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INDEPENDENT UTILITY REGULATORS:
LESSONS FROM MONETARY POLICY

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Abstract

This paper explores the similarity of the underlying economic problems that lead to the establishment of (a) independent central banks to operate national monetary policies and (b) independent regulatory agencies for telecommunications and other utility service industries. We show that, in both cases, the adoption of agencies independent of government results from the need to achieve credibility and a reputation for economically sound long-run behaviour while preserving significant discretion to handle unanticipated events. We show that this solution is superior to policy rules that are fixed in advance. Both for central banks and regulatory agencies, what is required are institutions that provide limited and accountable discretion within a clear policy framework, for example via high levels of accountability and transparency in their decision making processes. On the basis of a review of the empirical literature, we argue that central banks with superior governance arrangements, particularly on accountability and transparency, out-perform those with inferior arrangements and we discuss how this work might be extended to utility regulatory agencies.

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1 Introduction

Over the last 10-20 years, there has been a enormous increase in the number of countries (a) delegating monetary policy to independent central banks and (b) establishing separate regulatory agencies for utility service industries - typically with telecommunications as the pathfinder.¹ This joint development has taken place not just in EU and other European and OECD countries but also in many middle income countries (particularly in Latin America) and increasingly in other developing countries, including some low income countries in Asia and Africa.

The growth of these institutions has given rise to a sizeable number of academic and informal discussion both of the central bank independence (its key characteristics, governance issues and its impact) and of regulatory agencies (their key features including independence and governance). However, to date, there has been little discussion of the common relationship between the two developments. This is somewhat surprising since the prime motive force behind the two developments is very similar - as we shall demonstrate later. Indeed, one of the main purposes of this paper is precisely to demonstrate the similarities in the underlying economic problem in each case and to show the common relationship between the adopted responses.²

For independent central banks, there has been a lot of empirical work which suggests that independent central banks - and particularly independent central banks with good governance arrangements (and practices) - are associated with better macro-economic outcomes, for example on inflation and exchange rate volatility. As yet, there is relatively little literature that has formally tested the impact of independent utility regulation and governance arrangements on utility service outcomes. This is, at least in part, because of the difficulties in specifying common desirability in outcomes (for example, on utility service price movements) across a large number of countries. Nevertheless, we will argue that the empirical literature on the effects of various independent central bank governance arrangements on macro-economic outcomes provides a strong starting point for evaluating the impact of telecoms and other utility service regulators. This is the second objective of the paper.

¹See International Telecommunications Union (2002)

²An informal discussion of the policy issues is to be found in Stern and Trillas (2001).

The plan of the rest of the paper is as follows. Section 2 presents the theoretical rationale behind central bank independence. Section 3 discusses the empirical literature on the impact of central bank independence and governance arrangements. Section 4 parallels section 2 and presents the theoretical rationale behind the establishment of independent regulatory agencies for utility services. Section 5 discusses the limited empirical literature on the impact of independent regulators and governance arrangements. Section 6 concludes the paper.

2 Rules and Delegation in the Conduct of Monetary Policy

2.1 The Monetary Policy Game

It is useful to distinguish between three types of problems facing central banks, regulators and other public authorities: (i) the credibility of commitment; (ii) asymmetric information in relation to the private sector; (iii) non-benevolence arising, for example, from electoral pressures or capture by special interest groups. In this paper we focus almost exclusively on the first of these problems and we assume that the policymaker in question is benevolent and shares information with the private sector (and vice-versa). Although we do not formalize games with asymmetric information³ and political economy considerations⁴ at this stage, we discuss these aspects in the broader discussion that follows.

Following the seminal article by Barro and Gordon (1983) the credibility problem involving the conduct of monetary policy is usually formalised in the literature in terms of a game between the private sector and the Central Bank (CB). Until we introduce delegation, the CB is not independent and its preferences are those of the government. The elements of this game are as follows. The private sector consists of consumers, firms and wage setters. There are large numbers of these agents so the private sector is atomistic and does not act strategically. For the purposes of the game their behaviour is completely described by the an expectations-augmented Phillips Curve (EAPC)

$$l_t = \bar{l} + \xi[\pi - E_{t-1}(\pi_t)] - \epsilon_t \quad (1)$$

³In relation to asymmetric information, Geraats (2001) provides a comprehensive review of the theoretical literature on the benefits or otherwise of central bank transparency.

⁴But see al-Nowaihi and Levine (1998), for a recent treatment of political monetary cycles.

where l_t denotes employment in period t expressed in logarithms, \bar{l} is the equilibrium or ‘natural’ level of employment, π_t is the inflation rate, $E_t(\cdot)$ denotes expectations at time t and ϵ_t is a supply shock with known mean and standard deviation. In what follows we will assume that shocks are independently distributed over time with zero mean. Thus employment stays at a constant equilibrium level unless an inflation surprise or supply shock occurs in period t . The EAPC then constitutes the economic environment or constraint facing the CB given the expectations of inflation.

In the monetary policy game, the move of the CB is the inflation rate set in each period.⁵ The CB objective is to achieve price stability, ie zero inflation, but is also aware that monetary policy has real effects in the short-term and can therefore increase employment above its equilibrium level. All policymakers including the CB would prefer full-employment to unemployment and zero inflation to positive or negative inflation. If n is the full-employment level (still in logarithms and assuming a fixed individual supply of labour by households) then the unemployment rate in equilibrium (the ‘natural rate’ or ‘NAIRU’) is approximately $n - \bar{l} = u$, say. In employment- inflation space the bliss point of the CB is then $(n, 0)$. These preferences can be captured by the single-period social welfare function

$$W_t = b(l_t - n)^2 + \pi^2 \quad (2)$$

The remaining ingredient in the game is the model of expectations. Before the ‘Rational Expectations’ revolution, for instance in the work of Milton Friedman who introduced the EAPC into macroeconomics, the usual scheme was the adaptive expectations rule in which case the credibility problem described below does not arise. The credibility or ‘time-inconsistency’ problem, first raised by Kydland and Prescott (1977), only emerges with rational expectations. In game-theoretic terms without asymmetric information, this amounts to assuming complete information; i.e., the private sector knows the exact nature of the CB’s calculations and uses this knowledge to form its expectations.

⁵Of course CB’s do not in fact ‘set’ inflation; but we can think of them as having intermediate inflation targets which they successfully achieve using the usual array of actual monetary instruments (the money supply, short-term interest rates, reserve ratios etc). What is important is that the actual targets are credible in the sense to be described below.

2.2 Commitment and The Time-Inconsistency Problem

First suppose that the CB commits to an inflation rule. For the simple, essentially static model of the economy assumed, the optimal commitment rule must take the form of a constant deterministic component plus a stochastic shock-contingent component; i.e., $\pi_t = \bar{\pi} + \mu\epsilon_t$ with $\bar{\pi}$ and μ yet to be determined.

The sequence of moves is:

1. The CB commits itself at the beginning of time $t=0$ to apply the rule to all future periods $t=1,2,..$
2. In period $t-1$, the private sector forms an expectation.
3. In period t , the CB observes the shock ϵ_t and implements the rule $\pi_t = \bar{\pi} + \mu\epsilon$.

Since there are no structural dynamics in this setup, the CB's optimization problem is to minimise the expected welfare loss given the EAPC, the sequence of events and the rational expectations assumption. From the latter the CB can put $E_{t-1}(\pi_t) = \bar{\pi}$. Hence from the EAPC (1) and the welfare loss function (2) we can substitute $\pi_t = \bar{\pi} + \mu\epsilon$ to obtain

$$E_0[W_t] = \bar{\pi}^2 + bu^2 + [\mu^2 + b(1 - \xi\mu)^2]\sigma^2 \quad (3)$$

where $u = n - \bar{l}$ is the equilibrium rate of unemployment (in logarithms) and $\sigma^2 = \text{var}(\epsilon)$. Minimising (3) with respect to $\bar{\pi}$ and μ leads to the result

$$\bar{\pi} = 0 \quad \mu = \frac{b\xi}{1 + b\xi^2} \quad (4)$$

ie, the *ex ante optimal rule* is given by

$$\pi_t = \frac{b\xi}{1 + b\xi^2}\epsilon_t \quad (5)$$

Thus the optimal inflation rule with commitment then consists of zero average inflation plus a shock-contingent component which sees inflation raised (ie monetary policy relaxed) in the face of a negative supply shock.

