This chapter provides a survey of the economic literature on regulatory capture in network industries focusing on the solutions proposed by economic theory. We review alternative models of capture and discuss the predicted risks that these theories predict, bringing in empirical evidence where available. The bulk of the chapter then reviews the effect on capture of various decisions that policy makers face when designing the regulation of a network industry. We find that economic theory suggests a range of ways in which policy makers can reduce the risk of capture. However, alternative theoretical approaches can sometimes give opposing recommendations, and the empirical support is frequently weak. We conclude with a discussion of the need for future research in this area.

It is now indisputable that an effective regulatory regime is necessary for network infrastructure to be operated efficiently and equitably. A large body of economic theory has therefore been amassed to help understand what an optimal regulatory regime should aim to achieve and the means through which it should operate. However, at the same time, it has become increasingly clear that weaknesses in the institutional environment can undermine the objectives of regulatory policy. One such major weakness is the inability of society to ensure that regulatory agencies are acting in their general interest and not, instead, captured by a special interest group. As regulatory capture is becoming an increasing focus of the work of economic theory, this chapter aims to take stock and evaluate the risks and solutions that come out of the economic literature.
The chapter is divided into four sections. We begin in Section I by discussing alternative definitions and types of capture. The section considers the principal ways that capture has been modelled in the theoretical literature in economics. Section II follows by discussing broadly the potential problems that capture might cause, as well as potential positive effects. The bulk of our survey then comes in Section III, where we discuss the various potential solutions suggested in the literature to either reduce capture or mitigate its effects. We consider four areas where decisions over policy and institutions can affect capture: In choosing a market structure, in designing a regulatory structure, in appointing regulators and in shaping regulators’ careers. Finally, Section IV concludes by attempting to draw lessons from the solutions suggested. We show that each policy recommendation can be viewed as one of two broad approaches to reducing capture. It is noted that sometimes such approaches can be opposing or incomplete. We therefore conclude with suggestions as to where future research can be made to improve our understanding of proposed solutions.

In recent years, there has been a large increase in the economic literature studying capture and corruption, and this has included a number of surveys. This chapter differs from other articles in focusing on the institutional tools that policy makers have at their disposal to reduce capture or mitigate its damaging effects. It therefore takes a more policy orientated view than the survey of regulatory capture provided by Dal Bó (2006). When considering such solutions, we also focus on those that are specific to regulatory capture in the regulation of network industries, rather than anti-corruption strategies more broadly. For a broader discussion of policies that reduce corruption in infrastructure, see Boehm (2007) and Kenny (2009a, 2009b).

I. What is meant by capture?

Within the economics literature there is no precise definition of ‘regulatory capture’. Dal Bó (2006) argues that there exists a broad interpretation and a narrow one: Broadly, “regulatory capture is the process through which special interests affect state intervention in any of its forms”, whilst more narrowly “regulatory capture is specifically the process through which regulated monopolies end up manipulating the state agencies that are supposed to control them.” In this chapter, we shall use a definition of regulatory capture that lies somewhere between these two extremes. In particular, we focus on the manipulation of government agencies regulating network industries by special interests. We therefore take a broad view of the potential special interest groups involved whist concentrating narrowly on a particular type of government agency. It is important to note that this therefore does not include discussions of special interest groups influence over democratic institutions more generally (for a discussion of such issues, see Grossman and
Helpman (2001)). Moreover, we do not consider the `capture' of a regulatory agency by politicians when it is in fact in the general interest – in particular, when politicians wish to reverse a time-inconsistent policy. This issue we feel is better discussed in the context of government commitment, which is discussed in a section of Estache and Wren-Lewis (2009). Finally, we do not consider the personal interests of government bureaucrats to be a `special interest group', and therefore we do not consider the extortion of the regulated firm by government agents (for an example of this, see Shleifer and Vishny (1994)).

Given our definition of capture, there are a large number of actors that may potentially be involved in regulatory capture. Figure 1 shows some of the different possible actors and categorises them into three groups: Interest groups, supervisors and decision makers. The interest group most commonly of concern is the regulated firm itself, since the main purpose of the regulator is generally to control the firm's actions. However, other groups may also wish to manipulate the regulatory agency. Trade unions may desire more labour than is optimal for society, whilst taxpayers may desire a smaller than optimal network expansion if public subsidies are required. Different customer groups – e.g. residential or industrial – are likely to have competing interests about the relative prices they pay.

Figure 1: Actors potentially involved in capture

In Figure 1, we can see that government actors have been split into two groups – supervisors and decision makers. In this model, supervisors do not directly decide upon
regulatory policy, but instead just transmit information from the interest groups (particularly the regulated firm) to the decision makers. Decision makers, on the other hand, are in charge of policies such as the type of regulation, the prices a firm is allowed to charge and any subsidies that may exist. Auditors are therefore supervisors, whilst the executive and legislature are clearly decision makers who do not gather information directly. Other actors – in particular, the regulator itself – may play a dual role, both collecting information and making decisions. However, within the regulatory agency itself, these roles are likely to be split.

Categorising actors in this way allows us to distinguish between two sorts of capture. The first essentially ignores or abstracts from the supervisor category and concentrates on the direct influence of interest groups on decision makers. We label this form of capture the capture of decisions. This would, for example, include the regulated firm bribing the regulator to set a higher price in any rate review or to not enforce a particular regulatory statute. We then label the second type of capture as capture of information. This for example, would include the regulated firm bribing an auditor to hide the fact that it was in truth making a larger profit than it claimed.

