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The economics of lobbying and special interest groups

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Preface

This book is the result of my work as research assistant at the Socioeconomic Institute, University of Zurich. It consists of four investigations relating to the question of how special interest groups influence policy decisions. It starts with a survey of the existing lobbying literature, which summarizes and discusses existing approaches towards lobbying and states the resulting insights. This survey is followed by two theoretical investigations. The first analysis discusses differences in lobbying activities between multinational and national firms. It is motivated by the question whether the presence of multinational firms leads to less policy discretion of national policies. The second investigation discusses environmental regulation when firms engage in different types of lobbying incentives. The book concludes with a discussion of a regulation draft in practice, the Multilateral Agreement On Investment.

Since the beginning of this challenge, I have worked as a research assistant with Armin Schmutzler. I want to thank him for his encouraging, helpful and open minded support throughout this period, and his relaxed personal attitude. Discussions with him were not only possible at any time but also very fruitful. I have also benefitted from a lively and active atmosphere at various seminars at the University of Zurich. Many discussions with Peter Zweifel, Friedel Polk, Katrin Spitze, Sarah Niggli, Stephanie Fankhauser, Katrin Bernath, Harry Telser, Rafael Lalive, Daniel Halbheer, Matthias Gysler, Lorenz Götte, Dennis Gärtner, Stefan Bühler, Thomas Borek, Men-Andri Benz and Zava Aydemir have all been very valuable. Moreover, I want to thank the Study Center Gerzensee and its staff for the excellent doctoral courses.

Finally and most importantly, I thank my parents for their support and encouragement throughout my life (and that they let me do what I want!). The book is dedicated to them.

Chapter 1

Introduction

Political decisions are influenced by special interests. Politicians pay tribute to organized interests which spend remarkable resources in order to shape policies in their favor. Considerable research has been undertaken in the last three decades to understand how interest groups shape policies, and remarkable insights have been gained. This book deals with lobbying from a theoretical point of view. Its main objectives are threefold: First, I give a broad overview of theoretical approaches towards lobbying in chapters 2 to 5 with the aim to survey the main insights of this interesting field of research. Second, I contribute to recent research by presenting two own lobbying models. Chapter 6 deals with environmental regulation and the instrument choice of lobbies, and chapter 7 focuses on the influence of multinational enterprizes on national regulation. Third, it is shown how theoretical insights might be used to approach regulation in practice. Chapter 8 deals with the final draft for the Multilateral Agreement on Investment, which is criticized on theoretical grounds.

Before I state my main research questions in detail, let me give some examples of lobbying issues. It is important to mention in that context that many kinds of lobbying activities are politically institutionalized and abide by the legal system. Examples are public campaign spending (up to a certain extent) in Germany and the United States, or the integration of experts in the political process through hearings or advisory boards. However, a considerable extent of lobbying receives no public attention, and the borderline between legal influence and illegal corruption is not always as clear cut as it ought to be. Examples for lobbying activities are abound, even though its effect on the policy decision can often only be vaguely assessed:

- The German Federal Ministry of Economics and Technology is currently run by Werner Müller. He was a member on the board of directors of the energy company VEBA from 1992 to 1997 before he joined the German Government as a crossbench member. VEBA merged with VIAG to EON in 2000, which then decided to acquire a close competitor named RUHRGAS. This acquisition has been vetoed by the German competition authority (the German Federal Cartel Office) for competitive reasons. However, there seems to be a strong governmental interest that this acquisition takes place.

  The Minister of Economics currently considers to overrule this veto and allow the acquisition through a special permit. This is a legal policy instrument which is only available to the Minister of Economics. It is intended to allow mergers and acquisitions if they are in the public interest even though they may have negative competitive effects (and must be forbidden by the competition authority for this reason). As this instrument is very rarely used, the public suspected that the foreseen special treatment has reasons beyond politics. The suspicion is that the Minister, a manager who came to politics as a crossbencher, will possibly revert to business after his incumbency. Does the special permit support this step? The government denies this claim. It got caught up in indecision when it realized that the case stirred up more public attention than anticipated. The final decision is still open, but there are strong signals that the Minister will make use of this instrument and overrule the independent competition authority.[1]

- Technical expertise is often difficult to obtain and politicians must rely on information by experts who may possibly be biased. Consider for instance the administration of George W. Bush, whose affiliation with the energy cooperation Enron is now subject to investigation through congressional panels. The public in the United States has been taken aback when it learned about these former alliances, which may never have been known had the company not gone bankrupt. For instance, the Bush administration appointed Enron managers as experts to the Federal Energy Board, a political institution which has a strong influence on energy policy in the United States. These experts had been proposed by former Enron Chairman Kenneth Lay to the Bush administration. Other members of this board are reported to own substantial shares in this company. The question then arises if alliances like these

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[1]http://www.bmwi.de/textonly/Homepage/English%20pages/The%20ministry/mueller.jsp, Financial Times Deutschland, February 12th 2002

are simply subject to a lack of unbiased experts, or if this is indeed a way of camouflaged gives and takes beyond politics.[2]

- As a nice example of how informational lobbying may take place serves a decision of an advisory commission to the German Bundestag.[3] It prepares the decision about the future development of the computer infrastructure in the German Bundestag. (In fact, the commission makes the decision because the body of the Bundestag formally taking the decision is expected to abide to this advice.[4]) Under consideration have been two general concepts, namely a pure propriety infrastructure based on Microsoft's Windows platform, and an Open Source infrastructure based on Linux. Under consideration is a solution for 150 servers and 5000 clients, which is of considerable value and gives business incentives to care about this decision. But there is an additional reason why this decision is conceived as being important: It is expected that it emanates a strong signal about the use of Open Source software by governmental administrations in general, which challenges Microsoft's current position.

  Hence, Microsoft engaged a professional lobbying institute (lead by a former Microsoft manager), which started intensive informational lobbying: The task was to inform the committee members (in comfortable hotel over a three-day weekend) about the merits of proprietary software solutions and the risks of the Open Source concept. This prompted counteractive lobbying by the Linux community. Lobbying efforts on both side increased and finally culminated in Microsoft's incrimination that committee members (favoring Linux) denounced users of Microsoft software as being 'undemocratic' and 'undutiful'. Finally, it was not only due to Microsoft's invitation of the committee members to a gala dinner at the eve of the decision that oil poured on troubled water. Interestingly, the resulting committee decision appears to be quite balanced and can be interpreted as a compromise merging the merits of both worlds.[5] This may be viewed as an indication that informational lobbying may improve political decisions if all relevant interests organize.[6]

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[2]Chicago Sun-Times, Feb. 1, 2002; www.dailybulletin.com; www.c-span.org/enron/.

[3]Kommission des Bundestags für Informations- und Kommunikationstechnologie (IuK).

[4]The decision is made by the Ältestenrat of the German Bundestag.

[5]Opinions may vary to this respect.

[6]Information on this issue can be found in various issues of the German magazine c't, and on http://www.heise.de/fastbin/nt.arcview?d=2002.

- Companies may possess data which is not available to the public. This can be used to strategically inform politicians about a certain policy effect, as will be laid out in chapter 4. For instance, companies may finance independent research activities which have the task of evaluating firm data. These studies may be published if the gained insights suit companies' interests, and may vanish into thin air otherwise. A case in point is the discussion which came up with the trials against the tobacco industry in the United States. Several firms have been accused of having withheld studies about (negative) health effects of smoking. As The Economist puts it:[7]

  > "...a review published in the Journal of the American Medical Association (JAMA) examined articles about the health risks posed by passive smoking. The reviews authors found that they could reliably predict what an article would conclude about the effects of passive smoking by looking at one simple factor: whether the articles authors had any financial affiliations with the tobacco industry. (No prizes for guessing which way results veered when they did.)"

These examples indicate that lobbying occurs in various types, for different reasons and with open outcomes. For instance, the first two issues are related to lobbying through fringe benefits or contribution payments. The other issues focus on lobbying as transmission of information (which may also be paired with extra benefits). Moreover, they indicate that political outcomes may be ambiguous. It appears that fierce lobbying by two opposing interests in the Bundestag case increased the informational base upon which the decision has been cast. In contrast, the other cases indicate that lobbying may well have negative effects on aggregate welfare.

This book is organized as follows. Chapters 2 to 5 survey theoretical approaches towards lobbying. I begin in chapter 2 with reduced form and rather abstract models of political influence which provide some general insights and have found many policy applications. However, these models treat the political process mainly as a black box. Newer approaches fill this gap and provide a more thorough microfoundation for lobbying. They represent the 'state of the art' nowadays, and are therefore reviewed in great detail. Chapter 3 deals with the *influence motive* of lobbying and analyzes the effect of contribution payments on political decisions. The models presented assume that the politician has complete information concerning the effect of his policy choice, but he is willing to choose a worse policy from a welfare

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[7]The Economist, May 17th 2001.

point of view in exchange for money. In contrast, the models of chapter 4 assume that information is asymmetrically distributed: Interest groups are better informed than the politician about the effect of policy on aggregate welfare. Interest groups use this advantage to strategically transmit information to the politician. This is the *information motive* for lobbying. A shortcoming of these branches of literatures is that the links between them are largely unexplored, albeit in reality lobbying often consists of combined forms of influence seeking. Research has only recently begun to consolidate these two branches. I will pay tribute to these approaches analyzing the instrument choice of lobbies in chapter 5.

The model presented in chapter 6 provides an attempt to contribute to this interesting field of research. It considers that interests groups ultimately follow the same aim, namely low environmental regulation. However, they may choose between two different ways of influencing the political process. The first type of lobbying has a strong competitive flavor, because it determines the distribution of the political rents created through lobbying. It is denoted as private lobbying, because investments into this kind of activity lead to private benefits to the lobbying interest group, which are at the expense of the other. The second type of lobbying caters to the joint interest of interests groups. General lobbying efforts lead to lower overall environmental regulation, which positively affects all groups. The model investigates conditions under which interest groups prefer private or general lobbying. Hence it provides a simple first step towards the analysis of instrument choice by lobbies.

Through my approach is more general, it applies lobbying models to environmental regulation which is still rarely done. It tries to analyze whether the existence of individual loopholes to environmental regulation is harmful with respect to environmental quality. The idea is that although loopholes are detrimental per se, it may well be the case that they increase lobbying competition which in turn benefits the environment. As it turns out, this is the case if the existence of loopholes diverts influence activities from harmful general lobbying towards mere redistributive private lobbying.

The second formal analysis of this book is an application of the common agency framework to the regulation of multinational enterprizes. The motivation for this approach is the perception that the process of globalization leads to a loss of sovereignty of the nation state. I focus on one specific aspect of globalization, namely the increasing importance of multinational enterprizes. The question is whether the existence of multinational enter-

prizes in domestic markets leads to lower national regulation. Chapter 7 focuses on differences in the fixed costs of relocation between national and multinational companies and analyzes the lobbying incentives of both types of firms. It turns out that regulation is ambiguous: The possibility of lobbying tends towards stricter regulation of multinational firms compared to national ones, because multinationals have smaller stakes in domestic markets. Negative welfare effects through relocation in contrast tend towards lower regulation of multinationals.

Empirical research on lobbying is quite scarce, especially when it comes to European politics.[8] Lobbying is often conceived as being immoral and given the flavor of 'money buying politics'. Maybe it is partly for this reason that firms do not provide data about lobbying expenses, and politicians are reluctant to state the extent to which they care about interest groups. Therefore I leave empirical investigations of lobbying activities aside, but want to deal with an important topic of regulation in practice, the Multilateral Agreement on Investment (MAI). Its intention was to provide a general regulation of investment flows on a multilateral level, comparable to the framework of the GATT and WTO with respect to international trade.[9] The OECD countries tried to implement this agreement in the mid nineties, which eventually failed in 1998 partly due to intense lobbying efforts of opposing interest groups. Despite its failure, there is considerable chance that a multilateral framework of this sort will be implemented in the future. The idea of chapter 8 is to analyze the contents of the final draft from an industrial organization point of view, because multinational companies are mainly present in oligopolistic markets. To the best of my knowledge, this view on the MAI has not yet been pursued. The aim is to propose improvements for a possible future implementation. Chapter 9 summarizes the main insights and concludes.

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[8]Recent empirical approaches towards lobbying are Goldberg and Maggi (1999) and Baldwin and Magee (2000). Sloof (1997b) gives a comprehensive survey.

[9]GATT is the abbreviation for 'General Agreement on Tariffs and Trade', which is the core of the regulatory framework on international trade within the World Trade Organization (WTO).

Chapter 2

Reduced form models of political influence

I restrict my attention to influence seeking activities of one or many lobbies which try to influence the political decision of an incumbent politician.[1] My approach contrasts with existing surveys on lobbying in several respects.[2] First, many surveys cover only certain types of lobbying models, for instance common agency or signalling models. Surveys which comprise several approaches typically do not cover all of them comprehensively, or leave certain types of models aside. To my best knowledge, there is no survey to date which covers all relevant approaches to lobbying in a comprehensive way, as the following chapters attempt to do.

Second, many surveys focus on political economy models in the context of trade theory. This comes naturally, as much of the pioneering research in lobbying models has been conducted in this field of research. However, the objective of this survey is to give a broad and general intuition of how lobbying affects policy. The scope is therefore not restricted to models of trade theory, but shall cover all relevant topics of policy formation, such as for instance the provision of public goods, regulation of industries or environmental policy. However, as much of the research has been done in the context of trade models, reference to trade is given if it is considered crucial for an understanding of the underlying effects.

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[1] I do not cover election models (Besley and Coate 2001) as well as models focusing on institutional setups (Bennedsen and Feldman 2000).

[2] Compare Helpman (1995), Rodrik (1995), Austen-Smith (1996), Sloof (1997b), Persson (1998), Persson and Tabellini (2000), Potters and van Winden (1996), Ursprung (2000).

Moreover, newer approaches like the signalling literature, the choice of instruments, group formation models or models on lobbying as auctions have been surveyed seldomly - or not at all. The following chapters try to fill this gap. They put much weight on micro founded approaches to lobbying and relate them to the insights of their reduced form counterparts.[3]

The questions I wish to address in the following chapters are:

What are the welfare effects of lobbying?

For instance, does lobbying increase or decrease welfare? Under what circumstances is lobbying welfare enhancing? And what is the type of improvement achieved through lobbying?

Who benefits from lobbying?

The question arises whether interest groups always benefit if they engage in lobbying. Or may it be the case that interest groups lobby without any effect? How does lobbying competition affect the distribution of benefits? Does the politician benefit from lobbying?

What are relevant policy fields for lobbying?

This question is closely related to the distribution of benefits. One would expect that interest groups try to influence those policy fields where lobbying may be successful. What are the characteristics of relevant policy fields?

Reduced form lobbying models abstract from certain aspects of individual behavior. Instead, plausible assumptions are used which describe the presumed behavior of relevant individuals. For instance, the influence function approach (chapter 2.1) focuses on strategic interaction between two lobbies, but leaves the politician and the underlying decision process as a black box. The politician has no individual objectives, nor does he act as a player in the game. The political outcome is solely determined through the relative amounts of lobbying expenditures. As a second example, reduced form election models (chapter 2.2) assume that parties can somehow convert money into votes, which gives them an incentive to collect contributions from special interests. However, how money turns into votes if voters are rational is left as a black box.

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[3]This paper deals with theoretical models of lobbying. Empirical research will not be covered. For a recent survey on empirical investigations, consider for instance Sloof (1997b).

The newer approaches covered in chapters 3 to 5 overcome these shortcomings and provide fully specified microeconomic frameworks, which makes them more convincing with regard to their theoretical foundation. But reduced form models are nonetheless worth being discussed: First and most importantly, these models lead to insights which are also contained in models with a sound microeconomic foundation. Hence they combine the benefit of valuable general insights with lower costs in terms of theoretical complexity. This makes them a good starting point for a diverse range of applications. Second, reduced form models often combine main insights from a diverse set of the newer approaches. This helps to abstract from particularities which result from specific microeconomic setups.

Several surveys exist which cover reduced form approaches extensively.[4] Accordingly, this chapter will only mark the main insights. It serves as an introduction for the newer microeconomic approaches of chapters 3 and 5.

2.1   Models with an incumbent government

Two types of models analyze how lobbies influence political decisions of an incumbent politician: The model by Peltzman (1976) constitutes a *regulatory approach*. It assumes that a politician determines a policy in order to maximize an exogenously given weighted sum of special interests utility and aggregate welfare. These weights are exogenous. They can be thought of as being the outcome of an underlying lobbying process, that is not analyzed explicitly.[5] This approach has found many applications in the context of international trade policy. The *policy formation approach* by Becker (1983) analyzes the lobbying process explicitly, but abstracts from the determination of the policy variable by the politician. Instead it introduces an "influence function", which states how realized policies depend on contribution payments by lobbies. This approach has been applied in the context of international trade policy and environmental regulation.

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[4]Compare for instance Helpman (1995), Rodrik (1995) or Potters and van Winden (1996).

[5]Chapter 3 describes models, in which the lobbying process determines the political weights endogenously.

2.1.1   The regulatory approach

The regulatory approach was first proposed by Stigler (1971) and formalized by Peltzman (1976). It describes policy formation when special interest groups influence the decision maker, although this process is not explicitly analyzed. Instead, the model assumes that an unmodelled lobbying stage determines a political objective function, which reflects the fact that the politician is partially captured by special interests. This objective function serves as a starting point for the analysis.

Peltzman describes a general analysis and an application to price regulation. The general analysis determines the size of the interest groups and the resulting political contributions. However, the particular application to price regulation found greater acceptance in the literature and will be described in the following.

In the model, the politician maximizes a payoff which depends on the policy choice p and on the utility level of the interest group, V.[6] The utility of the interest group depends on the policy choice and an exogenous parameter θ. The direct effect of the policy on the politician's payoff can be interpreted as his interest in aggregate welfare. Thus, he chooses p to maximize

$$\max_{p} \quad W\left[p, \alpha V(p, \theta)\right].$$

Note that α is an amplification parameter which affects the politician's care for the interest group's payoff.[7] By assumption, W is concave and depends negatively on the policy level, i.e. $W_p < 0$ and $W_{pp} < 0$ around the equilibrium policy. The effect of interest group utility on the politician's payoff is positive and concave and W has the following properties with respect to the second argument: $W_2 > 0$, $W_{22} < 0$. The utility level of the interest group increases in p and is concave, $V_p > 0$, $V_{pp} < 0$. For instance, V may represent profits of an organized industry which lobbies for higher producer prices. The exogenous parameter θ might then be interpreted as a cost or

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[6]The model can be easily extended to multiple interest groups (Peltzman 1976, Long van and Vousden 1991). For expositional purposes I restrict the analysis to one group.

[7]If the payoff function of the politician is separable in aggregate welfare and interest group utility, the maximization problem can be rewritten as $\max_p W(p) + \alpha V(p, \theta)$, and W represents aggregate welfare. This specification corresponds to the separable setup of the common agency approach in chapter 3. I do not assume separability for the moment and stick to the original setup for reasons which will become clear later, but point at the underlying similarity between the regulatory and the common agency approach.

demand parameter, which affects profits for a given price level. The effect of p on W represents the welfare effect of a price increase in this case which is negative, because consumers prefer low prices.[8]

The model characterizes the equilibrium and derives comparative statics results. First, note that it incorporates the case of a benevolent politician for the limiting case of $\alpha = 0$. In this case, special interests are unimportant to the politician, and he chooses the welfare maximizing policy (for instance the competitive price level in the case of price regulation). As $\alpha \to \infty$, aggregate welfare becomes unimportant and the politician chooses the policy which maximizes the utility of the interest group (i.e. the monopolistic price). For intermediate weights, the politician sets a policy which reflects a compromise between various interests.

More important groups find it easier to influence the political decision. Consider an increase in the exogenous weight α, capturing the idea that the special interest group becomes more important to the politician. Obviously, the equilibrium policy favors the interest group more, and p increases in α. But a shortcoming of the model also becomes apparent: It cannot explain which factors determine the importance of an interest group, and hence α. The common agency models of chapter 3 fill this gap.

Finally, consider an increase in the exogenous parameter, and suppose that θ affects the interest group negatively (for instance θ might be interpreted as a profit reducing cost parameter). There is a direct and an indirect effect on the endogenous variable p. The direct effect is the economic adjustment of the endogenous variable by the interest group, which is independent of political considerations. For instance, if production costs increase, profit maximizing behavior leads to a price increase. The indirect effect reflects the change in relative utility levels and the induced political adjustment. As the utility level of the special interest group falls, a marginal policy change in favor of the interest group leads to a higher marginal gain for that group, which in turn leads to an increase in p. So in this case, the economic adjustment and the political effect work in the same direction, and p increases.

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[8]This example also demonstrates the shortcoming of this approach, which results from the partial analysis character: Aggregate welfare obviously depends on profits as well. The payoff to the interest group is also negatively affected by an increase of the price level, because producers also consume their income. These aspects will be laid out in chapter 3. But the general insights of this model do not crucially depend on these aspects. The mentioned effects can be interpreted as the dominating ones, resulting from an increase in the price level.

The same intuition applies if the exogenous variable affects the utility level of the interest group in a positive way, for instance if θ is a parameter reflecting increasing demand. Again, the direct effect works towards an increase of the policy variable. But now the political effect pushes towards a decrease in p. The utility level of the interest group increases, which lowers the marginal gain of a policy increase on producers' utility level. In this case, the indirect policy effect dampens the direct economic adjustment, and p increases less than without political considerations.[9]

A more general insight can be obtained from this analysis independent of the specifications of the utility and welfare functions. If the exogenous parameter changes, political adjustments spread the resulting gain or burden over all relevant groups. The reason is that the politician cares about all interests and tends to distribute the effects of exogenous changes across all groups.[10]

Several authors have applied the regulatory approach to trade policy or environmental regulation.[11] As an example, consider the determination of trade policy in a small country (Hillman 1982). The politician maximizes a weighted sum of consumer surplus and industry profits of an import competing industry. An exogenous decline in the world market price then leads to an increase in the domestic tariff: Consumers gain from an exogenous decline in the price of the importable, and producers lose. Since the politician balances these effects, he compensates the loser at the cost of the winners. This leads to a tariff increase, which partly offsets the decline in the world market price. The tariff increases more if the politician puts a higher weight on the interest of the producer lobby. However, he does not grant full compensation for the decline of the world market price.

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[9]If the politician's payoff function is separable in aggregate welfare and utility payoff as indicated in footnote 7, the political effect vanishes. The direct effect prevails and p must increase in this case.

[10]This also leads to the insight that extreme groups face relatively much regulation, whereas moderates faces less. Consider for instance a monopolist or a competitive firm. Both set the price either high or low. Since the regulated price lies somewhere in between, both groups gain relatively much regulation. In contrast, oligopolistic firms choose intermediate prices. Regulation has then only small effects on the resulting price level, because regulation always tends towards intermediate prices.

[11]For instance, Hillman (1989), Long van and Vousden (1991), or Maggi and Rodriguez Clare (2000) consider trade policy. Hahn (1990) analyzes environmental regulation.

2.1.2   The policy formation function approach

The following model picks the choice of contribution payments by two oppos-
ing lobbies as the central theme (Becker 1983, Becker 1985).[12] The analysis
provides no rationale for the decision problem of the politician. Rather,
it assumes that the relative contribution levels of both groups completely
determine the policy outcome. The political sphere is represented by a pol-
icy formation function, which maps contribution payments into policies. Its
properties are common knowledge among all groups. Groups choose their
contribution levels non-cooperatively.

The political decision has only redistributive effects. One lobby gains from
redistribution via subsidies and the other lobby looses, because subsidy pay-
ments are financed through taxes.[13] The collection of tax revenues and the
payment of subsidies are associated with deadweight-losses. This implies
that a dollar of tax revenue induces a cost on the tax payers which exceeds
one, and the benefit of a dollar of tax income to the receiving group is less
than one. The budget is always balanced by assumption. Hence the analysis
can be restricted to the determination of a uniform per capita tax. The tax
then determines the level of per capita subsidies available to the recipients.

Each group is characterized by an exogenous number of group members. The
model differentiates between the total payments collected from the members
of a particular interest group, and the resulting amount of contributions
paid to the politician. The total amount of contributions affects the policy
choice. It depends positively on the total payment of the group members, and
negatively on the group's size. This reflects the free-riding aspect of group
membership, because the same amount of payments leads to less contribu-
tions if the group is large. The total payment of the group is the product
of per capita payment times the number of members. The lobby determines
the amount of per capita payments per member and maximizes total utility
of all group members.[14] The implemented policy depends on the relative

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[12]Findlay and Wellisz (1982) propose a political economy model of trade-protection,
which follows the same lines. A protectionist and a free-trade lobby choose the amount
of labor devoted to lobbying simultaneously, which determines the tariff level. This ap-
proach is known as the "tariff formation function approach". It reflects the same ideas as
the approach discussed in this chapter, namely that policy is determined by the relative
amount of contribution payments.

[13]The assumption that the political decision is a zero sum game is not important for
the main insights. The crucial assumption is that both groups have opposing interests in
a common policy dimension.

[14]The two approaches of Becker (1983) and Becker (1985) vary slightly with respect to

amounts of each groups' contribution payments to the politician.

The setup can be summarized as follows: C_i are contributions, n_i the size, and a_i the per capita payment of a member of group i (the same notation applies for lobby j). $p(C_i, C_j)$ is the realized policy, which depends positively on the contribution payments of lobby i, and negatively on those of lobby j. $U(p, a_i)$ is the utility level of lobby i, and $-U(p, a_j)$ is the utility of lobby j. Contributions are a function of total payments by all group members, $m_i \equiv a_i n_i$, and the group size n_i. Each lobby chooses the amount of per capita payment to maximize group utility. So for group i:[15]

$$\max_{a_i} U(p[C_i(m_i, n_i), C_j(m_j, n_j)], a_i) \quad \text{with} \quad \begin{aligned} & m_i \equiv a_i n_i \\ & p_i > 0, p_{ii} < 0, p_j < 0, p_{jj} > 0 \\ & C_m > 0, C_{mm} < 0, C_n < 0 \\ & U_p > 0 \text{ and } U_{pp} < 0, U_{a_i} < 0, \end{aligned}$$

and for group j analogously.

First note that in a symmetric equilibrium, both groups pay the same amounts of contributions and the resulting policy is neutral: Lobbying does not lead to privileges for any group (i.e. $p = 0$). In this case, both groups engage in pure counteractive lobbying, because lobbying serves only to offset the lobbying expenditures of the opponent. There is scope for cooperation between lobbies, as both groups can jointly reduce their payoffs without affecting the policy outcome.[16]

Second, a group increases contribution payments if its lobbying efforts become more efficient (i.e. contributions have a higher effect on p). The policy turns to its favor, the payoff increases, and the opponents' payoff falls. Both lobbies increase contributions: The marginal benefit of contributions by the more efficient lobby increases. Hence it increases contributions, and its payoff rises, whereas the payoff to the opponent falls. This in turn also induces more lobbying by the opponent, because payoff functions are concave in p. The increase in contributions by the opponent dampens the unfavorable policy effect, but does not reverse it. Note that in a symmetric equilibrium, a joint and symmetric efficiency increase has no effect on the equilibrium policy. It

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this and some other minor aspects.

[15]Note the slight abuse of notation: For instance, C_m denotes the first derivative of C_i with respect to total payments of group i, m_i. p_i is the first derivative of the policy variable, p, with respect to contributions of group i, C_i. The same definitions apply for group j if not stated otherwise.

[16]Aidt (1997) analyzes cooperation between lobby groups in a related setup (compare also chapter 3.3).

only induces higher amounts of contributions. This leads to the surprising result that similar lobbies gain from being inefficient.[17] Hence in a symmetric equilibrium, groups' utility is maximized if lobbying has no marginal effect on policy, for instance if the institutional setup forbids lobbying. A lobby benefits only from a uniform efficiency increase, because only relative contribution levels matter.

If the exogenous group size of a lobby increases, two opposing effects are at work. First, more members imply higher total payments, which increases their political influence. But as the number of members increase, the free-riding effect becomes more important, which tends to reduce contributions. As the latter effect becomes more severe in large groups, small groups are relatively more successful. They benefit from an increase in group size, in contrast to large groups which lose.

Next, consider an increase in the deadweight loss associated with redistribution. For instance, tax collection has higher deadweight costs if demand elasticities increase, or the redistribution of tax revenue may become inefficient if bureaucracy increases. Lobbies bear the deadweight costs, because tax payers pay higher taxes for a dollar of tax income, and recipients get less money from each government dollar. For instance, if tax collection results in higher deadweight losses, the utility level of the tax payers decreases. As a result, lobbying becomes more important for this group, and contributions increase. This tends to decrease effective redistribution, which induces offsetting lobbying efforts by the opposing group. In sum, the policy shifts toward the preferences of the group with the increased deadweight costs, and redistributive efforts decrease. Note that both groups lose, because tax payers face higher deadweight losses and increase costly lobbying. Tax recipients lobby more and get fewer subsidies. Hence less efficient policies are less likely to gain political support, and efficient policy instruments dominate inefficient ones from the lobbies' point of view.[18] Consider for instance a symmetric equilibrium: More efficient policy instruments increases the welfare of both groups, as both groups face less incentives to engage in costly counteractive lobbying. Thus the restriction of available policy instruments to efficient ones increases aggregate welfare.

Several applications of this model exist, once again predominantly in the context of international trade policy.[19] For instance Pecorino (1997) analyzes

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[17]Compare chapter 6 for a variation on this theme (Polk 2002c).

[18]This result contrasts to the results of Grossman and Helpman (1994a), who explain why less efficient policies may be more successful in a political contest.

[19]Compare Findlay and Wellisz (1982), Wellisz and Wilson (1986) or Pecorino (1997).

the short run and long run lobbying efforts of a declining import-competing
industry. The paper abstracts from lobbying competition, but incorporates
free-riding of firms in the import-competing industry. The author determines
conditions such that lobbying expenditures increase in the short run if the
industry faces an exogenous decline (i.e. decreasing world market prices).
Moreover, the author asks if lobbying is self-defeating over time. Intuitively,
increased protection leads to higher profits and the sector expands. Two
effects result: Lobbying has a higher marginal benefit if the sector is large
because more firms benefit from a tariff-induced price increase. On the other
hand, free-riding among firms becomes more important which tends to de-
crease lobbying efforts. If the first effect dominates, increased protection
leads to expansion, reenforcing lobbying incentives. But if free-riding is im-
portant, lobbying becomes self-defeating: In this case, successful lobbying
leads to larger industries, and the free-riding effect decreases total lobbying
efforts.[20]

2.2 Election models

Some models analyze lobbying in the context of elections, where two can-
didates compete for political office. Each lobby pays contributions to one
or both candidates.[21] By assumption, contribution payments to a party in-
crease the chance of election. The process by which money turns into votes
is left as a black box, i.e. the models are reduced in the sense that the voting
decision of rational individuals are not picked as a central theme.

The literature distinguishes between two motives for contribution payments:
Lobbies may pay contributions in order to increase the winning chance of a
party which promises a preferred policy outcome (for instance high protec-
tion, low regulation, or low tax payments). This motive is called an *electoral
motive*, because contributions are aimed at increasing the election probability
of a preferred candidate with a given policy position. In contrast, contribu-
tions with an *incentive motive* are paid to extract a favorable policy from
a candidate once he is voted into office, given that the probability of being
elected is fixed. As lobbies and parties behave strategically and, dependent

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For an application in the context of environmental regulation compare Damania (1999)
and chapter 6 (Polk 2002c).

[20]For related arguments consider also Kruger (1993).

[21]Hillman and Ursprung (1988), Baron (1989), Wilson (1990), Magee, Brock and Young
(1989), Damania (1999).

on the specific setup, anticipate each other's behavior, most models implicitly incorporate both motives for contribution payments.

The following chapter describes the approaches by Baron (1989) and Hillman and Ursprung (1988). Both models formalize political competition between two parties engaged in an election. The chance of success is solely determined by the relative amount of contributions each party obtains, not by the policy choice itself. Contributions are paid by lobbies, whose utility levels depend on the realized policy variable after the election. Favorable policies are exclusive to lobbies which contribute, and all others are excluded from these benefits. Lobbies pay contributions before the election takes place. They maximize expected utility. Apart from this general setup, both models differ concerning their specific assumptions:

Baron (1989) assumes that parties benefit from being in office. The value of holding an office is exogenous for each party. As votes depend solely on money (and not on the policy), parties need to attract contributions in order to win the election. They offer favorable policies to lobbies which contribute money. Special interest policies are costly for the politician, but increase the utility level (and contributions) of the lobbies. A continuum of lobbies exists, which differ with respect to their policy stakes. In the first stage, each party announces a uniform policy offer. It consists of a policy parameter, which determines the benefit to a participating lobby. This benefit increases in the individual policy stake of each lobby. It also states a uniform contribution request, which must be paid in order to benefit from the policy offer if the candidate is elected. Each lobby observes the offer in the second stage of the game, and decides whether to accept or not. Lobbies form expectations about the winning probability of each candidate, anticipating how money influences votes. These decisions to buy access to the parties determine the equilibrium probabilities of electoral success. The political equilibrium is characterized by rational expectations of all lobbies, which requires that anticipated probabilities match the realized election outcome.

Contributions are paid before the election, but special interest policies of a party are only realized if the party wins the election. Policies are exclusive, in that lobbies which do not contribute are excluded from the policy gain if the party wins. Hence contributions serve as an access device to the politician in this setup.[22] The equilibrium consists of the policy vectors offered by

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[22]Compare chapter 4.2 for signalling models of access buying. Note two points about this model: First, it assumes that parties are not able to cheat, and the proposed policy is always realized ex post. This can be justified if one thinks of the political process as

the candidates, the contribution payments of the lobbies, and the resulting equilibrium probabilities.

Consider first a symmetric equilibrium, which is characterized by an equal election probability for both candidates. It has the following comparative statics properties: More lobbies buy access to a party, if it offers higher levels of specials policies to the groups. These offers are high if the value of being in office to a candidate is high, and they decrease in the cost of providing these extra benefits. The expected utility of a lobby increases in the parties' net benefit of being in office, as the parties are more eager to offer favorable policies in exchange for money. The expected payoff to a party increases if the benefit of being in office is high: Even though it caters more to special interests (which is costly), it will never give up its full benefit of being in office.

Obviously, parties benefit from a ban on lobbying in a symmetric setup. The chance of being elected does not change with lobbying. Both parties attract the same amount of contributions, but are forced to offer costly special interest policies in order to keep the equal chance of election. Lobbies gain in this situation. The welfare effect of a prohibition on lobbying depends on the welfare effect of the special interest policies. To assess its impact, suppose that special benefits are deviations from a first best policy (for instance free trade or the 'right' amount of environmental regulation). Then, welfare decreases through lobbying. Moreover, contributions are paid which tend to be unproductive (i.e. advertisement campaigns, etc.).

Further insights can be gained if one introduces asymmetries between the parties. Baron analyzes four types of asymmetries, namely incumbency advantages, differences in the value of being in office, exogenous campaign funds, and alignment of candidates to distinct sets of interest groups. As an example, consider party A which faces an incumbency advantage. This means that its election probability exceeds one half if contributions are identical. In equilibrium, party A has a higher winning probability and caters less to special interests. The reason is as follows: If the party tends to win the election, access to this party becomes more important. It must cater less to special interests to induce the same amount of contributions as without the advantage. Thus smaller special benefits induce a trade-off: Catering less to special interests saves costs of providing them, but tends to lower

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a repeated stage game. Second, note that the access buying motive implies that a lobby may pay contributions to both parties in order to get special treatment for any election outcome. Payments to both parties cannot be explained through the electoral motive.

the probability of electoral success. In equilibrium, party A partly sacrifices the incumbency advantage in exchange for lower political costs. The author shows that total contributions to this party increase if the incumbency advantage is small, because more interest groups lobby the likely winner despite decreasing benefits of access. In contrast, contributions decline if the incumbency advantage becomes sufficiently high. Moreover, total contributions to both parties decrease with the extent of the incumbency advantage. Voters anticipate that party B has a smaller probability of electoral success, and contributions decrease if the disadvantage grows. This latter effect dominates the increase in contributions to party A. As a result, lobbies gain from a close election race, because they are more important for the parties.

The model of Hillman and Ursprung (1988) develops a closely related setup, which differs from the above in two ways.[23] First, parties align with one lobby by assumption. Lobbies have opposing interests, which introduces competition between lobbies. This aspect is not present in the former approach, because lobbies get private benefits from special interest policies, which do not affect other lobbies.[24] Second, the choice sets of the lobbies differ, which induces important differences. In the first stage, the parties announce policy platforms. In the second stage, lobbies decide about the amount of contributions paid to properly aligned parties. The choice set of the lobbies is not restricted to the decision to buy access for a given price, as was the case in the above analysis. Rather, lobbies determine the optimal contribution payment, which determines the election outcome. This aspect is important with respect to the underlying motive for campaign contributions: The Baron model focuses on the influence motive for campaign contributions, as money helps to induce a favorable policy treatment. The Hillman and Ursprung model focuses on campaign contributions for electoral motives, because policy offers are fixed when lobbies decide on the contribution offers. They are paid to increase the winning probability of the aligned party.[25]

The model provides an application to trade theory. The political equilib-

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[23]For comments on this paper compare Hofer and Woodruff (1994), and Hillman and Ursprung (1994).

[24]One extension in Baron (1989) also covers this case.

