SR and U also have common knowledge that V is unaware of any special interest motives, whereas their game plan has special interests. The preferences of both the players are written in an extensive form as shown in Fig. 1 along with the attached payoffs, which are ordinal preferences. U prefers making high investment with concessions than high investment without concession: $p(i_{high}; c) > p(i_{high}; \sim c)$. Higher investment means higher revenues: $p(i) = e^{\alpha \cdot i}$. It prefers lower investments with some concessions than lower investments without any concession: $p(i_{low}; c) > p(i_{low}; \sim c)$. It always prefers high investment over low investment $p(i_{high}) > p(i_{low})$.

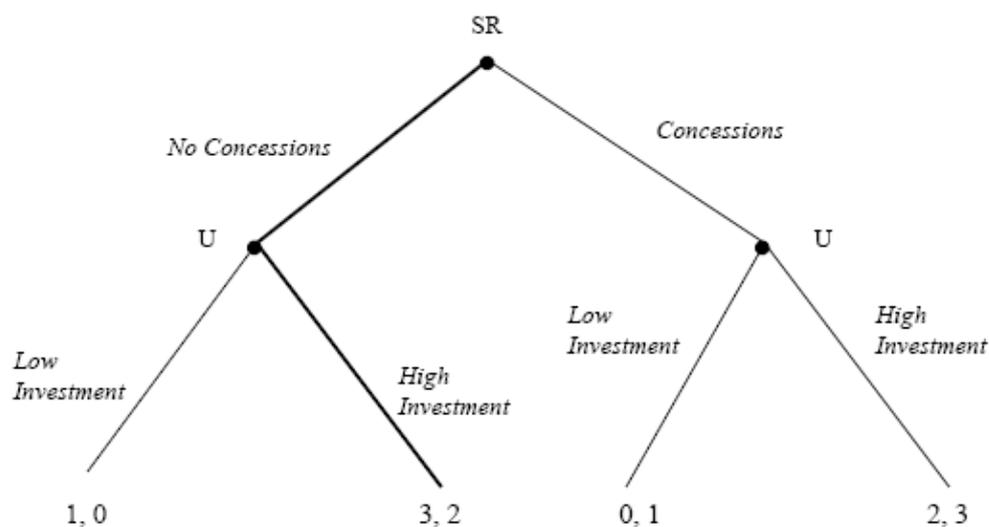


Fig. 1: Investment game: Regulators and utility

Utility (U) and Voter (V) Game

In parallel, utility (U) and voter (V) also play a game. This is because the only way V can observe the actions of the regulator (SR) is through the level of investments U makes. V believes that the higher the level of investment, the higher will be the availability of electricity and the lower the prices. This game is illustrated in Fig. 2 where U prefers making high investment and government being voted in to being voted out. However, when it makes low investment it prefers the government being voted out so that there is new government and new SR. V clearly prefers high investment over low but cannot decide in either case whether to vote in or out. The payoff structures reflect this set of preferences.

We solve both games through backward induction, deriving the Sub-game Perfect Nash Equilibria (SPNE) and the game equilibrium. The equilibrium in the ‘investment game’ (see Fig. 1) is where the regulators do not offer any concessions and yet the utilities make high investment. There is no single pure strategy equilibrium in the ‘voting game’ (see Fig. 2) but it could be both where utilities invest highly and the voters vote in the incumbent or utilities making low investment and voters voting out the incumbent. This indeterminate solution can be explained by the fact that V does

not observe the payoffs of the U beyond its investment decision. If U is assumed to be risk neutral, it can play a mixed strategy with 0.5 probabilities for each (because $3+0 = 1+2$). If its risk averse, it plays low investment.

