Political Insulation and Lobbying

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Abstract

The aim of the present paper is to show how inefficient redistribution can occur in a dynamic menu auction lobbying game. I study a two period lobbying game in which the politician has the choice between an efficient lump sum transfer and an inefficient output subsidy. Since the output subsidy increases production and therefore capacity in an industry, future governments may be more willing to sustain the subsidy in order to avoid costs associated with capacity reduction. As this saves lobbying contributions in the future, the present government may have an incentive to collude with the interest group at the expense of future governments, and implement inefficient transfers. This effect is shown to be even more pronounced if the degree of competition between lobbies increases.

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1 Introduction

One of the largest parts of government activity concerns redistribution across citizens. While part of the resources redistributed flow to large groups in the society such as the poor and can be justified on normative grounds, a large share is captured by small groups which have been able to organize powerful lobbies. In the last decades, a lot of work has been devoted to analyzing how lobbies can influence the political decision process and appropriate some resources at the expense of the general public.[1]

A far less investigated field is however which policy instruments are used in the political equilibrium to transfer resources to interest groups. A surprising observation is that apparently most of the instruments used in reality take an inefficient form. Examples abound: think of subsidies to agriculture in almost all countries of the world or of the wide use of tariffs and quotas which protect certain industries from competition. To be sure there could be reasons for such policies to be optimal, e.g. externalities or infant industry protection. However by now most scholars agree this is not the prime reason for such policies.[2] It is far from obvious how such inefficient transfers can survive in the political market. As forcefully argued by the so called Chicago School there are (at least) two arguments against inefficient redistribution devices. First, politicians who use them will simply be voted out of office and second, inefficient instruments will mobilize the rest of society since it has to bear the lion's share of the associated deadweight loss.[3] Hence, interest groups could obtain more resources by replacing inefficient instruments with efficient ones.

In this paper I propose a theory of inefficient redistribution which is based on dynamic considerations of the political actors. Specifically, interest groups do not only care about current transfers but also whether they will receive resources in the future. Therefore, it might be profitable for them to lobby for policies which are hard to reverse by succeeding governments. Political scientists have coined the term "insulation" for such policies[4] and I will argue that precisely the widely observed inefficient transfer instruments have the property that they are insulated against future reversal. The starting observation is that almost all inefficient transfers we encounter in reality, be it a price or output subsidy or a tariff, lead to overproduction and thus overcapacities in an industry. In contrast, an efficient, e.g. lump sum transfer clearly has no distorting effect. Cutting back an inefficient transfer therefore leads to a reallocation of production factors in the economy which, albeit efficiency enhancing in the long run may lead to some cost in the short run. As an example, the production factor may

[1]See Grossman and Helpman (2001) for a comprehensive overview of the existing literature.

[2]See for example Gisser (1993).

[3]See for example, Stigler (1971), Becker (1983) and Wittman (1989) for work in the tradition of the Chicago School.

[4]See e.g. de Figueiredo (2002) and the references therein.

have been partially specialized in the meantime or the market for the production factor may exhibit frictions such that its owner would suffer an income loss in case of reallocation. Hence a politician knows that if he is to introduce some inefficient transfer today, his successor will be more willing to sustain the policy. Thus insulation in the present model works through a change in the preferences of future governments.[5]

Is the effect outlined above really so strong that inefficient policies survive for that reason? Eventually, the income loss of a few members of society must be traded off against an overall welfare improvement. There is some evidence that politicians are willing to sacrifice welfare gains, especially in order to avoid rising unemployment. As an example some politicians in Britain supported ongoing subsidies to the (highly unprofitable) coal industry in order "to ease the pain that will be caused by the loss of 2,500 jobs". Similarly, Dominique Bussereau, the French minister for agriculture justified France's obstinate resistance to reform of the European Union's agricultural policy by noting that "tens of thousands of jobs would be at risk".[6] Since Bussereaus claim that ten thousands of jobs are at risk is probably an exaggeration, it is noteworthy that the number of job losses appears to be quite small in both examples.