[25]This distinction is not as clear cut as the above discussion suggests, because both models eventually incorporate both motives: In the Baron model, even though lobbies take the winning probability as given when they decide whether to participate, this anticipation is rational and correct in equilibrium. Thus lobbies implicitly determine the equilibrium winning probability of each party. Moreover, parties in the Hillman and Ursprung setup anticipate how lobbies choose contributions. Therefore anticipated contribution payments influence the policy choice as well.

rium determines the amount of protection which results if a foreign lobby pays contributions to a free-trade party, and a domestic import competing industry supports a protectionist party. It also determines the winning candidate. Particularities depend on the characteristics of the underlying imperfect market structure. Wilson (1990) extends this model to incorporate deadweight-losses from protection, which supports the insight that inefficient policy instruments tend to reduce the incentives to engage in lobbying.

Chapter 3

Contribution payments to an incumbent government

The approaches discussed in the following assume that interest groups pay contributions to an incumbent government in order to induce favorable policy outcomes. The chapter focusses on the *incentive motive* of lobbying, i.e. contributions provide incentives for the politician to deviate from a first best policy choice. In contrast to the reduced form models of chapter 2, these models fully specify the objective function of both the politician and the interest groups. This allows for an analysis of strategic interaction amid interest groups, and vis a vis the politician. Moreover, lobbies' objective functions result from a fully specified microeconomic general equilibrium model, and are not made ad hoc. This allows further insights concerning the resulting equilibrium policies.

The models of this chapter make use of theoretical results from common agency theory, which has been pioneered by Bernheim and Whinston (1986a).[1] The theory comprises situations in which a set of principals influences the decision of a common agent. It is a general setup and not specific to lobbying. Hence lobbying applications of the common agency framework are crucial for an understanding of how special interest influence works. Applications have been introduced by Grossman and Helpman (1994a), and several authors thereafter. The focus lies in applications to international trade theory. This chapter follows this line. Lately, other applications have been introduced, i.e. Aidt (1998) in the context of environmental regulation, and Neven and

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[1]Compare also Bernheim and Whinston (1986b).

Röller (2000) in the context of regulation theory.

To embrace this, this chapter starts with an introduction to common agency theory. Recent theoretical extensions, which are not yet reflected in lobbying applications, will be discussed briefly in a digression. In chapter 3.2, I will discuss an application to international trade theory, which nowadays serves as a workhorse model. Even if the main insights are stated in the context of international trade theory, the underlying intuition is generally valid for this class of lobbying applications. Extensions to this model will subsequently be discussed in chapter 3.3.

3.1   Common agency theory

The common agency framework is characterized by an agent and a set of principals (Bernheim and Whinston 1986a). The agent chooses an action p among a feasible set of actions, which affects his own utility, $W(p)$, and that of the principals $i = 1...n$, with individual utility levels $U_i(p)$. The utility levels of the principals depend on the agent's chosen action. Hence principals face an incentive to influence the agent's choice. In the first stage of the game, each principal makes a contingent contribution offer to the agent. These offers are individual payment functions $C_i(p)$, which state money rewards to the agent for each possible action he might choose. The individual payment functions thus map actions into money payments. The agent observes the contribution offers and decides which action to choose in the second stage of the game. Then principals make their payments which, in conjunction with the chosen action, determine the individual utility levels of all players.

Lobbying applications fit well into this framework: The politician (the agent) decides about a policy p, which affects the payoffs to the principals (the interest groups), who in turn try to influence his choice. In the first stage of the game, each lobby decides on a non-negative contribution function $C_i(p)$, which is a menu offer to the politician, stating how much money will be paid for each alternative policy realization. In the second stage, the politician observes these offers, determines the policy, and collects the respective money offers. The politician may well have preferences about the policy. For instance, a benevolent politician will prefer the policy which maximizes aggregate welfare. Any deviation then reduces aggregate welfare, and thereby his utility level. Contribution offers by special interest groups serve to compensate the agent for any deviation from the welfare maximizing

policy.[2] On the other hand, if the politician is completely opportunistic, he cares only about contributions, but not about the policy itself.

A political equilibrium consists of a policy choice p^* and a set of individual contribution schedules $\{C_i^*(p)\}_i$. The equilibrium $[\{C_i^*(p)\}_i, p^*]$ determines the utility levels of the lobbies, $U_i(p^*) - C_i^*(p^*)$, and the utility of the agent, $W(p^*) + C^*(p^*))$, with $C^*(p^*) \equiv \sum_i C_i^*(p^*)$, such that

- The politician maximizes his payoff through the choice of p^*, given the set of equilibrium contribution functions $C_i^*(p)$, i.e.

  $p^* \equiv \arg \max W(p) + C^*(p)$.

- Each lobby maximizes its utility level through the choice of a contribution function $C_i^*(p)$, given the set of contribution functions of the other lobbies, $C_{-i}^*(p)$, and the resulting policy vector p^*.[3]

The setup assumes that individual utility levels are separable in money income and the policy effect, which will be discussed in more detail later. Furthermore, any contribution offer is reliable in the sense that contribution payments are indeed made after the policy choice. Finally, lobbies are fully informed about the payoff functions of all players: The equilibrium depends on the ability of all lobbies to calculate how policies affect the other lobbies, and the payoff to the politician. In contrast, the politician only needs to observe the contribution offers. Hence his behavior does not depend on his knowledge of the utility functions of the lobbies. Nonetheless, the equilibrium exists even if he is imperfectly informed.

Note that the common agency framework is characterized by non-cooperative behavior on behalf of all players, i.e. the lobby groups behave non-cooperatively vis a vis each other and vis a vis the politician. This approach is very general, and there is no restriction on how policy choices affect the payoffs to the

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[2]Hence money payments have the flavor of bribes to the politician, which are paid in exchange for favorable policies.

[3]This can be formalized as follows: Each lobby chooses a function $C_i^*(p)$, given $C_{-i}^*(p)$, such that the following properties hold:

- $p^* \equiv \arg \max W(p) + C^*(p)$.

- There exists no function $C_i^o(p)$ and an action p^o, such that
  (i) $p^o \equiv \arg \max W(p) + C_i^o(p) + C_{-i}^*(p)$, and
  (ii) $U_i(p^o) - C_i^o(p^o) > U_i(p^*) - C_i^*(p^*)$.

lobbies. Consider for instance the case of a profit decreasing environmental regulation, and assume that only industry lobbies are organized. All lobbies prefer less regulation to more, i.e. they follow a common interest in low regulation. In this case, lobbying competition does not entail competition about the policy choice, but only concerning the money payments necessary to induce a certain level of regulation. As each lobby has an incentive to pay as little as possible, incentives to free ride exist. Next, consider an extension introducing green lobbies which prefer high regulation. Then beside the free-riding aspect, lobbies compete against each other concerning the policy itself. The equilibrium of the common agency framework, which will be discussed below, captures all these aspects.

Properties of the equilibrium: Bernheim and Whinston characterize any possible subgame perfect Nash-Equilibrium $[p^*, \{C_i^*(p)\}_i]$ for the class of common agency games: Apart from some feasibility constraints, the equilibrium policy choice p^* maximizes the utility level of the politician, given the set of optimal contribution functions $C_i^*(p)$. (This shouldn't surprise you much). Second, for no lobby exists a policy p^o which increases its payoff to such an extent that it is able to compensate the politician for a deviation towards p^o. If this were the case, the lobby would be able to modify its contribution schedule and induce the politician to choose p^o instead. As a result, both would be better off and $[p^*, \{C_i^*(p)\}_i]$ cannot be an equilibrium. The condition can also be interpreted in an alternative way: The optimal policy maximizes the joint payoffs to the politician and any one lobby, given the contribution payments of all other lobbies. If this were not the case, then the lobby and the politician could jointly increase their payoffs by a policy deviation and an appropriate compensation.[4] The third property is a condition on the contribution function of each lobby, which states that each lobby offers zero contributions for at least one policy choice. Suppose this condition did not hold for any lobby. Then this lobby could slightly reduce all its contribution offers by the same amount, without affecting the behavior of the politician: The politician compares all possible policy outcomes and the associated contribution payments. This optimization problem is not affected if a lobby reduces all contribution offers uniformly. Thus a lobby is able to increase its payoff without affecting the policy choice, if not at least one contribution offer is zero. This cannot be an equilibrium.[5]

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[4]To be precise, note that the model does not incorporate cooperative behavior, which is necessary to form such a coalition. Rather, think of the 'joint deviation' as a deviation which is induced by the lobby through an appropriate modification of the contribution function.

[5]The final two properties can be formalized as follows: (a) The equilibrium satisfies

Truthful strategies and existence: Many equilibrium sets of policy choices and contribution functions may exist. The question thus arises if some of these are focal. This leads to the introduction of a refinement to the Nash-equilibrium, i.e. the notion of "truthfulness": A principal's strategy is truthful relative to some reference policy p' if his contribution function reflects his true willingness to pay for a deviation from p' to any policy alternative p. Thus, a truthful contribution schedule consists of offers which make a lobby indifferent between the reference policy and any policy alternative p for which it offers positive contributions.[6] A truthful Nash equilibrium is characterized by truthful strategies of all principals, and the reference policy is the equilibrium policy p^*.

The authors further show that the set of best response correspondences of any principal contains a truthful strategy.[7] This implies that all individuals can do best and reveal their true willingness to pay for any possible policy alternative, given the opponents' anticipated contribution offers $C_{-i}(p)$, and the implied policy choice by the politician.[8] Hence truthful Nash equilibria may be interpreted as being focal. However, they are not necessarily unique.

Moreover, truthful Nash equilibria have two properties, which help to identify whether an equilibrium is unique. First, any truthful Nash equilibrium implies an efficient policy choice, and each efficient policy choice can be supported by a truthful Nash equilibrium. That is, the policy outcome of the lobbying game is the same as the policy choice of a benevolent politician![9].

$p^* = \arg\max U_i(p) + W(p) + C^*_{-i}(p)$ for all i, and (b) for any lobby i exists an individual policy p^i, such that this policy is chosen by the politician ($p^i = \arg\max W(p) + C(p)$) and $C^*_i(p^i) = 0$.

[6]Note that there may be policy alternatives which reduce the utility level of the individual compared to the reference policy. The principal offers zero contributions for these alternatives, because contributions are restricted to be non-negative. His payoff for these policy alternatives is then smaller than the payoff of the reference policy.

[7]The concept of truthful Nash equilibria is related to the revelation principle in the context of mechanism design, which states that any equilibrium in a Bayesian game can be represented by a truthful direct mechanism (a well known application is the Groves-Clark mechanism). The authors show that we can restrict attention to a certain type of equilibrium strategies in the menu auction game, namely truthful strategies. However, note two differences: We do not search for mechanisms which implement a certain outcome, but refine the set of Nash equilibria for a certain mechanism. Moreover, we do not focus on equilibria in dominant strategies but on Nash-equilibria.

[8]Note the importance of the assumption that all principals are fully informed. Only then is it possible to compute truthful contribution schedules accordingly.

[9]Efficiency here refers to the policy choice and the resulting payoffs to the principals and the agent, but not necessarily to efficiency measures related to aggregate welfare: An efficient policy has the property that no other policy exists, such that the payoff to one

For instance, if free trade is the first best policy among a set of organized interest groups, competition between lobbies leads to a free trade equilibrium. Or, if lump sum transfers and alternative inefficient redistributive means among interest groups are available, lump sum transfers will be used. The intuition is as follows: All lobbies consider only their private benefits and costs arising from any policy deviation, but ignore its social effects. But the politician internalizes these effects, as all lobbies reveal their true assessment of each policy alternative and how it affects their utility levels. Hence the resulting policy is efficient. This result is also important in order to determine whether an equilibrium is unique: If the common agency model is applied to a policy setup which has a unique first best policy, this policy is also realized in the lobbying game as a unique truthful Nash equilibrium.

Second, suppose lobbies are able to communicate with each other and form coalitions in order to achieve a deviation from a certain political outcome. An equilibrium is coalition-proof if no coalition exists such that its members can jointly deviate from this equilibrium and thereby increase their payoffs. The authors show that all truthful Nash equilibria are coalition-proof, and the set of payoffs to the players in coalition proof Nash equilibria coincide with the set of payoffs in truthful Nash equilibria. Hence if a unique coalition-proof Nash equilibrium can be identified in a cooperative game theory setting in which lobbies are able to communicate, this equilibrium is also the unique truthful Nash equilibrium in a non-cooperative game if lobbies cannot communicate.

Digression: New approaches to common agency theory[10]

Bernheim and Whinston derive their results under the assumption that principals' payoffs are separable with respect to income and the policy effect: $G_i(p) = U_i(p) - C_i(p)$. This assumption leads to equilibria which are independent of distributive concerns, as money can be costlessly transferred across all agents. Dixit, Grossman and Helpman (1997) suspend this assumption and show that the main results still hold: Each individual has a truthful strategy among its set of best response correspondences, truthful equilibria always exist and are Pareto-efficient. Moreover, the authors apply their model to a lobbying game, which offers an interesting insight: Remember that the common agency game yields an efficient policy choice with respect to all principals of the game. This implies that an efficient policy will be realized, such as for instance free trade, even if special interest groups in-

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principal can be increased without a reduction in the payoff to at least one other principal.

[10]This digression is not essential to the understanding of the following lobbying applications.

fluence the policy decision and all individuals are organized as lobbies. This result can be extended: Even if not all individuals are organized as lobby groups, policy efficiency results as long as the agent cares at least a little bit about aggregate welfare. This is a strong result. It implies that if the politician is not completely opportunistic and benevolent at least to a small extent, lobbying leads to efficient policy choices in any case. The reason is that if the politician considers aggregate welfare, he internalizes the effects of the policy on all individuals and chooses an efficient policy.

What determines the payoffs to principals and agents?[11] As is obvious, payoffs to the agent and the principals depend on the degree of competition between the interest groups. For instance, if lobbies follow a common interest, they uniformly prefer a certain policy vector. In this case, there is no incentive for any group to induce a deviation from this policy through contributions. Hence, if conflict of interest among lobbies is weak, low contribution payments can be expected in equilibrium. In contrast, if competition between interest groups is intensive, competitive bidding may lead to a high payoff for the politician, and low payoffs to the lobbies. Laussel and Le Breton (2001) derive general conditions in a cooperative game setting which determine the coalition-proof Nash equilibrium payoff to the agent. The main insight is that the agent may get no rent if the core of the game is non-empty. Non-emptiness of the core means that a policy and a resulting set of payoffs exist such that no possible coalition of principals has an incentive to deviate from this equilibrium. Hence non-emptiness of the core reflects the fact that interest groups follow a common interest. This in turn implies that a zero payoff equilibrium for the agent exists. However, as multiple equilibria may arise, the pure existence of this kind of equilibrium does not imply that it is in fact realized. The authors state additional conditions such that a zero-payoff equilibrium for the agent is indeed realized. Moreover, they characterize the payoff to the agent for the event that these conditions are not satisfied and the agent receives a positive payoff.

Konishi, Le Breton and Weber (1999) focus on the relationship between coalition-proof Nash equilibria and the truthful Nash equilibria of the common agency game. They first note that two types of coalition-proofness can be distinguished: A "weakly coalition proof equilibrium" is immune to the deviation of a coalition, which strictly increases the payoff to all participants in the coalition. This is a rather weak requirement, as possible deviations may exists which increase the payoff to some members of the coalition, but

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[11]This question has also been elaborated in some applications, which will be discussed in chapter 3.3.

not all. An equilibrium which is immune to the latter type of deviation is called "strictly coalition-proof equilibrium". The authors show that these two types of coalition-proof equilibria are related to each other in the common agency setup, because each strictly coalition-proof Nash equilibrium is also weakly coalition-proof. The reverse does not hold. Moreover, the authors consider the relationship between strictly coalition-proof Nash equilibria and strong Nash equilibria. The latter are characterized by the requirement that any possible coalition is a candidate for a deviating coalition, whereas the strictly coalition-proof Nash equilibrium requires this only for a subset of the winning coalition. The authors show that these sets coincide if the politician receives no payoff in equilibrium. Intuitively, the payoff to the politician is a measure for the degree of competition between the interest groups. A small payoff coincides with weak conflict of interest, i.e. small lobbying competition. The stricter requirement of a strong Nash equilibrium does not further restrict the set of equilibria, as lobbies with a common interest can not gain even if they can form a coalition with groups outside the winning coalition.

Bergemann and Välimäki (2001) extend the static common agency game to a dynamic setup. They employ the equilibrium concept of truthful Markov Perfect equilibria and show that a result related to the static model can be derived, namely that the set of truthful Markov Perfect equilibria is outcome equivalent to the set of dynamic coalition-proof Markov Perfect equilibria. Moreover, the introduction of the dynamic setting allows for the agent to become more powerful vis a vis the principals, as he may possibly be able to influence the amount of competition between the interest groups over time through his policy choices in the past. As strong competition between the interest groups increases his payoff, he may be willing to accept inefficient policy outcomes in the first stages of the game in order to increase competition. The authors state conditions on the payoff structure of the model such that these types of inefficiencies can not arise.

Kirchsteiger and Prat (2002) propose an alternative equilibrium concept for the class of common agency games, which they call "natural equilibrium". The authors believe that truthful strategies are too complex to be played in real world situations, as these strategies consist of complex offers of gives and takes for an entire set of policy alternatives. The proposed alternative equilibrium relies on 'natural' strategies: A natural strategy consists of a positive contribution offer for at most one policy alternative, and zero for all others. The idea is that principals focus on one preferred policy alternative and ignore all others. It is shown that natural equilibria always exist, but that they are not necessarily efficient and coalition-proof. Moreover, the

authors provide experimental evidence suggesting that neither truthful nor natural equilibria are played by individuals in laboratories.

3.2   The basic lobbying model

The first application of the common agency framework to a lobbying game is due to Grossman and Helpman (1994a).[12]   The authors determine the structure of protection in a small open economy, where import competing and exporting sectors organize as lobbies. I will start with a sketch of the model and discuss extensions in chapter 3.3. These also refer to the context of international trade. The rest of this chapter will therefore be biased towards trade theory, as other policy applications are still rare.

Assume a small open economy which takes world market prices as given. The economy consists of an exogenous set of sectors. Each sector produces a homogenous product with labor and a sector specific input. A good is considered importable if imports and domestic production satisfy domestic demand for that good, and domestic producers compete with foreign firms. A good is called exportable if the domestic sector exports the good and competes with foreign firms in the foreign market. Individuals have identical indirect utility functions which are separable in income and consumer surplus from consumption. Each individual owns specific factors of one sector. Factor specific income increases in the domestic price level of that particular good. Income consists of factor income, wage income, and tariff revenue.

Individuals differ only with respect to their sector specific income. They are grouped along sectoral lines, where each group or sector consists of a fraction α_i of individuals, with $\sum_i \alpha_i = 1$. By assumption, an exogenous number of sectors organize lobbies and influence the political process. α_L is the fraction of all organized individuals.[13]   Each lobby faces a trade-off concerning the structure of protection, which determines domestic prices: The factor income of a group depends positively on the output price of that specific sector; moreover tariff revenue increases in the prices of all sectors, and decreases in the size of the export subsidies. These two aspects work

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[12]For empirical evidence consult Goldberg and Maggi (1999), and Gawande and Bandyopadhyay (2000).

[13]The model abstracts from incentives to organize as lobbies, and assumes that a set of lobbies is given exogenously. Mitra (1999) extends the basic model to consider group formation, which will be discussed later in this chapter.

towards higher protection. But the members of a lobby act as consumers as well, and consumer surplus decreases in output prices. This effect tends towards lower protection.

The politician determines domestic prices through the choice of the tariff structure.[14] The timing of the game is familiar from the common agency setup: In the first stage of the game, each lobby determines its contribution schedule non-cooperatively, which maps every possible domestic price structure into a contribution offer. In the second stage of the game, the politician observes these offers and decides on the structure of protection. He maximizes a weighted sum of aggregate welfare and contribution payments. The relative weight put on aggregate welfare is denoted by α.

Besides the general results of the former chapter, which characterize the equilibrium, the following main insights are worth mentioning: First, the model gives a microeconomic foundation for the reduced form regulatory approach discussed in chapter 2.1: The reduced form approaches assumes that the government determines the tariff structure in order to maximize a weighted sum of aggregate welfare and contribution payments. The common agency theory tells us to focus on truthful contribution schedules, which reflect the effect of a marginal policy change on the payoff to that particular group. Hence if the politician maximizes a weighted sum of aggregate welfare and truthful contribution schedules in the common agency approach, he in fact maximizes a weighted sum of aggregate welfare and special interest utility. This is exactly what the reduced form regulatory approach assumes.

Second, the political equilibrium determines the tariff in an import competing sector i as

$$\frac{t_i^*}{1 + t_i^*} = \frac{I_i - \alpha_L}{\alpha + a_L} \frac{z_i^*}{\varepsilon_i^*},$$

where t_i is the tariff or subsidy in that sector, I_i is a dummy variable which equals one if the sector is organized (and zero otherwise), z_i^* is the equilibrium ratio of domestic outputs to imports, and ε_i^* is the (positively defined) import demand elasticity in the sector. The equilibrium tariff is positive if the group is organized as a lobby, and negative otherwise, i.e. organized import competing sectors receive positive protection through import tariffs; unorganized import competing sectors receive negative protection through import subsidies.[15] Intuitively, lobbies care for income and consumption. The in-

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[14]Note that world market prices are exogenously given and independent of the home country.

[15]Analogous results hold for the exporting sectors.

come interest dominates with respect to the own sector: A high output price increases factor incomes, which outweighs the loss in consumer surplus of that good. The consumption effect dominates in all other sectors, as a lobby receives no factor income there and the gain from tariff revenue is too small. As a result, each lobby prefers consumption subsidies in all other sectors except its own, where it prefers a tariff. This is where conflict of interest between lobbies comes into play: From a lobby's perspective, some of the other sectors are also organized and lobby for high prices of their good and low prices in all other sectors. Thus lobbying efforts partly offsets each other. In sum, all organized sectors obtain positive protection. Sectors which are not organized do not influence the politician. They receive negative protection.

The resulting equilibrium tariff of an organized sector increases in the share of domestic production, because large sectors gain much from a marginal increase in protection and have an incentive to lobby intensively. But high protection also entails a two-fold cost: First, the social cost of protection is high in sectors with large import demand elasticities. The equilibrium tariff structure entails some Ramsey-like elements. Sectors facing inelastic import demand receive more protection, because the welfare loss through protection is relatively small. Moreover, this aspect becomes unimportant if the politician does not care much about aggregate welfare, and protection increases. Second, high protection also implies a cost for the organized interest groups in their role as consumers. If the fraction of organized individuals is large, consumer interests become more important and protection declines in organized sectors. In unorganized sectors, negative protection increases as the consumption interests of organized lobbies become more important. Note that even if the politician has no concern for aggregate welfare at all, the level of protection is limited due to the fact that lobbies partially internalize the cost of protection.

How does conflict of interest affect the equilibrium policy? Suppose only one sector is organized as a lobby. The equilibrium policy is a tariff in the organized sector, and negative protection in all others. The lobby increases its income through high protection in its own, and consumption rents through negative protection in all other sectors. This is politically feasible, because there are no opposing forces if only one lobby exists. It also implies that if the size of the organized lobby is negligibly small ($\alpha_L = 0$), lobbies' consumption interests become unimportant, and the political equilibrium entails positive protection in the organized sector and free trade in all others. Moreover, the lobby receives the full surplus of its influence: Each lobby pays contributions which exactly compensate the politician for the policy he would have chosen

if that lobby was not active. If only one lobby exists, this reference policy is the free trade equilibrium. The lobby compensates the politician for the protectionist policy deviation, and the politician receives a payoff which is equivalent to his free trade payoff. The lobby gets all the extra rent through the political interaction.

Note that the general common agency framework predicts that lobbying competition yields an efficient policy choice. Efficiency refers to the set of principals and the agent, notably the politician and all existing lobbies. If only a fraction of sectors organize as lobbies, the politically efficient outcome is not equivalent to the efficient welfare maximizing policy, which is free trade. The reason is that the politician and the lobby can increase their joint payoff by a deviation from free trade. This deviation imposes costs on all other individuals, which is only fully internalized if all individuals organize as lobbies. If this is not the case, inefficient outcomes occur.

Suppose next that all sectors organize as interest groups. Each group tries to increase protection in its own sector and reduce protection in all others. Special interests are fully opposed in this case. Free trade emerges in the political equilibrium. Intuitively, each lobby ignores social costs and tries to induce high protection in its own, and low protection in all other sectors. Truthful contribution offers reflect these incentives. The politician is thus able to internalize all effects through policy deviations. He implements the free trade outcome if all groups participate in the political contest. Moreover, he captures a rent through the political context. The politician will implement the same policy as without lobbying, and receives contribution payments in equilibrium. The reason is that each lobby must engage in lobbying to prevent an individually disadvantageous outcome. If a lobby does not participate, lobbying by its competitors implies negative protection in its own and positive protection in all other sectors. Lobbying engagement is thus necessary to prevent this unfavorable outcome, and the best possible policy from a lobby's point of view is free trade. Hence lobbies are trapped in a prisoner's dilemma. I now discuss if there is scope for lobbying cooperation in this case.

3.3   Extensions

The basic lobbying model makes some particular assumptions which will be suspended in the following. It abstracts from lobby cooperation, but

indicates that scope for cooperation exists if lobbies with opposing interest are organized. It assumes that a single policy instrument is available to the politician and abstracts from the question of instrument choice. Finally, the analysis is restricted to a small country with a given world market price. This implies that the politician (as the agent) can uniformly decide on the policy without taking strategic interaction with other agents into account.

3.3.1   Policy choice

Consider first the question of policy instrument choice. The basic lobbying model abstracts from this question, because there is only one instrument available. But it leaves room for conjectures. Suppose an efficient and an inefficient policy instrument are available. The conjecture is that the amount of lobbying competition determines the instrument choice: Suppose that a single group is organized and no lobbying competition prevails. In equilibrium, the lobby receives all of the surplus resulting from the political game. It compensates the politician for the cost of providing the service, which is lower if the efficient instrument is employed. Hence a lobby facing low competition prefers a more efficient instrument, because this decreases contribution payments to the politician. Next, suppose that all groups are organized and compete with each other. The contribution payment of each lobby is a compensation for not deviating from free trade. The deviation (and hence compensation) is smaller if the policy instrument is inefficient, because the costs of providing services is higher for the politician. Hence compensations are smaller with inefficient instruments. Consequently, lobbies prefer inefficient policy instruments when competition is severe.[16] In other words: If competition among lobbies is weak, the ability to lobby is a benefit, and more efficient instruments decrease compensation payments. In contrast, if competition among lobbies is severe, the ability to lobby is a necessary duty

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[16]This conjecture conflicts with the insight of Becker (1983) (compare also chapter 2.1), who finds that competing lobbies prefer efficient instruments to inefficient ones. The reason for these different findings is the type of efficiency enhancement under consideration: Becker considers redistribution between tax payers and tax recipients. In his model, a policy becomes more efficient if one group can increase its utility level without harming its opponent. For example, more efficient means to collect taxes reduce shadow costs, which allows a lobby to increase its payoff given the utility level of its opponent. This has a competition reducing effect. In contrast, in the Grossman and Helpman setting with strong conflict of interest, more efficient policy instruments increase lobbying competition. Each lobby compensates the politician according to the joint utility level of a coalition of the politician and his opponents. This payoff, and the induced compensation payments by each lobby, increases with more efficient policy means.

in order not to remain unheard in the political process. In this case, lobbies prefer inefficient means, because this reduces obligatory compensation payments.

Several authors extend the basic lobbying game to the choice between various policy instruments but do not explicitly discuss the relationship between the degree of competition and policy efficiency (Maggi and Rodriguez Clare 2000, Rama and Tabellini 1998, Dixit 1996) For instance, Dixit (1996) extends the analysis to production subsidies and taxes, and consumption subsidies and taxes. This separates the different motives for lobbying: Interest groups lobby for high producer prices in one's own sector, and high production taxes in all other sectors in order to increase factor income. Note that production taxes and subsidies do not affect consumption prices, because these are determined through consumption taxes and consumption subsidies. Hence, incentives to lobby for high factor incomes are separated from incentives to lobby for low consumption prices. In equilibrium, organized sectors face production subsidies, and unorganized sectors face production taxes. This tax structure determines producer prices, which increases the income of the organized sectors on behalf of the unorganized. Consumption prices in turn depend on consumption taxes and consumption subsidies. Their equilibrium structure depends on the trade-off between higher consumption rents through consumption subsidies, and higher tax revenue through consumption taxes. In equilibrium, goods which are consumed by organized lobbies above average face consumption subsidies. Goods which are unimportant to lobbies face consumption taxes. If all individuals are identical, this latter trade-off is exactly offsetting and no consumption taxes and subsidies result.

Rama and Tabellini (1998) analyze two interest groups which compete with respect to one policy variable and coincide with respect to the other. The economy consists of two sectors. The unorganized sector produces only with labor. The import competing organized sector produces with labor and capital. Factor owners of the latter sector organize along factor lines, i.e. a lobby of workers and a lobby of capitalists exist. The available policies are a price increasing tariff, which benefits the workers and the capitalist alike, and a minimum wage in the import competing sector, which increases the payoff to the workers at the expense of capital owners. The authors show that a tariff redistributes income towards capitalists, and leads to allocative inefficiencies: The organized sector expands if protection is high, which attracts labor from the unorganized sector. The minimum wage works against the allocative inefficiency. Labor becomes more expensive, which tends to offset the initial incentive to expand production. The minimum wage corrects

for the allocative inefficiency, given that a tariff exists. Hence labor politics redistribute income between capitalists and organized workers, and imply a second best outcome. Moreover, these policy instruments are strategic complements: The politician has an incentive to increase the minimum wage if the tariff is high, because it corrects for allocative inefficiencies.

Maggi and Rodriguez Clare (2000) analyze the choice between voluntary export restraints, import taxes and import quotas. They derive conditions for the use of each instrument. Resulting policies depend on the relative political weights of foreign lobbies to domestic importers, and on the shadow costs of taxation.

3.3.2   Strategic interaction between governments

The basic common agency game and the basic lobbying model assume that the agent can set the policy independently. There is only one agent, who therefore takes no strategic interaction with other agents into account. For instance, the basic lobbying model assumes that the country is small and world market prices are given. This implies that the government is able to set trade policies uniformly. It can ignore possible countervailing measures of foreign governments.

Grossman and Helpman (1995b) consider strategic interaction between two governments, and extend the basic lobbying model accordingly.[17] The extension is relevant to the common agency model more generally: The governments now constitute two agents, which face influence from distinct sets of principals (the lobbies) in their home countries. Countries trade with each other, which establishes the link between domestic tariff structures. As a consequence, governments can no longer independently respond to lobbying activities, but need to take strategic interactions with the other government into account.

There are two countries, which have the same characteristics as in chapter 3.2. Countries trade exclusively with each other, which means that import

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[17]Other models analyze the effects of trade protection and incentives to join a free trade agreement, without considering strategic interaction between agents. For instance, Grossman and Helpman (1995a), and Maggi and Rodriguez Clare (1998) analyze the incentives of governments to join a free trade agreement when governments are subject to lobbying. For an empirical investigation of these questions, see Baldwin and Magee (2000).

demand and export supply as well as the endogenous tariff structures deter-
mine world market prices. The tariff structure in each country is a result of
the political interaction between domestic lobbies and the government, and of
the strategic interaction between both governments. The timing of the game
corresponds to that of the basic lobbying game. The model assumes that
lobbies influence only their domestic governments, but not the government
of the foreign country.

Consider the case in which governments set trade policies non-cooperatively.
Each lobby's payoff now depends on the trade policies of both countries, and
not only on the domestic country. Accordingly, a contribution schedule maps
each domestic tariff structure into money offers for any given trade structure
of the foreign country. An equilibrium of this modified game is defined by
a set of truthful contribution schedules of lobbies in each country and the
resulting structures of protection in each country, such that the contribution
offers and the resulting trade policies are mutual best responses.[18]

The resulting structure of protection reflects two elements. The first is the
political aspect, which is the same as in the basic lobbying model: Due to
political pressures, organized sectors tend to gain protection at the expense
of unorganized sectors. Protection in a sector is high if the politician cares
much for money, the group is small, and the sector is large. The second
aspect is that protection also depends on strategic considerations by the
governments. The outcome is an additional tariff component, which mod-
ifies the tariff structure through a terms of trade component. This terms
of trade effect, which increases domestic tariff revenue, is familiar from the
early strategic trade literature (Johnson 1954): It implies an export tariff
for exporting sectors, and an import tariff for importing industries, which
decreases in the import demand or export supply elasticities of the foreign
country. Intuitively, high foreign elasticities imply strong foreign quantity
reactions to domestic trade measures, which increases the deadweight loss of
protection.[19]

The political element and the terms of trade effect may reinforce or dampen

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[18]Note that domestic contribution offers are not observed by the foreign country. This
implies that governments cannot set their trade policies dependent on the contribution
offers of the foreign lobbies, which in turn implies that lobbies do not set their contribution
offers to influence the foreign country. The definition of the equilibrium reflects this:
Contribution offers and trade policies are best responses to the other country's trade
policy, but not to foreign contribution offers.

[19]Note that the small country assumption of the basic lobbying model can be interpreted
as infinite foreign supply and demand elasticities.

each other. Consider for instance an organized importing industry. Political pressures work towards an import tariff. So does the terms of trade effect, and both reinforce each other. Next consider an organized exporting industry. The political element works towards an export subsidy, but the terms of trade motive favors an export tax. In this case, the effects work against each other. The resulting trade structure depends on the relative strength of both effects.

How do political parameters affect protection? Consider for instance a case in which the domestic government becomes less benevolent, and contributions become more important.[20] This implies that lobbying costs decrease and protection increases (compare chapter 3.2). But a change in the domestic trade structure now also affects the foreign country, because lobbies offer contributions in anticipation of the resulting tariff structures. Organized foreign exporters face an incentive to offset increased domestic protection through an increase in export subsidies, or a decrease in export taxes. Hence, the strategic interaction of both governments works against the initial effect of increased protection, and trade enhancement by the exporting country tends to offset the initial increase of trade protection by the importing country. As a result, increased domestic government sensitivity to special interests then benefits organized lobbies of that country. Moreover, the terms of trade and domestic welfare of this country increases. This is a surprising result: A government which gets more aligned to special interests tends to increase domestic welfare through the implied strategic reaction of the foreign country. However, this result depends crucially on the assumption that the foreign government does not change its own responsiveness to special interests in response.

Consider next a setting allowing governments to set trade policies cooperatively, and assume lump sum transfers between countries are feasible. In this case, protection results only as a reaction to political pressures, but not for terms of trade reasons. The terms of trade aspect has a mere redistributive effect between both countries, and implies a deadweight loss. Not surprisingly, a corresponding lump sum transfer is a Pareto-improvement for both countries. It will be realized if cooperation is possible. The structure of protection is as follows: A lobby which competes with an unorganized sector in the foreign country receives positive protection. If both lobbies are organized, the politically stronger sector faces protection. A sector is stronger vis a vis the foreign lobby if the domestic government is more aligned to special interests, the sector is large, or the domestic supply and demand elasticities

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[20]Moreover, assume that import demand and export supply elasticities are constant, such that we can abstract from terms of trade considerations in the following.

are small. In the case of identical countries, strategic interactions fully offset each other and free trade emerges.[21]

3.3.3   Incentives to cooperate

The common agency framework and the basic lobbying model indicate that lobbies face incentives to cooperate. Lobbying leads to excessive contributions if interest groups compete with each other. Consider for instance the basic lobbying model if all sectors organize as interest groups: Each lobby pays contributions, but the equilibrium policy remains free trade. This is the same outcome as if no contributions where paid at all. However, the zero contributions outcome is not a non-cooperative equilibrium, as lobbies face incentives to deviate from it. Hence, scope for cooperation exists. In contrast, suppose that lobbies do not compete at all, which is the case if the consumption share of each lobby is negligibly small. Then, the joint payoff to all lobbies is the sum of the individual payoffs in the non-cooperative game setting. Hence no scope for cooperation among lobbies exists.

Rama and Tabellini (1998) analyze the incentives of labor and capitalist lobbies to cooperate. Tariffs and minimum wages make up the available policy instruments (compare the preceding paragraphs about the topic of instrument choice). The authors derive conditions such that cooperative lobbying leads to higher payoffs than non-cooperative lobbying. Particularly, this tends to be the case if the sum of the joint payoffs between the government and any of the lobbies is high compared to the payoff to a coalition consisting of all lobbies and the government. Intuitively, if the government achieves a high joint payoff with any of the two lobbies alone, it is able to outplay the lobbies against each other and benefit from firm conflict of interest between lobbies. In contrast, if the joint payoff to a coalition of all players, that is the government and both lobbies, is high, there is an interest to include all relevant groups in the political process, even if lobbies behave non-cooperatively. This is the case of low lobbying competition, where gains from cooperation are small.[22]

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[21]Compare Levy (1999) for an analysis of cooperative trade policy determination in a dynamic lobbying framework.

[22]Compare Laussel and Le Breton (2001), and the digression in chapter 3.3, on the general intuition underlying this argument. In this specific setup, both groups follow the same interest with respect to the tariff, but opposing interests with respect to the minimum wage.