This division can approximately be mapped to the division between two different ways of modelling capture. The capture of decisions is generally the focus of traditional ‘capture theory’ or ‘interest group theory’. This was originally developed by Stigler (1971) who argued that regulation would in fact be developed in the interests of the regulated firm. This theory was then extended by, amongst others, Posner (1974), Peltzman (1976), Becker (1983) who argued that there was likely to be a range of interest groups each with competing interests. Levine and Forrence (1990) provide a survey of this literature and others. This theory then stressed that regulatory policy was likely to be determined by the relative power of the interest groups involved, which in turn might be determined by things such as the size of each group. This style of model therefore relates to more recent models such as those by Bernheim and Whinston (1986) and Grossman and Helpman (1994, 1996) who apply similar ideas to the influence of special interest groups on politics more generally. Typically, these models do not explicitly consider the relationships among actors within the governmental process, nor the mechanisms by which the acts of regulators are made to conform to the desires of organized subgroups.

The second modelling approach has emphasised the importance of asymmetric information in determining capture. This approach takes a principal-agent framework and specifically considers the relationship between some kind of supervisor and its principal, where the supervisor may have access to information that the principal does not. A pioneering model in this field is that of Laffont and Tirole (1991, 1993), which considers the case where a supervising agency may receive information about the firm’s cost structure that it can then hide from a decision maker. The firm then has an incentive to ‘bribe’ the agency into not passing on this information in order for it to receive an information rent. In the model, the
supervising agency is motivated by private payoffs, and therefore will take the bribe if the principal does not offer a suitable incentive scheme. The key difference between this approach and the former is that information asymmetries between the supervising agency and the decision maker offer the potential for capture, even if decision maker itself is benevolent.

This style of model can be adapted in a variety of ways. Other interest groups besides the firm may also have an incentive to prevent information being revealed to the decision maker, such as environmentalists (see Laffont and Tirole (1991, 1993)) or taxpayers (Estache, Laffont, and Zhang (2006)). We might also consider different actors in the role of principal and agent – for example, they might both be members of the same regulatory agency. Furthermore, we relax the extent to which the principal is non-benevolent, such as in Spiller (1990).

Since the distinction between the capture of decisions and the capture of information has been most pronounced in the literature, we will focus mostly on this distinction in our following discussion of implications and potential solutions. Nonetheless, there are other ways in which we can categorise different types of capture that will help us to understand the breadth of potential mechanisms and the limitations of solutions. One such categorisation is the distinction between ex ante and ex post capture. In ex ante capture, the interest group’s objective is to influence the design of regulation or laws. For example, an incumbent firm may attempt to block a reform that would introduce competition. Ex post capture on the other hand happens within the existing legal framework – for example, the distortion of cost information to gain a better rate. Hellman, Jones, and Kaufmann (2003) show that whether a firm attempts to capture ex ante or ex post depends on characteristics such as their political connections.

It is also useful to note that capture occurs in both legal and illegal ways. Legal capture includes lobbying as well as more subtle forms of capture such as using the career concerns of regulators. Illegal capture consists not only of bribery, but also the use of favours or coercion. Dal Bó (2006) discusses the various instruments used in capture in more detail, whilst Dal Bó and Di Tella (2003) examines the differences between capture by threat and by bribery. Awareness of the existence of both legal and illegal forms of capture is important when considering policy in order to ensure that one type is not simply replaced by another.

Finally, it is useful to distinguish between direct and indirect capture. From our definition, we are considering capture to be the ‘manipulation of government agencies’, but the interest group has the option of manipulating the agency themselves or via an alternative power. For example, Holburn and Vanden Bergh (2004) develop a model showing how, in certain circumstances, it is optimal for firms to attempt to capture authorities who hold power over a regulatory agency, rather than the agency itself. If they are successful, these
authorities may then be able to exert sufficient pressure on the agency that it does not need to be captured directly.

Overall, the discussion in this section has shown that there are a variety of types of capture and indeed a number of different ways of modelling it. This should now enable us to consider how capture, in any of these forms, might affect outcomes that we are concerned about.

II. What are the implications?

We now turn to consider the crux of why regulatory capture is of such concern to economists. First, we consider the potential implications of capture that arise from theoretical models. These implications can be categorised into two main effects: redistribution of rents and changes to efficiency. We then consider how these two broad effects will manifest themselves in practice, and examine evidence for this in the empirical literature.

The general objective of capture is to redistribute surplus towards the party that’s doing the capturing and hence away from some other party. In the case of the regulated firm, for example, this could be an increase in producer surplus that comes through higher prices at the cost of reduced consumer surplus. A redistribution of surplus occurs in all models of regulatory capture and in all the types discussed in the previous section. For instance, in a interest-group model of capture, the firm may persuade the government agency not to carry out a rate review that would result in a lower regulated price. In a principal-agent model of capture, the firm wishes for the supervisor to hide cost information in order to generate an ‘information rent’ for the firm. The fact that the firm now has information that the regulator does not means that the regulator has to provide a transfer of funds to the firm in order to incentivise the revelation of this information.