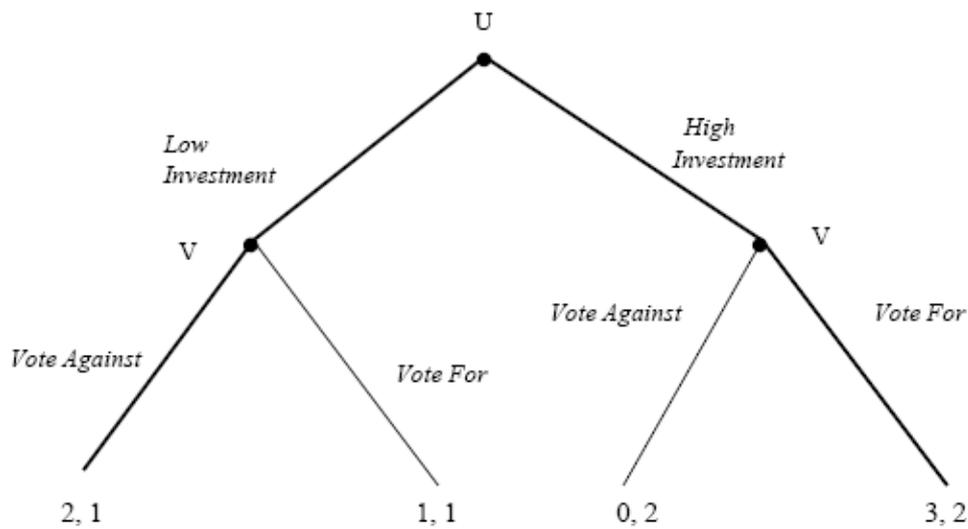


Fig. 2: Incomplete information voting game: Utility and voter

Stage 2: Information About Special Interests Available to Voters

The voter has now more information about the regulatory process of private investment due to the presence of public interest groups. Its strategies are now informed by the fact that there could be special interests in awarding concessions, so it is cautious. V receives information of the move taken by SR, although this information is imperfect and also incomplete, because the payoffs are not known to V. It is very important to remember that the assumptions we have on the information public interest groups produce will decide the outcome of the game. We assume that the information is primarily biased against SR and V now thinks that:

- a. There is rent seeking by utilities, through favored concessions from the government,
- b. Tariffs will ultimately increase as generated electricity will be sold outside their own regions.

In Game Theory, complete information refers to the common knowledge of the game structure, including the payoff functions. Common knowledge itself can be defined even broader as a meta-axiom, where the axioms of logic and game theory, including the behavioural assumptions, are known by each player (Gilboa and Schmeidler, 1988). In our case we are especially concerned with knowledge of the payoff functions. The game-theoretic literature has dealt with information concerning payoffs in different ways: The classical approach is Bayesian updating of priors (Heap and Varoufakis, 2004). Gilboa and Schmeidler (1988) first proposed the concept of information-dependent games which states that information can change players' payoffs in non-cooperative games. An example given by the authors is gossip, where the information told to a player may change his utility of a certain move. We take a similar approach, where information is not neutral, but can be *biased* in different ways. This can concern both the payoff of the player who the information is addressed to, as well as the payoff of other players involved in the same game.

New game in the next electoral cycle

The preferences of U remain the same but the preference ordering of V changes in the game between them for votes. This is due to the media-amplified information V receives from public interest groups. As V observes that U acquires some rents, V realizes that its own payoffs could be potentially better with putting the government under pressure. So V feels that voting against will give them a higher reward. If U makes high investment V wants to vote against the incumbent government as it sees concessions as a form of special interest. If U makes low investment, V does not get improved electricity provision and also wants to vote the incumbent out. The new payoffs of the voter V^* can be seen in Fig. 3.