Aidt (1997) analyzes cooperation between labor interests and capitalists in a Heckscher/Ohlin-framework. The author does not apply the common agency framework, but uses a reduced form policy formation function approach. There is always scope for cooperation because both lobbies engage in costly counteractive lobbying. Free trade is more likely to occur with cooperative lobbying than with non-cooperative lobbying. Moreover, trade protection occurs in the cooperative setting, only if lobbies differ substantially with respect to their lobbying power when they compete, or with respect to the bargaining positions if they cooperate.

3.3.4   Group formation

Lobby groups are not single entities, but rather consist of individuals who contribute to the group's activities. This is of importance, because the benefit of lobbying has the characteristic of a public good if the induced policy change through lobbying affects all individuals in society and it is not possible to exclude anybody from it. Hence incentives to free-ride within lobbies may result, and the question arises under which conditions interest groups emerge.[23] Although this question has been raised and discussed by Olson (1965) in the early beginning of public choice theory, this field of research has long been left aside, but recently faces greater interest again.

Olson (1965) asks which groups are more likely to overcome the free-rider problem and thus may be able to form a lobby. He focuses on two factors, namely group size and social pressure. His idea is that the benefits of lobbying dilute with an increasing number of group members. Hence, individual incentives to provide the public good are higher in small groups than in large groups. It is more likely that small groups are able to overcome the free-riding problem if group formation is to be expected at all. Moreover, social pressure may be a means of inhibiting free-riding. As it is easier exerted in small groups, this aspect also tends to increase the likelihood that if interest groups emerge, then they are small.

Damania and Fredriksson (2000) analyze the incentives to free-ride in a setup where two firms have a common interest in low environmental regulation. Each firm may either abstain from lobbying, lobby alone, or join an industry wide lobby consisting of both firms. In the latter case, lobbying costs are evenly shared across both firms. Hence, if lobbying occurs, the politician

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[23]If lobbying serves to provide a private good to the members of the lobby, and individual members can be excluded, free riding is of no concern (Baron 1989).

always faces one lobby and is exactly compensated for a policy deviation (compare chapter 3.2). The authors state conditions such that free-riding on the other firm's lobbying expenditures, joint lobbying, or unilateral lobbying occurs. The outcome depends on the effect of environmental regulation on aggregate welfare and profits.

The static setup is then extended to an infinitely repeated game. The idea is that even though free-riding may be optimal in the single stage game, joint lobbying may occur with the infinite time horizon. Firms may find it optimal to play a trigger strategy: contribute as long as the other one does, but if the opponent defects from cooperation, return to the optimal behavior of the one-shot Nash-equilibrium from then on. Thus defection results in free-riding by both firms, hence no lobbying occurs. With this strategy, each firm faces a trade-off when it has to decide whether to defect from cooperation or not: Defection increases profits of that firm in the single stage game, because it benefits from the opponent's lobbying without contributing. The cost of defection is that nobody lobbies in the future, and profits in all future stages of the game decrease. Hence cooperation depends on the relative amounts of profits with and without lobbying, and on the firms' discount rate. If the latter is small, future profits are important and the cost of defection tends to be high. It is more likely that firms overcome the free-riding problem in this case.[24]

Mitra (1999) abstracts from incentives to free-ride within interest groups. He extends the basic lobbying model (compare chapter 3.2) and focuses on the entry decision of lobbies to participate in the political process to determine the equilibrium number of active lobbies and the resulting degree of lobbying competition.[25] Groups are heterogenous with respect to fixed costs of organization, but identical otherwise. Moreover, each group knows how high the entry costs of the potential participants are. The idea is that lobbies are able to anticipate who enters in equilibrium, which allows them to derive the benefit of one's own entry. Then, each group enters if the benefit of entry exceeds the fixed costs of organization in equilibrium.

The benefit of participation (gross of entry costs) consists of the utility gain from the induced policy change and the contribution payments necessary to

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[24]Moreover, the authors show how collusion in the output market affects lobbying cooperation. It becomes more likely if collusion is strong, because the cost of defection increases in this case. A high degree of collusion also increases equilibrium contribution payments, which reduces environmental taxes.

[25]The approach is closely related to the analysis of endogenous market structure in industrial organization theory.

achieve it. The utility gain is positive, because policies deviate to its benefit
if a group becomes active. Contribution payments are costly. In equilibrium,
they reflect the effect of the induced policy change on all other interest groups
and aggregate welfare (compare chapter 3.1).[26]

The author shows that the benefit of entry declines in the number of ac-
tive lobbies: On the one hand, lobbying competition affects the structure
of protection: Positive protection for organized groups decrease because op-
posing interests tend to cancel each other out if many sectors organize. In
contrast, negative protection of unorganized sectors increases, because the
benefit on behalf of the organized increases. It can be shown that the first
effect dominates the second, and active lobby groups gain from low lobby-
ing competition. Hence the political benefit of being active is small if many
groups are present. On the other hand, benefits of entry depend negatively
on the necessary equilibrium contribution payments. If many groups are ac-
tive, contribution payments tend to be high due to pure number counting.
But necessary compensation payments per lobby decrease if lobbying com-
petition is strong, as well as the compensation for the decline in aggregate
welfare. The total effect on contributions is thus ambiguous, but it can be
shown that the negative effects dominate the positive ones. Hence the benefit
of entry declines if the number of active groups is large.

As all groups differ only with respect to their fixed costs of entry but are
identical with respect to all other variables, each group is able to calculate
how many groups will enter and how many will stay out. Hence in equilib-
rium, the number of lobbies as well as who enters is uniformly determined.
Those lobbies who do not organize anticipate that the cost of organization
exceeds its net benefits, whereas those who enter anticipate that the degree of
lobbying competition is small enough such that the benefit of entry exceeds
its costs.

The author extends the model and derives comparative static results. For
instance, if more individuals gain from factor specific income, the degree of
lobbying competition declines. Intuitively, if more individuals benefit from
high factor income through positive protection, less individuals can be ex-
ploited through negative protection. The net benefit of being active declines.
Thus less interest groups organize. Moreover, if the concern for contribution
payments increases, the number of lobbies increases. The politician caters

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[26]If this was not the case, the interest group could decrease contribution payments for
all possible policy outcomes, which increases its payoff without affecting the equilibrium
policy choice.

more to active lobbies in this case, which increases incentives to organize.[27] Finally, if the assumption of homogenous groups is relaxed, it can be shown that sectors benefit more form organization if they are small, face inelastic demand, and have large capital stocks.

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[27]Note that the effect on the equilibrium structure of protection is ambiguous in this case, and positive protection of the organized may increase or decrease: If the politician caters more to interest groups, positive protection increases for a given number of interest groups. But more groups organize and lobbying competition increases, which tends to decrease protection. The total effect is ambiguous. Negative protection of the unorganized increases in any case, because more individuals gain from exploitation of the unorganized, and the politician caters more to special interests even with a given number of interest groups.

Chapter 4

Signalling models

Models which analyze contribution payments assume that the politician is
perfectly informed about the effect of the policy at stance. Lobbying serves
as a means to bribe a self interested politician who is willing to deviate from
the first best policy in exchange for money. But this *incentive motive* for
lobbying is not necessarily the only reason why politicians listen to interest
groups. This is especially the case when policies are chosen under imperfect
information. For such a setting, this chapter gives an alternative explana-
tion of why politicians respond to interest groups. An important feature of
this approach is that the argument does not rely on the assumption that
politicians are self-interested. Rather, even benevolent politicians have an
incentive to listen to interest groups when they are imperfectly informed.
This is the *information motive* to listen to interest groups, because it gives
politicians a chance to improve political decisions .

If lobbying serves as a signalling device, it may help to improve political
decisions. For instance, the politician might be unsure about the preferences
of the electorate, or about the state of the world in which the policy takes
effect. Lobbies may be better informed, either because they are "closer" to
the preferences of their members, or they have specific expertise in certain
policy fields. In this case a welfare maximizing politician has an incentive to
listen to interest groups in order to improve the information upon which the
policy choice is based.

However, interest groups are of course still self interested, and thus politicians
cannot simply trust their speeches. Rather, politicians need to discount
what they hear. They have to extract the informative part of the received

messages, based on available a priori information. The lobby groups, on the other hand, know the way politicians discount their messages. They adjust their strategies accordingly to appear trustworthy. Hence lobbying has informative aspects and serves as a means to transmit information which the policy maker is unable to acquire himself. Formally, the relationship between interest groups and a politician is modelled as a signalling game in which these groups try to persuade a benevolent policy maker on a certain policy, who in turn improves the informational basis of his decision.

The following signalling models analyze a benevolent politician who decides about a policy under imperfect information. One or more self-interested lobbies transmit information strategically and try to influence his decision. The models can be categorized according to the following table.

policy	discrete	continuous
number of lobbies	one	many
access to the politician	costless	costly
lobby's information	perfect	imperfect
message	can be verified	can not be verified
signal	informative	uninformative
signalling costs	sunk	productive

Table 4.1: Categorization of signalling models.

Chapter 4.1 explains the basic signalling model as well as some extensions. Access to the politician is costless in these approaches. I first outline the basic model in chapter 4.1.1. It analyzes a single interest group which submits information strategically. Chapter 4.1.2 extends this model to lobbying competition. These approaches can also be reinterpreted as models of "mass movement", if we interpret each lobby as an individual deciding whether to send a costly message or not. For instance, this message may be the decision to participate in public demonstrations, or it may consist of individual activities like sending postcards, writing letters etc. Chapter 4.2 surveys models in which interest groups must buy access to the politician through contribution payments. Access is not costless, whereas signalling itself may be. Chapter 4.3 finally surveys miscellaneous signalling models which do not fit well into one of the above categories. These are models focusing on institutional aspects or intermediation.

4.1   Signalling models with costless access to the politician

All existing signalling models rely on the equilibrium concept of Sequential or Perfect Bayesian Equilibria and, depending on the specific model characteristics, specific refinements.[1] Equilibria are characterized by strategies for each player and beliefs about the uncertain states of the world at the time a player is called upon to act. The equilibrium strategies are chosen such that each player's expected payoff is maximized, given the other players' equilibrium strategies and their beliefs about the states of the world. Beliefs are derived from the a priori knowledge and observed behavior when a player moves. Updating takes place according to Bayes' rule. This rule is only applicable to situations which occur with strictly positive probability in equilibrium. Hence the formation of out-of-equilibrium beliefs, that is, about game situations which will never be reached in equilibrium, is arbitrary according to this concept. Implausible equilibria may occur, some of which may be eliminated through the use of refinements, restricting the way out-of-equilibrium beliefs can be formed.

Despite the use of refinements or intuitive plausibility arguments, signalling models are often plagued by a variety of suitable equilibria.[2] Unique results are often difficult to obtain, especially with regard to comparative statics. In order to increase the legibility of this chapter, I will not state every equilibrium which might occur. Rather, I shall restrict myself to the most important and relatively robust results which are necessary to grasp the intuition behind the models. If it seems appropriate or necessary, I will indicate which results lack generality or are specific to certain equilibrium properties.

4.1.1   Basic models with one interest group

The models of Potters and van Winden (1992), and Ainsworth (1993) and Sloof (1997b) are basic signalling models whose intuition is broadly valid. There are two states of the world, denoted by θ_1 and θ_2, whose realization is not known to the politician, but known to the lobby. The politician has prior beliefs about the probability that a certain state occurs. Further, he

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[1]Compare for instance Gibbons (1992), Fudenberg and Tirole (1991), Mas-Collel, Whinston and Green (1995).

[2]A good example is Sloof and van Winden (2000).

implements one of the policy alternatives τ_1 or τ_2. Each alternative "fits" one state. The payoff to the politician is high if he implements the correct policy in each state and low if he implements the wrong one. Hence, the task of the politician is to choose a correct policy under uncertainty.

A single lobby guides the politician in his choice. This lobby observes the realized state of the world and has perfect information. It can inform the politician about the realized state by sending a costly signal. The cost of the signal is denoted by c. The politician, who observes only the signal but not the true state of the world, anticipates that sending a signal is only worth for certain types of interest groups. He updates his beliefs accordingly.[3] The payoff to the lobby depends on the realized state of the world and may conflict with the interests of the politician.

Examples of these types of lobbying games are profuse. Consider for instance a politician who has to decide about the extent of environmental regulation, which negatively affects profits of a firm. The policy maker takes account of the welfare effects of environmental regulation. He prefers lax regulation if the marginal effect of regulation on profits is high, and strict regulation if the marginal effect on profits is low. The firm is assumed to be better informed than the politician about how regulation effects costs, and hence has an incentive to overstate its negative effects. Thus, if regulation affects profits heavily, the politician and the firm have a common interest. They have opposing interests if regulation affects costs only to a smaller extent. Other examples are the regulation of multinational firms when the politician is imperfectly informed about how regulation affects plant relocation and employment; or trade protection for industries, when the politician is only imperfectly informed about the effect of protection of a specific industry, or about the extent of industry decline.[4]

The payoff matrix of the game and the ex ante probabilities are common knowledge. The first entry denotes the payoff to the politician. The second denotes the payoff to the lobby:

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[3]Chapter 4.2 discusses models in which the politician does not listen to the signal of the lobbies without being paid to listen. In these models, lobbies buy access to induce the politician to listen.

[4]Applications of imperfect information models are scare. Some authors consider these examples in perfect information models, for instance Polk (2002b) for regulation of multi-national firms (compare chapter 7), Hillman (1982) and Long van and Vousden (1991) for trade protection for declining industries.

	θ_1	θ_2
τ_1	$a, 0$	$0, 0$
τ_2	$0, d$	a, e

The payoff to the politician is always positive, that is $a > 0$. The payoffs to the lobby are arbitrary and will be discussed in the following.

Suppose first that $d < 0 < e$. In this case, there is *no conflict of interest* between the politician and the lobby. They share the same interest, which is to find the policy suitable for each state of the world. There may or may not be an incentive for the lobby to send a message. This depends on the lobbying costs and on the politician's ex ante beliefs. What is of importance for this parameter range is that the politician can always trust the signal if he receives one. Thus in this situation, the policy maker is perfectly informed at the time he must implement the policy, since he knows that the lobby has no incentive to mislead him. Without a signal, he knows that the lobby has no incentive to send one, which indicates that the choice based on his a priori belief is the correct one.

Suppose next that $d > 0 > e$. This is the case of *full conflict of interest*, because the politician knows that he is better off mistrusting any signal he receives. Since he knows that, he will always ignore any signal. The lobby, anticipating the ignorance of the politician, knows that whatever it does, it has no effect. Hence it will never send a signal, because this is costly.[5] In this setup, there is no scope for information transmission, since the interest of the two players are fully opposed.

The most interesting case is when $d, e > 0$. This is the case of *partial conflict* between the lobby and the politician. Now it depends on the state of the world whether the two players have the same interest. Note that the lobby always prefers policy τ_2, independent of the realized state of the world. If the state is θ_2, the politician and the lobby follow a common interest. In the following, I shall denote the lobby in this particular state of the world as the "good type" and the corresponding state as the "good state". In contrast, if θ_1 is relevant, the politician prefers τ_1 and the lobby prefers τ_2, and scope for conflict arises. The lobby and the stage will be denoted as "bad type" and "bad state" respectively. In contrast to the full conflict of interest case, the politician will not systematically ignore any message, because he knows well that in some cases truth-telling is the preferred strategy of the lobby. Hence

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[5]If the signalling costs are zero, then "babbling" is also an equilibrium, where the lobby group randomly sends messages which are always ignored by the politician.

he can learn something from the signal he receives.

This parameter range is the model variant in which signalling is a matter of interest. The models in this chapter all correspond to this setup unless stated otherwise. Before I discuss the various equilibria of the basic model, let me first state two further characteristics.

First, in order to make information revelation through signalling possible, we need to assume that the payoff to the bad type is smaller then the payoff to the good type, $d < e$. This condition is commonly known as the "sorting condition". It assures that the bad type can not always mimic the good type. Suppose the sorting condition does not hold: Then the payoff to the bad type is always weakly higher than the payoff to the good type. To achieve this, the bad type must only mimic the behavior of the good type (which he can always do if $d > e$). The politician anticipates this and should thus mistrust any signal. Information revelation is not possible in this case. But if the sorting condition is satisfied, mimicry is not possible in any state of the world. The good type has an incentive to send a signal in some states of the world, which the bad type does not have.

Second, note that the content of the signal is meaningless in this setup. The only informational content of the signal is the cost it induces. The intuition is as follows: If the message can be chosen arbitrarily, for instance "the state is θ_1" or "the state is θ_2", the politician is able to derive the optimal contents of the message if one is sent. This is due to the fact that the politician knows the decision problem of the lobby, and is able to infer its best message. Since he can do so, not the choice of contents is important, but only the decision to send a signal or not. Hence all that matters are the signalling costs, but not the contents of the signal themselves.

High signalling costs: The resulting equilibria depend on the signalling costs c, and on the politician's ex ante belief. If signalling costs are high ($c > e$), a unique pooling equilibrium exists in which lobbies never send a signal, and the policy maker makes a choice based on his ex ante beliefs.[6]

Intermediate signalling costs: In contrast, if lobbying costs are intermediate ($d < c < e$), then two types of equilibria exist, depending on the ex ante belief of the politician. Note first that the bad type will never send a message, since this induces a negative payoff even if it persuades the politician. So the focus is on the good type and its incentive to send a signal, which in turn depends on the ex ante belief of the politician concerning τ_2. If the politician

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[6]The term "lobbies" refers to a realized type of lobby.

chooses the bad policy based on his a priori belief, the unique equilibrium is separating, and the good type always lobbies. Since the politician anticipates this, he trusts the signal and chooses policy τ_2 after receiving a message, and the alternative policy otherwise. The good type has no incentive to deviate, because not sending a signal induces the unfavorable policy and zero payoff.

However, if the ex ante belief of the politician induces the good policy without signalling, two equilibria exist. The first and most obvious equilibrium is a pooling one, in which no signal is sent. If the politician anticipates this, he chooses the policy based on his prior beliefs which is the appropriate one. Moreover, there is also a separating equilibrium: If the politician assumes that the good type always indicates that θ_2 is relevant, he only selects the good policy if this is affirmed. In this case, signalling is optimal only for the good type.[7]

Low signalling costs: If signalling costs are low ($c < d$), the bad lobby may try to mislead the politician. But it must consider the fact that the politician knows its incentive to do so. Hence the lobby needs to provide an incentive for the politician to listen to the signal. This incentive is not given if the bad type always signals, because the politician would anticipate this strategy and did not react. Thus signalling by the bad type is only a good strategy if it leaves a chance to extract some information from the signal. This is the case if the probability of a signal being sent by the good type is higher than the respective probability for the bad type.

If the politician's ex ante belief of the politician favors the bad policy, the good type has an incentive to always send a signal. Otherwise the bad type could mimic the good one. A unique semi-pooling equilibrium exists in which the good type always sends a signal, and the bad type plays a mixed strategy and mimics the good type every now and then. In this case, the politician is able to extract some (but not all) information from the signal. After having observed a signal, it is not optimal to choose the good policy in any case, because this also gives the bad type an incentive to send a signal in any case. Hence in equilibrium, the policy maker will sometimes choose the good policy if a signal is received, and otherwise not. Accordingly, the bad type will send a message now and then.

Next, consider the case where the politician chooses the good policy if he has to decide based on his a priori belief. In this case, no separating equilibrium

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[7]These two equilibria induce different expected payoffs and have different welfare implications, which is discussed below.

exists, since a separating equilibrium requires that the good type always sends a message, whereas the bad type never does. But as argued above, this is no good strategy for the bad type if signalling costs are sufficiently low. Thus, only pooling and semi-pooling equilibria exist. There are two pooling equilibria. In the first, both types never lobby and the politician always chooses the good policy. No lobby has an incentive to send a costly signal, and the politician chooses the best policy based on his a priori beliefs. In the second pooling equilibrium, both types always lobby and the politician chooses the good policy only if he receives a signal. Note that not sending a signal cannot be optimal, because this would induce policy τ_1, which yields a strictly lower payoff for the lobby. In the semi-separating equilibrium, the bad type never sends a message and the good type sends one every now and then. The politician anticipates these signalling strategies. He knows that a signal is a sure indicator of a good state of the world, but that the state of the world is not necessarily bad if no signal is sent. Accordingly, he chooses the good policy if he observes a signal; if he does not observe one, he occasionally chooses the good policy, because he knows that the good type sometimes remains silent.

Welfare implications

How can welfare effects be measured in these models? Since the politician is benevolent, welfare is maximized if he implements the policy which maximizes his payoff. Note that welfare can be measured in one of two ways, either by the (ex ante) probability that the politician chooses the correct policy, or by observing whether the correct policy is implemented ex post. As a benchmark, consider the case without lobbying. In this case, the politician chooses the policy according to his a priori beliefs and maximizes expected welfare. Note that this does not imply that the correct policy is indeed implemented when the actual state of the world becomes known. The probability of an error depends on the a priori knowledge and the payoff of both policy choices.

Does lobbying reduce the probability of an error? Welfare implications depend on the realized equilibrium and lobbying costs. Multiple equilibria exist for some parameter ranges. Thus, only some rather general results can be stated in the following. I focus on the effect of lobbying on welfare and abstract from lobbying costs.

In separating equilibria, full information is revealed through lobbying. In this case, welfare is maximized and no error occurs. This makes the politician (and welfare net of lobbying costs) strictly better off compared to the case when no lobbying is allowed. There is only one separating equilibrium,

namely when lobbying costs are intermediate. Observe that the lobby is not necessarily happy about its ability to lobby ex post: If the politician chooses the good policy based on his a priori belief, then the possibility to lobby decreases the payoff to both the good and the bad type: The good type lobbies and incurs costs in order to induce the good policy. But the politician would choose the good policy anyhow if the decision were solely based on his a priori knowledge and he knew that no lobbying is allowed. The bad type never realizes the positive payoff with lobbying (which on average it sometimes could without lobbying, depending on the a priori beliefs of the politician). Thus the good type is trapped into obligatory signalling and the bad type loses payoff. Hence the lobby would, ex ante and ex post, strictly prefer a regime without lobbying. This is not necessarily the case if the politician chooses the bad policy based on his a priori belief. In this case, the good type gets the chance to induce the good policy, and the bad type neither gains nor looses. Thus the expected benefit is strictly higher and the realized benefit is weakly higher when lobbying is allowed.

In contrast to the separating equilibrium, the politician does not gain any additional information if the types pool. Pooling equilibria only exist if the politician's ex ante belief favors the good policy. In this case, the politician's payoff and welfare are left unchanged if lobbying is possible. If the pooling equilibrium induces no lobbying by any type, then the no lobbying outcome is completely replicated and the expected payoff to the lobby does not change. If the pooling equilibrium induces lobbying of both types, then both types of lobbies are strictly worse off with lobbying and the expected payoff to the lobbies decreases. Note that pooling equilibria exist for low and intermediate signalling costs if the politician prefers the good policy based on his ex ante beliefs, and in general with high signalling costs.

Semi-separating equilibria occur only if lobbying costs are low. In these equilibria information is revealed, but the politician still retains a degree of uncertainty about the realized state. Moreover, the politician is sometimes mislead by the bad type. It turns out that the benefit of better information and the cost of sometimes being mislead cancel out. Hence the politician receives the same expected payoff as in the case without lobbying, and expected welfare remains unchanged. The payoff to the lobby depends on the politician's ex ante belief and the equilibrium strategies. If the politician choose the bad state, both types benefit in expectation. Hence the lobby benefits in expectation even before it knows its type. Note that this does not necessarily imply that it benefits ex post: Since the politician will sometimes choose policy τ_1 despite signalling, the good type sometimes invests in lob-

bying without benefit. If the politician chooses the good policy based on his
a priori beliefs, the good and the bad types lose in expectation, although the
payoff to the bad type may ex post equal the payoff without lobbying. The
good type looses for two reasons: The politician chooses the good policy less
often and the lobby sometimes has to bear signalling costs. Thus the lobby's
expected benefit decreases.

In short, lobbying tends to increase welfare if we abstract from lobbying
costs. The politician learns the true state of the world in separating equilib-
ria with certainty, and increases his knowledge if semi-separating equilibria
emerge. Only if the types pool, do welfare effects tend to be negative. In this
case, lobbies engage in costly activities without any effect on the politician's
decision.

Comparative statics

General comparative static results are difficult to obtain when multiple equi-
libria exists because a slight change in any variable may lead to a jump from
one equilibrium to another. For this reason, only one general result is stated
here.[8]

The likelihood that lobbying occurs tends to increase in the payoffs to the
lobbies and decrease in the signalling costs. This result seems plausible at
first glance and is valid in most cases. The reason is that the lobbies have
to weigh the expected benefit against the costs of lobbying. However, this
relationship may be less clear cut in certain circumstances. In the assessment
of their lobbying strategies, the lobbies must take account of the politician's
reaction. If for instance the benefit of the bad type increases, the politician
anticipates its higher incentive to lobby. This in turn makes him less willing
to react to lobbying, which again decreases the lobbying incentives of the bad
type. The general likelihood of lobbying depends on the magnitude of these
effects, but tends to increase in payoffs.

Extensions

Two extensions of the basic model are discussed in this chapter. Suppose
first that the policy maker has the opportunity to obtain information inde-
pendently, as analyzed in a model by Rasmusen (1993).[9] The politician is
able to get perfectly informed about the state of the world either by ver-

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[8]For details consult Potters and van Winden (1992).

[9]See also Rasmusen (1997), Sloof (1997c). For a variation of the following theme consult
also Potters and van Winden (1992), Austen-Smith and Wright (1992), and Sloof (1997a).

ification of a received signal, or, if he receives no signal, by investigation. Thus verification and investigation are means for the politician to overcome his uncertainty. Investigation and verification are costly and by assumption, investigation costs are higher than verification costs. We focus on the semi-separating equilibrium which results if lobbying costs are small and the policy maker chooses the policy which is unfavorable to the lobby, based on his a priori beliefs.

Obviously, the resulting equilibria depend on the relation between investigation and verification costs. If verification costs are sufficiently high, verification is no option and the equilibrium does not change compared to the basic model. The more interesting case is when verification costs are low. If, additionally, investigation costs are high, the lobby knows that the politician will never investigate. Since the choice of the politician tends towards the bad state, the lobby has incentives to signal. Investigation by the politician is no substitute for lobbying in this case. Thus, the only equilibrium is a semi-separating one with analogous characteristics as above: The good type always lobbies and the bad type lobbies sometimes. The politician in turn verifies the received signal sometimes, but not always. Investigation never occurs in this case. Lobbying is successful in the sense that the politician always chooses the best policy for the lobby whenever he receives a signal and the signal is not verified. If he doesn't receive a signal, he chooses the policy to the disadvantage of the lobby.

The probability that the bad type lobbies increases with verification costs, as high verification costs undermine the power of the politician vis a vis the bad type. Rasmusen (1993) discusses various characteristics of the equilibrium and compares it to the case when no lobbying is allowed. In our context, it is important to investigate whether welfare increases if the politician is able to verify the message. Even without a formal analysis, we can conclude that expected welfare (gross of verification costs) increases, since the bad type knows that the politician sometimes verifies. This reduces the bad type's expected benefit from lobbying. It thus lobbies less often, which in turn reduces the probability of a mistake by the politician. The payoff to the good type is not affected, because it never lies. The expected payoff to the bad type decreases because it can fool the politician less often.

The above equilibrium also holds if investigation costs are low. Moreover, two additional equilibria exist with interesting properties.[10] Both types refrain

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[10]I give the intuition for the pooling equilibrium. The intuition for the semi-separating equilibrium is analogous.

from lobbying in the pooling equilibrium. The politician learns nothing, always investigates, and always implements the correct policy. In this case, welfare strictly increases compared to the basic model, because uncertainty is completely eliminated. But the payoff to the politician does not necessarily increase. He has to bear information costs even though he always chooses the correct policy. The payoff to the good type increases, since the good policy is always implemented without lobbying. The payoff to the bad type decreases, since there is no scope for misleading anymore. Hence the expected payoff to the lobby (before it knows its type) is ambiguous. Note that this equilibrium is characterized by the fact that the good type passes on signalling costs to the politician.

The second extension to the basic model by Lagerlof (1997) uses a somewhat different setup. The author assumes that the interest group is also imperfectly informed about the true state of the world. It has to decide if it wants to invest in information acquisition, which is only sometimes successful: If the lobby investigates, it learns the true state of the world with an exogenously given probability and nothing otherwise. After having investigated, the lobby decides whether it wants to send a signal about the state of the world. The politician cannot observe if the lobby investigates or not.

This model has two pure strategy equilibria. The first is a pooling equilibrium. The lobby never investigates and the politician chooses the policy based on his a priori belief. The second equilibrium is an investigation equilibrium. The lobby only sends a signal if it learns the true state of the world, and this information is beneficial. In this case, the expected payoff to the politician increases compared to the case without lobbying, because the politician's beliefs are updated. He is therefore more likely to choose the correct policy. The expected payoff to the lobby may increase or decrease, depending on investigation costs: Without considering the politician, the lobby prefers no investigation if the expected benefit from investigation is lower than costs. However, if the politician expects investigation to occur, no investigation implies no signal. The politician then updates his belief to the disadvantage of the lobby. In order to prevent this, the lobby might investigate because it knows that the politician expects it to. Thus the possibility to investigate might lead to an equilibrium in which the lobby's expected payoff declines.

4.1.2   Lobbying competition and models of mass movement

The results of the previous chapter abstract from competition between different lobby groups. Models by Lohmann (1993), Lohmann (1995b) and Austen-Smith and Wright (1992)[11] use similar setups to focus on lobbying competition.[12] For instance, the paper by Austen-Smith and Wright (1992) focuses on lobbying competition between two lobbies in a setup where the politician decides between two different policy alternatives. The lobbies have opposing interests concerning the two policy alternatives. They prefer either one policy, which is independent of the support provided by the population. The politician cares about public support, but is imperfectly informed about which policy is best. If the politician makes his choice based on his a priori beliefs, he chooses the policy preferred by one lobby. Hence the other lobby, denoted as the opposing group, has an incentive to induce a policy deviation through signalling. This in turn may induce counteractive lobbying by the a priori benefitted group in order to prevent the politician from a policy deviation.

The model incorporates costly information acquisition by the lobbies and costly verification of the signals by the politician. The main result of the paper is that the benefitted group will never lobby solely to back up the politician's belief. Instead, lobbying occurs either by the opposing group alone, or by both groups. The opposing group has an incentive to acquire costly information and send a signal if verification costs are sufficiently low. In this case, the politician occasionally verifies the message. If he does not verify, he listens to the opposing lobby and modifies his policy decision accordingly. The initially benefitted group does not lobby, because the cost of acquiring information is excessive compared to the benefit of not loosing support occasionally. However, if verification costs are high, the politician will never verify if he receives a single signal, and will always verify if he receives two contrasting ones. As a consequence, he will always listen to the opposing group if he does not receive a second signal as well. Since the benefitted group does not want to lose its support entirely, it also engages in lobbying. Thus the only lobbying incentive for the benefitted group is a counteractive lobbying motive, aimed at offsetting the lobbying efforts of the opponent. In this situation both lobby groups might thus be trapped in

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[11]A comment on this paper is found in Sloof (1997a).

[12]For an empirical investigation of the results in Austen-Smith and Wright (1992), consult Austen-Smith and Wright (1994).

a lobbying equilibrium which induces lower expected payoffs to each group. The beneficiary is the policy maker, who errs less frequently.

The analysis of Lohmann (1993) deviates from the basic setup and yields some interesting new results.[13] Again, the policy maker decides between two given policy alternatives, which are now elements of a continuous policy interval. There is a finite number of lobby groups, which are distributed along this interval. They are characterized by single peaked preferences about the policy in question, and each group prefers the policy alternative which is closer to its ideal point. The distribution of the groups along the interval is known to the politician. He is benevolent and seeks to maximize welfare through implementation of the median policy.

The median voter setup is modified in the following way: Each lobby (and the politician) knows that the effect of the policy does not only depend on the known part of the utility function, but also on the realized state of the world. The realized state is unobservable to the groups and the politician. It is drawn from the unit interval, and its distribution is common knowledge. In contrast to the policy maker, each group receives an imperfect signal about the state of the world and updates its belief about its preferences accordingly. The signal serves as a "shifting" parameter which might affect the preferred policy of each group. After the groups observe the signal, each decides to send a costly signal to the politician. This signal has no content and is interpreted (without loss of generality) as a vote for policy alternative τ_1. The politician observes the number of signals, updates his belief concerning the preferred policy of the median voter, and chooses accordingly.

Before I characterize the resulting equilibrium, let me first provide some intuition for the lobbying decision of the groups if lobbying costs are zero. Consider an interest group which has strong preferences for or against one of the two policy alternatives. This group will always prefer this alternative, independent of the signal it receives about the state of the world. These groups are called "extremists", because their preferences are independent of the signal they receive. Since the message indicates that policy alternative τ_1 should be chosen, extremists which favor this alternative send a message. Extremists who favor the alternative will not signal. Next, consider interest groups which have moderate policy preferences, meaning that their preferred policy critically depends on the received signal about the state of the world.

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[13]I describe the basic model. An almost similar but slightly modified model can be found in Lohmann (1995b). This latter model yields the same qualitative insights, but also entails a counteractive lobbying effect.

Thus "moderates" who receive a signal in favor of τ_1 send a message and those who receive a signal in favor of τ_2 do not.

Now consider the case of positive (but not prohibitive) lobbying costs. Each group must compare the cost of lobbying with its expected benefit, which depends on the utility difference between the policy alternative, weighted by the probability that its lobbying effort is pivotal for the politician's choice. By definition, extremists always have an incentive to lobby. This is independent of their received signal. Note that lobbying by extremists conveys no information if the politician knows that it is lobbied by extremists. The reason is that extremists lobby independently of the received signal. Thus the policy maker is unable to infer anything about the state of the world form their signal. Hence only lobbying by moderates is important for the politician, because their decision depends on the received signal and contains information about the state of the world. Now consider the lobbying decision of a moderate who receives a signal in favor of τ_1. He updates his belief about the preferred policy, which switches from τ_0 to τ_1. This gives him the incentive to send a message. However this message is costly. Hence it will only be sent if the individual thinks that the expected benefit is high enough. Thus, some individuals send a message and some do not, even though the latter would if sending a message were costless. Hence some moderates free ride on those who send a message.

Next consider the choice of the politician. He knows the incentives of the individuals, but not the particular realizations of their received signals. He is able to calculate the number of lobbying and abstaining extremists. Moreover, the policy maker is able to infer how many moderates will lobby given any possible realization of the state of the world. The difference between the observed number of lobbyists and the calculated number of extremists bears information about the state of the world. Hence the politician is able to extract information by observing of the lobbying movement. He updates his beliefs accordingly. This in turn gives groups incentives to engage in costly lobbying, because they know that the politician is able to extract information from it.

The author shows that the critical parameter which determine the amount of information revelation are the lobbying costs and the dispersion of preferences across the groups. Consider the benchmark case with almost homogenous individuals and no lobbying costs. Then all individuals lobby according to their received signal, which means that all lobbyists are moderates. Thus by observation of the number of lobbyists, the politician knows how many

individuals received a signal in favor of policy τ_1. Hence he is able to extract all the information which is dispersed across the population.[14] Full information revelation is not possible if preferences are heterogenous, because then some lobbyists are extremists. Number counting of extremists delivers no new information. Hence the politician learns nothing from signals of extremists, and extremists are more likely to occur if preferences are dispersed. Less information is revealed if more extremists exist, which is more likely if preferences are widely spread. Next consider lobbying costs. Lobbying costs reduce moderates' incentives to lobby. More moderates abstain from lobbying although they could use their signal to induce a (to them) favorable outcome. Thus fewer moderates lobby, and the politician gets less information.

This analysis suggest that all available information can only be revealed if lobbying costs are zero and preferences homogenous. If lobbying costs are positive, then some individuals abstain from lobbying (due to free rider motives). Information is revealed in part. Less information is revealed if the population is more heterogenous, because uninformative lobbying by extremists occurs more often. Thus lobbying is more likely to increase welfare if the population is homogenous and lobbying costs are small.

Two remarks shall be made. First, note that there is a kind of "policy neutrality", because exogenous asymmetries between lobby groups have no effect on the induced policy change of the politician. As long as he knows about these asymmetries, he infers the different incentives for lobbying and discounts the observed number accordingly.[15] Second, in Lohmann (1995b) two types of signals can be sent by the lobbyists, either in favor of τ_1 or τ_2. Then extremists on both sides of the preference spectrum engage in costly and uninformative lobbying. This is a replication of the counteractive lobbying result, because each extremists knows that the politician is informed about his identity, and lobbying has no effect. But each extremist is forced to engage in lobbying in order to compensate for the lobbying efforts of the opposing

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[14]Note that this is not equivalent to full information, because the aggregate dispersed information is itself a signal about the true state of the world.

[15]An example for this idea can be found in Lohmann (1995b): It discusses different impacts of Anti-Gulf-War protests in the USA. In some liberal areas like San Francisco, demonstrations where expected. Accordingly, politicians have not been much impressed when they indeed took place. In other areas, politicians did not expect much anticipation. They learned that the movement took more attention than anticipated, although it was not larger than those in the liberal areas. Statements of the politicians indicate that those expecting high anticipation did not change their mind much. In contrast, those of the less liberal areas stated that they paid attention to the protest movements, because they where bigger than expected. That they were not larger compared to other areas did not play a role.

extremists. Abstaining is no option, because the politician would update his belief to the extremists' disadvantage in this case. Hence extremists are trapped in uninformative lobbying.