Other interest groups besides the firm that attempt capture are also seeking a redistribution of surplus. If a particular group of consumers capture the regulator (e.g. industrial consumers), they may seek a change in the cross-subsidy regime that benefits them (e.g. higher residential prices and lower industrial prices). Alternatively, consumers that are already connected to the network may seek to prevent further network expansion if such expansion would involve a transfer away from the connected to subsidise the unconnected (see Estache, Laffont, and Zhang (2006) for more details). Since regulated network industries are often full of opportunities for cross-subsidies or transfers, there is great potential for this redistribution of surplus to take place in a number of ways.
We can thus be sure that a redistribution of surplus would take place following any successful instance of regulatory capture. In some cases, this may be the only implication. If the surplus being redistributed is a relatively unimportant economic rent then there is a possibility that capture will simply result in some efficient transfer from one group to another. For example, if one firm wins a contract instead of an alternative identical firm simply because it has bribed the regulator, then the only consequence of this capture may be the gain of one firms’ shareholders over another. If this were the case generally, economists might be relatively unconcerned about capture, or at least it would be more appropriately considered within a more general framework. Judging whether or not regulatory capture was bad in this case would involve making some judgement over the optimality for social welfare of such a redistribution of income. For example, we could imagine that capture might be good a thing if the capturing interest group was generally under-represented in polity. However, most instances of capture are likely to imply more than an efficient transfer of surplus, and in addition are likely to impact the overall efficiency of the sector being regulated.

Regulatory capture may impact on economic efficiency in a number of ways. Some of these ways may in fact improve efficiency. One commonly cited way in which capture may increase efficiency is through helping to mitigate problems of commitment where the optimal policy is time inconsistent. For instance, Evans, Levine, and Trillas (2008) show that, when the government cannot commit to allow the firm a sufficient return on investment, capture can improve efficiency. Commitment problems are avoided if direct lobbying of the decision-making executive is allowed, or by devolving decision making to a sufficiently ‘pro-industry’ regulator. One way in which a regulator may be made sufficiently ‘pro-industry’ is through their openness to capture. More generally, capture might mitigate inefficiencies that arise elsewhere in the regulatory process, such as through the election of politicians (see Besley and Coate (1998), for example, for a discussion of such inefficiencies).

Overall, however, models of regulatory capture have generally focused on instances where capture, or the potential for capture, decreases efficiency. This generally occurs in three possible ways: the direct distortion of prices, the cost of capture itself and the measures taken in reaction to capture.

The nature of regulatory capture means that the redistribution of surpluses that occur does not typically take the form of direct lump sum transfers. This is either because the regulator does not have the power to make such transfers (perhaps precisely because this would increase the effect of capture) or because such transfers would expose the otherwise covert capture. As a result, the redistribution of rent that occurs will often result in the distortion of various prices away from their optimal values. For example, in the simplest case of monopoly regulation, a firm that captures the regulator will seek a higher price than desired by society, resulting in under-consumption. In another case, where consumer groups capture in order to change the cross-subsidy regime, this will frequently be through changes
in relative prices. We would therefore expect to see over-consumption by the group that captures and under-consumption by other groups. Finally, in the case where surplus is transferred from the government to a firm or interest group, the transfer itself may not be distortionary. However, since the government pays for the transfer out of taxation that is itself distortionary, this leads to inefficiency.

A further source of inefficiency arises from the costs of capture itself. This occurs in both legal and illegal capture. In legal capture, costs might include over-spending on election campaigns or the allocation of jobs to inferior candidates. When capture is illegal, time and money will be spent on keeping any transfers covert or enforcing damaging threats. As Tullock (1967) showed, these costs may be high, since the large surpluses present in network industries justify a large amount being spent on trying to obtain the rents. When opportunities for capture abound, managers will spend more time attempting to capture than improving their firms’ performance, as illustrated in the model of Dal Bó and Rossi (2007).

A final cause of inefficiency is changes in policy designed to prevent or mitigate the damages arising from capture. This is demonstrated clearly in the models of information capture of Laffont and Tirole (1991) and Estache, Laffont, and Zhang (2006). In these models, capture is costly to prevent, since the regulator has to be given a sizeable incentive not to be captured. These costs are directly related to the gain that an interest group receives through capture. There is thus an incentive for the principal to reduce these potential gains, even if doing so is costly for other reasons. Hence it may be optimal to offer a lower-powered incentive regime that does not sufficiently reward effort if this also decreases the information rent a firm can obtain through feigning inefficiency.

Overall therefore, regulatory capture - or the threat of such capture – is likely to cause both a redistribution of surplus and increased costs overall. In practice in network industries, there are three main ways in which such effects are likely to manifest themselves in ways which we can observe: increased prices (for at least some groups), increased subsidies (for at least some groups) and decreased quality (for at least some groups). These effects may occur directly, or through decisions over potential reforms that interest groups attempt to influence. For example, a monopoly may capture a regulator in order to prevent the liberalisation of the sector, which in turn would have resulted in lower prices.