Although the commitment solution is optimal *ex ante* at stage 1 of the game, it ceases to be optimal *ex post* at stage 3 when the rule is to be implemented. If the CB were to re-optimize at this stage, then it would take expectations $E_{t-1}(\pi_t) = 0$ as given. Observing the shock it would then choose the inflation rate to minimize

$$W_t = \pi_t^2 + b(u + \xi\pi_t - \epsilon_t)^2 \quad (6)$$

leading to a revised higher inflation rate

$$\pi_t = \frac{b\xi}{1 + b\xi^2}(u + \epsilon_t) \quad (7)$$

If no mechanism exists to enforce commitment then the rational private sector will anticipate this act of renegeing and the ex ante optimal rule with zero average inflation will lack credibility. There is, in other words, a ‘time inconsistency’ problem in that: even benevolent CBs always have an incentive to have a short-term monetary expansion to boost economic growth, and market participants know that CBs have such an incentive so that they will discount their statements on the need for a stable anti-inflationary policy, however strongly made. The only credible rule must now be consistent with *discretion* or, in other words, period-by-period optimization by the CB.

2.3 Discretion

With discretionary policy the sequence of events is now:

1. In period t-1, the private sector forms an expectation.
2. In period t, the CB observes the shock ϵ_t and chooses the inflation rate .

To solve this game we must proceed by backwards induction and start at stage 2. Given expectations $E_{t-1}(\pi_t) = \pi_t^e$ say, the welfare loss (2) can be written

$$W_t = \pi_t^2 + b[\xi(\pi_t - \pi_t^e) - u - \epsilon_t]^2 \quad (8)$$

Then minimising with respect to π_t , the first order condition is

$$\pi_t = \frac{b\xi}{1 + b\xi^2}[\xi\pi_t^e + u + \epsilon_t] \quad (9)$$

Proceeding to stage 1 the private sector uses (9) to form the rational expectation

$$E_{t-1}(\pi_t) = b\xi u \quad (10)$$

Hence the discretionary policy takes the form

$$\pi_t = b\xi u + \frac{b\xi}{1 + b\xi^2}\epsilon_t \quad (11)$$

The policy described by (11) can in fact be implemented as a rule with the same state-contingent component as the ex ante optimal rule. The difference is now that it includes a non-zero average inflation or *inflationary* bias equal to $b\xi u$ which renders the rule time-consistent. The credibility problem can be stated simply as how to *eliminate the inflationary bias whilst retaining the flexibility to deal with exogenous shocks*.

2.4 Rogoff Delegation: A Second-Best Solution to the Credibility Problem

Originally monetary growth rules were seen as the most likely way of handling the macroeconomic time inconsistency problem. (See Friedman (1968)) However, rules are difficult to apply strictly and their performance has been increasingly disappointing for many reasons. Consider, for example, the informational requirements needed to design the optimal rule. In our simple set-up the only source of uncertainty is the exogenous supply shock ϵ_t which we assumed to be independently distributed over time with zero mean and known standard deviation. This assumption is not too restrictive. If we allow serial correlation and a non-zero mean then the optimal inflation rule is as before with the *innovation*, $\pi_t - E_{t-1}[\pi_t]$ replacing ϵ_t .

More serious is allowing for other forms of uncertainty, the most obvious of which is model uncertainty associated with the slope of the EAPC and consequently the parameter ξ_t , which now becomes a stochastic time series. The optimal commitment rule (5) is a feedback on current observations or estimates of the supply shock ϵ_t . In general optimal rules under uncertainty do not have this convenient ‘certainty equivalence’ property and depend on higher moments of the distribution describing the stochastic parameters. To design a commitment rule with stochastic ξ_t and ϵ_t , the policymaker needs to know the joint distribution of ξ_t and ϵ_t . In a more realistic model of the transmission mechanism between inflation and output, more potential model uncertainty emerges. In practice then optimal commitment rules are exceedingly difficult to design. Inevitably it is impossible to incorporate every aspect of model uncertainty so any rule must be sub-optimal. This feature of optimal rules has been understood by macro-economists for some time and attention has focused on ‘simple’ sub-optimal feedback rules, such as the Taylor Rule, which feed back on a limited number of easily observed macro-economic variables, such as nominal income or inflation.⁶ However even simple commitment rules have the drawback that any revisions to their precise form arising from new information about the economy will be difficult to distinguish from renegeing on a previous commitment.

The alternative and, increasingly, the preferred solution to the macroeconomic time inconsistency problem has been for governments to delegate the operation of monetary

⁶See Levine and Currie (1985), Currie and Levine(1993).

policy to a goal-independent central bank with powers of discretion. In the context of our model goal-independence means that the CB sets and perfectly achieves its own inflation rate in accordance with its own welfare loss function. The theoretical case for such a policy has been set out by Rogoff (1985) among others. Rogoff proposed a second-best solution to the credibility problem involving a trade-off between low average inflation and effective monetary stabilization policy. The solution is to delegate monetary policy to an independent central bank with an appointed board chosen to be ‘conservative’, in the sense that they assign a higher priority to low inflation than that of the representative government. An optimal choice of conservatism will then see bankers appointed who deliver low average inflation, but who are not so over-conservative as to prevent monetary stabilization.

The details of the delegation equilibrium are as follows: suppose that both the government and the appointed bankers have preferences represented by the welfare loss function of the form (2), but with a different weight on employment. For the government a weight $b = b_m$ is adopted representing the preferences of the median voter. The point of delegation is that the bankers have different preferences, $b \neq b_m$.⁷ One would expect bankers to be naturally conservative in which case their weight on employment b is less than b_m . Some bankers are more conservative than others and, in principle, by asking potential appointees how much higher inflation is worth sacrificing for a 1% reduction in unemployment, the government can employ a CB executive with a particular degree of conservatism. In what follows we assume the government does this in such a way as to minimise its own welfare loss function. The CB is subsequently goal and instrument-independent, and pursues a discretionary policy corresponding to its own preferences.

The sequence of events in this ‘delegation game’ is as follows:

1. The degree of independence of the CB or the type of banker is chosen by the government determining the weight b for subsequent periods $t=0,1,2..$
2. In period $t-1$ the private sector forms an expectation .
3. In period t the CB observes the shock ϵ_t and chooses the inflation rate π_t .

Solving the game by backward induction as before, at stage 1 the credible inflation rule is given by (11) where we stress that the weight b now refers to the preferences of the CB,

⁷In fact Rogoff got the idea of delegating to conservative bankers from his experience working at the US Fed.

not the government. The latter has preferences formalised by the welfare loss function:

$$W_t = b_m(l_t - n)^2 + \pi_t^2 = b_m[\xi(\pi_t - \pi_t^e) - \epsilon_t - u]^2 + \pi_t^2 \quad (12)$$

using the EAPC as before. Substituting for the inflation rule of the CB, (11), and taking expectations we have

$$E_0[W_t] = (b_m + b^2\xi^2) \left[u^2 + \frac{\sigma^2}{(1 + b\xi^2)^2} \right] \quad (13)$$

which the government minimises with respect to b .