4.2 Signalling models with access buying

The signalling models of the former chapter assume that the politician considers any signal he receives and attempts to extract information from it. The underlying assumption is that access to the politician, that is the possibility of being heard by the politician, is costless for the lobbies. Under these circumstances, we identified the cost of sending a signal as the crucial information. Hence signals without costs cannot reveal any information.

However, costless signals may convey information if access to the politician is costly. Hence access costs may serve as a signal, informing the politician about a lobby's value of being heard. This is independent of the lobby's policy preferences. Hence access costs serve as a selection device in order to discriminate between groups. Some groups offer useful information, even if the message itself incurs no costs. In contrast, other groups offer useless information.

Lohmann (1995a) uses a slightly modified setup of her model of mass movement to focus on contributions as an access device (compare chapter 4.1.2). In this modification, each lobby either sends one of two costless messages, which indicates the preferred policy alternative, or no message at all. The groups do not know if the politician listens to the signals. To convince the politician that it is worthwhile to do so, each group determines a level of contributions paid to the politician, which serves as an access device.[16] The choice of an informative message and the cost of signalling are separated in this setup, because interest groups may also send messages which are not accompanied by contributions.

Two key insights result from this modification: First, some individuals send influential messages without a need to buy access to the politician. As in the previous model, interest groups split between moderates and extremists at

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[16]In order to focus on the mere signalling effect of contributions, contributions do not increase the payoff to the politician. Ball (1995), Austen-Smith (1998) and Bennedsen and Feldmann (2002) analyze a setup in which contributions increase the welfare of the politician. He faces a trade-off between a high level of contributions and a high amount of information revelation (compare chapter 4.3).

both sides of the policy spectrum. Consider their incentives to lie: Moderates prefer the policy choice according to their received signal about the state of the world. They have an incentive to reveal this information truthfully, and never lie. Since the politician anticipates this, he has an incentive to grant costless access to moderates in order to extract all information available to them. Thus their messages are influential, even if contributions are zero.

In contrast, extremists may have incentives to lie: Those who receive a backing signal have an incentive to signal this truthfully. But those extremists who receive a signal which contradicts their prior preference have an incentive to lie. Hence the politician likes to differentiate between these two groups. He can achieve this through the use of contributions as an access device: Since both types of extremists update their beliefs about the expected gain from either policy, extremists who receive an encouraging signal and update their beliefs accordingly have a higher stake in the preferred policy than extremists who receive an unfavorable signal. Full separation between these groups is possible: The politician listens only to those messages which are accompanied by contributions worth to be paid only for non-lying extremists.

Second and more surprisingly, full information is revealed in this setup, because all moderates send influential and costless messages (free-riding is no problem since signalling costs are zero). Moreover, extremists separate themselves completely, because the politician grants only access to those who do not lie. Those who do not gain access to the politician choose not to do so either because they prefer to free-ride, or because it is not worthwhile for them due to the unfavorable signal they received. Since the politician anticipates this, full information is revealed in equilibrium. Note that contributions are indeed a pure access device, because they are a means of separating lobby groups "who have something to say", independently of what they will say. Moreover, if the amount of contribution payments where not independent of the sent message, access costs would not only lock out lying extremists, but also moderates.

Austen-Smith (1998) analyzes a modified version, where only one interest group gains access to the politician although many groups will try to do so.[17] His model focuses on the idea that a politician selects those to whom he wants to listen. Although this stresses the power of the politician, the model generally yields similar results. The politician, who is interested in information and money, decides about a unique access charge for the interest groups. Lobbies again consist of moderates and extremists. Each group

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[17]Also compare Austen-Smith (1995).

decides whether to seek costly access. However, if the charge is paid, access is not granted automatically: From the pool of access seeking groups, the politician chooses exactly one, which strategically reveals information to the politician. Without going into details, the setup is such that the politician always prefers access to a moderate group instead of extremists, because the moderate will always reveal full information. However, even though the selection mechanism of the politician is detrimental for extremists, they still have an incentive to gain access. The reason is that the probability of no moderate seeking access turns out to be strictly positive in equilibrium.

In contrast to the model by Lohmann, full information is not necessarily revealed in equilibrium ex post. The (ex ante) probability that informational inefficiency occurs is strictly positive. This result is mainly driven by the assumption that access charges increase the payoff to the politician. Hence he faces a trade-off between informational efficiency and high contributions.[18] This trade-off is solved through a positive access charge, which gives extremists an incentive to seek access. Since extremists only seek access if the probability that no moderate seeks access is high enough, the expected probability that information is not fully revealed is strictly positive. Moreover, if only extremists seek access, full information revelation is not possible. Thus, in contrast to the model by Lohmann (1995a), the model by Austen-Smith (1998) explains why access charges might deter complete information revelation. However, his argument leaves scope for further research for two reasons: First it relies heavily on the assumed trade-off between contributions and information. Second, even though the probability that full information is not revealed is strictly positive ex ante, information is fully revealed ex post if at least one moderate seeks access, which is a relatively strong assumption.

4.3   Miscellaneous

Some analysis of signalling do not fit well into one of the above categorizations. For completeness, I will shortly describe them here. For instance, Sloof and van Winden (2000) analyze a model of reputation building. The single lobby is either weak or strong, which is unknown to the politician. It tries to influence the political decision in a repeated lobbying stage game. Without going into details, the lobby can choose between the instruments "pressure" and "lobbying". Lobbying is a soft instrument in the sense that it

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[18]Without this trade-off, full information can be achieved by setting the access charge to zero. Then all moderates seek access and the politician becomes fully informed.

is less costly and both types can use this instrument to their benefit in each stage game, whereas pressure is more costly and only beneficial in the stage game if the lobby is strong. However, the weak type may also use pressure in order to build up reputation: Even though pressure yields negative payoffs in the stage game for the weak type, it pays off in the long run if it induces the politician to belief that the lobby is strong.

The paper analyzes under which conditions each instrument is chosen. Due to the variety of setups and equilibria which emerge, only a handful of general results can be obtained. First, lobbying may always occur, whereas to exert costly pressure pays only if the ex ante belief that the lobby is strong is small. In this case it pays for the weak lobby to invest in costly pressure in order to build up reputation. Second, pressure is a means to increase reputation, whereas lobbying is a means to maintain reputation. Only if it is not possible to exercise pressure may lobbying be a substitute and used to build up reputation. This is the reason why lobbies must "show their teeth first", as the title of the paper suggests.

Bennedsen and Feldman (2000) analyze the incentives to lobby in two different multi-member legislations: The parliamentary legislature is characterized by a high voting cohesion, because members of the legislature benefit if they are a part of the winning coalition. In contrast, being a member of the majority coalition in a system with low voting cohesion brings no benefit to the politician. Lobbying has the effect of signalling which policy should be chosen and who should be part part of the majority. Since the members of the majority are more eager to stick to their policy proposal and the chosen majority in a parliamentary system, the incentives to lobby are dampened.

Ainsworth and Sened (1993) analyze a lobby which is distinct from the population and acts as a mere intermediary between the politician and the population. The lobby seeks its own interest which increases if a high fraction of the population believes that a certain policy alternative is good and decides to engage in costly signalling to the politician. Hence it behaves strategically vis a vis the politician and the population. The authors show that signalling costs for the lobby must be intermediate for lobbying equilibria to exist. In this case, lobbying tends to increase welfare, since all protagonists are better informed and the politician chooses the right policy with higher probability.

Chapter 5

The instrument choice of lobbies

The literature on lobbying divides into two broad strands as the preceding chapters indicate: Lobbying is analyzed either as contribution payments to the government, or as a means of transmitting valuable information. The question arises which type of lobbying interest groups prefer. To my best knowledge, there are only two recent approaches which pick this question as a central theme. These will be discussed in the following. However, many open questions for further research remain. For instance, what determines which type of lobbying occurs? Does this depend on the policy at stance, the degree of lobbying competition, or public concern about the policy? The general task is to combine these two independent approaches towards lobbying, at which end of line a general lobbying model possibly emerges. I will indicate the first steps of this promising direction of research in the following.

Some studies conceptualize contribution payments and informational lobbying in a single framework. The idea is that contribution payments may embody two purposes: They buy goodwill and serve as a signalling device. Depending on the relevant setup, either the politician sets an access charge which reflects his interest in information and money (Austen-Smith 1998), or the lobby offers a contribution schedule which both serves to buy goodwill and contains information about the lobby's type (Ball 1995).[1] Both models differ with respect to their particular setup[2], but the resulting equi-

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[1]Compare Prat (2001), Mueller and Stratmann (1994) for models in the context of electoral competition.

[2]Ball (1995) analyzes the interaction between a politician and a single interest group.

libria reflect a general insight: Contributions deteriorate policies, because self-interested politicians are willing to sacrifice aggregate welfare for money. However, contributions also serve as a signalling device and entail helpful information for the politician. The equilibria reflect this trade-off: Lobbying tends to increase welfare for informational reasons, but not as much as if the politician was completely benevolent and did not care for contribution payments.

Note that these models assume that a single lobbying instrument embodies both channels of influence, i.e. the incentive motive and the information motive, and that both motives for lobbying may play a role at the same time. However, the question of instrument choice is left aside. In contrast, Bennedsen and Feldmann (2002) focus on the instrument choice of lobbying. They assume that an interest group may influence a political decision in two ways: It may engage in costly information acquisition, which yields a signal about the true state of the world. The lobby prefers one policy outcome independent of the received signal. So it may report the search result either truthfully, or send no signal at all if it entails disadvantageous news. Moreover, the lobby is able to determine a contribution payment, which compensates the politician for a deviation towards its preferred policy choice. The question then arises in which type of lobbying the interest group invests: Does it prefer to engage in informational lobbying, or are contribution payments the better choice? Moreover, may it be efficient to engage in both types of lobbying at the same time? Do these different types of lobbying affect each other?

First, the approach resembles some insights from the signalling literature: If we abstract from the possibility of lobbying via contributions for the moment, the interest group is c.p. more likely to engage in informational lobbying if the cost of information acquisition is small, the benefit of the preferred policy is large, and the probability of successful investigation is high. The intuition

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The lobby offers a type-specific contribution payment which is contingent on the realized policy choice. In this setup, information is always revealed and the politician learns which policy is welfare maximizing. But he prefers to deviate from this policy in order to increase contribution payments.

Austen-Smith (1998) analyzes this trade-off in a model of mass movement (compare chapter 4.1.2). Without going into details, the politician faces an incentive to foreclose access of informative moderates in order to extract money from uninformative extremists. In equilibrium, information is revealed only sometimes, although full information was always possible by granting costless access to moderates. Hence the politician is willing to stay uninformed now and then in order to increase contribution payments.

The two models differ to this respect: The politician gets fully informed in the first model and decides to deviate for money motives, whereas he prefers to stay partly uninformed in the second model, choosing the best policy then.

is as follows: The politician updates his belief to the benefit of the lobby if he receives a signal, but to its disadvantage if he receives none. Hence the decision to investigate entails indirect search costs, which consist of the expected utility loss due to disadvantageous search results. Investigation is then more likely if the possible benefit is high and indirect search costs are low, which gives the stated results.

Consider now contribution payments as a second means of lobbying. The lobby exactly compensates the politician for the welfare loss through the policy deviation if it pays contributions. Hence, the decision to invest in information acquisition may render contribution payments unnecessary if it turns out to be successful, but it increases necessary contribution payments in the case of bad news. As the expected utility loss with bad news is high if the lobby has high stakes in the preferred policy outcome, indirect search costs increase. Moreover, indirect costs increase if the probability of success is small. In sum, informational lobbying becomes less likely if the lobby has high stakes in the preferred policy, and the probability of successful informational lobbying is small.[3] Note that both types of lobbying may occur if informational lobbying is beneficial in expectation, but turns out to be unsuccessful ex post. However, the possibility to influence the policy decision via contributions decreases incentives to engage in informational lobbying, because informational lobbying entails indirect costs if contributions are an alternative lobbying instruments which makes it less likely to occur.

Polk (2002c) follows a different approach (compare chapter 6). Two interest groups engage in lobbying against environmental regulation. Two types of lobbying exist, both of which serve to increase individual pollution standards: General lobbying leads to higher pollution standards for all interest groups. Hence lobbies provide a public good with respect to each other if they engage in general lobbying. For instance, general lobbying efforts may be informational lobbying, which informs the politician about negative consequences of environmental regulation in general. Moreover, a firm may also engage in private lobbying. Firms compete with respect to private lobbying efforts, because it increases the individual pollution standard of the lobbying firm on account of its opponent. For instance, private lobbying may consist of contribution payments inducing favors to one interest group at the expense of the other. Alternatively, private lobbying may induce loopholes granted to one

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[3]Investigation is more likely if the politician is not able to observe whether the lobby investigates or not. The expected loss of a disadvantageous search is smaller in this case, because the politician is left with uncertainty over whether the absent signal is due to no search effort instead of bad news.

group, which restricts the possibility of loopholes to the other group. In sum, groups engage in different types of lobbying. They follow a common interest through general lobbying, but compete through private lobbying efforts.

The question arises in which lobbying type the interest groups engage, and what is the policy outcome. Suppose that the politician becomes more responsive to private lobbying. Direct and indirect effects occur: The direct effect is an increase of the marginal benefit of private lobbying, which increases private lobbying efforts. But private lobbying efforts are strategic substitutes, which dampens the direct effect. It turns out that both interest groups increase private lobbying in a symmetric equilibrium, but that it may occur that both firms react differently in an asymmetric equilibrium. Hence, if the politician increases lobbying competition between the groups by getting more responsive to private lobbying, it may occur that a lobby diverts to general lobbying for strategic reasons.

Moreover, the environment tends to benefit if the politician becomes more responsive to private lobbying: Both groups may focus on private lobbying if lobbying competition increases. In this case, counteractive activities dominate and interest groups divert from their original interest. Instead of jointly lobbying against environmental regulation, they are trapped in activities for distributional reasons. Hence, the model indicates that the politician's ability to react to a certain type of lobbying may affect the lobbying instruments employed by interest groups. It is crucial to note that the politician's responsiveness towards private lobbying does not just depend on his own preferences: It may also depend on the type of regulation under consideration. For instance, a certain type of regulation may be achieved through different policy alternatives, leaving more discretion to the politician. In this case, it is likely that interest groups engage in private lobbying, and general lobbying becomes unimportant. On the other hand, if only a single policy instrument is available to achieve a certain policy outcome, policy discretion is small. It is likely that interest groups will focus on general lobbying in this case, which leads to low regulation.

Chapter 6

Lobbying against environmental regulation vs. lobbying for loopholes

6.1 Introduction

[1]Environmental regulation is often accompanied by loopholes for individual economic agents. For instance, the German "Abwasserabgabengesetz" grants large loopholes to the chemical industry, an important user of water.[2] The German energy tax foresees loopholes for energy intensive sectors, such as agribusiness and the chemical industry.[3] In Switzerland, the LSVA was recently introduced as a charge on trucks and heavy transportation, which serves to reduce emissions from transportation. However, the charge is not levied on personal transportation and rates for coaches are reduced, although these vehicles play also an important role as pollutants.[4]

Given that environmental regulation should aim at reducing pollution, loopholes are usually criticized from an environmental point of view. They tend

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[1]This chapter is closely related to joint work with Armin Schmutzler.

[2]The German "Abwasserabgebengesetz" is a waste water charge (Roth 1991, Berendes and Winters 1989).

[3]Compare for instance Friedrich-Ebert-Stiftung (1999), Chapt. 1, Tab. 1. The report can also be found at http://library.fes.de/fulltext/fowirtschaft/00952003.htm#E10E1.

[4]The LSVA is a heavy vehicle fee, a charge intended to reduce the emissions of CO2 and other pollutants (www.zoll.admin.ch/d/steuern/lsva/lsva_konkret/ekonkret/estart.htm).

to undermine the original aim of regulation, and they are often granted to the most important polluters. In this paper, I want to discuss the idea that the possibility of loopholes may well help to serve environmental concerns: If firms attempt to influence environmental regulation through lobbying, they not only try to reduce the total amount of allowed pollution. In addition, they may try to reduce the individual burden induced through this regulation. Accordingly, firms may privately lobby for loopholes. Loopholes serve to reduce the individual burden of a given regulation, and are granted exclusively to specific firms. They are costly to other firms, because the overall ability of the politician to grant specific loopholes may be limited. If this is the case, lobbying not only serves to determine the total amount of environmental regulation, but also the distribution of its costs among firms. I show that the existence of loopholes may benefit the environment: If firms expect that politicians pay more attention to private lobbying for loopholes, they will tend to focus lobbying activities on distributive aims. Their activities may then tend to offset each other, and small environmental damage results. If a focus on private lobbying leads to a reduction of general lobbying against strict regulation, the existence of loopholes may benefit the environment.

The political contest is modelled as a static game. Both firms set private and general lobbying efforts simultaneously in order to maximize the individual standard of allowed pollution. Lobbying efforts and the resulting individual and total pollution levels determine the Nash-equilibrium. The politician is represented by a policy formation function, which sets firms' pollution standards based on individual levels of private and general lobbying efforts (Becker 1983, Becker 1985). I show that the existence of loopholes may benefit the environment, if firms focus on private lobbying. Hence, if loopholes are important, firms may tend to focus on ineffective counteractive lobbying.[5] The environment benefits if this goes hand in hand with a reduction in harmful general lobbying.

The model relates to existing literature, which determines the extent of environmental regulation when interest groups influence political decisions. For instance, Hahn (1990) determines the effect of lobbying on the amount of environmental pollution in a simple political economy framework.[6] The politician maximizes a weighted sum of an industry's and a green lobby's

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[5]Compare Austen-Smith and Wright (1994) for a model which focusses on counteractive lobbying effects.

[6]Other contributions are Fredriksson (1997), Damania (1999) and Aidt (1998), which determine environmental policy when lobbies influence the political decision. Except Fredriksson (1997), these approaches do not focus on the effect of lobbying on environmental quality.

utility levels. The weights are exogenous and represent an unspecified lob-bying game. The resulting pollution depends on the available policy instru-ments, groups' preferences about these instruments and their relative politi-cal weights: Suppose that both lobbies have opposing interests with respect to one policy dimension and coincide about the other. For instance, a green lobby might have an interest in high environmental taxes, which opposes the interests of an industry lobby. But both lobbies may favor a high degree of ear-marking the tax to pollution abatement, or of ear-marking the tax to reduce associated employer outlays. Then, environmental pollution may probably decrease, if the politician attaches a higher political weight to the (anti-environmentalist) industry lobby: An increase in the relative strength of the industry lobby c.p. leads to a lower tax and more environmental pol-lution. If the policy dimensions are substitutes, a smaller tax increases the benefit of a higher degree of ear-marking. If the latter effect dominates, the negative effect through lower taxes are overcompensated by a higher degree of ear-marking. Accordingly, an increase of the political weight of an anti-environmentalist lobby may lead to a decrease of environmental pollution.

The model is similar in that both lobbying groups coincide with respect to one policy dimension (the amount of allowed pollution) and disagree about the other (the specification of loopholes). I assume that two different types of lobbying activities are available, and analyze their effect on the political equilibrium and the resulting pollution.

Many lobbying models analyze distributional aspects implicitly, especially those in the line of Bernheim and Whinston (1986b) and Grossman and Helpman (1994a). In these models, contribution payments are contingent on realized policies, which often entail both allocative and distributional aspects. Lobbying serves both purposes at the same time, and it is difficult to sep-arate distributional lobbying from allocative one. For instance, Aidt (1998) determines the amount of different input and output taxes in an environmen-tal setup. Output taxes are primarily levied for distributional purposes, and environmental taxes mainly serve to reduce emissions. But all these taxes nevertheless entail allocative and distributional aspects. So it is difficult to separate lobbying with mere distributional purposes from allocative lobby-ing. The model relates to this literature. It explicitly models the incentives of firms to give up general lobbying against environmental regulation, in order to increase the influence on distributional decisions.

To my knowledge, Bennedsen and Feldmann (2002) is the only approach which analyzes different types of lobbying activities. They consider influence

through informational lobbying and contribution payments.[7] Compared to this paper, their approach has a different general scope. The authors analyze the incentives to costly acquire information if contribution payments are an alternative way to influence the politician. The general insight of their paper is the following: Informational lobbying has indirect costs, which reduce incentives to engage in this type of lobbying. The reason is that the lobby refrains from sending prejudicial information; but no signal is bad news, and the politician learns that a firm friendly policy has negative welfare effects. This implies that the firm needs to increase the amount of necessary contribution payments, which compensate the politician for a policy deviation. Hence information gathering induces indirect search costs in the form of higher contribution payments, if bad news occur when the firm acquired information. This may lead to higher expected contribution payments, and lower efforts to acquire information. The analysis provides no application to environmental policy formation.

The chapter is organized as follows: Chapter 6.2 derives comparative static results if firms employ a fixed lobbying budget to influence environmental regulation. I introduce two different specifications in chapters 6.2.1 and 6.2.2. Chapter 6.2.3 introduces specific functional forms for the loophole and the share lobbying functions. I parameterize the model and describe which results occur. Chapter 6.3 describes an extension to the model, where firms determine their lobbying budget endogenously. Chapter 6.4 discusses the scope of the analysis and concludes.

6.2 Environmental regulation with an exogenous lobbying budget

I analyze two firms whose production induces environmental pollution. Each firm uses an abatement technology to reduce pollution. Abatement cost functions $A^i(E^i)$ are exogenous and bounded above. For simplicity, I assume that regulation takes the form of individual pollution standards E^i. I assume that the actual emissions standard is always binding. The abatement cost functions decrease in the emission level E^i and are convex: $A^{i\prime} < 0$, $A^{i\prime\prime\prime} > 0$.

Assumption 6.1 *Abatement costs are bounded above, that is $A^i(E^i) \leq \overline{A}$ for all possible E^i.*

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[7]Compare chapter 5.

I abstract from market particularities and focus on the effect of environmental regulation on abatement costs and profits. Individual pollution standards $E^i(p^1, p^2, g^1, g^2)$ are functions of private and general lobbying efforts of both firms, p^i and g^i. Throughout the analysis, I maintain the following assumption:

Assumption 6.2 *Individual pollution standards increase in own private and general lobbying efforts. General lobbying of the opponent increases, and private lobbying of the opponent decreases the individual pollution standard:*

$$\frac{\partial E^i}{\partial p^i} > 0, \ \frac{\partial E^i}{\partial p^j} < 0, \ \frac{\partial E^i}{\partial g^i} > 0, \ and \ \frac{\partial E^i}{\partial g^j} > 0.$$

Both types increase the level of allowable emissions for the lobbying firm, but they have different effects on the total level of allowed emissions and on the distribution among the firms: General lobbying of a firm increases the total level of allowed emissions, and the individual pollution standard E^i. It benefits the lobbying firm and the other firm subject to regulation. General lobbying efforts are perfect substitutes and bear no competitive element. Firms provide a public good through general lobbying, because an increase in general lobbying increases the individual pollution standard of the other firm as well. In contrast, private lobbying of a firm increases its individual pollution standard on the cost of the other.[8] But it does not increase the total level of allowed pollution, or only to a smaller extent. Both firms compete for individual high standards through private lobbying, given the total amount of environmental regulation induced through general lobbying efforts. Private lobbying thus bears a strong competitive element: An increase of private lobbying of one firm decreases the individual pollution standard of the opponent.

The lobbying budget of each firm is fixed and normalized to one (this assumption is relaxed in chapter 6.3). Each firm determines the optimal amount of private and general lobbying, and minimizes abatement costs. For instance, firm 1 maximizes[9]

$$\Pi^1(p^1, p^2, g^1, g^2, \theta) = -A^1(E^1(p^1, p^2, g^1, g^2, \theta)) - p^1 - g^1,$$

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[8]I discuss two specifications for the general setup, which differ slightly according to the effect of private lobbying on the total level of allowed pollution.

[9]Note that profits are negative in this setup. Alternatively I can write profits as $\pi^i = D^i - A^i(E^i)$, where D^i is some gross benefit resulting from market competition. I assume that this component D^i is independent of the level of allowed pollution by assumption. Therefore I drop it.

subject to

$$p^1 + g^1 = 1.$$

Exact specifications for the individual pollution standard functions E^i will be given in chapters 6.2.1 and 6.2.2. Note that the standard also depends on an exogenous parameter θ. It reflects the politician's responsiveness towards private lobbying and will also be closer specified in the following chapters. I derive comparative static results and state how a change in the politician's responsiveness towards private lobbying influences the equilibrium lobbying efforts and the total amount of pollution.

I analyze two different specifications for individual pollution standards in chapter 6.2.1 and 6.2.2. These specifications reflect two distinct applications of the general framework. I use the *loophole specification* to focus on private lobbying as a means to receive individual exemption rules from environmental regulation. For instance, consider a government that wants to reduce emissions of a certain pollutant. Pollution results from production in several sectors. Private lobbying may then serve to receive sectoral exemptions, given that the level of total regulation is fixed. As an example, the German chemical industry faces important exemptions from the charge on sewage water, which reduces the tax burden in that specific sector comprehensively. The common characteristic of the loophole specification is that private lobbying leads to individual exemptions from regulation, without decreasing the allowed base level of emissions of the other parties. Accordingly, private lobbying tends to increase the total amount of pollution, because larger loopholes increase the total amount of environmental pollution.

This is different in the *share lobbying* specification. In this specification, private lobbying is entirely distributional. Private lobbying has no environmental effect. Consider for instance that a government restricts the total level of allowed pollution through tradable emission permits. It decides about the total amount of pollution permits, and about its initial distribution across firms. Firms may try to increase the total amount of allowed emissions through general lobbying, which tends to benefit all firms. In contrast, private lobbying serves to increase the individual permit share of a firm. It does not affect the total amount of pollution rights. Hence, it reduces the pollution shares of the other party. Both specifications have in common that firms compete in private lobbying. A permit may be granted either to one or the other, but not to both if the total amount is fixed. Chapters 6.2.1 and 6.2.2 will make these arguments more precise.

Both specifications have some joint elements. For instance, the predisposition of the politician towards strict regulation can be influenced through general lobbying by each firm. It determines how lax or strict environmental regulation is in general. For instance, in the share lobbying specification, general lobbying determines the total level of emitted pollution permits. This is independent of the distribution of these permits across firms. Similarly, in the loophole lobbying case, general lobbying for instance determines the level of an ecological tax, which lets individual exemption rules aside and first serves as a regulation policy towards all firms. Firms have a common interest that this predisposition is low, because lax regulation leads to smaller abatement costs.

As a further example, general lobbying efforts may be informational campaigns which "inform" the politician about negative consequences of strict environmental regulation. Suppose that one firm engages in such a campaign, and low regulation results. This benefits the other firm as well. The sum of the individual levels of general lobbying efforts determines how strict environmental regulation is. Hence general lobbying efforts are perfect substitutes. Firms provide a public good with respect to each other if they engage in general lobbying. More general lobbying by a firm leads to lower regulation, which benefits the other firm as well.

Since the lobbying budget is fixed, firms face a trade-off when they determine their lobbying levels: An increase of private lobbying leads to a higher individual pollution standard, given that the predisposition of the politician towards environmental regulation is fixed. But an increase in private lobbying decreases general lobbying, which increases the predisposition towards strict regulation. Substitution of the budget constraint yields the following optimization problem for firm 1 (firm 2 accordingly):

$$\max_{p^1} \quad \Pi^1(p^1, p^2, \theta) = -A^1(E^1(p^1, p^2, \theta))$$

$$\max_{p^2} \quad \Pi^2(p^1, p^2, \theta) = -A^2(E^2(p^1, p^2, \theta))$$

All relevant functions depend on private lobbying efforts of both firms. A suffix i indicates the derivative of the respective function with respect to private lobbying of firm i. For instance, Π^i_{ij} is the cross derivative of profits of firm i with respect to its own private lobbying effort and that of the other firm.

Assumption 6.3 *Private lobbying efforts are strategic substitutes:* $\Pi_{ij}^i < 0$ *for all $i \neq j$.*

This assumption assures that the reaction functions are negatively sloped. If a firm increases private lobbying, incentives for private lobbying of the other firm decrease. Without the assumption, private lobbying efforts may be strategic complements. I want to exclude this case, because it leads to rather simple insights: If a firm faces incentives to increase private lobbying due to an exogenous parameter change, the opponent increases private lobbying as well. In this case, interesting strategic interactions between both firms cannot occur. An exogenous parameter change affects both firms in the same way, and both firms reinforce the reaction of each other. I exclude it here and assume that private lobbying efforts are strategic substitutes.[10]

Assumption 6.4 *The following condition holds in the neighborhood of the equilibrium:* $\Pi_{11}^1 \Pi_{22}^2 - \Pi_{12}^1 \Pi_{21}^2 > 0$.

This assumption assures that the equilibrium under consideration is locally stable.[11]

I show in the appendix that a Nash equilibrium $[p^{1*}, p^{2*}]$ exists for the specifications of E^i, which follow in chapters 6.2.1 and 6.2.2. Moreover I assume parameter ranges for all relevant functions such that interior equilibria occur. I also show in the appendix that the implicit function theorem is applicable and comparative static results can be derived. Straightforward calculations yield the following general results, which will be used and interpreted in the following chapters:

$$\frac{dp^i}{d\theta} = \frac{-\Pi_{i\theta}^i \Pi_{jj}^j + \Pi_{j\theta}^j \Pi_{ij}^i}{\Pi_{ii}^i \Pi_{jj}^j - \Pi_{ij}^i \Pi_{ji}^j} \tag{6.1}$$

$$\frac{dg^i}{d\theta} = -\frac{dp^i}{d\theta} \tag{6.2}$$

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[10]I will discuss this assumption in the context of specific examples below.

[11]The equilibrium is locally stable if the reaction function of firm 1 is steeper than the reaction function of firm 2 around the equilibrium. The slope of firm 1's reaction function is $\frac{dp_2}{dp_1} = -\frac{\Pi_{11}^1}{\Pi_{12}^1}$, that of firm 2 is $\frac{dp_2}{dp_1} = -\frac{\Pi_{21}^2}{\Pi_{22}^2}$. Hence the equilibrium ist stable if $-\frac{\Pi_{11}^1}{\Pi_{12}^1} < -\frac{\Pi_{21}^2}{\Pi_{22}^2}$.

6.2.1   Loophole lobbying

In this chapter, I focus on the incentives of the politician to grant loopholes. Loopholes are selective measures to specific firms, which serve as individual exemption rules. The individual pollution standard of firm i is specified as

$$E^i(p^1, p^2, g^1, g^2, \theta) = B(g^1 + g^2) + l^i(p^1, p^2, \theta).$$

$B(g^1 + g^2)$ is the basic level of allowed pollution to each firm. It depends on the sum of general lobbying efforts. I assume that $B(g^1 + g^2)$ is an increasing and concave function ($B' > 0$, $B'' < 0$). This specification reflects the idea that general lobbying efforts determine the predisposition of the politician towards environmental regulation, which affects both firms in the same way. If a single firm increases general lobbying, regulation becomes laxer and the basic amounts of individual pollution rights for both firms increase. As stated above, both firms have a common interest in low regulation, and general lobbying efforts are perfect substitutes.

$l^i(p^1, p^2) > 0$ is a loophole to firm i, which the politician grants in return for private lobbying. Private lobbying may consist of legal or illegal contribution payments, but also job guarantees for after-legislature employment, informational lobbying, or the promise of cooperation in other policy relevant fields. A loophole increases the individual pollution standard of a firm above the basic level. Its size depends on private lobbying efforts. The idea is that both firms compete for loopholes, because the politician has only a limited ability to undermine regulation through individual exemption rules. He is willing to increase individual pollution standards above the basic level of allowed pollution if he receives private money from a firm, but he cannot do so arbitrarily. For instance, the politician may be able to care for specific firm interests without getting much public attention, but this ability may be limited. Or the politician might care about his reputation, which decreases if he appears to be too closely aligned to specific firms.

So firms compete for special treatments, and individual loopholes result from this lobbying competition. Consistent with assumption 6.2, a loophole increases if the respective firm increases private lobbying; it decreases if the opponent increases private lobbying: $l_i^i > 0$, $l_j^i < 0$. Hence an increases of private lobbying by a firm has two effects: It increases the own loophole, which leads to a higher individual pollution standard. Abatement costs decline. Moreover it has an external effect on the opponent, whose loophole declines.[12] I assume that l^i is increasing and concave in p^i, and decreasing

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[12]Note that I assume that firms are active in different industries. Firms have no in-

and convex in p^j in the neighborhood of the equilibrium.

By assumption 6.3, private lobbying efforts are strategic substitutes. This assumption implies $B'' + l_{ij}^i < 0$. Thus concavity of B is a natural force towards strategic substitutes: If the opponent increases private lobbying, general lobbying efforts decrease. The marginal benefit of general lobbying increases, which works towards a decrease of private lobbying by firm i. In contrast, the marginal effect of the opponents' private lobbying on one's own private lobbying effect may be positive. I assume that it is not too strong, and the condition applies.[13] Moreover, I assume that the own increase in private lobbying has a stronger effect on one's own loophole, than an increase of the opponent. The following restriction applies: $l_{ii}^i < l_{ij}^i < -B''$.

θ is an exogenous parameter which indicates the responsiveness of the politician to private lobbying. I say that the politician gets more responsive to private lobbying if the marginal effect of private lobbying on individual loophole levels increases, i.e. $l_{i\theta}^i > 0$ for all i. For instance, a high θ may indicate that the politician can more easily provide individual loopholes, perhaps because public monitoring is less effective or the politician cares less about public reputation at the end of his incumbency. The following results state how an increase of the responsiveness to private lobbying affects the equilibrium, namely the equilibrium levels of private and general lobbying and the resulting environmental pollution.

Proposition 6.1 *If the politician gets more responsive to private lobbying, private lobbying efforts of firm i ($i \neq j$) increase, iff*

$$\frac{(B'' + l_{jj}^j)}{(B'' + l_{ij}^i)} > \frac{l_{j\theta}^j}{l_{i\theta}^i}.$$

Private lobbying efforts decrease, iff

$$\frac{(B'' + l_{jj}^j)}{(B'' + l_{ij}^i)} < \frac{l_{j\theta}^j}{l_{i\theta}^i}.$$

centives to decrease the loophole of the opponent. It's profits depend solely on the own pollution standard, and accordingly on the own loophole. There is no incentive to increase the cost of the opponent, because abatement costs have no effect on gross market benefits in this model.

[13]If this condition would not hold, private lobbying efforts were strategic complements. This would reasonably simplify the analysis. In this case, reaction functions would be upward sloping. If the politician gets then more responsive to private lobbying, private lobbying efforts of both firms always increase. Proposition 6.1 would simplify accordingly (Compare assumption 6.3).

Proof. The denominator of $\frac{dp^i}{d\theta} = \frac{-\Pi^i_{i\theta}\Pi^j_{jj} + \Pi^j_{j\theta}\Pi^i_{ij}}{\Pi^i_{ii}\Pi^j_{jj} - \Pi^i_{ij}\Pi^j_{ji}}$ is positive by assumption 6.4. Hence

$$
\begin{aligned}
sign\left\{\frac{dp^i}{d\theta}\right\} &= sign\{-\Pi^i_{i\theta}\Pi^j_{jj} + \Pi^j_{j\theta}\Pi^i_{ij}\} \\
&= sign\{-[A^{i\prime}l^i_{i\theta}][A^{j\prime}(B'' + l^j_{jj})] + [A^{j\prime}l^j_{j\theta}][A^{i\prime}(B'' + l^i_{ij})]\} \\
&= sign\{-l^i_{i\theta}(B'' + l^j_{jj}) + l^j_{j\theta}(B'' + l^i_{ij})\}.
\end{aligned}
$$

This yields the result. ■

In equilibrium, both firms trade-off the marginal effect of an additional amount of private lobbying with its marginal costs. The marginal cost of private lobbying is the necessary induced reduction of general lobbying and the resulting decrease of the basic level of allowed pollution. The marginal benefit is an increase of the individual loophole. If the politician gets more responsive to private lobbying of both firms, three effects determine how each firm reacts: There is a direct effect: Each firm faces an incentive to increase private lobbying, because the marginal benefit of private lobbying increases. The extent of this effect depends on the increase of the politician's lobbying responsiveness towards firm i (i.e. on the extent of $l^i_{i\theta}$) and on the weight $(B'' + l^j_{jj})$, which reflects the curvature of Π^j.[14] The direct effect reflects the change in private lobbying if we abstract from strategic interaction between both firms. In this case, reaction functions are horizontal, and each firm determines private lobbying efforts independently. But reaction functions are negatively sloped if firms behave strategically towards each other. This reflects the second effect, which is an indirect one: Imagine that the exogenous parameter change affects only firm i, but not the opponent. If firm i increases private lobbying, the opponent has an incentive to react. He decreases private lobbying as a reaction towards the increase of firm i, which reflects the indirect effect. Thirdly, the exogenous parameter change affects the other firm as well. Accordingly, this firm also faces a direct incentive to increase private lobbying, which works against the indirect effect. Moreover, it also works against the direct effect of firm i, because lobbying efforts are strategic substitutes by assumption 6.3. The strategic effect on firm i is stronger if the parameter change has a strong impact on firm j ($l^j_{j\theta}$ is high), or if private lobbying efforts are strong strategic substitutes $(B'' + l^i_{ij})$ is high.