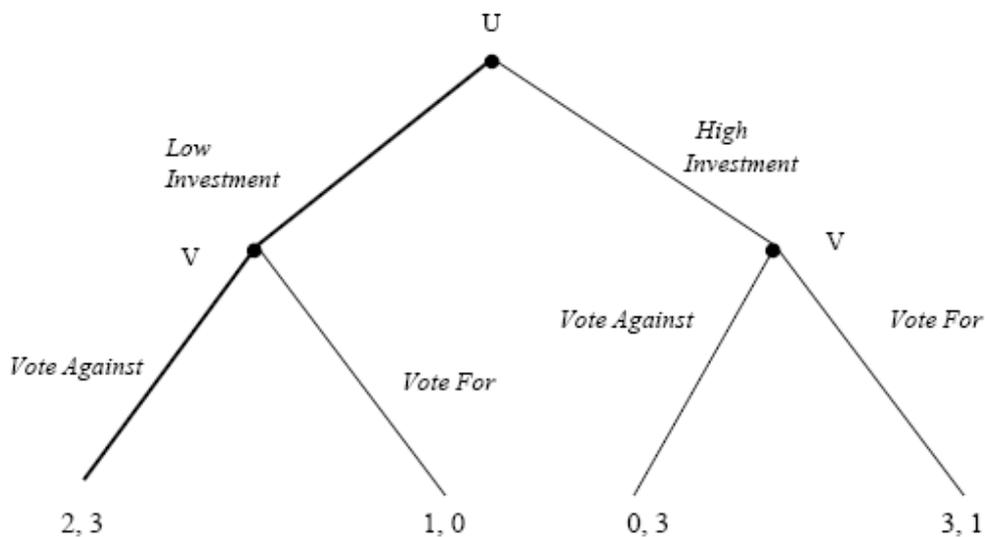


Fig. 3: Complete information voting game: Utility and voter

In the next time period, but within a short run context, the preference ordering of U will change, irrespective of regime change. U is a common player in both the games and has to make its decisions according to the potential outcomes of both games in which it is involved. The preference ordering of the new regulators, SR*, will remain same as it will employ the same strategy to invite investment². But U* will now clearly prefer low investment over high investment as it is not sure if the concessions will be overturned by a regime change. This will affect the viability of its investment project. The new payoffs of utility U* can be seen in Fig. 4.

Applying the pure strategy Nash algorithm, we see that for the complete information voting game (see Fig. 3), the equilibrium is where utility does not want to invest and voters still want to vote out the incumbent. This is because the voter does not vote for the incumbent under low investment as this translates into reduced power availability. It also does not vote when the investment is high as it observes the special interest move now. *This leads to a dilemma and is the source of the commitment problem.* Because of this dilemma, in the next period the preference ordering of U changes (see Fig. 4). It now values low investment more than high investment as it is in a dilemma that voters will always vote against the incumbent if it believes the information it receives from public interest groups. The equilibrium now is:

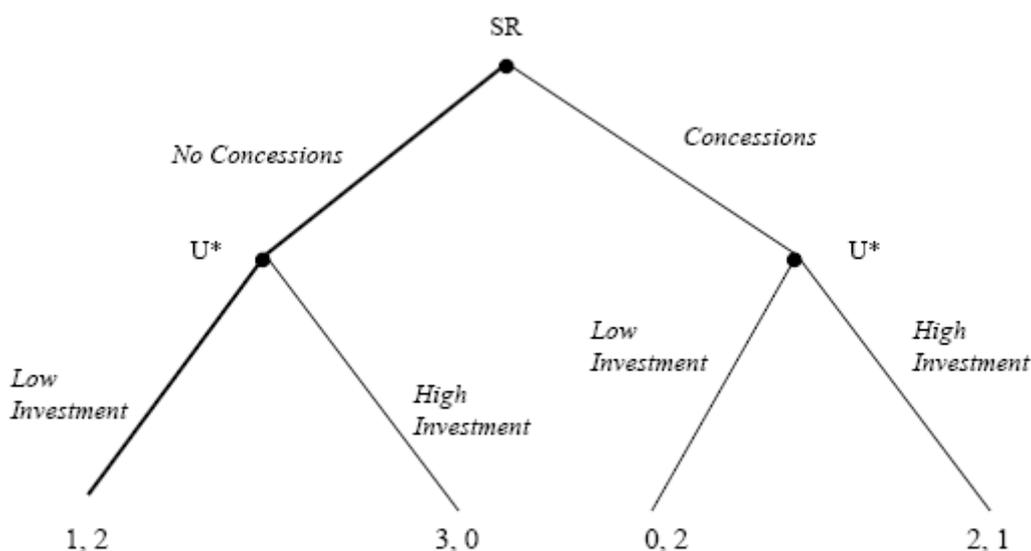


Fig. 4: New period investment game: Regulators and utility

(see Fig. 4) where regulators do not offer any concession and there is low investment by utilities. This, we call the *'low investment trap'* arising out of the commitment problem. The important insights from this are the following:

- a. The more biased the information is against the special interest moves, the greater will be the investment gap. But this is based on an assumption earlier that the quality of this information is high i.e. there are institutional mechanisms which facilitate the production of authenticated information. So there are laws which facilitate public interest groups to gather information from state agencies, and there are courts which protect those rights. An example of this is the Right to Information Act (2005)³ in India. Information produced through such a process will be high quality (i.e. backed by data) and believable to the voters. Generally, this mechanism is more likely to be present in an open democracy as compared to another less democratic set up because under party competition, voters have a choice, and are more interested to gather information.
- b. As long as such an information-producing mechanism exists, information will be produced and will keep the commitment problem intact. Therefore, the only way to break this trap is when information becomes less biased i.e. the quality

improves. This could happen only in the long run under a repeated game situation where the new state regulators learn with repeated interactions and attach a higher value to public interest moves. Also the voter learns to find out its own payoffs more clearly by learning which information is believable and which is not. *In other words, offering special interest concessions will not achieve the desired objective of higher investment.* Institutional changes (examples are vertical integration of utilities, political probity or other institutional incentives for investment) which allow public interest moves to be observed easily and thereby reduce the commitment problem, will lead to higher investment.