The first order condition for a minimum is

$$bu^2 + \sigma^2 \frac{(b - b_m)}{(1 + b\xi^2)^3} \quad (14)$$

Since the first term on the left-hand-side of (14) is positive, the second term must be negative; i.e., $b < b_m$ so that *the optimally chosen banker is conservative*⁸. It is also apparent that if then $b > 0$ so that the optimal conservative banker does not completely eliminate the inflationary bias but, instead, achieves a compromise of a lower inflation rate than the representative banker and the retention of some degree of stabilization policy.⁹

Figure 1 illustrates Rogoff-delegation by plotting the expected welfare loss as given by (13) against the parameter b , for different values of σ .¹⁰ The optimal choice of b , the inverse of the degree of conservatism, is at the minimum point of these graphs and these confirm that optimal b lies between 0 and $b_m = 1$. As σ increases, the need to delegate to bankers who engage in more stabilization emerges and this optimal choice then shifts closer to b_m .

The great advantage of delegation is that, in contrast with commitment rules of either the optimal or sub-optimal variety, the CB retains discretionary powers and can base monetary policy on the latest forecasts and information available. To explore this further, suppose now we allow ξ and u to vary over time. Given expectations of inflation on the

⁸The first-order condition (14) is a quartic in b so there may be more than one choice of conservatism satisfying this equation. In fact it is straightforward to show that there is only one positive solution to (14).

⁹Lohmann (1992) shows how this compromise can be improved, with a more favourable welfare outcome, using a rule with an escape clause specifying zero inflation for small supply shocks and discretionary behaviour with stabilization for large shocks.

¹⁰Parameter values are $\xi = b_m = 1$ and $u = 0.05$.

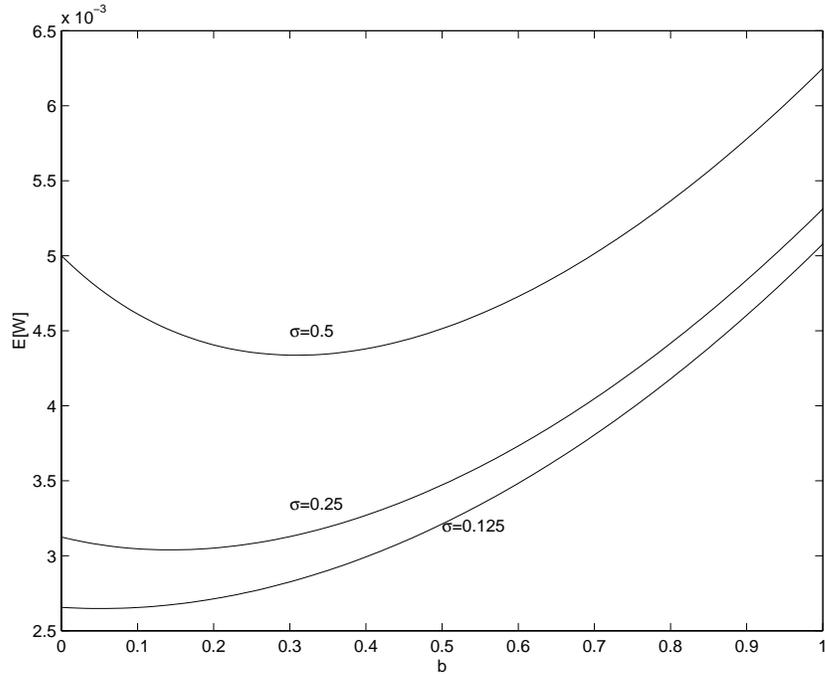


Figure 1: **Rogoff-Delegation of Monetary Policy**

part of the private sector the CB can in each period adopt an inflation rate

$$\pi_t = \frac{b\xi_t}{1 + b\xi_t^2}(u_t + \xi_t E_{t-1}[\pi_t] + \epsilon_t) \quad (15)$$

based on their best current estimates of ξ_t , u_t and ϵ_t . Optimal delegation described above in the first-stage of the delegation game still requires knowledge of the joint distribution of all parameter describing the model. It must also take into account rational expectations formed using (15) which now incorporates uncertainty in parameters ξ_t and u_t . Delegation will inevitably be sub-optimal even if the right CB types can be found.¹¹

There are a number of problems with Rogoff's solution at both theoretical and practical

¹¹An alternative interpretation of choosing $b < b_m$ is that it represents the degree of central bank independence. A completely independent bank would eliminate the influence of the government over monetary policy. Then assuming that bankers are naturally very conservative the result would be a choice of the weight b close to zero. At the other extreme a low degree of independence would result in the CB adopting a weight on employment close to b_m . The choice of b between these extreme is then one of *choosing an institutional structure for the CB* which allows for a particular degree of government influence over the conduct of monetary policy. The same (in fact greater) practical problems arise in the choice of b with this interpretation.

levels. The fundamental theoretical problem is that the solution is predicated on the assumption that commitment to the type of banker or degree of independence is possible whereas commitment to a monetary rule is not. The public must be reassured that once their expectations of inflation are formed, the government will not sack or over-rule the banker and appoint a less conservative banker or inflation target. Another theoretical problem is that when open-economy aspects and fiscal interactions are introduced the delegation equilibrium may turn out to exhibit significant Nash inefficiencies.¹²

At a practical level the government has to find a central banker with the right weight b. However, for a typical OECD country one can think of the monetary framework in two ways: as literal or ‘as if’ Rogoff Delegation. In the case of literal delegation a goal-independent CB has evolved towards optimally conservative bankers. This may possibly involve reputation-building where reputation for independence is established over time. In the case of ‘as if’ Rogoff an independent CB that has a duty to act in a conservative way (e.g. via obligations set out in the relevant law). The CB is goal dependent, in the sense that its objectives (in the form of utility defined over outcomes) are given to it by policymakers. However, the CB has the legal right to set the instruments under its control in a discretionary manner, using all available current information. The US Federal reserve with its emphasis on the personality of its head corresponds more to literal Rogoff-delegation and the European Central Bank (ECB) is a good example of ‘as if’ delegation. The Bank of England (BoE) is goal-dependent with imposed inflation targets which can be revised by government. Then the UK monetary policy could be seen as a form of ‘as if’ Rogoff delegation. However, the ECB has a higher degree of discretion than the BoE.

In a uncertain world where the economic environment is constantly changing one might expect either of these forms of policy regime to outperform any fixed rule that forbids discretion. In addition ‘as if’ Rogoff delegation might be expected to be superior to pure Rogoff delegation since the policy depends less on whether the predicted performance of monetary policy decision-makers is optimally conservative. With ‘as if’ Rogoff delegation where the desired trade-off between low inflation and flexibility is given to the office-holder as a duty that they must fulfil, the choice of monetary policy decision-maker can be made purely on the basis of technical and other ability and not on ability plus a prediction of

¹²See Currie et al (1996) and Levine and Pearlman (2001)

whether the chosen person is (and will remain) optimally conservative.

To summarise then the choice of approach to the credibility problem is then between the second-best alternatives of *commitment to a sub-optimal commitment rule either fixed and based only on information on the economy available at the time the rule is announced, or state-contingent but in a very limited and transparent way; or delegation to an independent CB who follows a sub-optimal discretionary policy based on all the latest information on the economy.*

3 The Impact of Independent Central Banks

There is a very large literature on the economic impact of central bank independence.¹³ The general consensus is that countries which assign monetary policy to an independent central bank have lower and less variable rates of inflation. There is less evidence that countries with independent central banks have higher employment levels or that they have less variance - i.e., that they avoid ‘boom and bust’ as claimed by Gordon Brown. If countries with independent central banks have less variable inflation, their real interest rates should be lower and this should encourage investment and increase the rate of growth for a long period if not in perpetuity. But again, there is less conclusive evidence on this.