Empirical evidence of the effect of capture on outcomes is extremely limited by the difficulty in measuring the extent to which ‘capture’ has occurred. Legal capture – in particular, lobbying – offers the advantage of frequently being overt, and therefore potentially measurable. This is the case with private campaign contributions to elected state legislatures, which de Figueiredo and Edwards (2007) uses to measure the effect of firms’ lobbying. They find increased lobbying by an established utility significantly increases the access price it is allowed to charge competitors.
Other papers attempt to infer the scale of capture from other variables. Duso (2005) uses price differentials to proxy for capture, and then finds that capture significantly reduces the probability of a cellular market being regulated in precisely those markets where regulation would lead to a reduction in general prices. Taking a different approach, Bonardi, Holburn, and Bergh (2006) argue that several factors will increase the probability of capture, including rivalry from competing interest groups, the resource base of regulatory agencies and a firm’s recent experience with policy-makers. They then find evidence that these factors indeed decrease the rate of negative rate reviews.

One alternative approach in cross-country work is to assume that capture is more commonplace when general rates of corruption are higher. Using indices of national corruption, Dal Bó and Rossi (2007) find that firms are less efficient when national rates of corruption are higher, and argue this is due to an increased amount of managerial time being spent on capture. Wren-Lewis (2010) finds a similar result for corruption interacted with regulatory governance, suggesting that capture is most prevalent in countries where corruption is high and regulatory governance is weak.

Other papers attempt to explore the effects of capture on market reform in network infrastructure. Looking at electricity unbundling within the old EU states, van Koten and Ortmann (2008) find that it is less likely to occur in more corrupt countries. They argue this is because here the incumbent is more likely to be able to capture the decision making process. Li, Qiang, and Xu (2005) take a different approach when considering cross-country differences in regulatory reforms in telecommunications. They find support for the interest-group theory of capture in showing that reforms are more likely when ‘pro-reform’ interest groups are large and less likely when incumbents have strong incentives to oppose the reform. They also find that democracy appears to facilitate this interest group effect. Similarly, Knittel (2006) finds that regulation of the electricity industry in the US occurred earlier where interest groups benefiting from such regulation were strongest.

Overall therefore, theory suggests that capture and the threat of capture are likely to be significantly damaging for a number of reasons. Though the empirical evidence is severely limited in its ability to measure capture, it does provide evidence to support this view. It is therefore appropriate to ask the question of ‘what can policy makers do to reduce capture and its effects?’ In the next section, we consider a range of solutions suggested by the theoretical literature, using the results of empirical work when it exists.

III. What solutions does theory suggest?

Having established the potential risks of regulatory capture, let us now turn to consider potential solutions that derive from the theoretical literature. Since network industries are
the focus of this chapter, we consider only solutions that are sector-specific. Clearly it may also be useful to pursue broader policies that affect the economy and government more generally, such as decreasing corruption or improving governance, but this is not within the scope of the chapter. We divide this section into four subsections that each deal with a different area of policy related to network industry regulation. First, we consider how decisions about the market structure, such as whether to privatise or liberalise the market, may affect capture. Second, we explore alternative regulatory structures. This includes decisions over the number of regulatory agencies and the level of government at which regulation takes place. Third, once the regulatory structure is in place, there are a variety of options for appointing the regulators, and this decision may also have an influence on future capture. Fourth, we examine how policies relating to regulators’ careers once in office, such as their term length, may affect capture.

### A. Industrial structure

**Privatisation**

One major reform that has significantly changed the structure of network industries in many countries over the last three decades has been the privatisation of incumbent monopolies. Although reducing capture was generally not the primary aim of such reforms, it has been argued that this may be a positive secondary effect. Indeed, since the regulation of public enterprises has often been managed together with their operation, ‘capture’ might have been seen as an odd thing to talk about. Nonetheless, to the extent that public enterprises have different objectives from the government, there exists the potential for capture.

In the model of Boycko, Shleifer, and Vishny (1996), privatisation may reduce the effect of capture and hence improves efficiency. However, this work concerns capture by interest groups other than the firm – notably labour unions – and assumes that the government itself is captured. Privatisation therefore decreases the effect of capture by making it more difficult for the captured government to influence the firms’ decisions. Shleifer and Vishny (1994) then extend this idea by arguing that privatisation is likely to only be successful in reducing captured politicians’ influence if the firm is profitable enough not to depend on subsidies. Of course, if we do not believe that the entire government is captured by damaging interest groups, then it is not so clear that distancing the government from the firm will be mitigating the effect of capture. In particular, these models do not consider

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1 It is worth noting that capture and corruption more generally are also likely to impact upon a governments’ decision to privatise - Laffont and Meleu (1999) and Bjorvatn and Søreide (2005), for instance, both provide models examining how corruption might influence the decision over whether to privatise.
potential capture by the regulated firm, which is generally the focus of the capture literature.

Martimort and Straub (2009) take a different angle to investigate the impact of privatisation on capture by the firm. They use a model of informational capture and consider privatisation to be the prohibition of transfers between the government and the firm. They then argue that the effect of capture depends on the firm’s ownership. If the firm is publically owned, the threat of capture results in a greater public subsidy funded through taxation, whilst a privately owned firm gains profit instead through higher prices. The relative cost of capture therefore depends on how distortionary taxes are relative to higher prices. Taking the model one step further, they argue that privatisation will therefore make capture more transparent, since higher prices are easier to link to the firm’s actions than increased taxation. This transparency may aid in the prevention of capture. However, if we instead consider the relative power of interest groups, it may be that a large electorate is relatively powerless to prevent such capture compared to a ministry of finance that wishes to stem the loss of funds.