- c. Biased information, although complementary, is different from political opposition. Biased information can bypass political competition and force institutional changes in the long run although in the short run it can have negative impacts. Political opposition on the other hand, if successful in achieving a regime change, can either stick to its pre-electoral promises or can renege, which will directly affect its electoral prospects. Public interest groups, however, do not have an electorally bound accountability measure and hence their impact is likely to be more indirect and positive only in the long run.

In the next section we will illustrate our arguments through the example of People's Monitoring Group on Electricity Reforms (PMGER), an influential public interest group in Hyderabad, India. We will discuss the case of their active public scrutiny of power purchase contracts between the private generation utilities and buyers.

IV. The Case of Private Investment in Andhra Pradesh, India⁴

The Andhra Pradesh electricity sector has some resemblance to a form of quasi-stakeholder engagement because civil society activity is strong. This is due to the presence of PMGER⁵, a public interest body which monitors the activities of the electricity regulator. PMGER also has a formal representation on the advisory board of the electricity regulator but that is only formal in nature and has no significant policy influence. That is why we refer to it as quasi-stakeholder engagement. The

actual action arena of PMGER is filing of litigation against any suspected moves by the utilities or the regulators to increase the tariff burden on the consumers. PMGER actively scrutinizes the PPAs between private investor-backed independent power producers (IPPs) and the distribution utilities. These power purchase contracts have strict 'take or pay' clauses which mean that any fuel risk is ultimately passed on to the consumers. This is a potential contractual hazard and indeed has led to multiple instances of renegotiations and amendments to the contract. This was because natural gas, which is the primary fuel for these private generation plants, was not available for the first 8 years after the power contracts were signed (Ghosh and Kathuria., 2011). We first briefly discuss the nature of contractual hazards which private investors face in electric power generation and then describe the regulatory process and the manner in which PMGER influenced the regulatory outcome.

Genesis of the Investment Problem

Usually the Independent Power Producers (IPPs) enter into power purchase agreements, long term contracts ranging from 15-23 years (PPAs), with the state distribution utilities. We discuss the important features and contractual evolution of 4 such IPPs⁶, which faced huge delays in operation and have had to face contractual renegotiations several times even before operations began. These four IPPs were almost ready to generate electricity by 2005-06, but could not do so because there was no gas available from Gas Authority of India Ltd. (GAIL)⁷ to them. The first IPP, GVK Industries Pvt. Ltd. entered into a MoU with the Andhra Pradesh state government for installing a power plant with 400 MW capacities on 14.02.92. The allotted gas base was for 1.5 MCMD.⁸ But after the agreement was entered into, the Ministry of Petroleum and Natural Gas, Government of India (MoPNG) reduced the allotment to 0.75 MCMD. In India the MoPNG is the highest authority related to all activities of exploration, refining as well as marketing and distribution of petroleum and natural gas. It is a central government ministry and regulates the allocation and pricing of natural gas.⁹ Based on the allotment by the MoPNG, the Gas Authority of India Limited (GAIL), a central government owned enterprise, supplies natural gas to the different thermal power plants. However this supply, guided by the Gas Supply Agreements (GSAs), is dependent on the actual production of natural gas by the two major public sector companies Oil & Natural Gas Corporation Ltd., (ONGC) and Oil

India Limited (OIL). While the allocations are based on projected demand and supply, the net supplies are based on the actual production levels. Thus the contract (PPA) with Andhra Pradesh State Electricity Board (APSEB) was renegotiated and GVK went ahead with a capacity of 216 MW to be set up as Phase 1 of the project based on the actual gas allotment and the remaining capacity 184 MW to be installed as Phase 2 based on future availability of gas. In 1998, GVK proposed approval for commencement of the Phase 2 with an increased capacity of 360 MW to be installed. This capacity expansion was done to bring the terms on par with the new PPAs entered with short gestation projects, selected through competitive bidding, like Gouthami, Vemagiri and Konaseema EPS Oakwell. The MoPNG allotted 1.1 MCMD gas for this Phase 2 project. But again on 01.09.2000 the MoPNG informed that unless more supply from KG (Krishna Godavari) Basin was available, no additional gas could be allotted. Thus Phase 2 was again split into two stages with Stage I (220 MW) based on 1.1 MCMD and Stage II (220 MW) based on further availability of gas. The final amended PPA was consented after public hearings by the newly established APERC, dated 18.06.2003.