The real difficulty with assessing the impact of independent central banks is that choosing to have an independent central bank is related to countries’ macroeconomic policies. For instance, in 1948, Germany established a highly independent central bank, which was given extensive control of monetary policy and a strong anti-inflation objective. But, all the evidence is that, as a result of its history, post-1945 Germany was a highly inflation averse country and that the political choice for a highly independent central bank was in response to this inflation aversion. Similarly, the UK only made the Bank of England independent and established the Monetary Policy Committee (MPC) to set interest rates after a decade or more of low inflation and when all major political parties had become convinced that a low inflation environment was essential for good economic performance.

In consequence, as has been recognized by others, the statistical association between assigning monetary policy to an independent central bank and low inflation may or may

¹³Excellent surveys are to be found in Effinger and De Haan (1996) and Walsh (1998), chapter 11.

not be causal. It may partially or wholly reflect the fact that countries which are more inflation averse or which place more weight on having a sound economic policy choose to have an independent central bank. There is some evidence that this is the case, as countries with healthy economies, not surprisingly, find it easier to establish independent central banks - and much easier to sustain them.

Many of the indicators used to assess the degree of independence of central banks in controlling monetary policy are the same as those used to assess the degree of independence of telecom and other utility regulatory agencies. This is particularly true for measures of political independence. For instance, both literatures agree on the importance of issues such as:

- Procedures for appointment and, more importantly, for the dismissal of governors;
- The existence of fixed terms of office;
- Government's rights to give instructions to the agency;
- Rights to veto, suspend or defer the agencies' decisions; and
- Governments' rights to have agency board members.

These indicators are typically taken as measures of political independence and are usually measured from provisions in the relevant law. They are thus examples of formal, legal aspects of governance. In addition, some attention has been given to actual independence as measured, for example, by the turnover rate of central bank governors or the proportion of governors replaced within 6 months of a change of regime or a change of government. This can give significantly different results than those obtained from what is written in the relevant laws. In general, formally independent central bank governors in developing countries are more likely to have high departure rates following a change of government or regime. Argentina is a case in point.

The key problem in testing for the effect of individual components on inflation and other is that they are highly related - countries which give fixed terms for bank governors are also likely not to require government approval of monetary policy decisions. The solution adopted by researchers is therefore to combine governance elements either (a) into, for example, a number of types of central bank with similar characteristics or (b) into a continuous index. Both methods suggest higher central bank independence is associated with lower inflation, but the literature has not yet identified which variables are most im-

portant. Indices are probably the better solution but they do have problems, for example, the weighting of different categories are often arbitrarily weighted equally and some very different institutional features in different countries can actually have similar indices.

4 Price Regulation and the Under-investment Problem

4.1 The Legal Context and the Under-Investment Problem

Explicit regulation of telecommunications and other utility services by designated and independent regulatory agencies was originally developed in the US. The FCC (Federal Communications Commission) was established in 1934. It is no co-incidence that regulation developed first in the US since telephone and other utility service providers were more likely to be privately owned and managed there than in other countries.

US regulation originally developed to protect the rights of consumers facing a vertically and horizontally integrated monopoly utility like the Bell System. However, it was also realised that protecting the consumers in the medium to long run meant that utilities - particularly privately owned companies - had to be able to earn a reasonable rate of return on their investments. In particular, the companies had to have the regulatory guarantees to be able to finance the large network and other investments required to roll out the system and create an efficient, nation-wide telephone system. These considerations led to the concept of “just and reasonable rates” being placed at the heart of the US regulatory system.

The establishment of an independent regulator has been a major element in the privatisation process. A regulator with clearly defined powers and duties is seen around the world as providing protection for the new shareholders in a way that no Government can guarantee. Oftel was the first UK regulator, established in 1984, following the Littlechild report in 1983, and its establishment was clearly part of the privatisation package. Other independent regulatory offices were set up in the UK for gas, electricity, water and railways as they were privatised.

Oftel was installed to protect consumers in the face of a privately owned highly dominant supplier (BT) facing very limited competition. It was also, however, installed to protect the company and investors in it, many of whom were first-time shareholders. As

telecom competition developed, Oftel increasingly had a role in protecting the interests of shareholders in the new entrants.

However, underlining this protection of shareholders was the notion that the main objective of regulation was to protect the interests of consumers - short and long-term. Indeed, this has been explicitly written into the Utilities Act 2000 for electricity and gas regulation in the UK where the principal duty of the regulatory agency was specified as “*to protect the interests of consumers wherever appropriate by promoting competition*”.¹⁴ It should be stressed here that consumers are defined in the Act as “both existing and future consumers”. This means that sustainability of economic arrangements is crucial and the protection of investors is essential to achieve the necessary investment in privately owned telecom and other utilities.

The UK (and most other) regulatory laws which specify such regulatory duties will normally define consumers’ interests in this way rather than just the interests of current consumers specifically to exclude the temptation of short-term consumer oriented populism. This is a classic time inconsistency problem analagous to the inflationary bias problem in monetary policy; for utility services like telecoms is that they require large volumes of investment which, once installed become ‘sunk assets’ in the sense that most or all of them cannot be removed and used elsewhere or sold on second-hand markets. In consequence, private investors are at risk of opportunistic behaviour by Governments, particularly over prices, once the investments have been installed; and awareness by private investors of this regulatory risk drives up the required rate of return and the cost of capital. The latter dramatically reduces investment as has been seen in many countries. (see Levy and Spiller, 1996).

4.2 The Model

In order to examine the under-investment or ‘hold-up’ problem, we now set out below a simple model of the regulatory pricing problem for private sector utility services such as telecoms. We will show that there exists a close parallel between the inflation bias in the conduct of monetary policy and a high price bias arising from the under-investment

¹⁴It is extremely likely that an identical or extremely similar form of words will be used in the new UK act to replace Oftel (and the ITC) with OFCOM which will handle all telecom and broadcasting regulation in the UK.

problem in utility regulation.

There are two periods. In period $t = 1, 2$, the firm produces a quantity q_t of a homogeneous good at total cost

$$C_t = \beta_t + c_t q_t; \quad \beta_1 = k_1 + i; \quad \beta_2 = k_2 - f(i) \quad (16)$$

where c_t and k_t are stochastic time-varying marginal and fixed costs respectively in the period t in the absence of investment, i is monetary investment in period 1 which leads to a lowering of fixed cost of $f(i)$ in period 2. We make standard assumptions: $f' > 0$, $f'' < 0$ and $f'(0) = \infty$. The good is sold at a price $p_t = \psi(q_t)$ where $\psi(\cdot)$ is the inverse demand curve.

In period 1 with the regulated price p_1 and therefore quantity $q_1 = \psi^{-1}(p_1)$ predetermined. Our focus is on the investment decision in period 1 and the price decision in period 2. The firm invests to lower fixed costs in period 2. The firm is risk neutral and in period 1, given p_2 it maximizes expected discounted period profits over the two periods. Profits in periods $t = 1, 2$, are given by

$$U_1(p_1, i) = p_1 q_1 - C_1 = (p_1 - c_1) \psi^{-1}(p_1) - k_1 - i \quad (17)$$

$$U_2(p_2, i) = p_2 q_2 - C_2 = (p_2 - c_2) \psi^{-1}(p_2) - k_2 + f(i) \quad (18)$$

In period t the government's social welfare function is given by

$$W_t(p_t, i) = S(p_t) + \alpha_m U_t(p_t, i) \quad t = 1, 2 \quad (19)$$

where $S(p_t)$ is the net consumer surplus given by

$$S(p_t) = \int_{p_t}^{\infty} \psi^{-1}(p') dp' \quad (20)$$

but, by analogy with Rogoff-delegation, the government may delegate the choice of price to an independent regulator with preferences

$$W_t(p_t, i) = S(p_t) + \alpha U_t(p_t, i); \quad t = 1, 2 \quad (21)$$

where $\alpha \neq \alpha_m$. As for the monetary policy game, α_m represents the preferences of the median voter. If $\alpha > \alpha_m$, the regulator is 'pro-firm' and this is analagous to the 'conservative' central banker. Whatever the regulator type, she faces a *participation constraint* $U_2(p_2, i) \geq 0$.