Overall therefore, the effect of privatisation on capture is ambiguous. If one is concerned about interest groups besides the firm capturing regulation, then privatisation may succeed in improving efficiency. Wren-Lewis (2010) provides evidence for this in showing that private ownership reduces the negative effect that corruption has on productive efficiency. However, if one is concerned about potential capture by the firm, then the effect of capture is likely to vary. This is consistent with empirical evidence presented in Estache, Goicoechea, and Trujillo (2009), who show that privatisation and corruption interact in a number of different ways.

**Liberalisation**

Another common recent reform of industrial structure that has often accompanied privatisation is the liberalisation of the market to allow new entrants to compete with the incumbent. An interest group theory of capture would suggest that such a reform is likely to reduce capture since firms find coordinating on capture more difficult in a less concentrated market (see, for example, Olson (1965)). Since each firm only gains a fraction of the total benefit of a price rise, then, as the number of firms increase, the incentive for each individual firm to capture decreases. However, this argument clearly only applies to capture that will result in benefits for all firms in the market. The flip side is that incentives for the incumbent to capture may now increase if it needs the regulator’s help to beat the competition.
Models of information capture would also tend to suggest that liberalisation is likely to have positive effects. On one side, competition may decrease the need for the regulator to amass information if competition provides an alternative downward pressure on prices. To the extent that information retrieval is still required, a greater number of firms in the market may provide alternative information sources. Laffont and N’Guessan (1999) show that such additional information is likely to reduce the damage caused by information. However, they also note that such a reduced dependence may not in fact reduce the prevalence of capture. Instead, since the government may see capture as less problematic, it may choose to spend less on preventing capture occurring.

Overall therefore, liberalisation is unlikely to be a panacea when it comes to reducing the risk of regulatory capture. However, it is probably fair to say that there is more grounding in both theories of capture to support liberalisation as an anti-capture measure than privatisation. Of course, this also helps to explain why we would also expect incumbent firms to use regulatory capture to prevent such a reform occurring at all!

B. Regulatory structure

The number of actors

Models of information capture focus on the key role of supervisors who collect cost information from the firm. Laffont and Martimort (1999) show that one way of reducing capture in these models is to increase the number of supervisors. This relies on the assumption that each supervisor is aware of the signal that the other receives but they cannot collude amongst themselves. In this model, capture remains a problem if only one of the supervisors receives information from the firm, but is removed as a threat when both supervisors receive information. This is because, if both regulators receive informative signals, each will anticipate that the other will reveal it, and hence any collusion would be ineffective. Estache and Martimort (2000) argue additionally that, if different supervisors are instead not aware of the information the other receives, separation is still likely to reduce capture. Since each supervisor is now only partially informed, their ability to extract bribes from the firm is reduced.

In practice, this insight could be applied on a number of levels. It may work through the creation of two separate agencies, or perhaps less costly through the involvement of a government body besides the regulator, such as the judiciary. At a more micro-level, it may

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2 This can be seen as an example of the general principle that competition amongst bureaucrats decreases corruption, as discussed in Rose-Ackerman (1978) and Wilson (1980), amongst other places.

3 See Laffont and Meleu (1997) for an analysis of the case where regulatory agents can collude between themselves.
simply suggest that individual supervisors within the regulatory agency work in pairs rather than independently.

Increasing the number of supervisors may well go along with increasing the number of decision makers. This would be the case if, for example, separation was achieved through dividing roles between agencies. This may also decrease capture if we believe that it is more costly to capture two decision makers than to capture one. On the other hand, Estache and Martimort (2000) argue that, when different principals are affected by the activities of the regulator, the latter can play one principal off against the other. The bureaucrat may then become less accountable with each principle unable to constrain its actions. Whether or not the existence of multiple principals is a curse or blessing for accountability depends on the regulatory process and structures in place. For example, one way to increase accountability is to expose the regulatory bureaucrat by making available private information on the effectiveness of the bureaucrat’s behavior. Simple institutional rules like the public release of regulatory information may allow this kind of information sharing between multiple principals.

Of course, increasing the number of actors will certainly impact a number of other aspects of regulation, as discussed in Estache and Martimort (2000). Indeed, Laffont and Meleu (2001) argue that it is in precisely the circumstances where separation’s role in capture reduction is most important that the costs are highest. We are not aware of any empirical work that attempts to test the impact of the number of actors on capture. However, the current theoretical literature appears to generally favor increasing the number of actors when it comes to reducing the risk of capture.

**Consumer advocates**

One particular way that has been suggested to increase the number of actors is to create consumer advocates that are involved in the regulatory process (see, for example, Ugaz (2003)). This aligns closely with the interest group theory of capture, since it may help to improve the power of consumers. By increasing the power of this particular interest group, which typically is seen as the victim of capture, the relative power of other groups – in particular, the regulated firm – will decrease.

Whilst this theory is in principal sound, two potential problems arise. First, from an interest group perspective, there remains a concern that the consumer advocates themselves may be captured. In particular, particular consumer groups may use the advocates to favour themselves over others. Holburn and Spiller (2002) provide empirical evidence for this

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4 See McCubbins, Noll, and Weingast (1987), Spulber and Besanko (1992) and Dixit (2003) for discussions on how the interaction of multiple actors in government is influenced by processes and structures.
concern by showing that in US electricity regulation, the creation of consumer advocates has benefited industrial consumers but not residential ones. Second, Laffont and Tirole (1993) argue that if one takes an information perspective, consumer groups will be of no help unless they can provide an additional information source and hence act as an alternative ‘supervisor’. These concerns should therefore be borne in mind when designing consumer advocates by ensuring representation and given the advocates enough resources to enhance their ability to gather information.