Another IPP, Gouthami Power Private Limited entered a PPA on 31.03.97 with APSEB for setting up 300 MW gas based (either on naphtha or natural gas) power plant at Peddapuram, through the route of competitive bidding. Subsequently, two years later, they obtained an expansion order for the plant to be of 358.9 MW capacity. During the same time another company, Nagarjuna Construction Company (NCC) entered into a separate PPA for setting up a 227 MW liquid fuel based power plant at Ammanabrolu, which was later shifted to Peddapuram. In the year 2000, Government of Andhra Pradesh (GoAP) decided to convert the Gouthami project to be run only on natural gas based on 'least cost' considerations. Upon request for gas allotment, only 1.22 MCMD gas was allotted to Gouthami and 0.74 MCMD to NCC Power. This gas was not sufficient for either of them for the given installed capacity and the two firms decided to merge. The new entity, by the name of Gouthami, agreed to proceed with the project in two stages. The first stage would be of 464 MW capacity based on gas supply of 1.96 MCMD and the second stage would be of 133.9 MW based on further availability of gas. The final amended PPA was signed on 18.06.2003. The third IPP, Konaseema EPS Oakwell Power Limited originally entered into a PPA with the APSEB on 31.03.1997 for setting up a 445 MW gas based

power plant at Deverapalli, also through the bid route. There were some amendments later on and it finally entered into a new PPA with APTRANSCO on 21.11.2003. However, beginning 2003 there were concerns about availability of natural gas for new projects and hence a new agreement was reached 12.01.2005 with clauses which restricted the use of alternate fuel before 2007. The fourth IPP, Vemagiri Power Generation Ltd. (earlier Ispat Power) entered into a PPA with the APSEB on 31.03.1997 for setting up a 468 MW gas based plant at Vemagiri. In the year 2000, the MoPNG allotted it 1.64 MCMD gas from the Krishna Godavari (KG) Basin. Thus the project was decided to be implemented in two stages. Stage I would be with 370 MW capacity with the existing gas allotment and Stage II would be with 150 MW capacity based on future availability of gas. The amended agreement was entered into on 18.06.2003 (later on we will see how Vemagiri is a special case as it renegotiated again on 02.05.2007).

These four IPPs were almost ready to generate electricity by 2005-06, but could not do so because there was no gas available from GAIL to these. Actually, GAIL could not supply the complete allocation even to the existing power plants in Andhra Pradesh. As per the terms of the PPA, due to the “alternate fuel” clause, the burden of this unavailability lay on the distributors who would still have to pay the full fixed charges in the event of non-generation. This commitment towards fixed charges, in the presence of the alternate fuel clause, would have cost the distributors an additional Rs. 1020 crores¹⁰ per annum (Common-Order, 2009). Thus the distributors (APTRANSCO at that time) filed for the deletion of the “alternate fuel” clause (in July 2004) from the contract. However, only one firm, Vemagiri, accepted the deletion of this clause and entered an amended contract. In return the PPA term was extended from 15 to 23 years to be able to recover the losses. Upon this they were provided the interconnection facilities and they declared their commercial operation date (COD) of the project on 16.09.2006 (Common-Order, 2009). But there was yet no gas available and hence the plant remained in ‘preservation mode’ till gas supply was restored around mid of 2009. The other three plants landed in similar fate and could not produce any power either. This not only caused stranded losses to the firms but also placed an additional burden on the distributors in the form of buying higher cost power to meet the shortfall due to delay in production by these IPPs. Following the example of Vemagiri, the other three IPPs agreed to delete the “alternate fuel”

clause. While this request was pending with the regulatory commission, one of them, Gouthami, obtained interim orders for gas supply from the AP High Court in year 2007. Learning from this, the other IPPs also withdrew their 'deletion proposals' and prepared for commissioning their plants by 'first' testing. But this High Court order was challenged by the distribution companies and a division bench of the High Court overturned the previous 'Order' and disallowed the supply of gas to the new IPPs. In September 2007, the IPPs proposed again to delete the 'alternate fuel' clause under the condition that they would be allowed to sell '20% of the PPA capacity plus any tested capacity over and above the PPA capacity to third parties' in order to recover their losses from non operation. The Vemagiri project, for example, was built at a cost of Rs. 1100 crore and did not see any returns for the first 5 years. Through this renegotiation, the IPPs would be able to easily make up for their past losses and hence Vemagiri too proposed a renegotiation in line with the proposed amendments of the other three IPPs.