4.3 Regulation with Commitment

The sequence of moves in the case of commitment is given by:

1. In period 1 the regulator commits to a price rule for period 2.
2. In period 1 the firm chooses investment.
3. In period 2 the investment project is realized and then the regulator implements the rule.

Expected two-period investment plus fixed costs are $k_1 + i + E_1[\delta(k_2 - f(i))]$ which is minimised at a first-best (FB) investment $i = i^{FB} > 0$ satisfying $1 = \delta f'(i)$.¹⁵ The firm, however, can choose not to invest. If the firm can exit from the industry in period 2, or the regulator guarantees a non-zero profit in period 2 whatever the investment choice, then the second period profit must satisfy $U_2(p_2, 0) \geq 0$. Assume for the moment that the commitment price is such that this constraint binds. Then the firm will choose $i = i^{FB}$ in preference to $i = 0$ iff at stage 2

$$i \leq E_1[\delta U_2(p_2, i)] = \delta E_1[(p_2 - c_2)\psi^{-1}(p_2) - k_2 + f(i^{FB})] \quad (22)$$

Therefore at stage 1 the *ex ante optimal price rule* contingent on estimates of c_2 and k_2 in period 1 that induces optimal investment is

$$(p_2 - E_1[c_2])\psi^{-1}(p_2) = E_1[k_2] - f(i^{FB}) + \delta^{-1}i^{FB} \quad (23)$$

at $p_2 = p^C$, say (C for commitment). The rule (23) is announced by the regulator at stage 1 of the game. The left-hand-side of (23) is upward-sloping in p_2 .¹⁶ Therefore it intersects with the constant right-hand-side at a unique price that is just sufficient to induce the firm to invest at the first-best level. The fixed variant of the rule is conditional on estimates of c_2 , k_2 available at the time the commitment is made in the first period. However as for the monetary rule in the state-contingent variant, these can also be realizations or improved estimates in period 2, providing the basis for such revisions is completely transparent. Notice that the rule offers a guaranteed rate of return equal to $\delta^{-1} - 1 = r$ where r is the firm's discount rate.

¹⁵ $E_t[\cdot]$ denotes rational expectations as before. Note that both $i^{FB} > 0$ and $\delta f(i^{FB}) > i^{FB}$ are ensured by the assumed properties of $f(\cdot)$

¹⁶To see this differentiate to obtain $\frac{d}{dp_2}[(p_2 - c_2)q_2] = 1 - \eta L(p_2)$ where $L = \frac{p_2 - c_2}{p_2}$ is the Lerner index and $\eta = -\frac{p_2 dq_2}{q_2 dp_2}$ is the elasticity of demand. Since $L < \frac{1}{\eta}$, the monopoly case, the result follows.

The time-consistency problem is now apparent. Whereas (23) is optimal *ex ante*, *ex post* in period 2 there is an incentive for the regulator, who considers investment as bygones, to revise the price downwards to a level that will just satisfy the participation constraint $U_2(p_2, i^{FB})$; i.e., based on observations of c_2 and k_2 to p_2 satisfying

$$(p_2 - c_2)\psi^{-1}(p_2) = k_2 - f(i^{FB}) \quad (24)$$

at $p_2 = p^R$, say (R for ‘renege’). This incentive, which exists even if prior estimates of c_2 and k_2 were correct, depends on the regulator not being too ‘pro-firm’ as captured by the parameter α_m in (19). As shown below in the delegation game this incentive certainly exists for a utilitarian regulator with $\alpha_m = 1$ and more so for a ‘pro-consumer’ regulator with $\alpha_m < 1$. Let us assume that $\alpha_m \leq 1$. As for monetary policy, if no mechanism exists to enforce commitment then the firm anticipates this act of renege and the *ex ante* optimal price rule will lack credibility. The only credible rule must then be consistent with *discretion* or, in other words, period-by-period optimization by the regulator.

4.4 Price Regulation with Discretion

The sequence of moves in the case of discretion is given by:

1. In period 1 the firm chooses investment.
2. In period 2 the investment project is realized and then the regulator observes c_2 and k_2 and sets the price subject to a participation constraint $U_2(p_2, i) \geq 0$.

The solution is straightforward. The firm now has no incentive to invest so $i = 0$. In period 2 the regulator sets the price so that $U_2(p_2, 0) = 0$; i.e.,

$$(p_2 - c_2)\psi^{-1}(p_2) = k_2 - f(0) = k_2 \quad (25)$$

at $p_2 = p^D$, say. Since $f(i^{FB}) > \delta^{-1}i^{FB}$ we have that $p^R < p^C < p^D$.¹⁷ Figure 2 illustrates this result. Thus paradoxically the consumer loses out as a result of the opportunistic behaviour of the regulator who is not sufficiently ‘anti-consumer’ in her preferences $\alpha_m \leq 1$. Because of the opportunity to renege and lower the price to $p_2 = p^R$, the equilibrium that results sees no investment and $p_2 = p^D > p^C$. This is analogous to the monetary policy case where because of the incentive to renege on zero inflation and raise output by engaging

¹⁷Hence $U(p^C, 0) < 0$ confirming that $U(p_2, 0) \geq 0$ is a binding constraint which we assumed in (22).

in surprise inflation, the public ends up in a discretionary equilibrium with high inflation and output still at its equilibrium level.

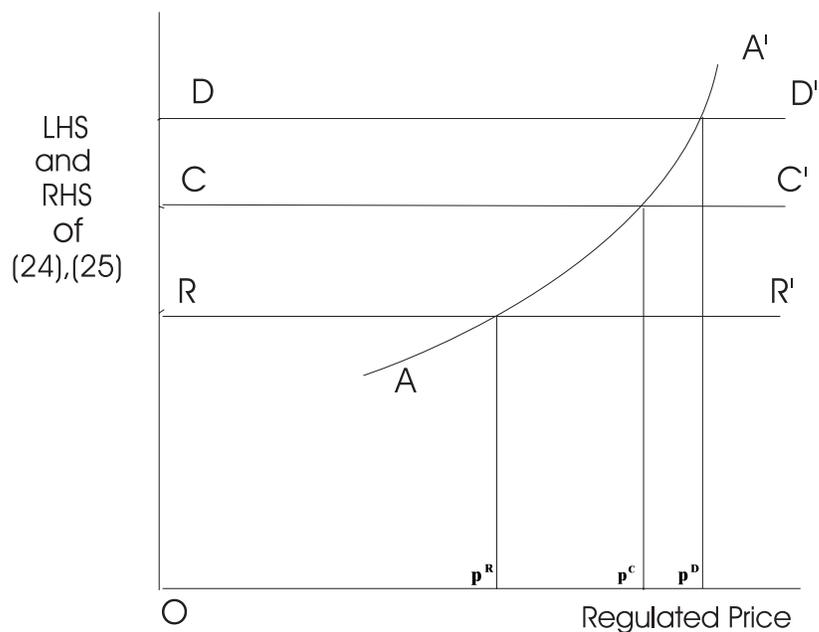


Figure 2: **The Underinvestment Problem**

Notes : $AA' = p_2 \psi^{-1}(p_2 - c_2) = \text{LHS of (24) and (25)}$

$$OC = E_1[k_2] - f(i^{FB}) + \delta^{-1}i^{FB}$$

$$OR = k_2 - f(i^{FB})$$

$$OD = k_2 - f(0) = k_2$$

4.5 Rogoff-Delegation to an Independent Regulator

In the model as it stands there is under-investment unless the government is able to commit to a price rule before investment is made that guarantees a sufficient return to the firm. The practical implementation problems with this rule are similar to those of the monetary rule: more complex and realistic models of the firm will lead to non-certainty

equivalence and rules which depend on second moments and the joint distribution of c_t and k_t . Revisions of the rule will be indistinguishable from reneging unless the basis for these revisions are completely transparent. For instance the firm may have private information regarding costs. Then any commitment mechanism in place will lack credibility and the firm may still under-invest.