Until now we have said nothing about who gains from political insulation. Clearly, for the argument to work, the present government must value the fact that the policy is sustained somehow. The mechanism by which this is achieved in the model is that interest groups anticipate that they will have to bribe future governments less for a transfer in case of political insulation. The additional rents which the interest group can thereby capture can be shared with the present ruler who may be able to extract even more resources from the lobby compared to the case of lump sum payments to the interest group. Hence the present government and the lobby collude at the expense of future rulers.

This paper contributes to an old dispute between the Chicago and the Virginia School[7] about how to interpret policies which seem to be inefficient at a first glance. While the proponents of the Chicago School (see the references above) argue that due to political competition seemingly inefficient policies can be given an efficiency rationale, the Virginia School posits that inefficient transfers can emerge since they can be better disguised. This argument was formalized by Coate and Morris (1995), who show that inefficient policies may prevail if voters are both uncertain about the politician's preferences and the welfare consequences of a certain policy. The drawback of this argument is that the policy under consideration must be welfare enhancing in at least some states of the world. However, if one takes agricultural

[5]This mechanism distinguishes this paper from Coate and Morris (1999) where insulation of a certain policy stems from the lobbies' higher willingness to pay for its maintenance once it is enacted.

[6]These examples are taken from the Economist: see "Bottomless pits", April 18th, 2002 and "European farm follies", December 8th, 2005.

[7]See, for example, Tullock (1983).

subsidies in the European Union this is hardly the case: at least at the point where huge sums had to be expended in order to export agricultural overproduction it was obvious that the subsidies paid to farmers do not correct for some market failure.[8]

Another strand of the literature explains inefficient redistribution on grounds of an improved bargaining position of the politician vis-a-vis the lobbies. A commitment to inefficient transfer instruments on the politician's side might limit the amount of resources redistributed as in Rodrik (1986), Wilson (1990) and Becker and Mulligan (1998) or even help the politician to extract more bribes from the interest groups as in Drazen and Limao (2004). However, a somewhat arbitrary assumption in these papers is that the policy maker can commit to the transfer instruments but not to the level of redistribution.

At the heart of our theory is a commitment problem which is prevalent in the political arena.[9] Specifically the actions of future governments can not be constrained by explicit contract but only through institutions or today's policy choice. The latter mechanism is not new: it has first been explored by Persson and Svensson (1989) and Alesina and Tabellini (1990) in the context of public debt accumulation. Here the argument goes that a present conservative government might want to accumulate debt to be repaid tomorrow in order to constrain spending behavior of future (more left wing) governments.

We apply a similar mechanism to inefficient redistribution to lobby groups. The paper closest to ours is Acemoglu and Robinson (2001). There, a politician can pay income subsidies which are targeted either to old or to all members of an industry. The targeted transfer is more efficient in their model since it gives no incentives for young agents to enter into the subsidized profession. However the non targeted subsidy program might still be preferred by the old members if the size of the industry is an asset in the political sphere. Acemoglu and Robinson (2001) assume that the industry gains power and effectively sets policy in all future periods if the number of agents working in that industry exceeds some threshold. Our paper departs from theirs in two important aspects. First the inefficient policy changes the preferences of future policy makers and not their identity.[10] Second, and more importantly, we explicitly model the determination of equilibrium policy by applying a menu auction lobbying game. This is attractive as interest groups usually try to influence policy makers but do not have political decision rights, and it helps us to identify the trade-offs a politician faces when he sets policy. This formulation also contributes to a better understanding of an unappealing property of menu auction lobbying games. The existing literature found that in the presence of multiple lobbies there is a strong tendency to efficient policies. This however benefits the politician only, since in the case of competing interest groups each lobby is held down to its

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[8] This fact also invalidates autarchy arguments in favor of these subsidies.

[9] See Acemoglu and Robinson (2005) and Acemoglu (2003) for an extensive discussion and a wide array of applications of the commitment problem in politics.