Proposition 6.1 reflects this intuition: The relative extent of the politician's responsiveness increase and the degree of substitutability between private

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[14]It is obscure how this term can be interpreted economically. Economic intuition becomes clearer in the symmetric case (compare corollary 6.1).

lobbying of both firms determine if a firm i increases or decreases private lobbying. If the own responsiveness increase is high compared to the other firm, private lobbying of firm i tends to increase. It tends to decrease if it is low, or private lobbying efforts are strong strategic substitutes.[15] Note that the substitution effect determines the curvature of the reaction functions. The proposition states that private lobbying of a firm increases, if lobbying efforts are weak strategic substitutes (then $(B'' + l^j_{jj})/(B'' + l^i_{ij})$ is high). In this case, reaction functions are relatively steep and strategic interaction between both firms plays no important role.

Corollary 6.1 *If both firms and the equilibrium are symmetric, an increase in θ results in identical increases in private lobbying efforts for both firms.*

Proof. In a symmetric equilibrium $l^i_{i\theta} = l^j_{j\theta}$, $l^i_{ii} = l^j_{jj}$ and $l^i_{ij} = l^j_{ji}$. Thus

$$sign\left\{\frac{dp^i}{d\theta}\right\} = sign\{-l^i_{i\theta}(B'' + l^j_{jj}) + l^j_{j\theta}(B'' + l^i_{ij})\}$$
$$= sign\left\{-l^j_{jj} + l^i_{ij}\right\}.$$

By assumption 6.4,

$$\left(\Pi^j_{jj}\right)^2 - \left(\Pi^i_{ij}\right)^2 > 0 \quad \Leftrightarrow (B'' + l^j_{jj})^2 - (B'' + l^i_{ij})^2 > 0$$
$$\Leftrightarrow l^j_{jj} < l^i_{ij}.$$

Hence $\frac{dp^i}{d\theta} > 0$. ∎

In a symmetric equilibrium, the change of the politician's responsiveness towards private lobbying affects both firms in the same way. The direct and strategic effects are the same for both firms. An increase of θ gives both firms the same direct incentive to increase private lobbying. Strategic effects dampen this incentives, but do not reverse it: An increase of private lobbying by a firm has a higher marginal effect on its own loophole, compared to the external effect it induces on the opponent's loophole. Hence direct effects

---

[15]Moreover, note that an increase of private lobbying induces a decrease in general lobbying. This cost is higher, if the curvature of B is high. Since the basic emission function is identical for both firms, this term enters in the direct and the indirect effect. Suppose that the curvature effect is very strong. Then the left hand side of $(B'' + l^j_{jj})/(B'' + l^i_{ij}) > l^j_{j\theta}/l^i_{i\theta}$ is close to one, and only the marginal responsiveness towards private lobbying matters. In contrast, if the curvature effect plays no role, the difference between an increase of the opponent's private lobbying and own private lobbying efforts becomes more important.

dominate strategic effects, and private lobbying of both firms increase.[16]

The increase in private lobbying is higher if the dampening strategic effect is small, or the direct effect is important: The strategic effect is small if the externality through private lobbying is relatively unimportant. The direct effect is high if a further increase in private lobbying leads to a large increase of the individual loophole.

If the politician becomes more responsive to private lobbying, proposition 6.1 states that a firm may react by a reduction in private lobbying under certain circumstances. As stated above, this can only be the case if the indirect strategic effect dominates the direct effect to increase it. This is more likely if private lobbying efforts are strong strategic substitutes and the politician's change affects both firms asymmetrically. However, it can never be the case that both firm decrease private lobbying simultaneously. Suppose that a firm decreases private lobbying as a reaction to a change in θ. This implicates that the dampening strategic effect must be so strong and dominates the direct incentive to increase private lobbying. This can only be the case if the opponent increases private lobbying, because private lobbying efforts are strategic substitutes. The following result states this idea:

Corollary 6.2 *If the politician becomes more responsive to private lobbying, there is always at least one firm which increases private lobbying.*

Proof. Suppose that both firms decrease private lobbying. From proposition 6.1, $\frac{dp_i}{d\theta} < 0$ iff $\frac{(B''+l_{jj}^j)}{(B''+l_{ij}^i)} < \frac{l_{j\theta}^j}{l_{i\theta}^i}$. Hence $\frac{(B''+l_{11}^1)}{(B''+l_{21}^2)} < \frac{l_{1\theta}^1}{l_{2\theta}^2}$ and $\frac{(B''+l_{22}^2)}{(B''+l_{12}^1)} < \frac{l_{2\theta}^2}{l_{1\theta}^1}$ must hold if both firms decrease private lobbying. These two conditions yield $\frac{(B''+l_{11}^1)}{(B''+l_{21}^2)} < \frac{l_{1\theta}^1}{l_{2\theta}^2} < \frac{(B''+l_{22}^2)}{(B''+l_{12}^1)}$, which implies $(B'' + l_{11}^1)(B'' + l_{22}^2) < (B'' + l_{12}^1)(B'' + l_{21}^2)$. This is a contradiction to assumption 6.4, which states that $(B''+l_{11}^1)(B''+l_{22}^2) > (B''+l_{12}^1)(B''+l_{21}^2)$. Thus both firms can not jointly decrease private lobbying. ∎

Do firms benefit if the politician gets more responsive to private lobbying? What is the effect on the environment? Remember that total lobbying expenditures do not change, because lobbying budgets are fixed by assumption.

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[16]The following corollary 6.2 implies this result in a straight forward manner: It is never the case that both firms decreases private lobbying. Hence in a symmetric equilibrium, both firms must necessarily increase private lobbying.

Accordingly, a firm benefits from a change of θ if the induced lobbying responses lead to higher individual pollution standards. The total effect on the environment depends on how both individual pollution standards change. Total emissions in the loophole case are:

$$TE^L = 2B(2 - p^1 - p^2) + l^1(p^1, p^2, \theta) + l^2(p^1, p^2, \theta).$$

In principle, the effect on TE^L can be ambiguous. But the following proposition gives a strong argument that an increase in the marginal response to private lobbying benefits the environment:

Proposition 6.2 *Environmental pollution decreases,*

- *if both firms increase private lobbying, or*

- *if firm i decreases private lobbying (i.e. firm j increases private lobbying), and $-dp_i(B' - l_i^j) < -dp_j(-B' + l_j^i)$.*

Environmental pollution increases, if firm i decreases private lobbying, and $-dp_i(B' - l_i^j) > -dp_j(-B' + l_j^i)$.

Proof. The effect of private lobbying on the total amount of pollution is

$$dTE^L = -2B'(dp_1 + dp_2) + (l_1^1 + l_1^2)dp_1 + (l_2^2 + l_2^1)dp_2.$$

By the first order conditions, $B' = l_1^1 = l_2^2$ in equilibrium, thus

$$dTE^L = [-B' + l_1^2]dp_1 + [-B' + l_2^1]dp_2.$$

Then $dTE^L < 0$, iff

$$-dp_1(B' - l_1^2) < -dp_2(-B' + l_2^1)$$

and positive otherwise, which gives the stated result.

If both firms increase private lobbying, the above inequality is equivalent to

$$\frac{dp_1}{dp_2} > -\frac{[-l_2^2 + l_2^1]}{[-l_1^1 + l_1^2]}.$$

Note that the right hand side is negative and the left hand side is positive. Environmental quality always improves if both firms increase private lobbying. ■

The proposition gives a strong argument that an increase in the marginal response to private lobbying benefits the environment: Environmental quality improves if both firms increase private lobbying.[17] The reason is that an increase in private lobbying decreases general lobbying, which leads to lower basic emission rights B. On the other hand, an increase in private lobbying leads to bigger loopholes, which tends to decrease environmental quality. The proposition states that, in a symmetric equilibrium, the first effect dominates the second, and environmental quality improves.

To be more precise, three effects occur if a firm increases private lobbying: First, private lobbying increases individual loopholes, which harms the environment. Second, it decreases the loophole of the opponent, which tends to benefit the environment. Third, an increase in private lobbying implies a decrease in general lobbying. The base level of allowed pollution declines. This latter effect affects both firms. Thus the only effect which might harm the environment is the increase of the individual loophole. Note that firms equate the marginal benefit of private lobbying (l_i^i) with its cost ($-B'$) in equilibrium. Hence the negative effect through an increase of the individual loophole offsets with the positive effect through the decrease of one's own base level of pollution. Positive environmental effects through a smaller base level and a smaller loophole of the opponent remain. In a symmetric equilibrium, both firms increase private lobbying. As a result, environmental quality improves. In sum, firms spend more resources in lobbying activities which have strong counteractive effects, but only small environmental effects. Hence environmental quality improves.

The effect on total emissions is ambiguous if only one firm increases private lobbying efforts. An increase in private lobbying by a firm tends to decrease the basic pollution levels of both firms, and the loophole of the opponent. Moreover, the opponent decreases private lobbying, which results in smaller loopholes of this firm. These effects benefit the environment. On the other side, an increase in private lobbying by one firm leads to a higher individual loophole. This effect is amplified by the fact that the opponent decreases private lobbying efforts. Moreover, a decrease in private lobbying by the opponent leads to more general lobbying. These effects work towards a higher level of total pollution.

In sum, the relative strength of these pollution increasing and decreasing effects determines whether the environmental quality improves or declines.

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[17]I discuss a specific form for the loophole function in chapter 6.2.3. The results indicate that an increase of private lobbying of both firms occurs for a large parameter range.

Proposition 6.2 reflects this idea. Consider for instance the case that environmental quality improves if firm i increases and firm j decreases private lobbying efforts. The left hand side of the inequality reflects the negative effect of a decrease of private lobbying on the environment: General lobbying increases, which tends to increase the basic level of allowed pollution (B'). The loophole of firm j increases (l_i^j). The right hand side reflects the positive environmental effect: If firm j increases private lobbying, general lobbying and the basic level of allowed pollution decrease $(-B')$. Due to the external effect of private lobbying, the individual loophole of firm i increases (l_j^i).

Proposition 6.2 is the central result. It indicates that an increasing importance of loopholes tends to benefit the environment, at least in a symmetric situation. If lobbying becomes more important, firms focus on lobbying activities which tend to be ineffective. They divert money from general lobbying activities, although these are more effective with respect to resulting pollution rights. Firms face incentives to form a lobbying cooperation in this case, which overcomes these inefficiencies from non-cooperative behavior.[18] If they can agree to jointly reduce private lobbying efforts, offsetting effects become less important. They can can then divert more money to general lobbying activities. However, since firms are not able to communicate in a non-cooperative game setting, the best individual response to an increase of private lobbying by the opponent is an increase of own private lobbying efforts. This effect strengthens lobbying competition, which benefits the environment.

6.2.2   Share lobbying

I consider an alternative specification for the individual pollution standards E^i in this specification. Private lobbying is fully redistributive, that is, it does not effect emissions at all. I assume that the politician decides about the total level of allowed emissions E, which depends on the sum of general lobbying efforts g^i. Individual pollution standards are then determined by a share function, which splits the level of total pollution between the two firms. Private lobbying efforts determine the share of each firm and the distribution of pollution rights. As an example, consider environmental regulation through emission permits: General lobbying affects the total amount of permits, which is granted to firms in a specific sector, or to different sectors.

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[18]Aidt (1997) analyzes incentives to cooperate in a common agency framework, where interest groups lobby for tariffs.

Private lobbying influences the initial distribution of permits across firms, given that the total amount is fixed. It serves to determine the initial individual pollution standard of each firm, without affecting the total level of allowed pollution. In this specification, individual pollution standards are given as

$$
\begin{aligned}
E^1(p^1, p^2, g^1, g^2, \theta^A) &= s(p^1, p^2, \theta^A)E(g^1 + g^2) \\
E^2(p^1, p^2, g^1, g^2, \theta^A) &= \left[1 - s(p^1, p^2, \theta^A)\right]E(g^1 + g^2)
\end{aligned}
$$

E is the total level of allowed pollution, which depends on the sum of general lobbying efforts g^i. General lobbying efforts are strategic substitutes. Each firm provides a public good for the other firm by general lobbying. Firms provide a public good with respect to the other firm through general lobbying. E has the same properties as the basic pollution function of chapter 6.2.1, namely $E' > 0, E'' < 0$. Firm 1 receives a share $s(p^1, p^2, \theta) \in [0, 1]$ of the total amount of pollution E. All pollution rights are fully granted to both firms, and firm 2 receives a share of $[1 - s(p^1, p^2, \theta)]$.

Again, firms follow a common interest through general lobbying. General lobbying efforts increase the total level of allowed pollution and individual pollution standards weighted by the share of each firm. Private lobbying efforts determine the distribution of E across both firms. Firms compete through private lobbying for high shares. Following the spirit of chapter 6.2.1, I assume that an increase of private lobbying by a firm leads to a higher share of that firm, given that the opponent holds private lobbying constant. If the opponent increases private lobbying, the own share decreases. I assume that the individual share functions are increasing and concave in one's own private lobbying efforts, and decreasing and convex in the lobbying efforts of the opponent in the neighborhood of the equilibrium: $s_1 > 0, s_{11} < 0, s_2 < 0, s_{22} > 0$. Assumption 6.3 implies that an increase of private lobbying by a firm may increase or decrease the marginal effect on the opponent's private lobbying effort. In case of an increase, the extent must be sufficiently small, which implies that private lobbying may be weak (but not strong) strategic complements.[19] I assume that the politician has no bias towards one firm: If both firms choose the same amount of private lobbying, both firms get equal shares and $s = 0.5$.

With this specification we can focus on the effect of lobbying competition.

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[19]The following condition must be satisfied, otherwise private lobbying efforts become strategic complements: $s_{12} < \frac{-E''s + E'(s_1 + s_2)}{E}$. A similar condition applies for firm 2.

As in chapter 6.2.1, θ is a parameter which indicates the politician's responsiveness towards private lobbying. He gets more responsive towards private lobbying, if the marginal benefit of private lobbying increases for each firm: $s_{1\theta} > 0$, $s_{2\theta} < 0$.[20] The following results show that the general insights of the former chapter remain valid with the share lobbying specification: If the politician becomes more responsive to private lobbying, firms tend to increase private lobbying efforts. General lobbying declines, and the level of total pollution falls. Thus, if lobbying for distributive purposes becomes more important, environmental quality improves.

Proposition 6.3 *If the politician becomes more responsive to private lobbying, private lobbying of firm i increases, iff*

$$-E_{ij}^i < \frac{s_{i\theta}}{s_{j\theta}} E_{jj}^j.$$

Private lobbying decreases, iff

$$-E_{ij}^i > \frac{s_{i\theta}}{s_{j\theta}} E_{jj}^j.$$

Proof. We know that $\frac{dp_i}{d\theta} = \frac{-\Pi_{i\theta}^i \Pi_{jj}^j + \Pi_{j\theta}^j \Pi_{ij}^i}{\Pi_{ii}^i \Pi_{jj}^j - \Pi_{ij}^i \Pi_{ji}^j}$. By assumption 6.4, the denominator is positive. So

$$
\begin{aligned}
sign\left\{\frac{dp^i}{d\theta}\right\} &= sign\{-\Pi_{i\theta}^i \Pi_{jj}^j + \Pi_{j\theta}^j \Pi_{ij}^i\} \\
&= sign\{-[A^{i\prime} E_{i\theta}^i][A^{j\prime} E_{jj}^j] + [A^{j\prime} E_{j\theta}^j][A^{i\prime} E_{ij}^i)]\} \\
&= sign\{-E_{i\theta}^i E_{jj}^j + E_{j\theta}^j E_{ij}^i\}.
\end{aligned}
$$

The numerator is positive iff $E_{ij}^i > \frac{E_{i\theta}^i}{E_{j\theta}^j} E_{jj}^j$ and negative otherwise. Since $\frac{E_{i\theta}^i}{E_{j\theta}^j} = -\frac{s_{i\theta}}{s_{j\theta}}$, the stated conditions follow. ∎

The intuition for this result is familiar from proposition 6.1: If the politician gets more responsive to private lobbying, direct and indirect effects occur. The direct effect is that private lobbying becomes more attractive and c.p. increases. The extent of this effect depends on the induced responsiveness change $s_{i\theta}$, and on the curvature of the opponent's profit function E_{jj}^j. The indirect strategic effects dampens the direct effect: Due to the increase of the

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[20]Note that the share of firm 2 is the residual of the share of firm 2. The marginal effect of private lobbying of firm 2 on its share increases if $s_{2\theta} < 0$.

politician's responsiveness $s_{j\theta}$, the opponent faces an incentive to increase private lobbying as well. Private lobbying efforts are strategic substitutes and p^i tends to fall.

To be more precise, several terms influence the extent of the direct and the strategic effect. For instance, consider the strategic effect of firm 2's private lobbying increase on firm 1, E_{12}^1. Straightforward calculations yield $E_{12}^1 = s_{12}E - E'(s_1 + s_2) + E''s$. The first term on the right hand side ($s_{12}E$) is the change of firm 1's incentives to increase private lobbying as a result of an increase in firm 2's private lobbying efforts. This effect depends on the form of the share function and may be positive or negative. If $s_{12} < 0$, a marginal increase of private lobbying by firm 2 c.p. reduces the incentives for firm 1 to increase private lobbying. If $s_{12} > 0$, the opposite holds. Second, the share of firm 1 decreases if the opponent increases private lobbying. This leads to reduced incentives to engage in general lobbying, because the marginal benefit of g^1 depends on the realized share of firm 1. This effect works towards an increase of private lobbying ($-E's_2$). Finally, the increase of private lobbying by the opponent reduces general lobbying. The level of total pollution c.p. decreases. As a consequence, a marginal increase of firm 1's share has less value, and the marginal benefit of private lobbying decreases ($-E's_1$). But the emission function E is concave, and incentives for general lobbying also increase. This is reflected in the term $E''s$, which is a natural force towards strategic substitutes and tends to decrease p^1. By assumption 6.3, private lobbying efforts are strategic substitutes, and effects tending towards a decrease in private lobbying dominate. The indirect effect dampens the direct one.

It can also be shown that at least one firm increases private lobbying if the politician gets more responsive to private lobbying. Moreover, in a symmetric equilibrium both firm increase private lobbying efforts. These results parallel those of chapter 6.2.1. I present them here without further remarks:

Corollary 6.3 *In a symmetric equilibrium with symmetric firms, private lobbying of both firms increases if the politician get more responsive to private lobbying efforts.*

Proof. In a symmetric equilibrium, $E_{ij}^i = E_{ji}^j$, $E_{ii}^i = E_{jj}^j$ and $E_{i\theta}^i = E_{j\theta}^j$.

Equations (6.1), (6.2), and assumption 6.4 yield:

$$sign\left\{\tfrac{dp^i}{d\theta}\right\} = sign\left\{-\Pi_{i\theta}^i\Pi_{jj}^j + \Pi_{j\theta}^j\Pi_{ij}^i\right\}$$
$$= sign\left\{-A^{i\prime}E_{i\theta}^i A^{j\prime}E_{jj}^j + A^{j\prime}E_{j\theta}^j A^{i\prime}E_{ij}^i\right\}$$
$$= sign\left\{-E_{jj}^j + E_{ij}^i\right\}.$$

Note that assumption 6.4 implies that $\left(E_{jj}^j\right)^2 - \left(E_{ij}^i\right)^2 > 0$, and $\tfrac{dp^i}{d\theta} > 0$ follows. ■

Corollary 6.4 *At least one firm increase private lobbying if the politician gets more responsive to private lobbying efforts.*

Proof. Suppose that both firms decrease private lobbying. By proposition 6.3, this can only be the case iff $E_{12}^1 < -\tfrac{s_{1\theta}}{s_{2\theta}}E_{22}^2$ and $E_{21}^2 < -\tfrac{s_{2\theta}}{s_{1\theta}}E_{11}^1$. Hence $\tfrac{E_{12}^1}{E_{22}^2} > -\tfrac{s_{1\theta}}{s_{2\theta}}$ and $\tfrac{E_{21}^2}{E_{11}^1} > -\tfrac{s_{2\theta}}{s_{1\theta}}$. These conditions imply $\tfrac{E_{12}^1}{E_{22}^2} > \tfrac{E_{11}^1}{E_{21}^2}$, which equivalent to $E_{22}^2 E_{11}^1 - E_{12}^1 E_{21}^2 < 0$ and a contradiction to assumption 6.4. Hence private lobbying of both firms can not jointly decrease. ■

The following proposition states how the level of total pollution changes if the politician gets more responsive to private lobbying. Note that the environmental quality depends only on the change of E, and total emissions in the share lobbying case are:

$$TE^S = E(2 - p^1 - p^2).$$

In contrast to chapter 6.2.1, private lobbying has no direct effect on the realized environmental quality in this specification, because it serves mere redistributive means. Accordingly, environmental quality improves if and only if the sum of general lobbying efforts declines.

Proposition 6.4 *Environmental pollution decreases,*

- *if both firms increase private lobbying, or*

- *one firm decreases private lobbying and $E_{1\theta}^1(-E_{22}^2 + E_{21}^2) + E_{2\theta}^2(-E_{11}^1 + E_{12}^1) > 0$.*

Otherwise environmental pollution increases.

Proof. The total amount of pollution is $E^t = E(2 - p_1 - p_2)$. Hence

$$dE^t = -E'(dp_1 + dp_2),$$

which is negative if $dp_1 + dp_2 > 0$ and positive otherwise.

If both firms increase private lobbying, $dE^t < 0$. By corollary 6.4, it is not possible that both firms decrease private lobbying. Thus $dE^t > 0$ can only be the case if one firm increases and the other firm decreases private lobbying. From equation (6.1), (6.2), and assumption 6.4, we get

$$sign\{dp_1 + dp_2\} = sign\{E^1_{1\theta}(-E^2_{22} + E^2_{21}) + E^2_{2\theta}(-E^1_{11} + E^1_{12})\}. \quad \blacksquare$$

The intuition for the result coincides with the insights of the loophole specification: If the politician gets more responsive to private lobbying, firms engage more in private lobbying and disregard general lobbying. The increases in private lobbying efforts have no environmental effects, as private lobbying merely determines the distribution of shares among firms.[21] An increase in private lobbying decreases general lobbying efforts. The realized level of allowed pollution is determined by the sum of general lobbying activities. Accordingly, an increase in total private lobbying efforts benefits the environment, as the total level of allowed pollution declines.

Environmental effects may be negative if a firm increases general lobbying activities. This can only be the case if the strategic effect of the respective firm dominates the direct effect to increase private lobbying. Moreover, this effect must be strong enough to compensate the increase of private lobbying by the opponent. These conditions are not easy to satisfy, but may occur if the equilibrium is not symmetric. Consider for instance that the increase in θ has a rather small effect on firm 1 ($E^1_{1\theta}$ is small), but a high effect on firm 2 ($E^2_{2\theta}$ is high). Then the strategic effect induced through firm 2 may dominate the direct effect of firm 1, and private lobbying of firm 1 decreases. Moreover, if the extent of the direct effect of firm 2 is relatively small (E^1_{11} is small), private lobbying of firm 2 may increase, but only to a smaller amount. If these conditions hold, the total amount of general lobbying may increase if the politician becomes more responsive to private lobbying. In this case, the level of total pollution increases.

The last argument indicates that the total level of allowed emissions tends

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[21]In the loophole specification, private lobbying has also environmental effects: A higher amount of private lobbying leads to larger loopholes, and loopholes increase the level of environmental pollution above the basic levels E.

to decrease if the politician gets more responsive to private lobbying. Rather restrictive conditions must be met for the opposite statement to hold. Accordingly, if the politician becomes more responsive to private lobbying, the effect on the environment is a decline of the total level of allowed pollution. This indicates that a high extent of lobbying competition benefits the environment, because firms lose power in ineffective distributional fights. Politicians who want to increase pollution standards should thus be responsive to private lobbying efforts.

6.2.3   Specific loophole and share functions

The results of chapters 6.2.1 and 6.2.2 indicate that private lobbying efforts and environmental quality tend to increase if the politician gets more responsive to private lobbying. In this chapter, I consider specifications for loophole and share functions, for which these statements hold generally.

I tried to simulate the comparative static results. My aim was to find out how robust the result is, namely that an increase of θ increases private lobbying efforts which benefits the environment. As propositions 6.2 and 6.4 state, environmental quality increases if both firms increase private lobbying. Only under certain circumstances may environmental quality decrease, which amongst other things necessitates that one firm decreases private lobbying.

Consider for instance the following specifications for the loophole lobbying and share lobbying functions. α and β are parameters which introduce asymmetries between the firms. Symmetric equilibria emerge if $\alpha = 1$, or $\beta = 0.5$. γ is a parameter which determines the curvatures of the respective functions:

$$
\begin{aligned}
l^1(p^1, p^2, \theta) &= \alpha\theta(p^1 + 1)^\gamma + \left[\frac{(p^1 + 1)}{(p^2 + 1)}\right]^\gamma \\
l^2(p^1, p^2, \theta) &= \theta(p^2 + 1)^\gamma + \left[\frac{(p^2 + 1)}{(p^1 + 1)}\right]^\gamma \\
s(p^1, p^2, \theta) &= \beta + \theta\left(\frac{p^1}{p^1 + p^2} - \frac{1}{2}\right).
\end{aligned}
$$

Straightforward calculations show that this specification satisfies the conditions on individual loophole functions globally (with $\alpha = 0.5$). The sign of the cross derivative is negative ($l^i_{ij} < 0$), which implies that private lobbying
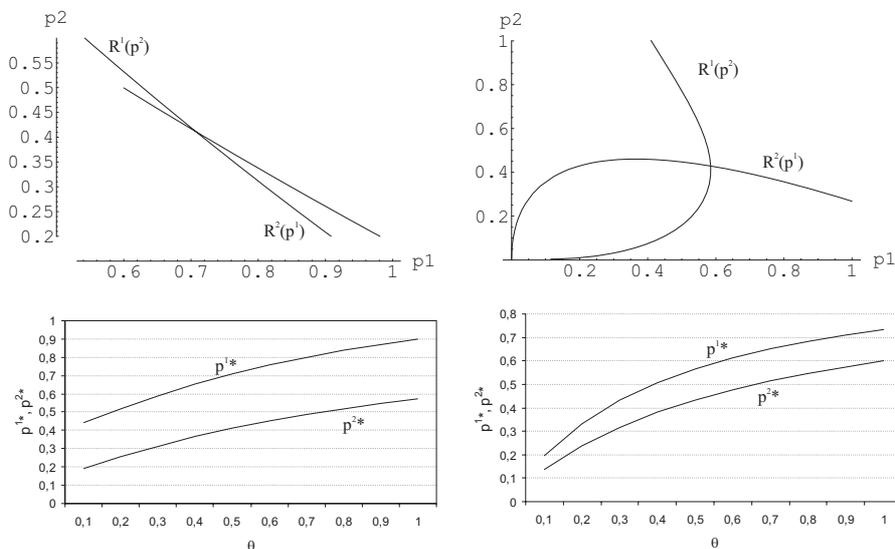
Figure 6.1: The left hand side shows reaction functions and comparative statics results for the loophole specification ($\alpha = 1.1$, $\gamma = 0.5$; θ varies between $[0, 1]$; $\theta = 0.5$ above)
The right hand side shows reaction functions and comparative statics results for the share lobbying specification ($\beta = 0.4$, $\gamma = 0.5$; θ varies between $[0, 1]$; $\theta = 0.5$ above)

efforts are strategic substitutes.[22,23] Both firms get equal shares with identical private lobbying efforts. The function is increasing and concave in p^1, and decreasing and convex in p^2. The cross derivative is positive if $p^1 > p^2$, and negative otherwise.

The function for the base level of allowed pollution (loophole specification) and the total amount of allowed pollution (share lobbying specification) are identically specified as

$$B(p^1, p^2) = (2 - p^1 - p^2)^{\frac{1}{\delta}},$$

---

[22]Note that with this specification, $l^i = \alpha\theta + 1$, if $p^i = p^j = 0$. This is a slight variation from the general approach. Remember that I consider only interior equilibria in the analysis.

[23]An alternative specification is $l^1(p^1, p^2, \theta) = \alpha\theta \ln(p^1 + 1) + \frac{\ln(p^1+1)}{\ln(p^2+1)}$, and for l^2 respectively.

and

$$E(p^1, p^2) = (2 - p^1 - p^2)^{\frac{1}{\delta}}.$$

$\delta > 1$ parameterizes the curvature of these functions.

Figure 6.1 shows that it is likely in the model that an increase in the marginal responsiveness towards private lobbying induces higher private lobbying efforts of both firms. As a consequence, environmental quality improves.[24] This is the case even in the loophole specification, where private lobbying leads to larger individual loopholes.

6.3   Extension: Loophole lobbying with an endogenous lobbying budget

If lobbying budgets are exogenous, an increase in private lobbying necessarily coincides with a decrease in general lobbying. Accordingly, if private lobbying becomes more important, general lobbying decreases. This tends to increase environmental quality. If firms can endogenously determine their lobbying budget, it may well be the case that an increase in private lobbying increases the incentives for general lobbying as well. Consider the share specification as an example: An increase in private lobbying increases the individual share of the respective firm. General lobbying then becomes more important. A marginal increase of the total level of allowed pollution leads to a higher increase of the individual pollution standard if the share is high. Hence more private lobbying may induce more general lobbying, and private and general lobbying of a firm may be strategic complements. This chapter analyzes the incentives to lobby if the lobbying budget is endogenous. For simplicity, I restrict the analysis to the loophole specification and consider a symmetric equilibrium with identical abatement cost functions A.[25] Moreover, I make the following assumption:

Assumption 6.5 *The marginal loophole effect of an increase of one's private lobbying is the same as a marginal decrease of the opponent's private lobbying:* $l_i^i = -l_j^i$.

---

[24]Using these specifications with several parameter constellations, I have not been able to sort out asymmetric equilibria, which have the property that a marginal increase of θ leads to a reduction of private lobbying by a firm.

[25]Hence in the following: $p^{1*} = p^{2*}$ and $g^{1*} = g^{2*}$.

This assumption implies that the extent of a marginal increase of one's own private lobbying is the same as the negative extent of a marginal increase of the opponent's private lobbying. If both firm increase private lobbying by the same amount, individual loopholes do not change.[26] In this case, mere counteractive effects prevail. The maximization problems of the firms are given as follows. Note that we cannot substitute for p^i anymore, as the lobbying budgets are endogenous:

$$\max_{p^1,g^1} \Pi^1(p^1,p^2,g^1,g^2,\theta) = -A^1 \left[E^1(p^1,p^2,g^1,g^2,\theta) \right] - p^1 - g^1, \quad (6.3)$$

$$\max_{p^2,g^2} \Pi^2(p^1,p^2,g^1,g^2,\theta) = -A^2 \left[E^2(p^1,p^2,g^1,g^2,\theta) \right] - p^2 - g^2. \quad (6.4)$$

Again, θ is parameter which reflects the responsiveness of the politician to private lobbying. The appendix describes properties of the equilibrium and shows that standard comparative statics methods yield

$$\frac{dp^{i*}}{d\theta} = \frac{-\Pi^i_{g_i g_i} \Pi^i_{p_i \theta} + \Pi^i_{p_i g_i} \Pi^i_{g_i \theta}}{\Pi^i_{g_i g_i} \left(\Pi^i_{p_i p_i} - \Pi^i_{p_i p_j} \right)}, \quad (6.5)$$

$$\frac{dg^{i*}}{d\theta} = -\frac{1}{2} \frac{\Pi^i_{g_i \theta}}{\Pi^i_{g_i g_i}}. \quad (6.6)$$

In analogy to chapter 6.2.1, an increase of θ indicates that the politician gets more responsive to private lobbying. The marginal effect of private lobbying on individual loopholes increases. Following chapter 6.2, I assume that both firms are affected in the same way if the politician gets more responsive to private lobbying: $l^i_{i\theta} > 0$ and $l^j_{j\theta} > 0$).

Proposition 6.5 *With an endogenous budget and assumption 6.5, if the politician gets more responsive to private lobbying of both firms, then private lobbying efforts of both firms increase.*

Proof. As θ is a parameter for the responsiveness of the politician to private lobbying, individual pollution standards can be written as

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[26] If this assumption does not hold, a similar increase of private lobbying by both firms influences the incentives for general lobbying as well. Interactions between private and general lobbying emerge, which may affect the results of this chapter in an important way. This is subject to further research.

$$E^i(p^1, p^2, g^1, g^2, \theta) = B(g^1 + g^2) + l^i(p^1, p^2, \theta),$$

which yields $\Pi^i_{p_i\theta} = -A'l^i_{p_i\theta} > 0$ and $\Pi^i_{g_i\theta} = 0$ (equations 6.3 and 6.4). Thus

$$\frac{dp^{i*}}{d\theta} = -\frac{\Pi^i_{p_i\theta}}{\left(\Pi^i_{p_i p_i} - \Pi^i_{p_i p_j}\right)} > 0 \text{ and } \frac{dg^{i*}}{d\theta} = 0. \quad \blacksquare$$

The intuition for the result is as follows: If the politician gets more responsive to private lobbying, each firm has a direct incentive to increase private lobbying. An increase of private lobbying tends to decrease incentives for general lobbying, because the base level of allowed pollution becomes less important.[27] The competitor increases private lobbying as well, which c.p. leads to a decline of the individual loophole. This makes general lobbying more attractive. By assumption 6.5, these two effects offset each other, and individual loopholes do not increase. As a result, a general increase in the responsiveness to private lobbying leads only to counteractive lobbying effects, but not to a change in regulation. There is no effect on the equilibrium basic levels of pollution, the individual loopholes and the overall level of pollution. Firms lose if the politician gets more responsive to private lobbying, because they increase lobbying efforts without any gain. Firms may face an incentive to form a lobbying coalition in order to overcome this situation. But in a non-cooperative setting, an increase of one's own private lobbying is the best response to an increase of the competitor's private lobbying.

6.4   Conclusions

The analysis shows that distributive concerns among anti-environmentalists lobbies may lead to an improvement of environmental quality. Firms focus on private lobbying if they expect politicians to supply loopholes - but these private lobbying efforts tend to cancel each other out. If the lobbying budget is fixed, an increase in private lobbying induces a decrease in general lobbying. Environmental quality improves, as the total amount of allowed pollution depends mainly on the amount of general lobbying. If the lobbying budget is flexible and private and general lobbying are substitutes, an increases in private lobbying tends to induce a decrease in general lobbying. In this case the same reasoning applies.

Although this model is formulated as a lobbying game against environmental

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[27]Remember that private and general lobbying efforts are strategic substitutes (compare the appendix for details).

regulation, the general idea is of broader scope: If loopholes become more important, interest groups may focus their lobbying activities on counteractive private lobbying. The increased importance of loopholes reduces general lobbying efforts, and the overall influence of special interests on the degree of regulation declines.

Is this framework also applicable to international trade models where interest groups influence the structure of protection (Grossman and Helpman 1994b, Aidt 1997, Mitra 1999), or models where firms influence taxes or competition policy (Dixit 1996, Neven and Röller 2000), or other models of environmental regulation (Aidt 1998, Damania 1999, Fredriksson 1997)?

The main characteristic of the type of policies is that allocative policies and distributive policies tend to be separated from each other. Firms agree about the allocative dimension of policy making, namely low general emission standards. But they disagree about the distribution of its benefits. The focus on the separation of allocative and distributive effects by different policies is a difference to the above mentioned models: For instance, if the policy under consideration is the structure of protection, each firm prefers high protection in its own sector and low protection in all other sectors. Therefore firms compete for favorable policies, and allocative and distributive effects are not separated as clearly as in this model.[28,29]

In this model, the policy parameter itself entails no competitive element, since all firms uniformly prefer high levels of allowed pollution. So this approach is not directly applicable to policies like protection rates and taxation, as these also entail competitive elements. Even though the policy itself (namely low regulation) is not debatable between groups in this context, firms compete about the distribution of gains from that policy. Hence the model implements lobbying competition through the idea that individual pollution standards can only increase by beggar-thy-neighbor behavior, given that the total amount of pollution is fixed.

To which type of policies does the framework apply? The policy must be

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[28]Note that an increase of private lobbying affects the allocation of emission rights indirectly in this model, because less resources are used for general lobbying. Moreover, private lobbying also has direct effects on the total level of allowed emission in the loophole specification.

[29]To be more precise, consider two organized sectors: They compete about protection in their own sectors, but agree that protection in all other sectors should be low. Accordingly, there is also a common interest. However, if one focuses on lobbying for protection in one's own sector, firms have opposing interests.

characterized by the property that interest groups have a common aim, but compete about the distribution of its benefit. Relevant policy setups may be the following:

- International bargaining setups like trade, environmental or investment agreements: Consider for instance governments who bargain in an international investment agreement about the degree of protection of each country. Then domestic lobby groups prefer a high general degree of protection for their country. But given that a certain level of protection is realized, firms compete about how protection should be distributed across sectors.

- Federal systems and equalization of costs between local governments: Consider net recipients in a federal system, like some countries in the EU or some states in the German revenue equalization scheme. They have a common interest in a high level of redistribution, but compete about the distribution of these gains.

6.5   Appendix

Existence of Equilibrium and Implicit Function Theorem

Lemma 6.1 *(Existence of equilibrium): A pure Nash equilibrium exists in any specification of the game under assumptions 6.2-6.4.*

Proof. A Nash equilibrium exists if the strategy space of any individual is a non-empty, convex and compact subset of $\mathbb{R}$, and the payoff functions are continuous and quasi-concave (Mas-Colell, Whinston and Green (1995), Prop. 8.D.3).