If the main purpose of independent central banks is to eliminate the temptation to engage in surprise inflation, the main purpose of independent regulatory agencies is to solve the hold-up problem and eliminate the temptation to engage in a surprise cut in the regulated price, thereby supporting investment. Of course, this has to be done while protecting the legitimate interests of shareholders and consumers. But, in itself, protecting the rights of investors reduces investment risk premia and the cost of capital and hence further reduces the costs of investment to the utilities and thereby lowers prices to consumers.

As set out above, the underlying rationale for an independent utilities regulator and an independent central bank is extremely similar. This suggests that there may well be similarities between the proposed ways of creating an institution which can establish and maintain a credible reputation for making and keeping commitments in a way that governments find extremely difficult to do. Surprisingly, however, there has been relatively little written on the Rogoff-delegation approach in regulation.¹⁸

We now turn to the formalisation of the delegation game in regulation. As for discretion we confine ourselves to the case where c_2 and k_2 are observed in period 2 by the regulator and there is no asymmetric information.¹⁹ The timing of events is as follows:

1. The firm government delegates price regulation to an independent regulator with objective function:

$$S(p_2) + \alpha U_2(p_2, i) \tag{26}$$

¹⁸Rogoff-delegation has been proposed in the environmental regulation context by Spulber and Besanko (1992). Where firms have private information, Currie, Levine and Rickman (1998) examine the role of delegation as a means of ameliorating the ‘ratchet-effect’ associated with incentive contracts. Levine and Rickman (2001) extend this study to include the hold-up problem. Levine and Trillas (2001) address the under-investment problem and compare Rogoff-delegation with a model of lobbying. The treatment of this section largely follows Levine and Trillas (2001).

¹⁹Asymmetric information requires incentive mechanisms to make the firm reveal its type; see, for example, Levine and Rickman (2001).

in period 2, where $\alpha \geq 1$ measures the extent to which the regulator is pro-industry.

2. The firm chooses investment i .

3. At the beginning of period 2, the regulator observes c_2 and k_2 and chooses p_2 to maximize (26).

Solving by backward induction for a perfect equilibrium, at stage 3 the independent regulator solves the problem:

$$\text{Given } i \text{ maximize w.r.t } p_2 \quad [S(p_2) + \alpha U_2(p_2, i)] \quad (27)$$

subject to $U_2(p_2, i) = (p_2 - c_2)q_2 - k_2 + f(i) \geq 0$.

The solution to this problem is standard and takes the form of the *Lerner price* given by

$$p_2^L = \frac{c_2 \alpha \eta}{\alpha(\eta - 1) + 1} = p_2^L(\alpha) \quad (28)$$

if the second-period participation constraint does not bind (i.e., $U_2(p_2^L, i) > 0$). It should be noted that p_2^L is independent of investment. If the constraint does bind then the regulated price is a function of investment $p_2 = p_2(i)$ where $p_2(i)$ is the solution to $U_2(p_2(i), i) = 0$. Note that $p_2(0) = p^D$ the discretionary price level following no investment set by a government-dependent regulator.

Given a particular realization of c_2 and k_2 the participation constraint binds for low α . Clearly $U_2(p_2^L, i) < 0$ if $\alpha = 1$ (in which case $p_2^L = c_2$), the case of a representative regulator. But as α increases, eventually the Lerner price given by (28) reaches a threshold value to yield expected non-negative rent given by $\alpha = \hat{\alpha}(i) > 1$ for which $E_1[p_2^L(\hat{\alpha}) = p_2(i)]$. Using (28) this is given by

$$\hat{\alpha}(i) = \frac{1}{1 - \eta L(p_2(i))} \quad (29)$$

where we define the Lerner index, $L = \frac{E_1[p_2 - c_2]}{E_1[p_2]}$ in terms of expected outcomes. Since $L \in [0, \frac{1}{\eta}]$ it follows that $\hat{\alpha} \in [1, \infty)$.

Given this choice of price at stage 3, at stage 2 if the participation constraint binds in period 2 and $E_1[U_2(p_2(i), i)] = 0$ for a given investment, then the firm does not invest in period 1. When $\alpha > \hat{\alpha}(i)$ the expected constraint ceases to bind and the expected price $E_1[p_2] = E_1[p_2^L]$ where p_2^L is given by (28). This increases with α , which increases the rent. Now an incentive to invest may exist. If the firm does choose to invest it will achieve a

maximum of the 2-period rents

$$(p_1 - c_1)\psi^{-1}(p_1) - k_1 - i + \delta E_1[(p_2^L - c_2)\psi^{-1}(p_2^L) - k_2 - f(i)] \quad (30)$$

at $i = i^{FB} > 0$ (the first-best) satisfying

$$1 = \delta f'(i) \quad (31)$$

However the firm may also choose not to invest. Given the regulated second-period price, $i = i^{FB}$ is preferable to $i = 0$ only if the firm expects the regulated price p_2^L to be sufficiently high to ensure that

$$\delta E_1[U_2(p_2^L(\alpha), i^{FB}) - U_2(p_2^L(\alpha), 0)] - i^{FB} > 0 \quad (32)$$

subject to $E_1[U_2(p_2^L(\alpha), 0)] \geq 0$, the expected second-period participation constraint *following no investment*. If at higher values of α , this constraint does not bind then (32) becomes simply $\delta f(i^{FB}) > i^{FB}$ which always holds. If the constraint does bind (32) becomes:

$$\delta E_1[U_2(p_2^L(\alpha), i^{FB})] - i^{FB} > 0 \quad (33)$$

This occurs when $\alpha > \bar{\alpha}$, say. The evaluation of $\bar{\alpha}$ and $\hat{\alpha}$ requires the probability distribution of c_2 (but not that of k_2).

Figures 3 and 4 provide some numerical solutions of the delegation equilibrium for the functional form and particular parameter values shown.²⁰ In figure 3, for $\alpha < \bar{\alpha}$, investment and rent are zero and the price is given by $p_2^* = p_2(0) > p_2(i^{FB})$. For $\alpha \in [\hat{\alpha}(i^{FB}), \bar{\alpha}]$, investment is still zero, but p_2 rises until at $\alpha = \text{bar}\alpha$ the rent in period 2 is just sufficient to satisfy condition (32) and induce the optimal level of investment. If α increases further to a value high enough such that $p_2^L(\alpha) > p_2(0) > p_2(i^{FB})$ then $U_2(p_2^L(\alpha), 0) > U_2(p_2(0), 0) = 0$ and the second-period participation constraint following no investment ceases to bind. This occurs at $\alpha = a > \hat{\alpha}$ in figure 3.