[10] Other papers which examine the impact of a policy on the identity of future governments in different contexts are Milesi-Ferretti and Spolaore (1994), Besley and Coate (1998) and Aghion and Bolton (1990).

reservation utility.[11] This prisoners dilemma type of situation seems to be somewhat at odds with the sharply raising number of political action committees and interest groups in the US, as in theory each lobby loses nothing by unilaterally abandoning its influence activities. Therefore the theoretical result raises some concern about why lobbies manage to organize in the first place. In response to these problems, Dixit, Grossman, and Helpman (1997) resort to the informal argument that interest groups obey to some agreed - upon "constitution" specifying that all organized groups are only allowed to lobby for inefficient transfers, in which case lobbies are able to expropriate some positive rent.
The extension of our model to the case of multiple lobbies reveals that in our dynamic setting, first, inefficient policies still can prevail, and second, lobbies earn positive rents. To obtain these results we do not need to assume some exogenously given coordination device, be it an explicit contract or a repeated game setting. It is also noteworthy that competition between interest groups can make the implemented policy even more inefficient.

The paper is organized as follows. The next section lays out the model and discusses the basic assumptions. Subsequently we will analyze the simplest version of the model where only one interest group is active in the political arena. The forth section investigates the impact of multiple lobbies and the last section concludes.

2 The Model

In the first part of this section I present the structure of the model, while the following subsection is devoted to the discussion.

2.1 Description of the Model

We consider a small open economy which is populated by a unit measure of individuals with different factor endowments.[12] All individuals have the same utility function defined over $n+1$ goods $(x_0, x_1, \ldots, x_n)$

$$u = x_0 + \sum_{i=1}^{n} u_i(x_i),$$

where x_0 serves as a numeraire good with price equal to one and the functions $u_i(\cdot)$ are increasing, strictly differentiable and concave. Assuming that the income of all individuals is high enough and the price for good x_i equals p_i the demand for good i is given by the inverse of $u'(x_i)$ and is denoted by $d_i(p_i)$. For an individual endowed with income m this gives rise

[11] See Grossman and Helpman (1994), Dixit (1996) and Dixit, Grossman, and Helpman (1997).
[12] The model largely follows Grossman and Helpman (1994).

to the indirect utility function $V_0 = m + S(\mathbf{p})$, where $\mathbf{p} = (p_1, p_2, \ldots, p_n)$ is the world market price vector the consumer faces and $S(\mathbf{p}) = \sum_{i=1}^n u_i(d_i(p_i)) - \sum_{i=1}^n p_i d_i(p_i)$ denotes consumer surplus.

It is assumed that the numeraire good x_0 is produced competitively by labor alone with a constant returns to scale technology. The input - output coefficient is set equal to one which implies that the labor market will clear at a wage of one. The nonnumeraire goods x_i are produced by labor and a sector specific input with a constant returns to scale technology. The sector specific input is supplied inelastically and its reward is denoted by $\pi_i(p_i)$. It is assumed that the specific input can not be traded (one could think of human capital, for example).[13]

A fraction (mass) $1-\varphi$ of the population is only endowed with labor z alone, while a fraction φ_i, $\sum_{i=1}^n \varphi_i \equiv \varphi$ additionally owns the sector specific input for good i. Hence the income of the owners of labor alone is given by one (the wage rate in the economy) while the owners of the sector specific input derive additional income of $\pi_i(p_i)$.

Some sectors $i \in L$ are organized as lobbies. Only organized sectors can try to bribe the politician in order to get a transfer, which can take two different forms: a lump sum transfer denoted by e_i or an output subsidy t_i. Note that the output subsidy has no impact on prices in the economy, hence all consumers face world market prices. Total transfers $T(e,t) = \sum_{i=1}^n [e_i + t_i y_i(p_i + t_i)]$ are financed equally by all members of the economy where $y_i(p_i + t_i) = \pi_i'(p_i + t_i)$ denotes the equilibrium supply of good i. We denote by $T_i(e_i, t_i)$ the transfer to lobby i. It is assumed that the lobby maximizes the welfare of its members.