Decentralisation

The relationship between decentralisation and broader issues of corruption and accountability has received a significant amount of attention in the literature (see, for example, Bardhan and Mookherjee (2000), Bardhan (2002)). Clearly, regulatory capture can be viewed as a particular aspect of this relationship. From an interest group perspective, the proposed advantage is that regulation at a more local level is likely to be more accountable. In other words, consumer groups and or local taxpayers are likely to be able to organise themselves more effectively to influence the regulator’s decisions. Evidence to support this view is found in Boyes and McDowell (1989), who finds that elections for regulators are only effective at reducing consumer prices when held at a sufficiently decentralised level. However, the flipside from an interest group perspective is that local firms and other groups might also find capture to be easier at a local level. For example, Boehm and Olaya (2006) argues that regulation at the local level is likely to lead to more frequent interactions, encouraging capture.

Models focused on informational capture are also ambiguous as to the effect of decentralisation on capture (see Laffont and Aubert (2001) for an overview). Laffont and Pouyet (2004) show that, when decentralisation induces competition between regulators, this competition may reduce their discretion and hence their potential to be captured. On the other hand, Besfamille (2004) shows that a local government may have an incentive to collude with a local firm against the national government if this results in greater subsidies heading to the local area. In China, for example, local governments have been known to collude with small-scale inefficient coal power plants in order to prevent them being shutdown by the central government. This is because the local government has an incentive to keep power plants in their region open as they provide jobs and tax revenue, which aid the local officials’ personal objectives such as promotion.\(^5\)

Overall therefore, economic theory presents no clear view about the effect of decentralisation on capture. One idea that may be worth further research is the extent to

\(^5\) See Laffont (2005, pp.22-24) for further details.
which the positives of both decentralised and centralised regulation could be brought out using a hierarchy involving both levels of government. This might also be a mechanism by which to increase the number of actors involved in regulation, and hence reduce capture through the mechanism discussed above.

**Regulatory independence**

A final decision that needs to be made when deciding upon the regulatory structure is the degree to which the regulatory agency should be independent from the government. Generally, the emphasis of policy advisors has been to push for greater regulatory independence in the belief that this will decrease political interference and hence improve the ability of the government to commit (see, for example, Thatcher (2002)). However, a regulator that is less constrained by government may be more open to collusion with the firm. In light of this argument, it is worth studying some of the empirical work on independent regulation more closely. We may, for example, expect to see greater investment under a captured independent regulator, alongside excessive returns. In this case, it should be noted that evidence that independent regulation increases investment is not necessarily evidence that it is welfare enhancing.\(^6\) Further work is needed in distinguishing between productive and unproductive investment, as well as other outcomes, to allow us to weigh up the costs and benefits of independence more precisely.\(^7\)

Independence may however not increase collusion if the limited accountability of the government means that capture of politicians or the executive is a greater threat than regulatory capture. Furthermore, in considering the trade-offs that independence brings, it is worth distinguishing between different components of independence.\(^8\) For example,

\(^6\) For example, Henisz and Zelner (2006) use cross-country panel data to show that a more powerful industry lobby reduces investment in SOEs generating electricity, and argue this is evidence that inefficient ‘white elephants’ are prevented. On the other hand, also using cross-country panel data, Cubbin and Stern (2006) show that independent regulation increases investment in electricity utilities, and they argue this shows the positive effects of commitment. Whilst both interpretations may be correct, the contrary may also be the case.

\(^7\) Faure-Grimaud, Laffont, and Martimort (2003) provide a theoretical model where the principle makes this trade-off between commitment and capture when deciding upon independence.

\(^8\) Gutiérrez (2003) considers different levels of independence amongst independent regulators, whilst Pargal (2003) finds evidence in cross-country regressions that different aspects of independence may have different effects.
making the regulator’s workings transparent to the government and citizens is likely to reduce the risk of capture, whilst making it transparent the firm may facilitate capture.\(^9\)

Related to the discussion of the degree of independence is the amount of discretion a regulator should hold. Clearly, the greater discretion the regulator is allowed, the greater the potential for capture. Hiriart and Martimort (2009) show that a greater degree of capture (i.e. pro-industry bias) calls for a smaller amount of discretion to be given to the regulator. Overall therefore, whilst increasing independence by no means necessarily increases capture, policy makers need to be aware that granting too much discretion carries such a risk.

### C. Appointment of regulators

#### Elections of regulators

Turning now to the appointment of regulators, one idea that has been suggested is to elect regulators directly, rather than having them appointed. In the models of Besley and Coate (2003) and Guerriero (2006), regulators that are directly elected are more responsive to consumers’ demands for the regulated sector since this is the sole issue of concern in these elections. They also both find empirical support for this hypothesis in showing that residential electricity prices are lower in areas in the US where regulators are directly elected. Smart (1994) finds a similar result for telecoms prices in the US. In addition Atkinson and Nowell (1994) finds that elected regulators set the regulatory lag closer to the social optimal and Guerriero (2006) finds that the election of judges also tends to result in reduced electricity prices. This result is not universal - Boyes and McDowell (1989) finds that elections are only effective when carried out at a relatively local level, whilst Kwoka (2002) finds that only industrial prices are reduced. However, there is little to suggest that election of regulators increases capture, suggesting it is an anti-capture policy with relatively strong empirical support.