Upon analyzing the whole negotiation process we observe that some of the key reasons why the contracts between the IPPs and the distribution utilities ran into rough weather are transactional in nature. The shortfall of natural gas means that the existing contracts were rendered incomplete and ineffective. To deal with this 'perceived' uncertainty, the 'alternate fuel' clause was introduced in the initial contract as it was known even during the drafting phase that there may be uncertainties about fuel supply in the future. Since generation utilities make asset specific investments, such adaptive elements are important. But this clause also creates scope for opportunistic behaviour by them. Once the COD is declared, the distribution utility gets locked in and has to buy the higher cost electricity generated by high cost alternate fuel or pay at least the fixed charges in the absence of any generation.

The IPPs agreed to delete this clause on the condition that they are allowed to sell 20% of their contracted capacity in the open market. This would enable them to recover the losses due to non-generation and earn net positive returns. However this meant that the already deprived distribution utilities would have to buy a portion of their own legitimate share from the open market at higher rates. This again was considered as opportunistic behaviour of the IPPs by the distributors and hence objected to. Another adaptive response by the IPPs would be to extend the period of

the contract. This follows the TCE prediction that long term contracts are safeguards against ex post contractual hazards. So while one of the IPPs did initially agree to this amendment, it later reversed on its decision in favour of open market sale. However these negotiations went through the regulatory process and the regulators being the ‘independent’ authorities decided on the final outcome. The next sub-section describes it briefly.

The Role of Civil Society Actors and Regulatory Decision

The PPAs, with the proposed amendments, along with the report of a state government appointed committee to look into the amendments, were submitted to APERC for approval on the 02.02.2009. The APERC then conducted in the spirit of the ‘law and philosophy’ of electricity reforms, a series of public hearings, where all stakeholders, including public interest groups (PIGS), discussed and debated the proposed amendments. In multiple hearings ranging over 10 months, all the parties presented their cases and debated over issues related to consumer welfare, contractual cost benefits and micro mathematics of the incentives. The PIGS raised tough questions on the intent of the IPPs in trying to maximize their profits at the cost of loss to the consumers whereas the IPPs defended themselves on the basis of their stranded costs and high risks of future gas unavailability. In the meantime, gas supplies improved from April 2009 due to increased availability from the KG Basin and Reliance Industries Limited (RIL) committing regular supply of gas to the IPPs. Finally, in a gas order dated 05.12.2009, the APERC overturned the appeals for amended agreements keeping in view the ‘public interest at large’.

The regulators further recommended some options to be reworked, which would allow the IPPs to cover up their losses without hampering consumer welfare. But as stated in Section 3, these PPAs are different from the privately ordered relational contracts. These are more of the nature of public contracts and hence subject to scrutiny by the third party public or private interest groups. In this case the regulatory process was constantly tracked and monitored by civil bodies, like the People’s Monitoring Group on Electricity Regulation (PMGER) and some other independent energy auditors and journalists.

At every stage of the amendments and fresh PPA proposals, there were objections filed by the PIGS during the last 10 years. Moreover, the public hearings which covered the whole span of the year 2009¹¹ went back and forth with the PIGS raising objections and the IPPs, distribution utilities and the regulators responding (Common-Order, 2009). This whole process of public hearing of the case filed by PMGER was covered by the media. In the meantime, the Government of Andhra Pradesh appointed an independent committee to look into the amendments and it passed an order G.O. 135 (Government Order). This order overruled most of the objections raised by the PIGS and ruled in favor of the IPPs and distribution utilities. While ‘respect(ing) and hold(ing) the observations of APERC in the highest esteem’, the order claimed to supersede the authority of the regulatory commission in having the final word. In the public hearing subsequent to the passing of G.O. 135, the PIGS raised this issue and reminded the regulatory commission of its independent powers that “the APERC is a quasi-judicial authority and it cannot be directed to decide the matter in a particular manner” (Common-Order, 2009; p.162).

In its final order, the regulatory commission ‘(in) view... (of) the legitimate interests of the various stakeholders, including the IPPs, DISCOMs, electricity consumers and general public interest at large’ and having well taken the content of the objectors, overruled the G.O 135 and agreed to the amendments as proposed by the PIGS. The regulators also cited various references from previous court orders (some brought to their notice by the PIGS) to prove that the government order was not binding and that they were independent in framing their own regulations and stated that ‘APERC being an independent regulator cannot be influenced by any authority including the Government in the matter of balancing the interest of all the stakeholders by issuing directions by invoking section 108 of the Electricity Act, 2003’ (Common-Order, 2009; p.193). Finally, the regulatory commission rejected all those amendments which were not in tune with the public interest at large and accepted only those which matched the interests of the IPPs, the distribution as well as the electricity consumers at large.