In figure 4 the deterministic social welfare is plotted with $\alpha_m = 1$, the utilitarian case. If the government inadvertently chooses a more pro-industry regulator, the regulated price

²⁰Calculations are based on the deterministic case $c_1 = c_2 = c$ and $k_1 = k_2 = k$ where c and k are constants. Functional forms and parameter values are: $f(i) = i^\gamma$; $\psi^{-1}(p) = Ap^{-\eta}$; $A = 2$, $\gamma = 0.5$, $c = k = 1$, $\eta = 1.1$, $\delta = 0.95^5$, $b = d = 1$. In our 2-period model, this choice of δ can be interpreted as an annual 5% discount rate over a 5-year regulatory review period

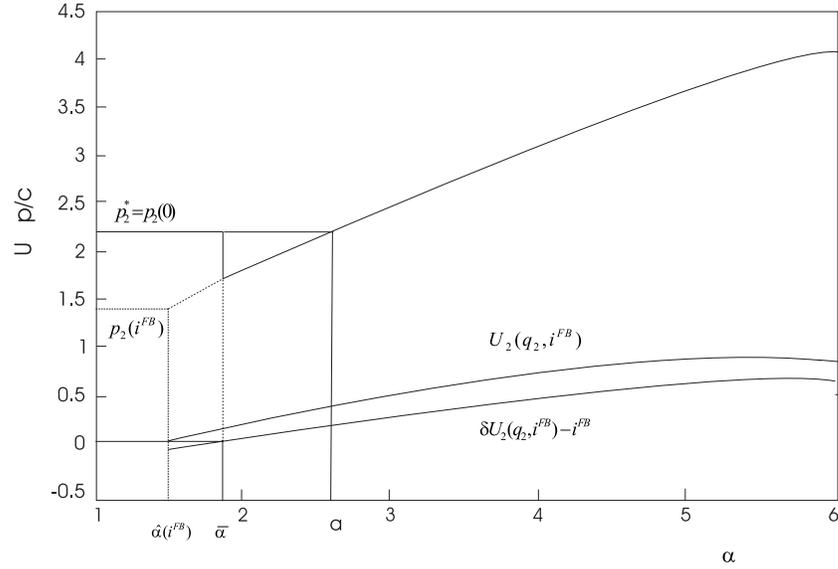


Figure 3: **The Delegation Game: Price and Rent**

rises and consumer surplus falls until at a another threshold $\tilde{\alpha}$, for $\alpha > \tilde{\alpha}$ delegation becomes counterproductive. As with Rogoff-delegation to an independent central bank, the optimal degree of pro-firm bias α can be computed by maximizing the expected welfare calculated over the distributions of c_2 and k_2 . There are interesting issues here concerning the relationship between the optimal type of regulator and the nature of the uncertainty regarding costs captured by these distributions, but these are left to future research.

As with monetary policy, the great advantage of Rogoff-delegation is that it allows full discretion for the regulator to engage in period-by-period optimization based on all information available at the time the price decision is made. In the context of our model a sufficiently pro-firm regulator will implement the Lerner price p_2^L based on the latest estimate of c_2 . By contrast, the optimal rule with revisions to k_2 may be indistinguishable from renegeing on the rule altogether. An alternative is the fixed version of the rule based on estimates made in period 1. Certainly this makes the rule more transparent and the regulator more accountable. But in the face of significant model uncertainty, the fixed version becomes severely sub-optimal.

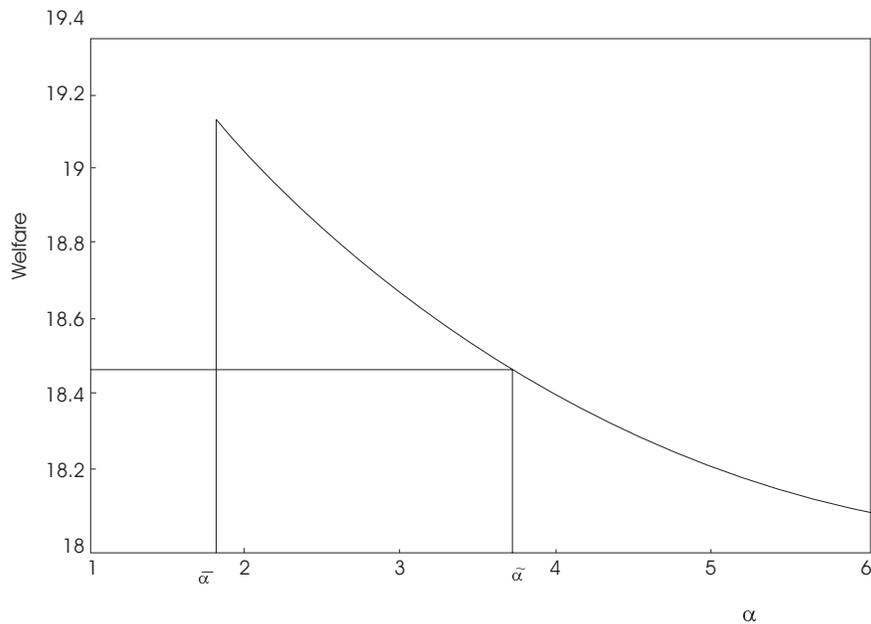


Figure 4: **The Delegation Game: Welfare** $=W(p) + U(p, i)$

4.6 Procedures, Commitment and Discretion

As for the case of monetary policy, the choice of approach to the credibility problem in utility regulation is between 1) *Commitment to a fixed and therefore sub-optimal rule* based on information on the industry available at the time the rule is announced, or perhaps a simple and therefore sub-optimal rule that is state-contingent but only in a very limited and transparent way, and is based on common information, or 2) *Rogoff-delegation to a literally conservative regulator or, in our preferred interpretation, ‘as if’ Rogoff delegation* to an independent regulator who has a duty to behave in a conservative way and follows a sub-optimal discretionary policy based on the latest information on the industry.²¹ In public utilities regulation, it is common that the government establishes the policy to be followed (for example, a policy to expand broadband, or a policy to promote certain fuels in energy) and the regulator sets a previously defined set of instruments using all available current information. Primary legislation usually prescribes that the regulator has to guarantee the financial viability of regulated firms. In this sense, regulators such

²¹In the electricity industry, recent appraisals of actual regulatory reforms point out that regulatory governance arrangements based on rigid rules were not robust to unforeseen contingencies. Joskow (2001) for the case of California.

as the British are goal-dependent and required to behave in a conservative way.

In the context of monetary policy the emphasis has been made on “well-understood procedures within which judgements can be made and openly explained rather than relying on decisions made behind closed doors”.²² Increasingly, clear and open regulatory procedures are seen as the essential foundation of fair and effective regulation by telecom and other utility service regulatory agencies. The case for clear and open procedures often leads to the suggestion that regulatory agencies should operate by simple rules and have no (or minimal) discretion. This view is particularly associated with Spiller (see for example Guasch Spiller, 1999) and it is developed in a framework where the emphasis is on the need for regulatory stability to achieve successful privatisation. Indeed critics of UK regulatory processes regularly maintain that regulators have too much discretion.

In the context of Latin America and in many developing countries, Spiller rightly argues that the essential is to create effective governance arrangements. These must be tailored to the institutional capacity of the country and it is more important than the content of regulation. Hence, it is argued that countries with limited institutional capacity should carry out regulation by simple, minimum discretion or, if possible, by reliance by the regulatory agency on contract enforcement. The problem is that the proposed solution is very inflexible and seems to create significant problems beyond the short run as post-privatisation conflicts in Chile and other Latin American countries have shown.²³

In telecommunications regulation, whilst the non-independent and very much legally constrained Subtel in Chile seems to follow the route of commitment to state contingent rules, the more discretionary regulation by Oftel in the UK may be thought of as following the route of ‘as if’ Rogoff delegation. Again, it must be emphasised that ‘as if’ Rogoff delegation may co-exist with highly variable degrees of discretion. For example, in the UK it can be argued that the BoE has much less discretion than Oftel. The latter is more personalized than the former, and the government has less mechanisms to intervene in a fully transparent way in telecommunications regulation than in monetary policy.

In reality, proper regulatory governance arrangements are crucial precisely because telecom and other utility regulation cannot avoid some discretion. Indeed, regulatory sys-

²²See Brown (2001).

²³See Fischer and Galetovic (2000) on problems derived from rigidity in Chilean electricity and Abdala (1999) on post-privatisation conflicts in Argentinian telecommunications.

tems work better where independent regulatory agencies are given (limited) discretionary powers, but which they must exercise in a fully accountable and open way, to achieve political legitimacy and market credibility.