#### Joint appointment by executive & legislature

If the direct election of the regulator is infeasible or potentially damaging, one alternative is for the appointment to be made jointly between the executive and legislature. In an interest group theory of capture, joint appointment has the advantage of involving more than one

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\(^9\) As Difference between IRAs and CBs / Competition authorities is that for latter there is public scrutiny by international comparison and an industry of commentators.
actor and therefore diluting the power of any particular interest group. Supporting this theory, Smart (1994) finds that telecoms rates in the US are lower when regulators are appointed jointly by the executive and legislature. However, this effect only occurs when the executive and legislature are different political parties, suggesting it is indeed a true separation of powers that is required to reduce the effect of capture.

D. Regulatory Careers

Term length of regulator

Let us now consider the final policy area in which we focus on, the design of the careers of regulators. In particular, we begin with a variable that has been the focus of a significant amount of work in the area, namely the term for which an individual regulator is appointed for. An important work in the study of the regulatory life-cycle is that of Martimort (1999) who develops the information based model of capture of Laffont and Tirole (1991) one step further by considering the contract between the ‘capturer’ and the ‘captured’. In particular, the paper notes that since agreements between the capturing firm and the regulator are likely to be illegal, they cannot be explicit contracts that are externally enforced. Instead, such contracts are implicit, and hence depend on the fact that relationships between the regulator and the firm are repeated over time. The threat of capture is therefore positively correlated with the frequency of these interactions and the duration of time over which they are expected to last. It can therefore be argued that reducing the regulator’s term length decreases the potential for collusive implicit contracts between the firm and the regulator to be maintained.

Based on a similar model, Faure-Grimaud and Martimort (2003) give a different argument for why shorter term lengths may reduce capture. They work on the assumption that the cost of bribes are likely to increase in a convex manner at any given time, which seems reasonable when we consider that giving small amounts of cash under the table will go relatively unnoticed, but larger transfers will require more time and effort spent on making the transaction covert. Moreover, they also argue that the benefits to the firm of capture are likely to change over time – for example, during a potential rate review it may be particularly valuable to the firm for the regulator not to reveal any information it has on the firm’s cost structure. Given these two assumptions, the firm would like to spread out its
bribes over time in order to reduce the total cost. However, if term limits are short, this will not be possible, since a given regulator may only hold the post during a period where capture is particularly valuable. In this way, decreasing term limits may increase the total cost to the firm of capturing the regulator.

Whilst these two articles suggest shorter term limits will reduce capture, Leaver (2009) does not find evidence for this when she examines the effect of term limits on prices in the US electricity sector. Indeed, she finds the opposite result – longer term limits in fact appear to lead to reduced prices for consumers. She explains this by building a model where regulators are concerned about gaining future employment and hence preserving their reputation. This career concern increases as regulators near the end of their term, and hence regulators are less keen to challenge the firms they regulate for fear that they might be exposed as being wrong. This can be interpreted in ‘capture’ in the loose sense of the word if we consider that one of the tools firms have at their disposal to exert power over regulators is through damaging their reputation.

Finally, in an event study of electricity regulation in the UK, Dnes and Seaton (1999) find no evidence for a ‘life-cycle’ effect related to capture either way. Hence, overall, the theoretical and empirical juries are still out when it comes to the way term lengths should be adjusted to reduce regulatory capture.

The ‘revolving door’

A second aspect of regulatory careers that has been studied in the literature is the ‘revolving door’ that exists between jobs in regulation and jobs with interest groups, particularly the regulated firm. Since the skills required to work for a regulator are often similar to those required to work for a regulated firm, the movement of people between the two bodies is natural. Unfortunately, it also offers the potential for capture by enabling the firm very easily to reward regulators for ‘good behaviour’. This is particularly valuable in situations where other sorts of corruption such as bribery are more difficult, since the value to the regulator of a well paid career in a firm may be very sizable. To reduce this route for capture, restrictions can be placed on who regulators can work for after leaving the agency, although such rules are likely to be ineffective when the regulated firm is part of a large multi-sector consortium. An alternative is to appoint a different type of person to the agency, such as career civil servants, academics or those close to the end of their career, since these actors are less likely to seek employment in the firm afterwards.

Empirical work on the existence of a ‘revolving door’ effect is minimal and inconclusive. Cohen (1986), for example, shows that regulators do become more favourable to the firm they regulate in the year before they become employed there, but not before this. This
The importance of the proximity to the end of one’s term is also found in Leaver (2009), suggesting that careers in industry may act as an incentive only when the prospect of a change in employment is imminent. More work may be required before it can be conclusively argued that closing the ‘revolving door’ is necessarily worth the costs involved in lost skills. Overall, however, it seems likely that closing the revolving door will reduce regulatory capture.

