



Commitment in utility regulation: A model of reputation and policy applications[☆]

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ABSTRACT

This paper builds a dynamic model of utility regulation where a government cannot commit to a time-inconsistent policy of not expropriating investment. By allowing the government's type to change over time, I explore how reputation concerns may generate partial commitment. Restricting attention to equilibria that are strongly renegotiation proof, I show that there is a unique perfect Bayesian equilibrium. This contains episodes of investment and good behaviour followed by periods of expropriation and non-investment. I then apply the model to consider how the power of the incentive scheme and decentralization may influence the properties of this equilibrium. In the case of the power of incentives, the model suggests that price-caps may worsen commitment in developing countries, but not in developed ones. Similarly, the model suggests that decentralisation is likely to have a significant effect on commitment, but that this effect will depend on the general ability of the government to commit. Overall, we conclude that the effect of such policies on commitment will be different across countries, depending on the institutional environment.

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1. Introduction and previous literature

In many contexts, governments enter into a relationship with the private sector where the government's optimal policy is time-inconsistent. This is to say that the government would like to commit itself to carrying out certain actions in the future, but when it actually comes to that point in time it would prefer to carry out different actions. Examples include the taxation of investment, sovereign debt, inflation policy and the regulation of utilities, which is the focus of this paper. In some situations the government can use a third party to tie its hands, but where institutions outside the executive are relatively weak such constraints may not be possible. When the government cannot constrain itself in this way, it may still be able to commit through the use of reputation.

In general, reputation encourages commitment since the government fears a period of 'punishment' by the private sector should it lose its reputation. In some instances, government reputation is always maintained and hence such a punishment is never carried out. However, in other cases, particularly in developing countries, a loss of government reputation is a very real prospect. In order to understand how commitment can be aided in developing countries, it is therefore important to use a model of government reputation that includes periods where reputation is lost. This article therefore builds a simple

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model which aims to capture such a situation. In particular, we analyse a situation where the government promises to a single firm not to expropriate its gains from investment and use the model to consider two relevant policy choices.

Several previous papers have modeled how a reputation mechanism may sustain investment in utilities when other commitment mechanisms are weak. Within these models, equilibria are typically sustained through the use of ‘trigger’ strategies, where the firm proposes a punishment period should the government expropriate. However, since the punishment period in these strategies is often arbitrary in length, such models may not be best suited to apply to a situation where a government expropriates in equilibrium. Moreover, trigger strategies are typically not robust to allowing the parties to renegotiate, an action that is frequently observed in many countries with weak commitment abilities. This paper therefore adds to the literature on commitment in regulation by building a model which contains a renegotiation-proof equilibrium with non-investment periods of endogenously determined length. This allows us to analyse policy choices within a model that more closely reflects the situation in many developing countries.

Within the broader literature on reputation, several papers have constructed models where commitment is maintained through a player having changing unobservable characteristics. In such a situation, commitment can be generated since the ‘good’ type wishes to continue with an otherwise time-inconsistent strategy in order to signal that it is ‘good’. However, these models typically involve one player committing to many other players, and hence have restricted themselves to looking at Markov equilibria, where strategies are dependent only on beliefs and types and not on the game history. This paper therefore adds to the literature on reputation by considering a similar commitment mechanism in a case where there are only two players. In this context, the possibility of renegotiation makes a restriction to renegotiation-proof strategies more appropriate than the restriction to Markov strategies.

Central to the model in this paper is the fact that the government’s preferences vary over time. This could be due to external factors such as a change in the need for government revenue. These environmental changes then translate into how much the government has to gain from expropriating. In good times, the gains may be fairly small, whilst in bad times the payoff from expropriating will be larger. Crucially, the firm is not aware of the government’s preferences, and hence its investment decision may be dependent on its current beliefs as to the government’s type.

Within the paper, we restrict our attention to studying equilibria that are renegotiation proof. This aims to rule out equilibria where at some point both parties would like to forget what has passed and instead play as if some other history had occurred. We believe that the renegotiation proofness criterion is an important one in a model between the government and one other player because in this situation renegotiation is a very real possibility. For example, Guasch et al. (2007, 2008) show that in infrastructure regulation in Latin America, renegotiation is a very common event.¹ We show that by restricting ourselves to renegotiation proof equilibria, we rule out traditional ‘trigger’ strategies where the firm proposes an arbitrarily long punishment period should the government expropriate. These are not renegotiation proof equilibria since, at some point during these proposed punishments, both the firm and the government would like to pretend expropriation had never happened and return to the firm investing.

Having rejected these equilibria, we then show that there is a unique perfect Bayesian strongly renegotiation proof equilibrium that may contain investment. In this equilibria, the government’s needs are sufficiently low in good times that it will not expropriate. However, when needs are particularly great, the government finds expropriating the preferable option. Given this strategy, the firm’s beliefs become the key factor in determining its investment. If the firm believes that the government is likely to be facing ‘good’ times, it will invest, since it believes the probability of expropriation to be low. On the other hand, when a firm believes the government’s needs are high, it will fear expropriation and not invest. Since expropriation is equated with a government in ‘bad’ times, a period of non-investment will follow government expropriation. It is fear of this non-investment that keeps the government from expropriating when the state of the world is good. The non-investment period is not set by the firm as an amount of punishment but instead it is the time it takes for the firm to believe that the government’s type has probably changed and it is safe to invest again.

Since the firm does not observe the government’s needs directly, the equilibrium relies on a system of signaling and built up reputation. At any given time, the government will wish to expropriate, but doing so sends the firm a signal that the government’s needs are high, and hence the government is likely to expropriate in the near future. Not expropriating, on the other hand, sends the signal to the firm that needs are low (i.e. times are good), and hence expropriation in the near future is unlikely. The government therefore builds a reputation for having low needs by not expropriating, and the desire to keep this reputation is the only reason it does not always expropriate.²

Building the model in this way allows us to apply it to the case of monopoly regulation in developing countries, where reputation (rather than the rule of law) is a crucial factor in making sure governments provide the promised return on their investment. In particular, we can use the model to analyse how policy decisions affect the government’s ability to

¹ Of course, renegotiation can occur for a variety of different reasons. Indeed, Guasch et al. (2007, 2008) argue that many of these renegotiations are in fact beneficial only for the firm or the government. ‘Expropriation’ in our model can therefore be viewed as renegotiation that disadvantages the firm and favours the government. For a study of renegotiation that benefits the firm and not the government, see the model of Guasch et al. (2006). Stern (2009) provides a discussion of the positive side of many renegotiations.

² A key assumption in the model is therefore that there is not another signaling mechanism that the government can use to indicate the value of θ . Such an assumption is reasonable in this context, given that factors influencing expropriation in utility regulation are often sector specific. This therefore implies that the variable θ will at best be weakly correlated with any variables relating to instruments outside the sector, and hence signalling mechanisms are restricted to those that are part of sector regulation.

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