Current Private Investment in Andhra Pradesh

We contend that this uncertainty surrounding the commitment of the regulator to protect their investment could well explain the current lack of enthusiasm in the levels of gas-based private investment in Andhra Pradesh. During the period from 2007-2012, there was private investment to the tune of 1275 MW¹² installed capacity in gas based power plants in Andhra Pradesh, but for the period from 2012-2019, there is not even a single forthcoming private investment in Andhra Pradesh¹³. This is despite the fact that there have been huge discoveries of gas in the Krishna-Godavari (K-G) basin off the coast of Andhra Pradesh. In fact the share of non-gas based private investment has also slumped in Andhra Pradesh. This is in sharp contrast to another state called Gujarat, where the growth of IPPs has been quite high (Ghosh and Kathuria, 2013).

V. Conclusions

This paper tries to show the way in which information is linked to regulatory commitment. Public interest groups, by producing information, which tend to be biased against special interest moves, lead to a reduction of commitment in the short run and hence the 'investment trap'. As long as societies have institutional environments which facilitate such information production and a media which amplifies that, such a link will persist. This dilemma can be solved in the long run under a repeated game situation where state regulators make public interest moves being aware that otherwise an investment trap will be created. In other words, the long run best response for state regulators will be to always make credible public interest moves. This is similar to Scharpf's (1997, p.186) prediction that 'by choosing public interest oriented policies, the government will assure itself a moderately good outcome'. But Scharpf's prediction hangs on the stringent condition that political opposition opposes the moves by the incumbent and voters react each time. What we argue is that even when this condition does not apply, in the presence of an institutional mechanism of information production, the long run strategy of state regulators (the incumbent) will be to make public interest moves.

Our game model and the corroborative example of Andhra Pradesh are indicative that the state policy of offering special interest concessions does not necessarily lead to

higher investment. Active public interest actors help the voter know its own payoff better through increased information, which translates to lower regulatory commitment levels. We therefore contend that institutional changes – either through a change in the governance structure i.e. vertical integration of utilities; or more transparent rules of the game which allow public interest moves to be observed by the voters and thereby strengthen political probity – will reduce the transaction costs arising due to the commitment problem. In the long run, this may lead to stable regulatory outcomes and higher investments.

Bibliography

Ayres, I. & Braithwaite, J. 1992. *Responsive Regulation: Transcending the Deregulation Debate*, Oxford.

Common-order. 2009. O.P.No.9-12 dated 05-12-2009, Andhra Pradesh Electricity Regulatory Commission (APERC), Hyderabad.

Dixit, A. K. 1996. *The Making of Economic Policy*, Cambridge, MA, MIT Press.

Dubash, N. K. 2008. Independent Regulatory Agencies: A Theoretical Review With Reference To Electricity and Water in India. *Economic and Political Weekly*, October 4, 2008.

Dubash, N. K. & Rao, D. N. 2008. Regulatory Practice and Politics: Lessons from Independent Regulation in Indian Electricity. *Utilities Policy* 321-331.

Dutton, W. H., Schneider, V. & Vedel, T. 2012. Ecologies of Games shaping Large Technical Systems: Cases from Telecommunications to the Internet. *In: Bauer, J., Lang, A. & Schneider, V. (eds.) Innovation Policy and Governance in High-Tech Industries The Complexity of Coordination*. Berlin, Heidelberg: Springer.

Ghosh, R. & Kathuria, V. 2011. Barriers to Governance in Evolving Power Generation Markets. *Conference Papers and Proceedings*, IAEE International Conference on 'Institutions, Efficiency and Evolving Energy Technologies, Stockholm, June 19-23.

Ghosh, R. K. & Kathuria, V. 2013. Do Governance Costs Explain the Problem of Private Investment in the Indian Power Generation Sector? *USAEE Working Paper No. 13-110* [Online].