5 The Impact of Independent Regulation

Some recent empirical studies on the impact of regulation, competition and privatisation in network industries provide a good starting point for a cross-country comparison of regulator independence. Wallsten (1999) shows for 30 African and Latin American countries between 1984 and 1997 that competition and privatisation in telecommunications, when combined with adequate regulation, have a positive effect on network penetration. Bertolotti et al. (1998) show that ‘sound’ regulation is positively associated with increased privatisation revenues due to lower regulatory risk, using data for 38 countries between 1977 and 1997. Henisz and Zelner (2000), using *International Telecommunications Union* data on 55 countries between 1975 and 1994 show that the probability of arbitrary change in the policy environment negatively affects telecommunications investment.²⁴ Interestingly, Roller and Duso (2001) warn about the problem of not taking into account the potential endogeneity of the regulatory and other policy variables, and suggest the use of political variables as instruments to correct for this problem, which they show to cause lack of consistency of the estimates.

Despite these efforts, the testing of the impact of independent regulatory agencies on telecom or other network industries’ outcomes is in its infancy relative to the testing of the impact of independent central banks. Moreover, the measurement of regulatory arrangements in these studies in terms of indices has not been very satisfactory and has been much cruder than in the studies of the impact of independent central banks on inflation and other macro-economic outcomes.

It has to be said that it is not easy to construct good tests of an independent regulatory agency analogous to the simple inflation rate (or inflation and growth) test for an independent central bank. More investment in the industry is the most obvious - but an effective regulatory system may increase the efficiency and/or length of life of capital

²⁴Other cross-country empirical studies of the impact of privatisation, liberalisation and regulatory reform include Ros (1999), Alexander et al. (1996) and Boylaud and Nicoletti (2000).

and reduce investment requirements. Reductions of prices to consumers may be a good indicator in comparing US states but, for Indian or Russian states, increases in prices may be more relevant as an indicator of regulatory success.

In general, the studies that have been done tend to demonstrate beneficial effects of both independent regulation and of competition for national telecom markets. But, much more needs to be done on the characterization of key governance characteristics. Developing and transition economies may not absolutely need an independent regulatory agency to generate some private investment in telecoms but it is still, though, likely that having such an agency would reduce the cost of capital to the countries involved. By how much, and depending on what governance characteristics, remains to be established.

For central banks, we saw earlier that there was a question of how far actual independence corresponded to formal, legal independence, particularly in developing countries. This has also been a major issue for telecom and utility regulation. Some authors (eg Noll, 2000) argue that it is unreasonable to expect smaller and poorer developing countries to establish effective independent telecom and similar regulatory agencies. Indeed, this view is one that has led to the push for relying solely on regulation by contract or seeking for regulation by multi-national agencies. The problem is that it is just as difficult to find credible regulatory alternatives to an independent regulatory agency with some discretion as it is to find credible alternatives to monetary policy control by an independent central bank. The problem is similar in both cases but the solution is equally as elusive.²⁵

It is clear that both independent CBs and regulatory agencies can be difficult to sustain in many environments. Their institutional form and sustainability depend on constitutional, political and legal issues as well as on economic factors. The non-economic factors vary, often considerably, between countries. However, both for independent central banks and for regulatory agencies, a proper legal governance framework is the necessary starting point. But, the willingness to abide by the spirit of the framework, ie the acceptance by all actors, (including Ministers and politicians) of the need to sustain the institutions is the key to the effectiveness and sustainability of the regulatory compact whether for monetary policy or utility services. How to achieve this in modern democracies is a critical

²⁵A regulatory price formula for the first few years of post-privatisation, with no regulatory discretion until the initial period is over, may be useful in some contexts.

challenge for political economy (see for example Abadala, 1999, on the Argentinian case in telecommunications). Others in the political economy literature have pointed out the roles of the judiciary, of legal contracts, of the strength and impartiality of the civil service and of informal behavioural norms (e.g. Spiller and Vogelsang, 1999).

Finally, we note that it is rare to find countries with independent telecom regulatory agencies that do not also have independent CBs operating monetary policy. Further, the independent central bank usually preceded the independent regulatory agency, often by many years (for example, Germany). The UK is a rare exception - Oftel was established in 1984 but the Bank of England only received the responsibility for operating monetary policy in 1997.

6 Conclusions

In this paper, we have set out the similarity in the nature of the underlying problems that lead to the establishment of (a) independent central banks to operate national monetary policies and (b) independent regulatory agencies for telecommunications and other utility services. In both cases, the solutions result from the difficulties that governments face in credibly establishing a reputation for sound long-run behaviour and resisting short-run political pressures while preserving significant discretion in decisions. We have argued that there are two broad solutions: first, limit the discretion of the bank or agency and impose simple commitment rules that are either fixed, or are state-contingent but only in a very limited and transparent way; second, Rogoff delegate either literally to conservative agents, or in the ‘as if’ sense, delegating to a goal-dependent institution that has a legal duty to behave in a conservative way, allowing them full discretion to set instruments using all available current information.²⁶

But with both arrangements, to achieve the necessary credibility, it is essential that governance of the institutions - central banks and regulatory agencies - support the framework and provide the necessary reassurance that future governments will not be tempted to renege on the commitment. In both cases, this is necessary given the link to long-run

²⁶Laffont (2000) argues that limiting the discretion of the regulator reduces the rents that the firm may use to capture the regulatory process. Cowan et al (2000) argues that discretion may be preferred to rules for the public to learn about the policy-maker’s type.

investments. The consequence is, for both sets of institutions, an emphasis on powers and duties being established in a primary law that lays down the length of terms of office, appointment and dismissal criteria of institution directors, funding arrangements, etc. For both central banks and regulatory agencies, what is required is institutions that provide limited and accountable discretion within a clear policy framework. Although we leave the formal developments on this for future work, we conjecture that accountability and transparency²⁷ in a context of limited discretion, are key to address the issues of asymmetric information and capture in policy-making.

Of course, there are significant differences between the tasks faced by independent central banks and independent regulatory agencies. The most important is that regulation (at least in some network industries such as telecommunications) is inherently about the monitoring and enforcement of the behaviour of commercial (and potentially competing) companies according to licence conditions or equivalent obligations. Monetary policy is not primarily concerned with the regulation of banks. In consequence, regulation must operate within a general competition framework and may in time be replaced - at least in some countries - by general ex post competition policy. A further crucial issue is that the history of telecom and other utility service regulatory agencies is very limited, particularly outside the US. In contrast, a significant number of countries still have very clear memories of hyper-inflation and the damage it causes. For many other countries there is a greater understanding of the need to maintain a low inflation rate through the relationship between monetary stability, low inflation and a good economic growth performance.

The empirical results uniformly show that independent central banks operating monetary policy are associated with lower and less variable inflation and that independent central banks with better governance arrangements out-perform banks with less good governance arrangements. However, whether the relationship is causal or related to underlying policy choices is more debatable. These results are encouraging for the supporters of independent regulatory agencies for telecoms and other utility service industries, but,

²⁷There is a large literature on the costs and benefits of transparency in the conduct of monetary policy (see for example, Faust and Svensson (2001) and the survey by Geraats (2002), *op. cit.*, which broadly concludes in favour of transparency. The issue of optimal transparency has received less attention in the area of regulation, but Grossman and Helpman (2001) argue that a better informed electorate reduces the clout of pressure groups in policy making.

as yet, the historical experience has not produced enough evidence to be able clearly to demonstrate the gains from effective regulatory governance. Certainly, we can point to the disasters that result from regulatory arrangements with poor governance, including the bad outcomes arising from wide, non-accountable discretion, particularly in developing countries (see Levy and Spiller, 1996).

The theoretical arguments and the central bank literature suggest strong potential benefits from well-founded regulatory arrangements with proper and transparent procedures that will support limited and accountable discretion. The next task is to define and estimate the benefits, in practice, in the field of utility regulation.

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