The strategy space in the fixed budget cases is non-empty, convex and compact, since $p_i \in [0,1]$ and $g_i \in [0,1]$. The strategy space in the flexible budget cases is non-empty and convex, but not compact, since $p_i \in [0,\infty($ and $g_i \in [0,\infty($. But we can restrict the strategy space to a compact subset without affecting the results, if all strictly dominated strategies are eliminated. Such a modified strategy space always exists, because lobbying is costly and abatement costs are bounded above by assumption 6.1: Profits net of lobbying costs will never be below $\Pi^i = -\overline{A}$, independent of lobbying efforts of firm i and j. Thus it cannot be optimal to induce private and general lobbying efforts which exceed the maximum abatement costs. Any optimal private lobbying effort satisfies $p^i \leq \overline{A}$, and $g^i \leq \overline{A}$ by the same reasoning. Hence we can restrict the strategy space to $p_i \in [0,\overline{A}]$, and $g_i \in [0,\overline{A}]$, which are non-empty, convex and compact subsets of $\mathbb{R}$.

The payoff function Π^i is continuous and concave in p_i and g_i in each specification, as straight forward calculations show. Concavity implies quasi-concavity, and hence an equilibrium exists. ■

Lemma 6.2 *The implicit function theorem is applicable, and comparative statics results can be derived.*

Proof. The implicit function theorem is applicable, if the profit functions are twice continuously differentiable with respect to p_1, p_2 and θ, and the determinant of the Jacobian matrix is non-zero. Differentiability applies, because the profit functions are continuous with respect to all variables. The Jacobian matrix is non-zero by assumption 6.4. ■

Flexible Lobbying Budget

The first order conditions for each firm are

$$\Pi^i_{p_i} = -A'E^i_{p_i} - 1 \stackrel{!}{=} 0,$$

$$\Pi^i_{g_i} = -A'E^i_{g_i} - 1 \stackrel{!}{=} 0.$$

By symmetry of the equilibrium and derivation of the profit functions, we know

$$\Pi^1_{p_1 p_1} = \Pi^2_{p_2 p_2} = -A''l_i^{i2} - l_{ii}^i A' < 0$$

$$\Pi^1_{g_1 g_1} = \Pi^1_{g_1 g_2} = \Pi^2_{g_2 g_1} = \Pi^2_{g_2 g_2} = -A''B'^2 - A'B'' < 0$$

$$\Pi^1_{g_1 p_1} = \Pi^1_{p_1 g_1} = \Pi^1_{p_1 g_2} = \Pi^2_{p_2 g_1} = \Pi^2_{p_2 g_2} = \Pi^2_{g_2 p_2} = -A''B'l_i^i < 0$$

$$\Pi^1_{p_1 p_2} = \Pi^2_{p_2 p_1} = -A''l_i^i l_j^i - l_{ij}^i A' \gtreqless 0$$

$$\Pi^1_{g_1 p_2} = \Pi^2_{g_2 p_1} = -A''B'l_j^i > 0$$

$$\Pi^1_{p_1 \theta} = \Pi^2_{p_2 \theta} \gtreqless 0$$

$$\Pi^1_{g_1 \theta} = \Pi^2_{g_2 \theta} \gtreqless 0$$

Note that $\Pi^1_{g_1 p_2} = -\Pi^1_{g_1 p_1}$ since the loophole function is symmetric with respect to private lobbying efforts around the equilibrium ($l_i^i = -l_j^i$).

Most signs of the derivatives are standard and as expected. Note that $\Pi^i_{g_i p_i} < 0$, which means that the marginal effect of general lobbying on profits decreases if private lobbying increases. This implies that private and general lobbying are strategic substitutes with this specification. The reason is an (indirect) convexity effect of the abatement cost function: Since the individual pollution standards E^i are separable in private and general lobbying, an increase in private lobbying has no (direct) marginal effect on general lobbying, and vice versa. But an increase in private lobbying increases the level of allowed pollution for the firm. Since the abatement cost function is convex in E^i, an increase through private lobbying decreases the marginal cost reduction of an additional amount of general lobbying. Hence $\Pi^i_{g_i p_i} < 0$.

The same reasoning applies for $\Pi^i_{g_i p_j} > 0$: If firm j increases private lobbying, the loophole of the firm i shrinks. This implies that an increase in general lobbying leads to more cost savings, since an additional unit of allowed emissions is more valuable if E^i is low.

The general solution to the comparative statics problem is

$$\frac{dp^{i*}}{d\theta} = \frac{\Pi^i_{g_i g_i} \Pi^i_{p_i \theta} - \Pi^i_{p_i g_i} \Pi^i_{g_i \theta}}{\Pi^i_{p_i g_i} \left(\Pi^i_{p_i g_i} + \Pi^i_{g_i p_j} \right) - \Pi^i_{g_i g_i} \left(\Pi^i_{p_i p_i} - \Pi^i_{p_i p_j} \right)},$$

$$\frac{dg^{i*}}{d\theta} = -\frac{1}{2} \frac{\Pi^i_{p_i \theta} \left(\Pi^i_{g_i p_i} - \Pi^i_{g_i p_j} \right) - \Pi^i_{g_i \theta} \left(\Pi^i_{p_i p_i} + \Pi^i_{p_i p_j} \right)}{\Pi^i_{p_i g_i} \left(\Pi^i_{p_i g_i} + \Pi^i_{g_i p_j} \right) - \Pi^i_{g_i g_i} \left(\Pi^i_{p_i p_i} - \Pi^i_{p_i p_j} \right)}.$$

Since the loophole function is symmetric, this simplifies to

$$\frac{dp^{i*}}{d\theta} = \frac{\Pi^i_{g_i g_i} \Pi^i_{p_i \theta} - \Pi^i_{p_i g_i} \Pi^i_{g_i \theta}}{-\Pi^i_{g_i g_i} \left(\Pi^i_{p_i p_i} - \Pi^i_{p_i p_j} \right)},$$

$$\frac{dg^{i*}}{d\theta} = -\frac{1}{2} \frac{\Pi^i_{g_i \theta}}{\Pi^i_{g_i g_i}}.$$

Note that $\Pi^i_{p_i p_i} < 0$, $\Pi^i_{g_i g_i} < 0$, and $\Pi^i_{p_i p_i} < \Pi^i_{p_i p_j}$.

Chapter 7

Lobbying activities of multinational firms

7.1 Introduction

One aspect of globalization is the increasing importance of multinational companies. Worldwide nominal in- and outflows of foreign direct investment grew from about 40-60 billions of US dollar in 1982 to about 1200 billion US dollar in 2000. The average growth rates of foreign direct investment are much higher than comparable growth rates, i.e. productivity, GDP or even trade (UNCTAD 2001, OECD 1999b). Some authors argue that economic influence on the political process has grown due to this aspect of globalization (e.g. Reich (1993), Summers (1999)). This perception sometimes culminates in the notion of 'the loss of sovereignty' of the nation state. It reflects the idea that, due to the process of globalization, national governments lost almost any discretion to set national policy, because the bargaining position of multinational companies vis a vis national governments has improved. The reason is that firms relocate their production plants if governments set unwanted policies. As governments care about the presence of these firms, they are caught in a "race to the bottom" (Rauscher 1995), and there is almost no discretion left to set national policy.[1]

An extensive literature exists which investigates lobbying activities of firms in the context of international trade models. But only little attention has

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[1]Compare also Janeba (2000) and the quoted literature there.

been paid to the analysis of lobbying activities of multinational firms so far.[2] The aim of this paper is to analyze differences in lobbying incentives between multinational and national firms, and show how they affect the political outcome. The paper attempts to address the following questions: How do lobbying incentives of multinationals differ from those of national firms? Will their influence be higher or smaller? What is the political outcome if multinationals are present: Will regulation be more lax?

To answer these questions, the distinction between a national and a multinational firm needs to be clarified. Obviously, a multinational firm produces in at least two regions, in contrast to a national firm. But this distinction lacks precision: Each national firm may also relocate production abroad as a reaction towards rigid domestic regulation, and thus become a multinational. Accordingly, each national must be regarded as a potential multinational.

In this approach, I define a multinational as a firm which can relocate production with smaller moving costs than a national firm. To justify this view, consider a firm which intends to relocate production. A multinational possesses general skills and knowledge which are essential for operation in foreign countries. For instance, it possesses a network for cross-border communication, has knowledge how to handle cultural differences and is accustomed to foreign law. A national firm lacks such knowledge. In addition, if the multinational already runs a plant in the foreign country, expanding this plant will generally cause smaller costs than building a plant from scratch, which is necessary if a national firm wants to move abroad.

I will show that it is not obvious in such a setup that multinationals have more influence on the political process than national firms: On the one hand, a multinational might have smaller stakes in the home market. It can move at least a part of the production to a foreign country if the government sets unwanted regulation. The option to escape national regulation tends to reduce incentives to engage in lobbying activities against it. It should be expected that this effect leads to less political influence of multinationals. On the other hand, a government might be interested that multinationals produce at home. For instance, it might care about local production, the number of firms in the domestic market, or tax revenue. This aspect tends to improve the influence of multinational companies on national regulation. In sum, even though lobbying activities of multinationals might be less intense, they might also be more successful.

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[2]Exceptions are Ellingsen and Warneryd (1999), Grossman and Helpman (1996), or Konishi et al. (1999).

The paper analyzes these aspects in a general lobbying game. The first part derives differences in lobbying incentives between national and multinational firms. I employ a reduced form model of imperfect competition, which can easily be applied to specific market forms. The second part describes the lobbying game. It investigates how firms determine contributions to the government, and derives the political outcome.

Two branches of recent literature are related to the analysis: Approaches towards analyzing the location decisions of firms are used to derive the different incentives for plant relocation. For instance, Horstmann and Markusen (1992) or Krugman (1991) are seminal papers in this field. Lobbying games in the context of international trade policy were pioneered by Hillman (1989), Hillman and Ursprung (1988), Mayer (1984), Grossman and Helpman (1994a). For recent research in this area compare e.g. Goldberg and Maggi (1999) or Mitra (1999). Grossman and Helpman (2001) and chapters 2 to 5 (Polk 2002a) provide comprehensive surveys about the literature.

This paper is organized as follows: Chapter 7.2 introduces the basic set-up of the model and gives relevant definitions. In chapter 7.3, I derive general conditions which imply that national and multinational firms have different stakes in national regulation. These general results will be applied to specific forms of competition thereafter. The insights of the general model then work as a basis for the lobbying game in chapter 7.4. I use a slightly modified framework and analyze the lobbying process. The choice of the optimal contribution function and resulting regulation will be characterized. Chapter 7.5 concludes.

7.2   The basic set-up

There are two countries ('home' and 'foreign'), which are separated by transportation costs s. Production in the home country is subject to real valued regulation $r > 0$, which decreases variable profits. The producing firm is either a national firm or a multinational. Production in the foreign country is not subject to regulation. One might think of r as a tax, environmental regulation, or a product standard which increases costs.[3] The foreign coun-

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[3]Note that the type of regulation in this model does not influence the characteristics of the good. Goods produced at home and in the foreign country are homogenous, independent of the level of domestic regulation. The idea is that regulation does not serve as a means to differentiate domestic from foreign goods. This type of regulation applies for

try does not set any policy, independent of the home country's policy choice. The home country can thus be interpreted as being small.[4]

I analyze the location decision of a multinational firm, which initially produces in the home country and serves the foreign country through exports. The firm can react to a change in national regulation via relocation: It can either stay in the home country and export to the other country, or it can relocate partially or completely to the foreign country. In the latter case, it serves the market of the home country through exports. Relocation has two effects on profits. First, variable profits change, because the marginal costs of production depend on national regulation and transportation costs. Second, total profits are affected, because the firm faces fixed moving costs if it relocates production.

I assume that the profits of the firm depend on the policy choice r, on transportation costs s and on the location decision l. Markets are imperfect, and profit functions are given in reduced form. It is assumed that a unique solution to the product market game exists, with equilibrium quantities denoted as $q(r)$.[5] Firm's profits can then be written in reduced form as

$$\Pi = \Pi^l(r, s) - \delta F^l.$$

The superscript $l \in \{nr, pr, cr\}$ denotes the location choice of the multinational firm. nr means 'no relocation', pr means 'partial relocation' and cr means 'complete relocation'. Location structure nr is the starting point of the analysis. The firm produces in the home country and serves the foreign market through exports. Parameter δ is a dummy, which is equal to one if the firm relocates (partially or completely). If it does not relocate, then no fixed costs arise and $\delta = 0$. Note that the fixed moving costs F^l are indexed as well. The model allows for different levels of these costs dependent on the choice of location.

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instance to environmental standards, which affect the way a good is produced, but not the good itself (i.e. water and air pollution, waste management, social security standards etc.). Other examples are competition policies affecting the degree of competition in a market (and hence profits), or tax policies. The model does not cover regulation policies which differentiate the good subject to regulation from others, as for instance laws which prohibit certain ingredients in food. Moreover, the model does not apply to regulation which affects production in both countries, as for instance general labor standards or tariffs.

[4]In this chapter I assume that regulation is exogenous. I will determine regulation endogenously in chapter 7.4.

[5]Since the model allows for international trade, the amount of goods consumed in the home country q^D may differ from the amount of goods produced in the home country, q^S. This distinction will not be used in this chapter, but in chapter 7.4.

To analyze differences in lobbying incentives between a national and a multinational firm, I consider the effect of a policy change on profits for two types of firms: (i) If the firm is a multinational, the location structure is an endogenous choice variable. The multinational might react to the policy choice through relocation. The location decision depends on transportation costs, the amount of regulation, and fixed moving costs. I will derive conditions in chapter 7.3, such that the multinational takes advantage of this opportunity. (ii) If the firm is a national firm, it cannot relocate production. The location structure is given exogenously as $l = nr$ in this case. A national firm is restricted to produce in the home country and serve the foreign country through exports, irrespective of the amount of regulation r.

The following definition summarizes the approach:

Definition 7.1 *A national firm has location structure $l = nr$. Profits of a national firm are given by*

$$\Pi^{NAT}(r, s) = \Pi^{nr}(s, r).$$

A multinational firm chooses its location structure endogenously. Profits of the multinational are

$$\Pi^{MNE}(r, s) = \max_{l} \left\{ \Pi^{l}(s, r) - \delta F^{l} \right\} \quad , l \in \{nr, pr, cr\}.$$

The idea that the national firm cannot move may appear overly restrictive. A national firm might also be able to relocate production and become a multinational, although at higher costs. The reasons for this assumption is tractability: If the national firm is also allowed to relocate production, the following arguments are still valid if moving costs of the national firm are higher than those of the multinational. The focus is on differences in profits between a multinational and a national firm, and the resulting differences in lobbying incentives. These exist whenever moving costs differ. Hence I normalize moving costs to be prohibitively high, such that the national firm will never relocate production, even though in principle it could.

Figure 7.1 illustrates an arbitrary profit function of the multinational, which is the upper bound of the profit functions for each location decision. The profit function of the national firm is given by Π^{nr}.

The aim is to derive some general principles on how multinational and national firms differ in their influence on the political process. The structure of
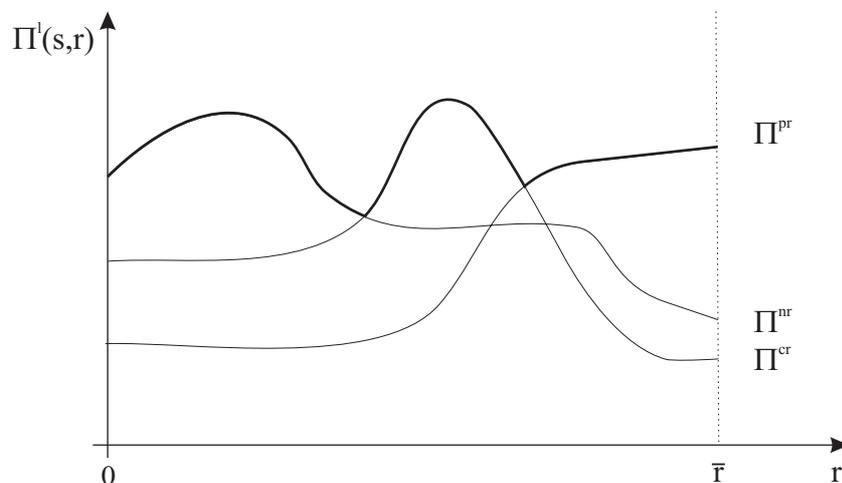
Figure 7.1: Profits of the multinational depend on the location decision $l \in \{nr, pr, cr\}$. It is the upper bound of national firm's profits (printed in boldface).

the model is very general and does not rely on any specific form of competition at this stage. It entails only some general assumptions on the behavior and shape of the profit functions, which are satisfied in most models of competition.

The first assumption defines critical upper and lower bounds for transportation costs s and the regulation parameter r. It serves to exclude some rather uninteresting cases: For instance, if transportation costs were allowed to be very high, both markets would be completely separated. Then it could never be the case that the multinational relocates completely and serves the domestic market through exports. Hence, either the multinational produces in the home country; then there is no difference between the national and the multinational firm. Or the multinational produces abroad; but then national regulation does not affect it at all, because markets are completely separated. To exclude this uninteresting case, transportation costs are bounded above, and it is always possible to serve a market through exports.

The regulation parameter is also bounded above. Regulation increases the cost of production. Thus very strict regulation can lead to negative variable profits of the national firm. To exclude this case, I restrict the parameter

range or r. Regulation will never drive the national firm out of the market.[6] Note that the upper bound for r may depend on the exogenous parameter s, that is $\overline{r} = r(s)$. The same applies for $\overline{s}$, which may be a function of the realized level of regulation, $\overline{s} = s(r)$:

Assumption 7.1 *a) Upper bounds for r and s exist: Variable profits are negative for any value of s, if $r > \overline{r}$. Markets are completely separated by transportation costs for any value of r, if $s > \overline{s}$.*

b) The government sets regulation, such that profits are positive if production takes place in the home country: $r \in [0, \overline{r}]$.

Transportation costs do not separate the markets completely, and both countries can be served through exports: $s \in [0, \overline{s}]$.

The next two assumptions state how regulation affects profits in the home country. Regulation decreases profits if the firm produces at least partly in the home country. This is a rather intuitive assumption and is satisfied for most forms of competition.[7] If production takes place in the foreign country only, regulation in the home country may increase or decrease profits of the multinational. The effect is ambiguous and depends on the specific form of competition. For instance, I allow for circumstances where firms benefit from raising rivals' costs, as is the case in the application to Cournot competition discussed in chapter 7.3.2.[8]

Assumption 7.2 *If a firm produces at least partly in the home country, regulation decreases profits: $\frac{\partial \Pi^l(s,r)}{\partial r} < 0$, if $l \in \{nr, pr\}$. If the multinational does not produce in the home country, regulation affects its profits monotonically.*

Since regulation affects only domestic production, but not production abroad, it is intuitive to assume that regulation has a higher impact if more production takes place in the home country. Note that the assumption allows that

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[6]This implies that the multinational is not driven out of the market either, because it can always perform at least as good as the national firm.

[7]A contrary view for the special case of environmental regulation is given by Porter (1991) and Porter and van der Linde (1995). However, their argument relies on some specific conditions and cannot be sustained for environmental regulation in general (Schmutzler 2001).

[8]In a basic model of Cournot competition, profits of the multinational increase if the competitor in the home market faces higher variable costs through regulation.

profits depend positively on regulation if the multinational produces solely in the foreign country. I make the following assumption on the impact of regulation on profits:[9]

Assumption 7.3 *There is a positive relationship between the extent of production in the home country and the effect of regulation on profits, that is*

$$\frac{\partial \Pi^{nr}(r,s)}{\partial r} \leq \frac{\partial \Pi^{pr}(r,s)}{\partial r} \leq \frac{\partial \Pi^{cr}(r,s)}{\partial r}.$$

Moving costs depend on the location structure in the following sense:

Assumption 7.4 *Moving costs depend on the type of relocation: If the firm relocates completely to the foreign country, fixed moving costs are higher than with partial relocation, i.e. $F^{cr} \geq F^{pr}$. With no relocation, $\delta = 0$, otherwise $\delta = 1$.*

Assumption 7.4 is a 'monotonicity assumption' on the amount of fixed moving costs, which assures that each location structure is optimal for a specific parameter range. If this assumption did not hold and $F^{cr} < F^{pr}$, it would never be optimal to relocate partially: Suppose that regulation is low and production in the home country is optimal. If regulation increases such that it becomes optimal to relocate, partial relocation is no option. The reason is that partial relocation has two negative effects compared to complete relocation: First, the firm escapes national regulation only partly, which leads leads to lower variable profits compared to complete relocation. Second, fixed moving costs are higher. However, transportation costs could be saved. But since it was optimal to bear transportation costs in the first place with slightly lower regulation, transportation costs cannot be the sole reason to relocate partially.[10]

Figure 7.2 provides examples on how the profit functions of the multinational and the national firm might look like.

I will denote the loss of profits through regulation as the 'stakes' of a firm in the home market. The stakes of a firm define possible benefits through

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[9]Note that this assumption can be written in a more intuitive, but slightly less precise way as $\left| \frac{\partial \Pi^{nr}(r,s)}{\partial r} \right| \geq \left| \frac{\partial \Pi^{pr}(r,s)}{\partial r} \right| \geq \left| \frac{\partial \Pi^{cr}(r,s)}{\partial r} \right|$.

[10]Note that profits decrease continuously in regulation by assumption 7.2. Moreover, they decrease faster with partial relocation by assumption 7.3.
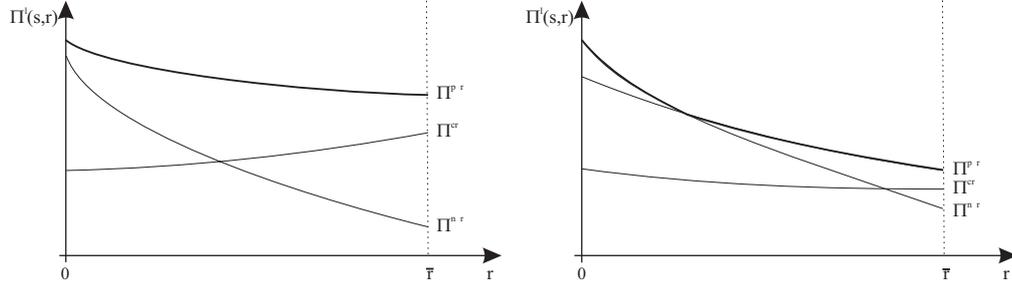
Figure 7.2: Possible profit functions of the national and the multinational firm satisfying assumptions 7.1 to 7.4.

lobbying. If the multinational has smaller stakes in the home market than a national firm, regulation affects the firm to a smaller extent. Other things equal, this should result in a smaller interest for the multinational to engage in costly lobbying.

The following definition states the idea of smaller stakes in the home market formally. In the remainder of the paper, I will use the following notation: $\Delta \equiv r - r^0$ is the change in regulation from r^0 to r, $\Delta\Pi^{MNE}(r, s, \Delta) \equiv \Pi^{MNE}(r, s) - \Pi^{MNE}(r - \Delta, s)$ denotes the corresponding profit change of the multinational firm, and $\Delta\Pi^{NAT}(r, s, \Delta) \equiv \Pi^{NAT}(r, s) - \Pi^{NAT}(r - \Delta, s)$ for the national. Note that if $r > r^0$, $\Delta\Pi^{NAT}(r, s, \Delta) < 0$, but $\Delta\Pi^{MNE}(r, s, \Delta) \gtrless 0$ by assumptions 7.2 and 7.3.[11]

Definition 7.2 *For a given level of transportation costs s, the multinational company has smaller stakes in the home country compared to a national firm, if and only if*

$$\left|\Delta\Pi^{MNE}(r, s, \Delta)\right| \leq \left|\Delta\Pi^{NAT}(r, s, \Delta)\right| \ \text{for all } r, \ \Delta$$

and

$$\left|\Delta\Pi^{MNE}(r, s, \Delta)\right| < \left|\Delta\Pi^{NAT}(r, s, \Delta)\right| \ \text{for at least one pair of } r, \ \Delta.$$

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[11]Note that $\Pi^{MNE}(r, s)$ denotes the profits of the multinational which result from the maximization problem over the location decision.

7.3 The interest of MNEs in national policies

7.3.1 A general model

To analyze differences in lobbying between a multinational and a national firm, incentives to lobby need to be distinguished from the impact of lobbying on the policy decision. This chapter focusses on the incentives to influence political decisions. I show that multinational companies have different stakes in domestic regulation than national firms. The result of this chapter will then be used in chapter 7.4, which focusses on the effectiveness of lobbying.

Whether a multinational has smaller stakes in the home market than a national firm depends on the relationship of the exogenous parameters for transportation costs s, regulation r and fixed moving costs F^l. When the multinational decides if to relocate production, it has to take different aspects into account. First, if it relocates, fixed moving costs reduce profits. On the other hand, relocation serves to escape national regulation, and profits decline to a smaller extent. Therefore the relation between fixed moving costs and the change in variable profits through regulation is essential for the decision to relocate production. Second, if the multinational relocates, variable costs change because transportation costs become more or less important. For instance, if the multinational relocates partially, transportation costs become less important. If it relocates completely, the importance of transportation costs increases.

To illustrate these aspects, take the initial location structure as a starting point. The multinational produces in the home country only. If it relocates partially, it saves transportation costs, because the foreign market tends to be served by local production. The gain from relocation is two-fold: The firm escapes national regulation and saves transportation costs. Next, suppose the firm is present in both markets. When it decides if to relocate completely, it has to bear increased transportation costs to serve the home market, which cannot be served by local production anymore. Therefore, the gain is to escape national regulation, but only at the cost of higher fixed and transportation costs.

The optimal location decision is determined by the amount of fixed costs which have to be paid for relocation, given specific values of transportation costs and regulation.[12] The following proposition specifies this:

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[12]Figure 7.2 shows that fixed costs shift the profit functions vertically. Their value is

Proposition 7.1 *Suppose the following conditions are satisfied:*

(i) $F^{pr} < \Pi^{pr}(\overline{r}, s) - \Pi^{nr}(\overline{r}, s)$ *or*

$\quad F^{cr} < \Pi^{cr}(\overline{r}, s) - \Pi^{nr}(\overline{r}, s).$

(ii) $F^{pr} > \Pi^{pr}(0, s) - \Pi^{nr}(0, s).$

The multinational has the same stakes in the home market compared to a national firm if regulation is lax (i.e. for small r). If the regulation gets tighter and reaches a critical level, the multinational has smaller stakes in the home market than a national firm.

Proof. The proof is given in the appendix. ■

The multinational has the same stakes as a national firm if it produces in the home country only. This is the case if it is optimal to produce at home with the smallest possible regulation. If this was not the case, it would never be optimal to produce in the home country only, because variable profits decline in r. Condition (ii) of the proposition states the respective condition: If, for the smallest level of regulation, the difference in profits between partial relocation and no relocation is smaller than the amount of necessary fixed costs to relocate partially, it is not profitable to relocate production. Complete production in the home country is the best location structure in this case.

If regulation becomes tighter, the multinational must have an incentive to move abroad. If this is not the case, differences between multinational and national companies do not exist. We must assure that the multinational has an incentive to relocate production either partially or completely for some regulation parameter r. It suffices to consider the upper bound $\overline{r}$, because variable profits decline in r. Condition (i) states these requirements: Fixed costs for either partial or complete relocation must be less than the difference in profits between some type of relocation and production at home, if regulation is strictest. These conditions are sufficient, because profits are continuous and declining in r if production takes at least partially place in the home country (assumption 7.2 and 7.3). An interval of regulation exists, which induces relocation of the multinational. The national firm cannot move by definition. As a result, both firms face different profits with high regulation, if condition (i) of proposition 7.1 applies.

essential for the determination of the optimal location structure.

Note that we are not primarily interested in the difference in profits, but in different stakes between the national and the multinational firm. The term 'stakes' accrues to a change in profits due to a change in regulation, not to the height of profits per se (compare definition 7.2). Proposition 7.1 implies that the multinational has higher profits than the national firm if regulation is tight, and that there is no difference in profits if regulation is lax. Trivially, the latter case implies that both types of firms have the same stakes in the home market if regulation is low. If profits are identical, both firms have the same stakes. However, condition (i) alone does not imply that the multinational has smaller stakes in the home market if regulation is high. It only implies that profits are different; but even though the amount of profits is different, the stakes of both firms may be the same if they are affected through a change in regulation in the same way.

It is assumptions 7.2 and 7.3 which assure that different profits lead to different stakes. Unequal profits result from different location structures. Assumption 7.2 implies that profits decrease in regulation if the firm produces in the home country. This assumption alone is not sufficient to induce different stakes between the firms. Assumption 7.3 assures that the extent of regulation on profits increases if more production takes place at home. The combination of these two assumptions leads to the result of proposition 7.1. Figure 7.3 illustrates it graphically.[13]

If the general model is applied to specific forms of competition, proposition 7.1 gives upper and lower bounds for fixed moving costs, which depend on transportation costs and regulation. If moving costs are above the upper bound, relocation is no means to escape regulation. The cost of moving abroad exceeds its benefits, which is less impact of regulation and possibly lower transportation costs. In this case no differences between a multinational and a national firm exist.

The following corollary contrasts this to the case where the multinational has always smaller stakes in the home market, independent of the regulation in place. Intuitively, this is the case if moving costs are small relative to possible gains of relocation. Corollary 7.1 gives conditions only on the upper bound of fixed costs. The intuition is analogous to the one of proposition 7.1. I simply state the result, the left part of figure 7.2 plots a corresponding situation. Note that a condition similar to condition (i) of the previous proposition is not necessary. Profits decline faster in regulation if more production takes

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[13]Note that the argument does not rely on the type of relocation (partially or completely). The relevant condition is that production moves at all.
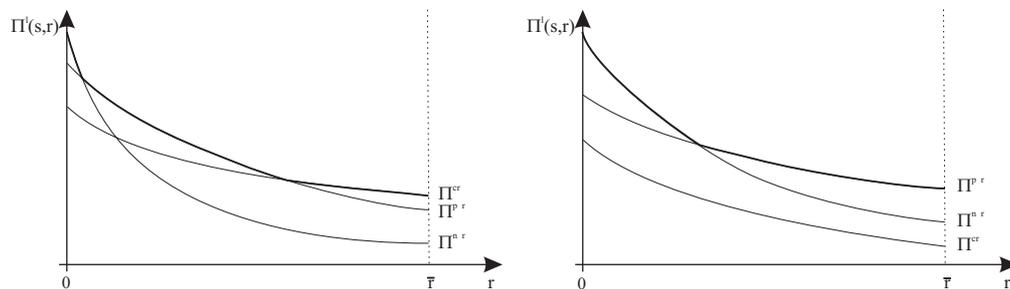
Figure 7.3: A national and multinational firm have different stakes in regulation if regulation is high. If it is low, both firms have the same stakes. The multinational completely relocates if regulation is strict and fixed costs are small. In this case transportation costs tend to be small, such that complete relocation becomes an option if regulation is sufficiently high (left). If fixed costs for complete relocation are high, or transportation costs play an important role, complete relocation is never optimal (right).

place in the home country. The stated condition thus also implies condition (i) of proposition 7.1.

Corollary 7.1 *Suppose the following condition is satisfied:*

$$F^{pr} < \Pi^{pr}(0,s) - \Pi^{nr}(0,s).$$

The multinational has smaller stakes in the home market compared to a national firm, independent of the regulation r.

Proof. Follows immediately from the proof of proposition 7.1. ■

7.3.2   An application to Cournot competition

This chapter applies the general model to a basic two-stage game. Firms play Cournot competition and face linear demand. The regulation is an input tax t which increases marginal costs. In the first stage, the multinational chooses a location structure for a given tax, as described in the previous chapter. In the second stage, firms play Cournot competition. The game is solved by backwards induction.

The notation is as follows: There are two countries $k \in \{$home, foreign$\}$, and two firms X and Y which produce a homogeneous good consumed in both countries. The amount of the good produced by firm X (Y) and consumed in country k is denoted by x^k (y^k). Consumers in each country have linear demand $p^k = a - x^k - y^k$, where p denotes the price of the good and a is a market parameter. Firm Y produces in the foreign country. It is inactive and cannot relocate in the first stage of the game.[14] The analysis focuses on firm X, which is initially located in the home country. It can relocate production if it is a multinational, and can not do so if it is a national firm.

The cost structures of both firms consist of two parts: There are constant marginal costs, which consist of production costs m, transportation costs s if the firm exports to the other country, and the input tax t of firm X if it produces at home. Plant specific fixed costs F arise if the multinational moves production. For simplicity, I assume that $F \equiv F^{pr} = F^{cr}$. If part of the production takes place in the foreign country, the multinational is able to move production completely without further costs.

Standard calculations yield firm X's variable profits for a given tax in the home country, and for each possible location structure:[15] With two firms having constant marginal costs c_x and c_y, and linear demand with slope -1, standard derivations show that the multinational sells $x^k = \frac{1}{3}(a - 2c_x^k + c_y^k)$, and firm Y sells $y^k = \frac{1}{3}(a - 2c_y^k + c_x^k)$ in each market. Variable profits in each market are $\Pi_x^k = \frac{1}{9}(a - 2c_x^k + c_y^k)^2$ and $\Pi_y^k = \frac{1}{9}(a - 2c_y^k + c_x^k)^2$ respectively. Straightforward application and accounting for fixed costs yields the relevant profit functions for each location structure.[16]

Proposition 7.2 *Suppose the following conditions are satisfied:*

(i) $s \geq 0; t \geq 0$,

(ii) $a - m \geq 2(s + t)$,

(iii) $F \in \left[\frac{4}{9}(a - m - s); \frac{1}{9}(a - m)^2 \right]$.

A multinational and a national firm have the same stakes in the home market if the tax is small. If the tax reaches a critical level, a multinational firm has

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[14]Firm Y can be interpreted as the rest of the market.
[15]Compare for instance Tirole (1988, Chapt. 5.4).
[16]$\Pi^{nr}(s,t) = \frac{1}{9}[(a - m + s - 2t)^2 + (a - m - 2s - 2t)^2]$,
$\Pi^{pr}(s,t) = \frac{1}{9}[(a - m + s - 2t)^2 + (a - m)^2] - F$,
$\Pi^{cr}(s,t) = \frac{1}{9}[(a - m - s)^2 + (a - m)^2] - F$.

smaller stakes in the home market.

Proof. The proof is given in the appendix. ■

The conditions of this proposition result from assumptions 7.1 to 7.4, and from application of proposition 7.1:

Fixed costs for relocation are independent of the location structure, therefore assumption 7.4 is trivially satisfied. Assumption 7.1 requests that upper and lower bounds for s and t exist, such that all markets are served for parameters within this range. Conditions (i) and (ii) of proposition 7.2 define these bounds. Note that the upper bounds of s and t depend on each other. The highest possible tax rate depends on the height of transportation costs and vice versa. These conditions imply $\overline{s}(t) = (a - m)/2 - t$, $\overline{t}(s) = (a - m)/2 - s$. Assumptions 7.2 and 7.3 are then satisfied as well, as is shown in the appendix. The conditions of proposition 7.1 are satisfied if and only if F lies within the stated parameter range. Therefore, the general result of proposition 7.1 holds, and the result follows.[17]

One particular shape for the profit functions is given in figure 7.3 above. This is not the only possible shape. Three different cases might arise, depending of the values of s and t. To distinguish these, I define s^* as a critical level of transportation costs. If $s > s^*$, the multinational will never relocate completely to the foreign country. The critical level of transportation costs results from the condition $\Pi^{pr}(s, \overline{t}) = \Pi^{cr}(s, \overline{t})$, which defines s^*. It states that profits under complete relocation are the same as profits with partial relocation, given that the tax level reaches its maximum level $\overline{t}$. In this case, the multinational will never relocate completely. Even if regulation takes its maximum value, profits with partial relocation are at least as high as profits with complete relocation.[18] We get from the above condition

$$s^* \equiv \frac{1}{4}(a - m).$$

The following values of the tax parameter will be used in corollary 7.2. They define critical levels of transportation costs, such that the multinational is indifferent between no relocation and partial relocation (t^1), and partial relocation and complete relocation (t^2). These values depend on transportation costs and moving costs. t^1 results from the condition $\Pi^{nr}(s, t) = \Pi^{pr}(s, t)$, and t^2 from $\Pi^{pr}(s, t) = \Pi^{cr}(s, t)$:

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[17]For derivations of the relevant parameter ranges consult the proof in the appendix.
    [18]Note that markets are not separated completely if $s > s^*$, because partial relocation may be optimal.

$$t^1 \equiv \frac{1}{2}\left[(a-m-2s) - \sqrt{(a-m)^2 - 9F}\right],$$

$$t^2 \equiv \frac{1}{2}(a-m-\frac{1}{2}s) + \sqrt{\frac{1}{4}\left[(a-m)^2 - s(a-m) + \frac{1}{4}s\right] - 4s^2 - \frac{9}{8}F}.$$

The following corollary gives the explicit solutions of this Cournot model:

Corollary 7.2 *Suppose that the conditions of proposition 7.2 are satisfied. It is possible to distinguish three cases.*

The multinational does not relocate completely if transportation costs are high ($s > s^*$). It produces in the home country and exports to the foreign country if taxes are low ($t \leq t^1$). If taxes are high ($t > t^1$), the multinational relocates partly and serves both markets through local production.