- Gilboa, I. & Schmeidler, D. 1988. Information dependent games: Can common sense be common knowledge? *Economics Letters*, 27(3), 215–221.
- Heap, S. H. & Varoufakis, Y. 2004. *Game theory: a critical text*, London, New York: Routledge.
- Hirschman, A. O. 1970. *Exit, voice and loyalty: Responses to decline in firms, organizations, and states*, Cambridge, Mass, Harvard University Press.
- Jensen, M. C. 1983. Organization Theory and Methodology. *Accounting Review* 58, 319-339.
- Kimmich, C. 2013. Linking Action Situations: Coordination, Conflicts, and Evolution in Electricity Provision for Irrigation in Andhra Pradesh, India. *Ecological Economics*, 90, 150-158.
- Klijn, E. H. & Koppenjan, J. F. M. 2000. Public Management and Policy Network: Foundations of a Network Approach to Governance. *Public Management Review*, 2:2, 135-138.
- Levy, B. & Spiller, P. T. 1994. The Institutional Foundations of Regulatory Commitment: A Comparative Analysis of Telecommunications Regulation. *Journal of Law, Economics, and Organization*, 10, 201–246.
- Lubell, M., Henry, A. D. & McCoy, M. 2010. Collaborative Institutions in an Ecology of Games. *American Journal of Political Science*, 54, 287-300.
- Majone, G. 2001. Nonmajoritarian institutions and the limits of democratic governance: a political transaction-cost approach. *Journal of Institutional and Theoretical Economics* 57-78.
- Mayntz, R. & Scharpf, F. W. 1995. Der Ansatz des akteurzentrierten Institutionalismus. In: SCHARPF, R. M. F. W. (ed.) *Steuerung und Selbstorganisation in staatsnahen Sektoren*. Frankfurt am Main: Campus.
- Mcginnis, M. D. 2011. Networks of Adjacent Action Situations in Polycentric Governance. *Policy Studies Journal*, 39, 51-78.
- Newbery, D. M. 1999. *Privatization, Restructuring and Regulation of Network Utilities*, Cambridge, Mass., MIT Press.
- North, D. C. 1990. *Institutions, institutional change, and economic performance*, Cambridge University Press.
- Prosser, T. 1999. Theorizing Utility Regulation. *The Modern Law Review* 62 (2 March).

- Scharpf, F. 1997. *Games real actors play: Actor-centered institutionalism in policy research*, Boulder/Cumnor Hill: Westview Press.
- Spiller, P. T. 1990. Politicians, Interest Groups, and Regulators: A Multiple-Principals Agency Theory of Regulation, or "Let Them Be Bribed". *Journal of Law and Economics*, 33, 65-101.
- Thatcher, M. & STONE SWEET, A. 2002. Theory and Practice of Delegation to Non-Majoritarian Institutions,. *West European Politics* 25, 1-22.

Notes

- ¹ As also mentioned earlier, by utility here we mean a privately owned electric company involved only in generation.
- ² This is of course a short run phenomenon.
- ³ Under the provisions of the Act, any citizen may request information from a "public authority" (a body of Government or "instrumentality of State") which is required to reply expeditiously or within thirty days. (<http://rti.gov.in/>).
- ⁴ We only present an indicative case of electricity regulation and investment in Andhra Pradesh, but recently there have been two other cases of private investment which suffered on similar counts. One is the 2G spectrum bandwidth auction failure (<http://www.bbc.co.uk/news/business-20335147>) ; and other, the allocation and subsequent de-allocation of private licenses of captive coal mines (<http://businesstoday.intoday.in/story/coal-scam-coalgate-cag-analysis/1/187782.html>). Readers are directed to the web-links for further details as it is beyond the scope of the paper. However, a common thread in all of these cases is the revoking of government (or regulator) awarded contracts ex-post the investment. This has a plausible effect on regulatory commitment.
- ⁵ People's Monitoring Group on Electricity Regulation.
- ⁶ The detailed contractual and related information presented in this section is sourced from the individual Power Purchase Agreements (PPAs) and other records availed from the regulatory commission: COMMON-ORDER. 2009. O.P.No.9-12 dated 05-12-2009, Andhra Pradesh Electricity Regulatory Commission (APERC), Hyderabad.
- ⁷ GAIL is the state-owned gas supplying agency in India.
- ⁸ Million Cubic Meters per Day.
- ⁹ <http://expenditurereforms.nic.in/petroleum.pdf>.
<http://petroleum.nic.in/ng.htm>.
- ¹⁰ 1 Crore = 10 Million.

¹¹ Between 04.03.2009 to 17.11.2009, 13 public hearings were conducted by the APERC (APERC Common Order, 2009).

¹² Megawatts.

¹³ The information is based on the official report 'Power Scenario at a Glance, 2012' published by the Central Electricity Authority of India (CEA).