**IV. Conclusions**

The previous section has shown that economic theory suggests a range of solutions that aim to deal with the risks presented by regulatory capture. From reviewing these solutions, we can see that each policy aims to do one of two things: Reduce the power of threatening interest groups to influence decision makers or reduce the ability of regulatory agents to exploit the information asymmetry between them and their principals. Table 1 categorises the various solutions considered in section III according to these two objectives.

The first of these two objectives arises from the ‘interest-group’ theory of capture which argues that regulatory capture is determined by the relative power of rival interest groups. According to this theory, capture can be reduced by decreasing the power of the groups most likely to capture and increasing the power of the groups that suffer from capture. Liberalisation serves to decrease the power of the regulated industry by splitting it up, whilst closing the revolving door decreases the power regulated firms have over current employees of the regulator. More generally, increasing the number of regulators and requiring their appointment to be made by two separate powers dilutes the effect of any interest group that has power over a single actor. Consumer advocates and the election of regulators then aim to increase the power of consumers and taxpayers, who are generally the victims of capture. Other policies may then either reduce or increase the risk of capture. Decentralisation is likely to increase the power of both local consumers and other local interest groups, and hence the overall effect will be context dependent. Similarly, privatization and increasing regulatory independence have ambiguous effects. If an interest group holds power over politicians, then distancing them from control of the firm is likely to reduce the effect of capture. On the other hand, if we are worried about the firm capturing government agencies, then distancing this process from relatively accountable politicians may increase the probability of capture.

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10 Che (1995) and Salant (1995) argue that keeping the revolving door open may also offer other benefits, such as increasing commitment and incentives for regulator’s to signal their skill through efficient regulation.
<table>
<thead>
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<th></th>
<th>Reduces interest group power</th>
<th>Reduces agents exploitation of asymmetric information</th>
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<tbody>
<tr>
<td>Privatisation</td>
<td>+/-</td>
<td>+/-</td>
</tr>
<tr>
<td>Liberalisation</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Increasing number of regulators</td>
<td>+</td>
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<tr>
<td>Consumer advocates</td>
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<tr>
<td>Decentralisation</td>
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<td>Greater regulatory independence</td>
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<tr>
<td>Elections</td>
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<td>Joint appointment</td>
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<tr>
<td>Shorter term length</td>
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<tr>
<td>Closing the revolving door</td>
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A ‘+’ indicates a positive relationship predicted by theory (e.g. liberalisation reduces interest group power) whilst a ‘-’ indicates a negative relationship (e.g. greater regulatory independence increases agents’ exploitation of asymmetric information). A ‘+/-’ indicates that the theory predicts that there will be an effect, but this could go in either direction (e.g. privatisation will either reduce or increase agents’ exploitation of asymmetric information). An empty box indicates there is currently no theory that suggests how the policy may be related to this aspect of regulatory capture.
The second objective, which focuses on decreasing an agent’s ability to exploit information asymmetries, comes out of the theory of capture revolving around a principal-agent model. This theory tells us that one way capture can be reduced is through the reduction in information asymmetries, which may be brought about through liberalisation if competition is achieved. Increasing the number of regulators may also be useful since it reduces the ability of any individual regulator to hide information – an activity that may be made easier if the regulator is given greater independence. The theory also suggests that shortening the term length of regulators and closing the ‘revolving door’ may reduce the ability of the firm to make credible implicit contracts with the regulatory agent, and in doing so decrease the risks of capture. Finally, according to this theory, the effect of privatisation on the costs of capture will depend on the relative distortions of higher prices compared to higher taxes.

When we consider the results shown in Table 1, we can see that for some solutions, it is possible for one theory to suggest that capture will be reduced whilst the other concludes the opposite. Increasing regulatory independence may, for example, decrease the risk of the firm bribing politicians to make favourable decisions but at the same increase the risk of the firm bribing the regulator to hide information. However, in the majority of cases clear contradictions do not tend to occur. Liberalisation, increasing the number of regulators and closing the revolving door are offered at least some support from both of the theoretical approaches.

However, this apparent consensus is weakened by the fact that there are gaps in the table where one theoretical approach has not been analysed by the other theory. In some cases, this gap is relatively harmless – it would seem unlikely that consumer advocates will increase information asymmetries, for example, and more likely they will just be ineffective in this regard. In other cases, however, the result is less clear. With decentralisation, for example, the effect of the policy on the amount of information capture is less certain and unlikely to be irrelevant. More research is needed therefore to fill these gaps before economic theory can be clear on its policy recommendations. Indeed, this also applies to some of the entries that have been filled in on the basis of rather weak support.

Finally, two further recommendations for future research arise from this survey. First, empirical research on the issue of regulatory capture is patchy and needs further development. Particular attention should be paid to those issues where the current economic theory appears to favour a policy fairly clearly, such as in increasing the number of regulators. Here there is the potential for a strong policy recommendation if supported by empirical evidence and great need for re-examination otherwise. Second, our survey has uncovered remarkably few papers that incorporate both the ‘interest-group’ approach of power over decision makers and the ‘principal-agent’ approach of focusing on information asymmetries. Such a dual approach is likely to be useful in considering the potential interaction between the two types of capture. For example, is it the case that the capture
of decision makers facilitates the capture of supervisors, or that the two forms of capture are substitutes? Is it more important to reduce one kind of capture than the other? Answering these questions will help us go forward in suggesting the priorities that policy makers should hold if they wish to reduce regulatory capture and the damage it causes.

V. References