If transportation costs are small ($s < s^*$), but $s > t^1$, three different location structure arise:

- *The multinational does not relocate if $t < t^1 < s$.*

- *The multinational relocates partly if $t^1 < t < s$.*

- *The multinational relocates completely if $t^1 < s < t$.*

If transportation costs are low ($s < s^*$), and $s < t^1$, the multinational will never produce in both countries:

- *The multinational does not relocate if $t < t^2$.*

- *The multinational relocates completely if $t > t^2$.*

Proof. The proof is given in the appendix. ∎

The intuition corresponds to the former chapter. For a graphical illustration compare figure 7.3: The right hand side illustrates the case of high transportation costs ($s > s^*$). It never pays to relocate completely, even if regulation is very high. The left hand side illustrates the case of low transportation costs ($t^1 < s < s^*$). If pays to relocate partially if regulation is intermediate. If it is sufficiently high, complete relocation is the best choice.

Figure 7.4 shows how the relocation decision depends on transportation costs, fixed costs and taxes. Note that fixed costs influence the critical tax levels t^1 and t^2.
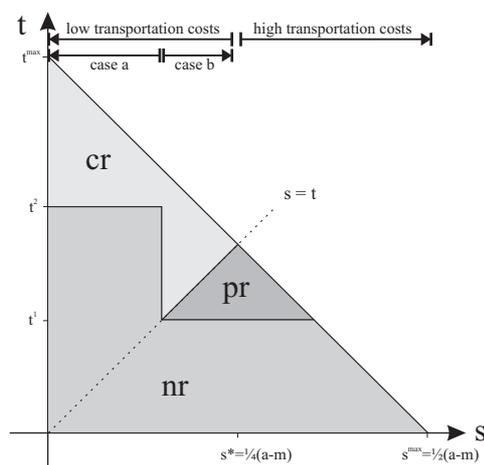

Figure 7.4: Optimal location decisions of a national firm in the Cournot example. The location decision depends on transportation costs s and taxes t, and fixed costs.

Note that the decision between partial and complete relocation depends on the comparison of transportation costs and taxes. It is independent of moving costs, because partial and complete relocation induce the same amount of fixed costs. It never pays to relocate completely to the foreign country if transportation costs are high, because tax savings cannot compensate for transportation costs. If the tax reaches a critical level such that relocation becomes optimal, the multinational considers whether to relocate completely or partly in this case. This decision depends solely on the trade-off between tax savings through complete relocation and higher transportation costs. If transportation costs are high, tax savings are too small to induce complete relocation. This is the case even if tax payments take on their highest possible value.[19]

If transportation costs are low, two cases may arise: complete immediate relocation ($s < t^1$), and partial relocation first ($s > t^1$). In both cases it is optimal to relocate completely if the tax is sufficiently high. High tax

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[19]Remember that the upper bound of t depends negatively on transportation costs.

savings dominate transportation costs. The question remains whether the multinational should relocate completely once the tax reaches a critical level. This decision depends on the amount of moving costs: The critical tax level t^1 decreases if moving costs are low. Hence lower fixed costs imply that the multinational reacts faster towards a tax increase. If $s > t^1$, moving costs and the critical tax level which induces relocation are small. Transportation costs are high enough such that it pays to move only partially. In such a situation, it is better to face moving costs than to pay taxes, but it is also better to pay taxes than to pay transportation costs. Only if the tax rises further, complete relocation becomes optimal. If $s < t^1$, transportation costs are small enough such that complete relocation is optimal once the trade-off between fixed costs and lower taxes induces relocation. Hence transportation costs are too small to play any role in the decision between complete and partial relocation. Relocation reduces to the decision between fixed costs and tax payments, if transportation costs are low.

In sum, multinational enterprizes have smaller stakes in the home country than national firms, if certain conditions are met. Low transportation costs and low costs of relocation make this difference more likely. Regulation becomes more important and the multinational can easily relocate production, which leads to different stakes of both types of firms. This argument contrasts with the perception that multinationals have a higher influence on the political process than national firms. In contrast, it indicates that multinationals have smaller stakes in the home country. They care less about national regulation, which tends to decrease lobbying incentives. But if multinationals do not care about national politics, perhaps it is politicians who care about multinationals?

7.4   The lobbying game

This chapter focuses on the effectiveness of lobbying. It takes the results of the previous chapter as a starting point. Multinationals have smaller stakes in the home market, which tends to decrease lobbying incentives. But incentives to engage in lobbying depend on its effectiveness. Multinationals might be more effective in lobbying, compared to national firms. If this is the case, higher effectiveness might compensate for lower stakes, which leads to more influence.

There are several possible reasons why politicians care more about multi-

nationals than about national firms. For instance, multinationals are quite important as employers. People care about jobs, and so politicians do. Or politicians might expect positive spillover effects or tax revenue from the presence of multinational companies. But politicians are also interested in general welfare, partly because they are benevolent, partly because they intend to improve their chance of reelection. Moreover, they might be interested in contribution payments. These can be used for election campaigns, personal joy, or may be stuffed into anonymous bank accounts for harder times. This analysis relies on a different aspect of multinational firms. Multinationals can relocate production at lower costs than national firms. I will determine how this aspect affects national regulation, if the politician cares about aggregate welfare and contribution payments.

This chapter analyzes these issues in a two stage game.[20] The game is solved backwards. In the first stage, the firm decides about an optimal contribution schedule offered to the politician, $C^*(r)$. The contribution schedule is a menu, which maps regulation into money payments to the politician. The firm decides about the contribution schedule and takes the politician's behavior into account. In the second stage of the game, the politician observes these offers and decides about the optimal amount of regulation, r^*. Hence $[C^*(r), r^*]$ determines the political equilibrium. Money payments are made, dependent on the offered contribution schedule and the resulting choice of regulation.[21]

I take the result of the previous chapter as a starting point. Proposition 7.1 states conditions such that a multinational has smaller stakes in the home market with sufficiently high regulation, compared to a national firm. Corollary 7.2 applies the general result to a specific form of Cournot competition. It derives critical values for the regulation parameter and transportation costs, such that a multinational has smaller stakes in the home country compared to a national firm (compare also figure 7.4). In both cases, if regulation is sufficiently low, both types of firms have the same stakes in the domestic market. The focus of this chapter lies on differences between multinational and national firms. Therefore, I restrict the analysis to parameter ranges such that both types of firms have different stakes in national regulation, i.e.

$$\frac{\partial \Pi^{NAT}(r,s)}{\partial r} < \frac{\partial \Pi^{MNE}(r,s)}{\partial r}$$

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[20]The approach follows Bernheim and Whinston (1986b) and Grossman and Helpman (1994a).

[21]Cheating is not possible, and money offers are paid as soon as the respective regulation is realized.

holds.

Aggregate welfare depends on the net benefit of regulation, $B(r)$, and the amount of goods produced and consumed in the home country, $q^S(r)$ and $q^D(r)$. The net benefit of regulation might be interpreted as reduced environmental damage, higher labor standards, or welfare gains through a higher degree of competition. The distinction between goods consumed and goods produced reflects the idea that the politician cares about production in the home country and about consumers' well being. A good consumed in the home country increases welfare, but even more if it has been produced there. Hence, aggregate welfare is a linear function given as

$$W(r) = W[B(r); q^S(r); q^D(r)].$$

Direct effects are assumed to be positive, i.e.

$$\frac{\partial W}{\partial B} > 0, \ \frac{\partial W}{\partial q^S} > 0 \quad and \quad \frac{\partial W}{\partial q^D} > 0.$$

Regulation has a negative impact on the amount of goods produced and consumed in the home country, because regulation increases costs:

$$\frac{\partial q^S}{\partial r} < 0; \ \frac{\partial q^D}{\partial r} < 0.$$

Note that these assumptions are valid for many specific forms of competition. Moreover, I make the following assumption on the benefits of regulation:

Assumption 7.5 *The benefit function $B(r)$ is concave, has a unique maximum, and $r^b = \arg\max_r B(r)$.*

I make the two following assumptions, which state that a multinational and a national firm react differently if regulation increases. Both reduce production; however, the multinational can escape national regulation, since it is able to relocate production to the foreign country and thus escape national regulation at least partially. In contrast, the national firm is bound to produce in the home country. Hence, the effect of regulation on domestic production should be higher if the firm is a multinational. But relocation has also a positive effect on consumption in the home country. The multinational escapes national regulation, and costs rise to a smaller extent compared to a national firm.[22] Hence, the effect of regulation on consumption is negative for both types of firms, and it is stronger if the firm is national.

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[22]Recall that the firm bears increased transportation costs to serve the home market. The total effect is positive, because otherwise relocation is not optimal.

Assumption 7.6 *(relocation effect): The negative effect of regulation on production in the home country is stronger if the firm is a multinational:*

$$\left.\frac{\partial q^S}{\partial r}\right|_{MNE} < \left.\frac{\partial q^S}{\partial r}\right|_{NAT} < 0.$$

Assumption 7.7 *(consumption effect): The negative effect of regulation on consumption is weaker if the firm is a multinational:*

$$\left.\frac{\partial q^D}{\partial r}\right|_{NAT} < \left.\frac{\partial q^D}{\partial r}\right|_{MNE} < 0.$$

Consider now the second stage of the game. A rational politician decides about regulation. He cares about aggregate welfare and contributions. Contribution offers result from firms' optimization in the first stage of the game. The politician takes these offers as given and decides about regulation. Thus in the second stage of the game, the politician chooses r to maximize his payoff, given the contribution schedule $C(r)$:

$$\max_r \quad U(r) = W[B(r); q^S(r); q^D(r)] + \alpha C(r).$$

The firm is either a national or a multinational company, and I compare political outcomes with both types of firms. $\alpha \geq 0$ is a weight which specifies the impact of money to the politician's payoff. Note that the politician's payoff function is separable in aggregate welfare and contribution payments. This is a common assumption, which assures that no interaction between contribution payments and aggregate welfare exist.[23]

The optimal amount of regulation, r^*, is determined by the following first order condition:

$$\frac{\partial W(r)}{\partial r} + \alpha \frac{\partial C(r)}{\partial r} = 0.$$

As a special case, consider a benevolent politician who does not care for contributions, i.e. $\alpha = 0$. In this case, the politician maximizes aggregate

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[23]To be more precise, separability assures that income is transferable without loss. The marginal utility of income is constant at rate α, and is independent of the level of aggregate utility. To illustrate this point, consider a payoff function of the form $U = U[W(r), C(r)]$, and U concave in W and C. In this case, the marginal utility of contributions decreases in C. Moreover, it may also depend on the total level of aggregate welfare, because this specification allows that $\frac{\partial^2 U}{\partial C \partial W} \neq 0$.

welfare and chooses $r^0 = argmax\ W(r)$. By observation of the first order condition, the following insights result: The marginal (net) benefit of regulation is positive in equilibrium, because the politician trades-off net benefits from regulation with negative effects on consumption and production. This results in regulation $r^0 < r^b$. If the politician cares about contributions, political costs of regulation change. They may increase or decrease, which depends on the effect of regulation on contribution payments. Note that I cannot specify this function at the moment, because it depends on the firm's optimization in the first stage of the game. Suppose that it turns out that contributions decrease in r. In this case, regulation decreases if the politician cares for contributions, i.e. $r^* < r^0 < r^b$. Lower regulation results and aggregate welfare declines. If contributions increase in r, regulation with lobbying will be higher than the welfare maximizing level, i.e. $r^* > r^0$. It may even be higher than r^b, which is the maximum of the benefit function. I will restrict my attention to decreasing contribution schedules in the following. This is natural to do so, because the following arguments show that contribution offers can only increase if the lobbying firm has an interest in high regulation. This is never the case if the firm produces at least partly in the home country. It may only result if the multinational completely relocates and benefits from high domestic regulation through a raising rivals' costs argument. I will exclude this special case in the following, but indicate here that it may arise in general.[24]

Consider now the first stage of the game. The firm anticipates the behavior of the politician. It realizes that in order to induce a deviation from r^0 towards any alternative regulation, the contribution schedule must locally satisfy the politician's first order condition around the preferred level of regulation. If this was not the case, the politician would not deviate in the second stage of the game facing the respective contribution schedule. Thus, in order to induce a policy deviation towards any regulation, the contribution schedule must satisfy the following condition in the neighborhood of r:

$$\frac{\partial C(r)}{\partial r} = -\frac{1}{\alpha}\frac{\partial W(r)}{\partial r}.$$

Integration yields

$$C(r) = -\frac{1}{\alpha}W(r) + x.$$

Thus, any contribution schedule which shall be suitable to induce a certain regulation policy r must satisfy the stated form locally. This is a necessary

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[24]Some countries prohibit lobbying activities by foreign firms, as for instance the United States.

condition for the contribution schedule. Note that contribution payments for a deviation towards a particular regulation depend on the induced level of aggregate welfare, the weight α, and a fixed parameter x, which shifts the contribution schedule vertically and will be discussed in the following.

To understand what determines x, we have to take the maximization problem of the firm into account. The firm maximizes net profits, which are variable profits minus contribution payments, $\Pi(r, s) - C(r)$.[25] Note that the firm determines a complete menu offer, which consists of contribution offers for all possible regulations. This is a complete function $C(r)$, which is more than the contribution payment for the equilibrium policy choice r^*. The firm has to take three constraints into account: First, any contribution schedule which induces a deviation from r^0 must satisfy the above form locally at the realized level of regulation. Otherwise it would not induce the proper behavior of the politician in the second stage of the game. Second, to induce a political outcome different from r^0, the contribution payment needs to compensate the politician for the deviation from his welfare maximizing policy r^0. Hence, the firm must consider the politician's participation constraint, which is $W(r) + \alpha C(r) \geq W(r^0)$. Third, it is optimal to offer positive payments only for certain policies if the resulting net profits including contribution payments exceed profits which are realized if no contributions occur and r^0 results, $\Pi(r^0, s)$. Hence contributions are positive for any regulation r only if $\Pi(r, s) - C(r) \geq \Pi(r^0, s)$.

The firm solves

$$\max_{C(r)} \quad \Pi(r, s) - C(r) \quad s.t. \quad \begin{array}{l} C(r) = -\frac{1}{\alpha} W(r) + x \\ W(r) + \alpha C(r) \geq W(r^0) \\ \Pi(r, s) - C(r) \geq \Pi(r^0, s). \end{array}$$

Note that x is a parameter which shifts profits to the politician on account of the firm. If x is high, higher contribution payments are made in exchange for a policy deviation. Hence the firm has an interest to choose x as low as possible, but high enough to induce the preferred policy outcome. From the first and second constraint of the firm maximization problem follows

$$x \geq \frac{1}{\alpha} W(r^0).$$

Hence any contribution schedule satisfying

$$C(r) \geq \frac{1}{\alpha} \left[W(r^0) - W(r) \right]$$

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[25]With slight abuse of notation, I drop the suffixes for firm types. The assumptions hold for both types in the same way.

is suitable to induce a policy deviation from r^0. Moreover, the firm will always choose the smallest amount of contribution payments which are sufficient to induce a certain policy deviation from r^0, because contribution payments are not costless. Thus the equation must be binding in order to maximize profits, and any contribution schedule which entails higher payments for all levels of regulation can not optimal: The firm could always increase profits through a slight reduction of x in this case, without affecting the policy outcome.

Hence, if the firm anticipates how the politician decides in the second stage of the game, it realizes that any policy r is feasible through a contribution schedule satisfying

$$C(r) = \frac{1}{\alpha} \left[W(r^0) - W(r) \right]$$

in the neighborhood of r. Intuitively, contribution payments compensate the politician for a policy deviation from r^0, which exactly offsets his induced utility decline. As a consequence, he is indifferent between the welfare maximizing policy r^0 and any alternative induced through this contribution offer. Note that the firm benefits from a first mover advantage. It anticipates how the politician reacts towards any possible contribution schedule $C(r)$ and minimizes compensation payments given that they are suitable to induce the preferred policy outcome, and it realizes the full rent from the political interaction.

Note that it is not optimal to offer positive compensation payments according to the above equation to any r, because this may violate the participation constraint of the firm. Hence the firm prefers to pay zero contributions for any policy deviation which necessitates compensation payments exceeding the benefit from deviation, and an optimal contribution schedule satisfies $C(r) = 0$ for any r satisfying $\Pi(r, s) - \frac{1}{\alpha} \left[W(r^0) - W(r) \right] \leq \Pi(r^0, s)$.[26]

Consider the following contribution schedule as a suggestion for the solution to the maximization problem:

$$C(r) = \begin{cases} 0 & , if \; \Pi(r, s) - \frac{1}{\alpha} \left[W(r^0) - W(r) \right] \leq \Pi(r^0, s) \\ \frac{1}{\alpha} \left[W(r^0) - W(r) \right] & , if \; \Pi(r, s) - \frac{1}{\alpha} \left[W(r^0) - W(r) \right] > \Pi(r^0, s). \end{cases}$$

This contribution schedule satisfies all conditions of the maximization problem. Contribution payments are positive only if the profit increase through the induced policy deviation exceeds the contribution payments which are

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[26]To be more precise, zero contribution offers are not necessary. It suffices that they are small enough to not affect the policy outcome (compare the appendix).

necessary to induce this outcome; otherwise they equal zero. The firm exactly compensates the politician for the respective policy deviation from r^0 if contribution payments are positive. Note that this contribution schedule has an interesting property: Since any positive contribution payment exactly compensates the politician for the policy deviation, he remains indifferent between the welfare maximizing regulation r^0, and any deviation associated with positive contribution payments.

In fact, the firm is able to induce its most preferred policy outcome through a slight modification of the above contribution schedule. This is an implication of the first mover advantage: Anticipating the politician's behavior, the firm is able to induce its preferred policy through the choice of a suitable contribution schedule as long as the contribution function satisfies the stated constraints.

The optimal policy choice r^*, given that the firm compensates the politician for the deviation, is given by the first order condition of the firm. Hence

$$r^* = argmax_r \ \Pi(r, s) - \frac{1}{\alpha} \left[W(r^0) - W(r) \right],$$

This result states that the firm prefers a policy choice whose marginal benefit exactly offsets the marginal costs which are necessary to achieve it. This allows us to determine the optimal contribution schedule. To be precise, there is an infinite number of optimal contribution schedules $C^*(r)$ which implements the most preferred outcome: The reason is as follows: The firm must compensate the politician for the policy deviation towards r^*, as characterized above. Contribution offers must be zero for all policy variables satisfying $\Pi(r, s) - \frac{1}{\alpha}[W(r^0) - W(r)] \leq \Pi(r^0, s)$. But the contribution offers distinct from $C^*(r^*)$ and not satisfying this latter condition are arbitrary as long as they induce no other policy deviation. I restrict attention to one particular form:[27]

Lemma 7.1 *The following contribution schedule solves the maximization problem of the firm:*

$$C^*(r) = \begin{cases} 0 & , \ if \ r \neq r^* \\ \frac{1}{\alpha} \left[W(r^0) - W(r) \right] & , \ if \ r = r^* \end{cases}$$

[27]The complete specification of all optimal contribution schedules is given in the appendix. The form stated here satisfies the "natural" refinement of Kirchsteiger and Prat (2002).

This particular contribution schedule is optimal for the firm. It offers a compensation payment for a policy deviation towards r^*, which leaves the politician indifferent between the welfare maximizing policy r^0 and the most preferred policy of the firm.[28] Contribution offers for all other policies are zero. Hence the contribution schedule induces a policy deviation towards r^*, which is the best policy choice of the firm. Note that zero contribution offers result for two reasons: Some contribution offers are zero, because the firm realizes that it cannot induce the respective policy deviation and gain something. Hence it offers nothing. In contrast, some policy deviations are feasible for the firm, because necessary compensation payments are smaller compared to the resulting benefit. But although feasible generally, it is not optimal to induce them because they do not maximize firm's profits net of contribution payments. Hence the firm can offer zero contributions for these policy choices as well.

The form of the optimal contribution schedule is the same for a multinational and a national firm for a broad range of r. Both firms pay positive contributions which are sufficient to compensate the politician for a policy deviation towards its most preferred policy choice. But the contribution schedules differ with respect to four aspects: First, the intervals of feasible policy deviations differ between both types of firm, because they depend on $\Pi(r, s)$ and $\Pi(r^0, s)$ which are different for the multinational and the national firm. Second, r^0 differs in both cases: The politician chooses a different regulation policy without lobbying, which depends on the present type of firm. Third, equilibrium contribution payments compensate the politician for a deviation from r^0. These compensations depend on the loss in aggregate welfare if regulation decreases. Welfare depends on the amount of goods which are produced and consumed in the home country, and these amounts change differently for both types of firms (assumptions 7.6 and 7.7). Finally, the optimal policy choice r^* may differ between a national and a multinational firm.

Note that equilibrium contribution payments tend to be high if the politician cares much about welfare. In this case α is small, and the firm must offer high compensation payments to induce a policy deviation. As a result, firm's payoff decreases if the politician cares much about aggregate welfare, and more money is transferred on behalf of the politician. The politician's payoff is independent of α, because he gets exactly compensated for the equilibrium

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[28]I assume that the politician deviates if he is indifferent. Otherwise the firm could increase the contribution payment for r^* by a small amount, and the politician would be strictly better off with deviation.

policy deviation. For instance, if he cares much about aggregate welfare contribution payments tend to be high in equilibrium, but his marginal benefit of money is small in this case.

This result can be used to solve the model completely. The firm determines the optimal contribution schedule $C^*(r)$ in the first stage of the game. It anticipates the politician's behavior of the second stage and induces a certain policy outcome, r^*. Thus $[C^*(r), r^*]$ determines the political equilibrium.[29] This leads to the following proposition:

Proposition 7.3 *The multinational company tends to face lower regulation compared to a national firm, if the following conditions hold:*

- *The consumption effect is relatively unimportant, or consumption has only small welfare effects.*

- *The multinational and the national firm do not differ much with respect to their stakes in national regulation.*

The multinational tends to face higher regulation compared to a national firm, if the following condition holds:

- *The relocation effect is small if the firm is a multinational, or production is unimportant for aggregate welfare.*

Proof. The proof is given in the appendix. ∎

By assumption, regulation has a positive direct effect on aggregate welfare and negative effects on consumption and production in the home country. The relocation effect tends to lower regulation if the firm is a multinational, because regulation affects national production to a greater extent in this case. Hence, if the politician cares much about production in the home country and the relocation effect is large, regulation might favor the interests of the multinational company. The consumption effect works in the opposite direction. The multinational company is able to escape national regulation at least partially and the negative effect on domestic consumption is smaller in this case. This effect tends towards higher regulation of multinational companies.

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[29]Note that an infinite amount of equilibria exists, because an infinite number of optimal contribution schedules induce the optimal policy deviation r^*.

The proposition also covers the first part of the analysis: Both types of firms may have different stakes in domestic regulation, which depends on exogenous parameters as described in chapter 7.3. In this case, a national firm is c.p. willing to offer higher contribution payments at the margin, because national regulation affects it to a greater extent. As a result, regulation tends to be lower if national firms are present compared to multinationals. With only small stakes in the home market, multinationals' incentives to engage in lobbying are small. The extent of this effect depends on the marginal benefit of contribution payments. If the politician cares much about contributions, the tendency towards lower regulation of national firms increases.

The model predicts that the existence of multinational firms has ambiguous effects on national regulation, which raises scepticism about the common perception that the presence of multinational companies leads to a loss of sovereignty of the national state. In this setup, rather strict conditions must be fulfilled to support this view. However, it may well be valid if relocation is very important. Which view is suitable comes down to an empirical test of the relative strength of these effects. If it turns out that politicians have a high interest in local production and relocation is an important issue, the model may support the common perception. If this is not the case, multinationals tend to face higher regulation than national firms, and the presence of these firms does not reduce the scope of national policy making.

7.5   Conclusions

The approach provides a formal analysis of differences in lobbying incentives between a multinational and a national firm. It is independent of specific market forms or the type of competition, and determines how these differences affect the political outcome. A multinational differs from a national firm because it has smaller costs of relocating production. Smaller stakes in the national market result, and a multinational can always perform at least as good as a national firm. National regulation tends to have smaller impacts on multinationals, which tends to decrease their lobbying incentives. Less influence on the political decision can then be expected. This argument suggests that multinationals tend to face higher regulation than national firms. Moreover, consumer surplus declines less in the home country if regulation affects multinationals. These two effects, the lobbying effect and the consumption effect, tend towards an outcome of the lobbying game which neglects the common perception that multinationals reduce the scope

of national politics.

An effect which works in favor of less regulation of multinational firms is the production effect. Multinationals may relocate production due to unwanted regulation, which decreases local production to a higher extent compared to national firms. If politicians are interested in domestic production, they might be hesitant to introduce high regulation in order to avoid a drain of capital. If this effect is strong, the presence of multinational companies may well lead to a loss of sovereignty of the nation state.

The paper provides some hypothesis for empirical investigation. Less regulation of multinationals should coincide with the importance of local production to politicians. Moreover, regulation should be lax in sectors with relatively footloose capital, compared to sectors where relocation is costly. Regulation of multinationals should be lax if lobbying is not too important, or the politician cares not much about contribution payments. For instance, a politician might have less discretion to set policies in sectors facing much public attention. In contrast, it might be easier to cater to special interests in sectors attracting little public attention, and contributions might be of higher importance then.

There is ample scope for further research. To begin with, the first aspect is that either a multinational or a national firm is present in the market. Presence of both firms, possibly with opposing interests in regulation, should lead to further insights. Firms can then anticipate the lobbying offers of their opponents and modify contribution offers accordingly. Whether this will work in favor of more or less regulation remains an open issue. In addition, politicians and multinationals might have asymmetric information about the possible extent of relocation. A multinational might have better information about the production and costs structure than the politician. I do expect that regulation works more in favor of the multinational if information is asymmetric.

7.6   Appendix

Proof of Proposition 7.1:

A necessary and sufficient condition that the firm relocates at some level of regulation is given, if it is optimal to relocate at least partially if the regulation takes on its tightest form. These conditions are given by

$$\max\left\{\Pi^{pr}(\overline{r}, s) - F^{pr}; \Pi^{cr}(\overline{r}, s) - F^{cr}\right\} > \Pi^{nr}(\overline{r}, s).$$

This can be rewritten as in condition (i).

Next one has to assure that a regulation exists such that it is optimal to produce in the home market only. Profits not only decrease in regulation (assumption 7.2), but even faster if production takes place in the home country only (assumption 7.3). Thus it is necessary and sufficient to check whether it is optimal to produce in the home market if regulation takes on its minimum level. This condition is given by

$$\Pi^{nr}(0, s) > \max\left\{\Pi^{pr}(0, s) - F^{pr}; \Pi^{cr}(0, s) - F^{cr}\right\}.$$

Denote $F_{crit}^{pr}(r)$ as the critical level of fixed costs which makes the firm indifferent between moving partially and staying in the home country if regulation is r. Thus $F_{crit}^{pr}(r) \equiv \Pi^{pr}(r, s) - \Pi^{nr}(r, s)$. Differentiating yields that this critical value is increasing in r by assumptions 7.2 and 7.3. Analogously, $F_{crit}^{cr}(r) \equiv \Pi^{cr}(r, s) - \Pi^{nr}(r, s)$ is increasing in r. By comparing these critical values, one gets that fixed moving costs increase faster in r in the case of complete relocation (again by assumption 7.3). Thus the relevant assumption must be $\Pi^{nr}(0, s) > \Pi^{pr}(0, s) - F^{pr}$, as stated in part (ii) of the proposition.

Proof of Proposition 7.2:

Using standard technique one can derive the quantities sold by each firm in each market for every possible production structure of the multinational. By assumption 7.1, each of these quantities must be positive. This gives assumptions on the relationship between the demand parameter a, marginal cost of production m, transportation costs s and the tax t. These assumptions are satisfied if $a - m \geq 2(s + t)$ holds.

Straight forward application of standard oligopoly theory then yields the following profit functions for the multinational:

$\Pi^{nr}(s,t) = \frac{1}{9}[(a-m+s-2t)^2 + (a-m-2s-2t)^2]$,

$\Pi^{pr}(s,t) = \frac{1}{9}[(a-m+s-2t)^2 + (a-m)^2] - F$,

$\Pi^{cr}(s,t) = \frac{1}{9}[(a-m-s)^2 + (a-m)^2] - F$.

Taking derivatives, it is easy to check that assumptions 7.2 and 7.3 are satisfied. Thus all assumptions are satisfied.

Part (i) of proposition 7.1 gives an upper bound for the fixed cost parameter F. Simply plug $t^{\max} = \frac{1}{2}(a-m) - s$ into the profit functions and compare. This give the upper bound which is stated in part (iii) of proposition 7.2.

Part (ii) of proposition 7.1 gives a lower bound for F. Set $t = 0$ and compare profits without relocation and with partial relocation. This gives the lower bound, which is stated in part (iii) of proposition 7.2.

Hence the conditions stated in proposition 7.2 assure that all assumptions of proposition 7.1 are satisfied and the result follows.

Proof of Corollary 7.2:

We know that the firm produces in the home country only, if the tax is small.

The case of high transportation costs

If $\Pi^{pr}(s,t^{\max}) > \Pi^{cr}(s,t^{\max})$, it can never be optimal to relocate completely for any value of t. Plug in the value of $t^{\max}$ and see that this is the case if $s > \frac{1}{4}(a-m)$, which is the critical value s^*. The critical value of the tax where relocation is pays is given by t^1.

The case of low transportation costs

By the former result, complete relocation pays for some tax level if $s < s^*$. It has to be clarified if partial relocation is optimal for some interval on t, or not. This can be done by comparing the values of the profit functions at $t = t^1$.

If $\Pi^{pr}(s,t^1) > \Pi^{cr}(s,t^1)$, profits are higher at t^1 if the firm does not relocate completely, but only partially to the foreign country. This condition yields $(s-t^1)(a-m-t^1) > 0$, which is equivalent to $s > t^1$. We know that complete relocation is optimal if the tax is high enough. Thus to determine the relevant critical value, one has to find the value of the tax such that the firm is indifferent between partial and complete relocation. This yields $t = s$

as the critical value and completes the proof if $t^1 < s < s^*$.

For the case of $s < s^*$ and $s < t^1$, the proof is analogous. If $\Pi^{pr}(s, t^1) < \Pi^{cr}(s, t^1)$, production in both countries is not optimal if $t = t^1$. Thus a smaller level t^2 must exist, such that immediate complete relocation is optimal. This value is determined by comparing $\Pi^{pr}(s, t)$ and $\Pi^{cr}(s, t)$, which yields the respective value for t^2.

Complete specification of the optimal contribution schedule:

There is an infinite number of optimal contribution schedules which satisfy the stated conditions. Remember that

$$r^* = argmax_r \ \Pi(r, s) - \frac{1}{\alpha} \left[W(r^0) - W(r) \right].$$

All contribution schedules of the following form are optimal:

$$C^*(r) = \begin{cases} \frac{1}{\alpha} \left[W(r^0) - W(r) \right] & , \text{ if } \quad r = r^* \\ \frac{1}{\alpha} \left[W(r^0) - W(r) \right] - \epsilon(r) & , \text{ if } \quad r \neq r^* \end{cases}$$

The function $\epsilon(r)$ is an element of a class of functions satisfying

- $\epsilon(r) > 0$, and

- $\epsilon(r) \leq \frac{1}{\alpha} \left[W(r^0) - W(r) \right]$.

Proof of Proposition 7.3:

We know that the politicians chooses r^* in the second stage of the game, given $C^*(r)$. Hence in equilibrium

$$\frac{\partial C(r)}{\partial r} = -\frac{1}{\alpha} \frac{\partial W(r)}{\partial r}.$$

Note that I assume differentiability of the contribution function around r^* here, which is slightly imprecise with respect to the stated contribution schedule of lemma 7.1. From the preceding discussion, continuous contribution function around r^* are easy to find. Hence I ignore this slight imprecision here.

We also know that this induces the optimal policy choice of the firm, r^*. By the first order condition of the firm, we get

$$\frac{\partial \Pi(r, s)}{\partial r} = -\frac{1}{\alpha} \left[\frac{\partial W}{\partial B} \frac{\partial B(r)}{\partial r} + \frac{\partial W}{\partial q^S} \frac{\partial q^S(r)}{\partial r} + \frac{\partial W}{\partial q^D} \frac{\partial q^D(r)}{\partial r} \right]$$

around the equilibrium. The result follows from comparison of this first order condition if the firm is national or a multinational.

Chapter 8

The Multilateral Agreement On Investment - A critical investigation from an industrial economics point of view

8.1   Introduction

[1]Negotiations on a Multilateral Agreement on Investment (MAI) within the OECD failed in 1998. This failure does not imply that efforts to regulate direct investment flows on a multilateral basis have come to an end. Instead, it can be expected that a general multilateral framework on investment will substitute for the multiplicity of existing bilateral agreements in the future.[2] The negotiations on the MAI indicate the form of such a future framework.

Several working papers present and criticize the contents of the MAI.[3] But an assessment from an industrial economics point of view has not yet been made. In the following, I will give such an assessment. I conclude that a comprehensive liberalization of direct investment flows only makes sense if

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[1]This chapter is based on the article "Multilaterale Abkommen für Direktinvestitionen (MAI) - Eine Kritik aus industrieökonomischer Sicht", (Polk 2000). I am grateful to my father for helpful comments.

[2]Compare UNCTAD (1998a).

[3]Compare e.g. Hartwig (1999), Kozul-Wright and Rowthorn (1998), Polk (1999), Singer and Stumberg (1999).

strong competition authorities exist, which are able to ensure effective competition. In order to develop its positive effects also in less developed countries (LDCs), it is essential that a future agreement accompanies the implementation of effective competition authorities in these countries. Moreover, the term "investment" needs closer specification in a multilateral agreement. The MAI entirely ignores these aspects.

This article deals also with the question which institution should implement a future multilateral agreement on investment. The WTO and OECD play an important role in this context: Due to their high worldwide share of direct investment, OECD countries have a strong interest to liberalize investment flows. Up to now, the regulatory framework of the OECD comprise regulations concerning hidden investment barriers, the free flow of capital, and general guidelines for multinational enterprizes.[4] These regulations have three fundamental disadvantages: First, they do not cover all areas which are relevant for investment flows. Second, the agreements do not represent a real multilateral framework. They refer only to the member states of the OECD. Third, the contents of the agreements are not binding. Accordingly, the OECD has no effective dispute settlement body, which assures compliance to existing rules.

In contrast, the WTO can be regarded as a real multilateral organization. It contains two agreements that pertain to foreign direct investment: The Agreement on Trade-Related Investment Measures (TRIMs) is an additional agreement to the GATT (General Agreement on Tariffs and Trade). It states that member countries of the WTO are not allowed to implement investment barriers which form a possible obstacle towards trade. The General Agreement on Trades in Services (GATS) also contains some minor investment related regulations.[5] But both agreements are limited to the scope of the WTO. A comprehensive regulation of investment flows, which is independent of trade political concerns, has not yet been established within the WTO.[6] I

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[4]The existing regulations within the OECD refer to the "The Declaration on International Investment and Multinational Enterprises" (OECD 2000a), "The OECD Guidelines for Multinational Enterprises" (OECD 2000b), and the Codices of "Liberalisation of Capital Movements" (OECD 2001a) and "Current Invisible Operations" (OECD 2001b). Compare Polk (1999) for a detailed presentation of these OECD agreements. Investment related agreements of the WTO are also presented in this paper.

[5]For an overview of these regulations, see Polk (1999). Grimwade (1996), Senti (1999), Trebilcock and Howse (1995) and WTO (1999) give a general overview of the regulatory framework of the WTO.

[6]The question whether a multilateral agreement on investment is generally desirable is not dealt with in this context. I will instead indicate which regulations should be altered

will argue that the WTO is a good forum for a future multilateral investment agreement.

This contribution has the following structure: Chapter 8.2 describes the regulations of the MAI which affect market structure and competition. Chapter 8.3 introduces arguments from an industrial economics point of view, which lead to my propositions in chapter 8.4. Chapter 8.5 discusses the WTO as a possible forum for a future multilateral agreement and concludes.

8.2   Presentation of the relevant MAI regulations

The basic contents of the Multilateral Agreement on Investment are:

- The National Treatment Principle.

- The Most Favored Nation Principle.

- Rules concerning protection of investors against expropriation.

- A dispute settling procedure.

Several authors discuss and critically evaluate the contents of the MAI.[7] I will restrict the following discussion to two important aspects, which concern competition policy.

Definition of the term "Investment"

The definition of the term "Investment" determines the scope of the agreement and is therefore of great importance. The definition of the MAI does not differentiate between different types of foreign investment.[8] Strictly speaking, the agreement does not only cover direct investment, which involves a long term relationship and control of a resident entity in one economy.[9]

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if an agreement like the MAI is be installed in the future. For this approach compare also Ganesan (1998).

[7]Compare for instance Hartwig (1999), Polk (1999).

[8]OECD (1998b), Section II, DEFINITIONS.

[9]For a close definition of foreign direct investment in this sense compare UNCTAD (2001), Annex B, A.2.

Rather, scope is more general: It comprises any kind of engagement of a foreign investor. For instance, what defines an investment is independent of the question if the investor exercises control over the investment. Nor does it presuppose that the investor engages in a long term relationship. Stated positively, any investment which entails the economic performance of a natural or legal person falls under the scope of the MAI. Such activities include portfolio investments, which may be undertaken for short term gains or risk diversification purposes. Moreover, the acquisition of companies, shares or similar equities, debentures, intellectual property rights, licences or other movable properties also fall under the definition of the MAI. The same applies to investment which is related to the privatization of state owned properties, or for the allocation of concessions.[10]

Furthermore, the agreement does not differentiate between different kinds of foreign investment, as for instance acquisitions of firms, mergers, new foundations of plant locations, or acquisitions of minority stakes. The effect of an investment on market structure and the degree of competition depends much on its type: If a direct investment is made in form of a merger or an acquisition, it has different effects on competition than e.g. the foundation of a new plant location. Beside its type, the kind of control exercised with the investment plays an important role. If a foreign investment consists for instance of a cooperation in research and development activities (R&D), other welfare effects can be expected compared to a horizontal take-over of a competitor.

In sum, the definition of the term "Investment" in the MAI is too general. It does not differentiate between different forms of investments, between long term and short term engagements, and between different types of control. This is relevant for the effect on market structure and competition, as will be further laid out in chapter 8.3.

Effects on regional competition

The contents of the MAI weaken the bargaining position of governments towards multinational enterprizes. The common practice is that governments sanction concrete investment projects of foreign firms. The MAI forbids such individual concession procedures: It allows a country to stipulate general conditions for investments, as long as they do not discriminate foreign investors against domestic ones. The principles of national treatment and the most favored nation principle imply that a member state has to treat

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[10]OECD (1998a), Section III, Privatisation.

foreign investors in the same way as domestic ones. Individual investment requirements, which possibly imply a discrimination against other domestic or foreign investment, are forbidden.[11] This mechanism implies a complete and general opening of domestic markets for foreign investment flows.

This complete liberalization of investment flows does not only refer to engagements of MAI member states. Rather, it grants access investors from all countries, independent of their MAI membership. In addition, the treaty explicitly prohibits certain popular conditions on foreign direct investment, such as for instance local content requirements, minimum export contingencies or minimum expenditure requirements for R&D.

The MAI foresees one exemption to the principle of national treatment: Remember that the treaty forbids negative discrimination of foreign investors against domestic firms. But it explicitly permits positive discrimination of foreign firms. Positive discrimination is a preferential treatment of foreign investment vis a vis domestic firms. This rule, in connection with the most favored nation principle, implies a second rule. If a country grants a particular concession to a foreign investor, it is bound to grant this concession also to comparable investments in the future. These rules weaken the bargaining positions of national governments vis a vis investors essentially. I present the implications in the following chapter.

8.3   An evaluation of the MAI from an industrial economics point of view

Multinational enterprizes are present in oligopolistic markets, which are characterized by a high degree of market concentration.[12] The existence of transaction costs is crucial for the emergence of multinational enterprizes: If transaction costs in markets are high compared to transaction costs within the firm, firms gain through the internalization of trade within the firm organization, which promotes the emergence of multinational firms.[13]

Vertically integrated multinational enterprizes can be expected in markets

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[11]OECD (1998a), Section III, NATIONAL TREATMENT AND MOST FAVORED NATION TREATMENT.

[12]Compare Horstman and Markusen (1987), Markusen (1984) or Helpman and Krugman (1985).

[13]Dunning (1988), Chapter 1; Caves (1996), Chapter 4.

where high switching costs between upstream and downstream firms exist. For instance, search costs of firms reduce incentives to trade intermediate goods in a market. If a customer is not able to react to a change in market conditions within a suitable amount of time, the supplier may take advantages in negotiations. This may reduce a customer's incentive to trade the good in a market, and inefficiencies may occur. Internalization within a multinational enterprize can avoid such problems. Another reason for the emergence of vertically integrated multinational enterprizes is the importance of product specific investments, which may cause a hold-up problem: Suppose that an upstream and a downstream firm trade a good, the quality of which can be improved by a specific investment of the upstream firm. Both firms benefit from the investment. Now suppose that the upstream firm invests and both firms share the investment costs. Once the investment is done, costs are sunk. The downstream firm is then able to benefit from renegotiations. It knows that the investment is specific and its value to the supplier is small if the latter trades with other firms. Accordingly, the downstream firm can renegotiate and impose a higher degree of the investment costs on the upstream firm. But the upstream firm will anticipate this behavior ex ante, and its incentives to invest decline. As a consequence, it invests less than is socially optimal, and under investment results. A multinational enterprize may overcome this hold-up problem through the internalization of transactions and investments within a firm.

Horizontally integrated multinational enterprizes emerge in markets where non-tradable assets play an important role. These are for instance R&D intensive markets, or markets where organizational knowledge is a crucial factor. Horizontally integrated multinational enterprizes may also emerge in markets where marketing, brand names and the product mix plays an important role. These assets can not, or only to a smaller extent, be traded over markets. Internal organization within an enterprize may then provide a solution.

In sum, multinational enterprizes are mainly prevalent in oligopolistic markets where goods are diversified, or in markets where transaction costs within firms tend to be small. Market entry barriers must play an important role, or markets must be inferior institutions for trade of crucial assets. In contrast, if entry barriers do not exist, potential domestic competitors are able to enter the market; If trade upon markets is possible, the organization of trade within firms is unnecessary. In these cases, incentives to organize production in multinational firms are small.

8.3.1   Market concentration and the pursuance of market power

Multinational companies are present in oligopolistic markets. This indicates that an industrial economics point of view is appropriate to analyze the contents of the MAI: Which effect does a general liberalization of foreign investment have on market structure and concentration? In particular, does market concentration in host countries increase? And does increased market concentration imply that multinational enterprizes can exercise market power more easily? These questions are of interest, because a liberalization of foreign investment may increase market concentration. As a consequence, multinationals may exercise market power, which leads to negative welfare effects. But is this in fact the case? I discuss the relation between a liberalization of foreign investment, market concentration, and the exercise of market power in the following.

The relationship between market concentration and market power can be summarized as follows:[14] A high degree of *market concentration* exists if few companies have a high share of market demand. The existence of *market power* implies that companies take advantage of the high degree of market concentration. If market power is exercised, firms increase profits at the expense of consumers and aggregate welfare. A high degree of market concentration should therefore not be judged negatively per se. Only if a high degree of concentration leads to the pursuance of market power, allocative inefficiencies arise and aggregate welfare decreases.

Inefficiencies may arise in various forms: A company which exercises market power may be able to set prices above marginal costs, which increases profits. Compared to first best marginal cost pricing, equilibrium demand decreases and aggregate welfare declines. This may go hand in hand with a second way to exercise market power: If a firm realizes high markups and equilibrium demand is low, incentives to invest in cost reducing technologies may be small. The reason is that the benefit of the investment may be relatively unimportant if equilibrium demand is low. Moreover, a firm facing strong competition may also have higher incentives to invest in cost reducing technologies, because the cost reduction becomes more important if competition is strong. As a result, marginal costs may be excessively high if competition

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[14]Compare Neven, Nuttall and Seabright (1993), Chapter 2, and Tirole (1988), Chapter 5. Scherer and Ross (1990), Chapter 11, explain measures for market concentration, such as the Herfindahl-index and others.

is low. In this case, firms underinvest in cost reducing-innovations, which decreases aggregate welfare. Higher costs leads to higher consumer prices, and demand and welfare decline. Thus, the pursuance of market power has negative welfare effects, irrespective of the specific form it is exercised.

However, a high degree of concentration does not necessarily imply that firms are able to exercise market power:

- If consumers can easily switch between different products, a high degree of market competition prevails, even if the number of firms is small. In this case, a single company is not able to influence the market result noticeably, because consumers substitute towards products of competitors in case of a price increases. Competition between firms tends to be tough if products are homogenous and consumers can easily substitute between them. If goods are heterogenous, substitutability tends to be small and firms find it easier to exercise market power.[15]

- Even though a single firm may not be able to exercise market power in a specific market, firms may be able to coordinate and exercise market power jointly. Competition laws forbid these practices, so explicit cartels are rarely found.[16] But firms may collude and exercise market power implicitly. This is more likely if the number of companies is small and the degree of concentration is high.[17]

Thus in itself, a high market share is not a reliable indicator that a firm exercises market power. High prices are more likely if market demand is inelastic, products are heterogenous, or coordination among firms is easy. But even then high prices may not necessarily prevail. Suppose that market entry is possible and potential competitors can enter the market at low costs. In this case incumbent firms cannot set high prices, because high profits makes entry more attractive, which increases competition. Accordingly, markups may be small even if market concentration is high. If a market is in fact contestable depends on several other factors beside low entry costs. For instance, suppose that the incumbent is able to adjust prices relatively fast in comparison to the time scale of the investment. In this case incentives to enter a market

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[15]Neven et al. (1993) show how these rather theoretical concepts can be applied in reality. They introduce the concept of product specific "relevant markets", which describes the range of substitutes for a good under consideration.

[16]The OPEC is an example of an explicit international cartel.

[17]Bresnahan and Reiss (1991) indicate that coordination is not possible in markets with more than five firms.

decrease, because the potential entrant anticipates that the incumbent will decrease prices as soon as he enters. In sum, whether a market is contestable depends on various factors beside entry costs, and should be judged case by case.

Finally note that a high market share and an increase of market concentration may result from successful investments. If a firm invests in cost reducing technologies or demand increasing product improvements, demand may switch from competitors to that firm. The market share of the investing firm increases and concentration rises. Increased concentration is then not the result of welfare decreasing high markups, but welfare enhancing investments. Therefore, a high degree of market concentration may be an indicator that some firms are very efficient, rather than exercising market power. All these arguments indicate that a high degree of market concentration should not per se be considered as negative. One must decide case by case whether a high degree of market concentration goes hand in hand with the exercise of market power.

What is the effect of the MAI on competition? The MAI liberalizes foreign investment. Its effect on market concentration in the host countries is difficult to assess. Two opposite hypotheses seem plausible from a theoretical point of view: Multinational enterprizes may find it easier to overcome entry barriers compared to national firms, for instance because financial constraints are less binding. This tends to increase the number of firms in a market, and market concentration declines. If this is the case, liberalization of foreign investment increases competition in host countries, and the exercise of market power is less likely. Liberalization of foreign investment leads to less concentration. The effect of the MAI on market structure and aggregate welfare are then positive. As a second hypothesis, multinational companies may reduce competition in the host countries. This may be the case if multinational enterprizes drive out national companies due to technological advantages and the realization of scale economies. This increases efficiency on the one hand, but may also lead to a higher degree of market concentration on the other. As a possible consequence, firms may better exercise market power.[18]

It may be difficult to assess if the liberalization of foreign investment leads to more market concentration in general. As the following chapters indicate, there may be differences between the short run and in the long run. But even if increased market concentration results from liberalization, one has to consider whether firms are able to exercise market power. This depends

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[18]Technological advantages lead also to lower costs, which tends to increase welfare.

on market characteristics like demand elasticities, substitutability and the degree of entry barriers. This has to be assessed case by case.

8.3.2   Short term effects of direct investment

The last chapter contains two opposing statements about how a liberalization of foreign investment might affect market concentration. These statements do not necessarily contradict each other, because short run and long run effects of increased foreign competition may be different.

In the short run, the type of foreign investment determines which concentration effects result. Unfortunately, only few studies deal with the question of which type of market access a multinational chooses, and how this choice affects market concentration in the short run.[19] I will distinguish two forms as polar cases, namely market access through merger and acquisition (M&A), and market access through foundation of a new plant locations.[20]   These two types have different short run effects on market concentration indicates. Moreover, they are of great empirical relevance, because these two types account for a great share of today´s direct foreign investment.[21]

Direct investment as foundation of new plant locations reduce market concentration in the short run. New market participants enter the domestic market, which increases the number of firms and competition. In contrast, mergers and acquisitions may increase market concentration. Whether this is the case depends on different factors and has to be examined case by case: Suppose that a foreign investor acquires a domestic firm. The effect on market concentration depends on the relationship between the investor and the takeover candidate before the acquisition. If the domestic company competes with the exports of the acquiring firm, the acquisition leads to reduced competition and increases market concentration. If in contrast the domestic firms do not compete with exports of the investor, market concentration is not affected. It may even decrease. Consider for instance the case where firms in the domestic market are heterogenous: The acquired firm is small compared

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[19] Compare Walter (1993), Buckley and Casson (1998), Hennart and Park (1993), Caves and Mehra (1986) in the context of multinational enterprizes. General industrial economics approaches towards mergers and acquisitions and their effect on market structure and welfare are for instance Ordover, Saloner and Salop (1990), Barros and Cabral (1994) and Aydemir and Schmutzler (2002).

[20]Other types are for instance licensing or franchising.

[21]Friedman, Gerloski and Silberman (1992), UNCTAD (1998b), and UNCTAD (2001), p. xiii.

to its competitors and lacks productivity in the domestic market without the investor. The acquisition may then lead to a transfer of know how and new production skills, which increases productivity and the size of the acquired company. Thus mergers and acquisitions may increase competition even in the short run.

The effect of foreign investment on market concentration and competition depends on the type of investment and specific market conditions. But which type of investment do companies choose? This question is subject to further research. Existing studies (compare footnote 19) indicate that the following factors plays a role: If speed of entry plays an important role, firms prefer foreign investment as mergers and acquisitions. This is also the case if firms intend to stay close to a market competitor, who is already present in a market which is strategically important. In contrast, cultural differences between the acquiring and the acquired firms tend to increase the costs of a merger. Accordingly, if cultural differences play an important role, direct investment as foundations of new plant locations are more likely.

8.3.3   Long term effects of direct investment

Long run effects of the MAI on market concentration depends mainly on two aspects. First, multinational companies may be able to drive national firms out of markets. Moreover, multinationals may find it easier than domestic firms to erect market entry barriers.[22] The empirical evidence is ambivalent:[23] Foreign investment in industrialized countries tends to decrease market concentration in the long run. Competition increases through direct investment, which indicates that the MAI has positive welfare effects in these countries. In contrast, foreign investment in less developed countries (LDCs) leads to an increase of market concentration in the long run. Multinational companies tend to drive national companies out of markets. This is due to technological advantages and the use of scale economies. Accordingly, the welfare effect of a broad liberalization of foreign investment in LDCs is difficult to assess. Market concentration and the exercise of market power may increase, which tends to decrease aggregate welfare in these markets. On the other side, productivity improvements lead to lower costs and reduce prices, which tends to increase aggregate welfare.

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[22]For instance, multinationals might use transfer prices to collect profits in regions with small taxes, which gives them strategically advantages over national firms.

[23]Compare Dunning (1974), Kumar (1990), Ratnayake (1999), Lall (1979), Petrochilas (1989), Jenkins (1990).

A second aspect relates to the exercise of market power. The broad liberalization of foreign investment through the MAI may have positive welfare effects, even if the market structure does not change in a specific country. This is a contestable market argument: Suppose that the MAI does not induce more foreign investment in a certain country. It may nevertheless improve aggregate welfare there, if multinational companies overcome market barriers easier than national companies. The mere threat to enter a market may be sufficient to induce competitive pricing. In this case, prices decline and aggregate welfare improves, even though the market structure remains the same. Empirical studies show that the aspect of contestable markets may play an important role.[24]

8.3.4   Competition for direct investment

Governments often try to influence the location decision of companies. They grant subsidies or loopholes for specific regulations, which tends to decrease taxes or costs. As stated in chapter 8.2, the contents of the MAI imply that regional competition increases. Foreign investors improve their bargaining position against national governments. The question arises if the induced intensification of regional competition through the MAI improves aggregate welfare.

The following model by Rauscher (1995) gives a basic intuition how regional competition effects aggregate welfare.[25] It analyzes strategic interactions between a single multinational enterprize and representatives of various identical regions. The multinational serves all regions, creating a consumer surplus in each region that is independent of its production location.[26] In each region, market demand and cost conditions are identical, except possibly for emission taxes, which increase variable costs (and thus reduce the supply of the good). Emission taxes are set by each region in the first stage of the game, because production causes pollution, which is strictly local. That is, environmental damage occurs only in the host country of the enterprize. Environmental damage is the same in each region. Jurisdictions maximize

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[24]Compare Shapiro (1983), Geroski (1991).

[25]The following description follows the survey on regional competition by Schmutzler and Polk (2001) closely. Janeba (2000) provides an analysis which combines the view that multinational companies benefit from regional competition, with the idea that governments may potentially exploit multinationals once an investment has been made. Compare also the quoted literature there.

[26]The model assumes away transportation costs.

welfare, which consists of the sum of local tax revenue and local consumer surplus minus local environmental damage. The multinational decides about the production location in the second stage of the game, which is the region with the lowest taxes. Finally, the multinational serves all regions from the local production plant.

The basic insight of this model is that, even in the absence of global environmental pollution, different market equilibria may emerge. The reason is that environmental damage and tax revenues arise only in the host country, whereas all countries realize consumption rents. I restrict the analysis to two polar cases, which I entitle as "strong regional competition" and "not-in-my-backyard"-politics. In the first case, countries opt for lax environmental regulation to attract the investment. Strong regional competition exists, and environmental regulation is too small. In the latter case, no region wants to bear the burden of local environmental pollution, even though production in general is desirable. When do these cases arise?

Strong regional competition arises if local environmental pollution through production is very small. In this case, tax income from local production outweighs the welfare effect of environmental pollution. Accordingly, each country is interested to win the competition for the plant decision. As only the country with the lowest regulations gets the foreign investment, all countries face incentives to lower regulation. Strong regional competition results, which leads to inefficient under regulation of the firm. On the contrary, if environmental pollution is very high, disadvantages from local production exist. In this case, tax revenue and domestic consumer welfare are not enough to outweigh environmental pollution from local production. Each country sets high emission taxes to deter local production. As all the countries employ this "not-in-my-backyard"-behavior, no production takes place in any region and consumer welfare will not be realized. A prisoners' dilemma results: Due to strict regulation, no investment takes place, even though production is desirable from an aggregate welfare point of view.

As the preceding model indicates, regional competition is efficient with respect to the location decision of the multinational firm. The firm invests where environmental regulation is small, which minimizes tax payments. But the extent of regulation is inefficient. Regulation tends to be too strict if environmental pollution is high. If it is low, strong regional competition emerges and regulation tends to be too low. This result, namely efficient regulation with respect to the location decision, but inefficient regulation with regard to allocative aspects, is relatively robust to variations of the theme.

The MAI intensifies regional competition, which tends to decrease allocative efficiency. In contrast, locational efficiency improves. In reality, these two effects have to be weighed against each other, which may be subject of further research.

8.4   Propositions for a new MAI

I will develop three theses in this chapter:

- Foreign investment affects market structure and competition. A multilateral agreement on investment needs to consider these effects. It can either implement own competition rules, or explicitly state the primacy of national competition laws.

- If a future agreement implements regulations on competition policies, the term "Investment" needs more careful specification.

- A far reaching liberalization of foreign investment flows can only exhibit its positive effects on growth, productivity and employment, if all countries have well functioning competition authorities. A multinational agreement on investment should only be implemented, if it includes active support for the creation of competition authorities in all countries, especially in LCDs.

Before I justify these theses, let me first state that the higher degree of regional competition has no negative consequences in my opinion: I discussed theoretical approaches concerning the effect of foreign investment on competition between regions in chapter 8.3.4. The discussion concluded that no clear statement can be made about the effect of increased regional competition on aggregate welfare. Suppose that further research indicates that tough regional competition reduces aggregate welfare. Even then no argument in favor of discrimination of foreign investors should be deduced. The MAI prohibits discriminating behavior against foreign investors, but not a general prohibition of certain types of investment. Accordingly, a country may impose general investment regulations if it turns out that regional competition is bad. The binding condition is that these affect foreign and domestic firms in the same way. For instance, a government might impose a regulation which restricts the maximum amount of investment subsidies, or it may

prohibit the construction of new sites for nuklear energy. These types of regulation are allowed as long as they affect domestic and foreign investors in the same way. They are only prohibited if they lead to discrimination of foreign investors against domestic ones. And to my point of view, nothing is bad about this particular prohibition of discrimination.

In addition, the MAI foresees a rule which implies that once granted subsidies must be open to all investors in similar situations in the future. This rule increases the cost of a singular subsidy substantially, because a country must consider its expected future cost. If competition between regions turns out to be bad, the implied higher costs of subsidies through the MAI tend to reduce these inefficiencies. In sum, even if increased regional competition turns out to decrease aggregate welfare, this should not be used to deduce arguments for discriminating behavior against foreign investors.

8.4.1 Integration of competition policy aspects

The detailed effects of a liberalization of foreign investment on market structure and concentration depend on the specific circumstances in which foreign investment is carried out (compare chapter 8.3). But it is undebatable that a broad liberalization of foreign investment affects market structure and competition. Hence a multilateral agreement should consider competition policy concerns. It should be open to rules which prevent negative competition effects in the member states, which may be induced through the general liberalization of foreign investment flows. The draft of the MAI lacks such an approach.

The form of integration is debatable. The question is whether competition rules should be explicitly integrated in such an agreement on a multilateral basis. Or is it preferable to foresee a clause which acknowledges the primacy of national competition laws, but leads the implementation and integration of these rules to the member states? This question is subject to current debates.[27]

Consider for instance the following argument in favor of central competition policy rules. The existence of multinational enterprizes leads to interdependencies between national competition policies, which gives incentives to set competition policy strategically: A national government is interested to as-

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[27]Compare for instance Basedow (1998), Rosenthal and Nicolaides (1997), Härtel (1999), Barros and Cabral (1994).

sure strong competition in its domestic market, which maximizes national welfare. But suppose that this country is the host of a multinational enterprize, which produces in a foreign country. Moreover, suppose that its profits can be transferred to the home country. Then the country benefits from relatively lax competition in the foreign country, which increases profits there. Accordingly, if countries have asymmetric political strength, countries may face incentives to implement different standards of competition policy in different regions. Welfare reducing distortions in the product markets can then be expected.[28] This is an argument in favor of a central competition authority within the MAI. But there are also arguments against it: It may be easier for interest groups to influence a single central authority compared to several national ones, as Laffont and Tirole (1993) indicate. Moreover, a central authority eliminates competition between institutions, which may not be desirable.

If the member states decide to centrally implement competition rules in the agreement, concrete laws need to be worked out. Moreover, member states must agree to implement an effective dispute settlement body, which promotes the factual realization and accordance to these rules. Effective punishment measures are crucial, otherwise the body would degenerate to a tiger without teeth. On the other side, if the agreement includes rules on competition policies at a decentral basis, competence for legislation and implementation remains with the authorities of the member states. The agreement should then foresee a primacy of competition concerns about the liberalization of investment. The formulation, implementation and execution of concrete competition laws would then be left to the authorities of the member states.

8.4.2   Specifying the meaning of "Investment"

As sections 8.3.1 to 8.3.3 indicate, the effect of foreign investment on market structure and competition depends on its type. Accordingly, a multilateral agreement on investment needs to differentiate between different types of foreign investment. The definition of the term "Investment" in the MAI is too general. For instance, the agreement treats portfolio investment in the same way as traditional direct investment. These two types have different characteristics, as portfolio investment are made on a short term basis, and risk diversification plays a crucial role. Portfolio investments entail stability

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[28]Caves (1996), Chapter 4; Empirical references can be found in OECD (1974).

risks for the receiving country, and affect corporate planning in a different way as long term direct investment.[29] In contrast, portfolio investments do not affect market structure and competition, which direct investment does.

Long term oriented direct investment affects market structure and competition in the receiving and the host countries, which should be considered in a multilateral agreement. If a future agreement foresees the primacy of competition laws upon the liberalization of investment flows, but leaves the implementation to the member states, a broad differentiation of the term "Investment" seems suitable. However, if the agreement will explicitly integrate corresponding regulations on a multilateral basis, the term "Investment" needs much more detailed differentiation in order to comply with the different effects of various investment types. As explained in chapter 8.3.2, e.g. mergers has other effects on market structure and competition, as the creation of new plant locations. The very far-reaching and general definition of the MAI does not allow such a differentiation. It should be extended accordingly.

8.4.3   Promotion of competition authorities in LDCs

I discuss possible negative effects of foreign direct investment on LDCs in chapter 8.3.3. The analysis hints at the increasing importance of well functioning and efficiently working competition authorities. A multilateral agreement serves to liberalize direct investment flows, with the aim to increase competition. The framework must assure that these positive effects can in fact be realized. This is not the case if increased liberalization leads to less competition. In this case, the MAI may create negative effects on market structure and competition, which decreases aggregate welfare especially in LDCs. Accordingly, the implementation of a multilateral agreement on investment should only be undertaken, if it simultaneously promotes the establishment of efficient competition authorities in LDCs.

If an agreement foresees that competition policy remains in the hands of the member states, it should be considered that many LDCs lack well functioning competition authorities.[30] To guarantee competition in these countries, a multilateral agreement should then promote the implementation of well functioning competition authorities in LDCs. If this is not the case, nega-

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[29]Some economists propose a tax on short term capital transactions. Compare Tobin (1978), Frankel (1996).

[30]Compare Basedow (1998).

tive effects on market structure and competition may result in less developed countries. Positive effects on growth and development may be weakened in these countries, and even be converted into a negative welfare effects.

8.5   Is the WTO a suitable forum for a future MAI?

If a multilateral agreement on investment will be implemented in the future: What is a suitable forum for its realization? The OECD is not appropriate for two reasons: First, it seems rather unlikely that the OECD resumes negotiations after its first failure. Second, the limited sphere of influence of the OECD speaks against this organization, as it does not represent the group of less developed countries.

The WTO can play an important role for the integration of such an agreement.[31] It already has an extended mandate beyond the field of international trade in some respects. It touches the fields of direct investment, trade and competition policy, in as much as these fields are linked to questions of international trade policy. Therefore an integrative and broad approach to regulate these associated fields within the WTO seems reasonable.[32] Consider for instance the recent negotiations between China and the European Union for a Chinese entry into the WTO. Access to the Chinese telecommunication market was of special interest to the EU. So the countries agreed that European companies are allowed to purchase minority stakes of Chinese telecommunication companies of up to 49%. Remarkably, this WTO agreement essentially regulates the liberalization of foreign investment, and does not exclusively refer to mere trade policies.

The WTO has also established structures to elaborate, realize and integrate multilateral agreements. The dispute settlement mechanisms are relatively effective. Recently, the settlement body accomplished that member states abide to the contents of the WTO agreements.[33] A dispute settling mechanism must be integrated into a multilateral agreement on investment. As its effectiveness is crucial for a good implementation, the WTO appears to be a

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[31]For argument in favor of an implementation within the WTO, compare Ganesan (1998). Arguments against an implementation gives Hartwig (1999).

[32]Compare also OECD (1999a), OECD (1999b).

[33]Information on current and past proceedings can be found at http://www.wto.org/english/tratop_e/dispu_e/dispu_status_e.htm.

suitable platform.

Another advantage is that less developed countries are represented within the WTO. Of course, their political weight and their representation in working groups is not comparable to the US, the EU or Japan. This should be improved with a multilateral agreement on investment, such that all countries are in fact able to coordinate own interests and bring them forth within the WTO. Other forums, as for example the UNCTAD, would probably better represent the interests of LDCs. But it would be doubtful whether the member states of the OECD agreed to such a forum.

A transfer of the MAI to the WTO generates political costs. For instance, members of the OECD and the WTO face different interests, as Hartwig (1999) argues. But this is not an argument that an agreement should be restricted to the OECD. If an agreement on investment is ever going to be implemented, the WTO appears to be the right organization to deal with it.

Chapter 9

Conclusions

This book dealt with special interest influence on policy decisions. Chapters 2 to 5 gave an overview of theoretical approaches towards lobbying and analyzed the two main lobbying channels. With the *influence motive* for lobbying, the focus lies on contribution payments in exchange for favorable policies. The idea is that politicians follow individual objectives which depart from welfare maximization. The political arena is viewed as a market, and politicians supply special benefits in exchange for money. Contributions may consist of legal donations (i.e. public campaign spending) or illegal bribes (i.e. black money), but the concept is of broader scope and goes beyond pure money offers. For instance, contributions may be interpreted as jobs offered to politicians for after incumbency, or even political mobilization of a specific clientele like trade-union members or addicts of the tabloid press. Contributions may also be interpreted as investments which are necessary to get access to the political sphere. These may be costs for the maintenance of lobbying bureaus, professional political entrepreneurs on the payroll, or outlays for extensive networking.

The second channel of influence does not rely on the assumption that politicians are self-interested. The idea of the *influence motive* for lobbying is that politicians face restrictions which prevent them from being fully informed about the policy effect on aggregate welfare. Lobbies, in contrast, are better informed, which gives politicians incentives to listen to interest groups. Time constraints, workload of politicians or pecuniary reasons are not the sole examples why this may be the case.[1] Companies often posses

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[1]Policy decisions often have strong impacts on certain sectors, as for instance trade liberalization on agribusiness, environmental regulation on the chemical or car industry,

information not available to the public, such as data on costs and demand, technological knowledge etc. This information is valuable to politicians who try to implement the welfare maximizing policy. Hence interest groups have incentives to strategically inform politicians about policy effects, and politicians face incentives to listen to those groups.

The *welfare effect of lobbying* depends on the channel of influence and may be positive or negative. Suppose that lobbying takes the form of contribution payments in exchange for political favors. As indicated in chapters 2 and 3, aggregate welfare declines if politicians deviate from first best practices, incurring deadweight losses on the expense of the public. A prohibition on lobbying increases aggregate welfare according to this approach. The extent of the welfare loss through lobbying depends on the relevant policy field and the degree of interest group organization: If lobbying competition is weak and only some groups with possibly joint interests organize, negative welfare effects are more intense due to special interest influence. In contrast, if all relevant groups organize, opposing interests cancel each other out and lobbying has only minor effects on aggregate welfare. Thus, a prohibition on lobbying is more valuable in policy areas where one-sided interest group pressure prevails. Moreover, it depends on the extent of the politician's care for aggregate welfare if lobbying influence is intense. If we postulate that politicians care for aggregate welfare in policies attracting much public attention (and care less about welfare in apparently unimportant fields), lobbying will be more successful in seemingly unpopular policy areas. As a consequence, negative welfare effects through lobbying can be expected in policy fields which are economically important but raise little public attention. In contrast, lobbying in policy fields with much public attention is less effective, especially if competing interests influence the political process.[2]

In contrast to the case of contribution payments, lobbying as information transmission tends to be welfare enhancing. As chapter 4 indicated, details depend on signalling costs, the degree of lobbying competition, and the extent of the politician's ex ante information. For instance, if signalling costs are high enough to separate between interest groups which tell the truth and others, aggregate welfare (gross of lobbying costs) increases. If the degree of information is high even without lobbying, the politician extracts only little new information. The gain from lobbying is rather small in this case. It may

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or health regulation on the tobacco industry. These groups have high stakes in a certain type of regulation, whereas politicians must deal with many policy issues.

    [2]The lack of public attention may be an explanation why the pharmaceutical industry in Germany has a strong influence on political decisions.

even be negative if lobbying costs are taken into account, because lobbying efforts may be unproductive activities and incur a welfare loss (Bhagwati 1995). Strong lobbying competition has ambiguous effects: On the one hand, information available to the politician increases; on the other hand, more uninformative money is spent in the lobbying process.

The *distribution of gains from lobbying* depends on various factors. Politicians always benefit because they could alternatively foreclose access to interest groups if they did not. Lobbying provides benefits either in the form of contribution payments or transmission of new information, and politicians can always do at least as good with lobbying as without.

The effect of lobbying on unorganized interests depends on the channel of political influence. If lobbying takes on the form of contribution payments, politicians deviate from welfare maximizing policies in order to attract money. Unorganized interests lose in this case, because lobbies and politicians increase their payoff at the expense of the unorganized public. The best possible outcome for unorganized interests is that lobbying induces no costs, which occurs if lobbying competition is strong and mere counteractive effects occur. On the other hand, unorganized interests benefit from lobbying if it involves the transmission of information. Although lobbies now and then mislead the politician to the disadvantage of the public, the quality of political decisions improves on average in this case. Intense competition between interest groups tends to increase the informational gain from lobbying, which benefits unorganized interests.

Payoffs to organized interests depend essentially on the degree of lobbying competition. Benefits tend to to decrease if lobbying competition is intense. For instance, a single lobby facing no competition is able to extract the full rent created through the political interaction if lobbying is in the form of contribution payments. In contrast, lobbies are caught up in inefficient activities if lobbying competition is strong. In this case, interests groups tend to lose because they are forced to engage in costly activities without getting extra benefits and lobbying serves merely to prevent them from being outsiders in the political game. Groups therefore face incentives to cooperate if lobbying competition is strong, or may even benefit from a prohibition of lobbying.

These insights are broadly valid for both types of influence channels, even though subtleties remain. For instance, lobbies' payoffs depend on the efficiency of the available policy instrument: With weak lobbying competition, more efficient means of redistribution tend to increase payoffs, because small

contribution payments suffice to compensate the politician in this case. This reverses if lobbying competition is strong. In this case, obligatory compensation payments need to be high in order to prevent the politician from implementing unfavorable policies with efficient means of redistribution. As a second example, consider the free-riding aspect of lobbying which occurs if interest groups follow a common interest. The total benefit of lobbying is high since counteractive lobbying efforts are small in this case. But the distribution of gains depends on the ability to free-ride, which may undermine effective lobbying. This aspect has been worked out in greater detail in the context of environmental regulation in chapter 6. It indicates that the extent of free-riding may also depend on the politician's responsiveness towards different types of lobbying, and on the policy at stake.

Chapters 2 to 5 led to the conclusion that *relevant policy fields for effective lobbying* from an interest group's point of view are characterized by weak lobbying competition and little public attention. Strong informational advantages vis a vis governments makes lobbying more attractive to interest groups, and efficient policy instruments decrease the cost of redistribution. Politician's, in contrast, gain from strong lobbying competition. As interest groups they gain from little public attention and prefer efficient means of redistribution. It is noteworthy that politicians always benefit from lobbying, whereas lobbies may lose. It is therefore not surprising that politicians have only small incentives to prohibit lobbying.

Chapter 6 investigated the instrument choice by lobbies and its effect on environmental regulation. Interest groups have two elementary means to influence the political process, which affects the degree of lobbying competition. They compete with respect to private lobbying efforts, but follow a common interest through general lobbying. If the politician becomes more responsive to private lobbying, competition between interest groups increases. As a result, both groups tend to cut back on general lobbying and increase private lobbying instead. Environmental regulation becomes stricter in this case since joint engagement against environmental regulation attenuates and interest groups are trapped in inefficient redistributive battles.

The analysis indicated that responsiveness towards private lobbying does not necessarily undermine environmental regulation. Granting loopholes to individual pollutants may increase environmental quality because lobbying competition increases, which diverts from harmful lobbying against regulation in general. Moreover, if the responsiveness towards private lobbying is interpreted as a parameter indicating policy discretion, a higher degree

of general regulation can be expected if a certain policy goal is achievable through several alternative instruments.

Chapter 7 applied the common agency framework to the regulation of multinational enterprizes. It investigated whether multinationals face stronger incentives to engage in lobbying activities than national firms. There is a natural force towards less regulation of multinationals, because the possibility to relocate production reduces the stakes in domestic regulation. However, the extent of regulation depends also on its effect on aggregate welfare. If the multinational's ability to relocate production is important and has strong negative welfare effects, less regulation of multinationals may occur. The model also implied that the possibility of lobbying benefits national firms to a greater extent than multinationals, simply because this channel of influence is less important for multinationals.

Chapter 8 focused on regulation in practice. It analyzed the General Agreement on Investment from an industrial economics point of view and criticized the final draft. Main shortcomings are the disregard of competition concerns, the lack of support for LDCs, and the broad definition of the term "investment".

Let me conclude with an outlook to further research. To my opinion, benefits can be expected from further insights with respect to three areas of interest. First, it is not yet well understood which channel of influence lobbies choose. It can be observed that informational lobbying as well as contribution payments play an important role in reality, often both at the same time. But what determines which type of lobbying occurs? Second, the question of interest group formation is a long posed but not yet sufficiently answered issue. Theory indicates that small interest groups with large stakes in political decisions effectively influence policies. This can be observed in reality; however, we also observe important influence by large groups, as for instance labor unions in Europe, environmental groups like Greenpeace, or special interest groups like the ADAC, a strong car lobby in Germany. This leads room for further theoretical insights concerning group organization and its influence on political decisions. Finally, theoretical research should always go hand in hand with empirical investigation, but lobbying activities are difficult to assess empirically. I see much scope for further research in this field especially with respect to European countries, where empirical research has still been very scare. If data is difficult to obtain, case studies may provide a suitable form to get further insights how interest groups shape policies. And it is undebatable that they do so to a huge extent.

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Lebenslauf

Andreas Polk, geboren 1971, besuchte die Primar und Sekundarschule in Kettwig (Deutschland) und schloss sein Studium der Volkswirtschaftslehre an der Universität Heidelberg 1996 mit dem Diplom ab. Von 1997 bis 1998 war er zunächst am Alfred-Weber Institut der Universität Heidelberg am Lehrstuhl von Prof. Dr. Malte Faber, von 1998 bis 2002 am Sozialökonomischen Institut der Universität Zürich am Lehrstuhl von Prof. Dr. Armin Schmutzler als wissenschaftlicher Mitarbeiter tätig. Seit 1997 beschäftigt er sich schwerpunktmässig mit dem Einfluss von Interessengruppen auf politische Entscheidungen. Während dieser Zeit führte er auch verschiedene Lehrtätigkeiten aus.