Redistributing money causes a welfare loss to the society which is expressed by $\phi(\sum_{i=1}^n [e_i + t_i y_i(p_i + t_i)])$, where $\phi(\cdot)$ is strictly increasing and convex with $\phi(0) = \phi'(0) = 0$.

Therefore the welfare of the workers consists of their consumer surplus minus the share of the transfer and the redistribution cost they have to bear and can be expressed as

$$\mathcal{W}_0 = (1-\varphi)\left[m + S(\mathbf{p}) - \sum_{i=1}^n T_i(e_i, t_i) - \phi\left(\sum_{i=1}^n T_i(e_i, t_i)\right)\right]. \qquad (1)$$

Note that both transfers enter the welfare of workers only through the cost function $\phi(\cdot)$ and the share workers have to contribute to transfer expenditure but leave consumer surplus unaffected.

The welfare of the owners of the specific input gross of contributions (see below) to the politician in turn can be written as

$$\mathcal{W}_i = \pi_i(p_i + t_i) + \varphi_i\left[m + S(\mathbf{p}) - \sum_{i=1}^n T_i(e_i, t_i) - \phi\left(\sum_{i=1}^n T_i(e_i, t_i)\right)\right]. \qquad (2)$$

[13] This so called specific factor model is often used in the theory of international trade. It goes back to Jones (1965), Mussa (1974), and Neary (1978).

Total welfare is simply given by the sum of the welfare levels of workers and the owners of the sector specific inputs

$$\mathcal{W} = \mathcal{W}_0 + \sum_{i=1}^{n} \mathcal{W}_i = m + S(\mathbf{p}) - \sum_{i=1}^{n} T_i(e_i, t_i) - \phi\left(\sum_{i=1}^{n} T_i(e_i, t_i)\right) + \sum_{i}^{n} \pi_i(p_i + t_i).$$

As is standard in the literature, the lobbying process is modeled as a menu auction, i.e. for every policy vector $\mathbf{q} = (\{e_i\}_{i\in L}, \{t_i\}_{i\in L})$ each lobby offers a contribution $C_i(\mathbf{q})$. The policy $\mathbf{q}$ is set by a politician whose preferences are dependent on both aggregate welfare and contributions from the lobbies. We follow the literature in that both components enter linearly into the governments objective function such that

$$G = a\mathcal{W}(\mathbf{q}) + \sum_{i\in L} C_i(\mathbf{q}), \tag{3}$$

where $a \in \mathbb{R}_o^+$ is the weight the politician attaches to social welfare.

The model we consider has two periods, $\tau = 1, 2$. In every period, each lobby first offers a contribution schedule. After that the politician chooses a policy $\mathbf{q^1}$ which maximizes his utility given the contribution schedules. Then each sector decides on its production and therefore on the optimal amount of inputs employed. It is assumed that the industry represented by the lobby chooses the optimal amount of inputs in every period. At the end of the first period production takes place and payoffs are realized.

The second period is identical to the first one except that we assume that a new politician is in power who has the same objective function as his predecessor. Again the organized sectors lobby, followed by the implementation of the preferred policy by the politician. However if any sector chooses to adjust its production level we assume that every worker who changes job incurs a loss of ϑ. After this adjustment has taken place firms produce and payoffs are realized. For simplicity we assume no discounting. The timing of the model is summarized in figure 1.

2.2 Discussion

This subsection is devoted to the discussion of the model.

First of all we restricted the set of policy instruments available to the politician. The transfer e can be seen as an efficient mean of redistribution while the price subsidy t leads to distortions in the product market and is therefore less efficient. This structure is similar to Dixit, Grossman, and Helpman (1997) where the policy instruments are also exogenously given. What is really important in my model for the two means of redistribution is that first they

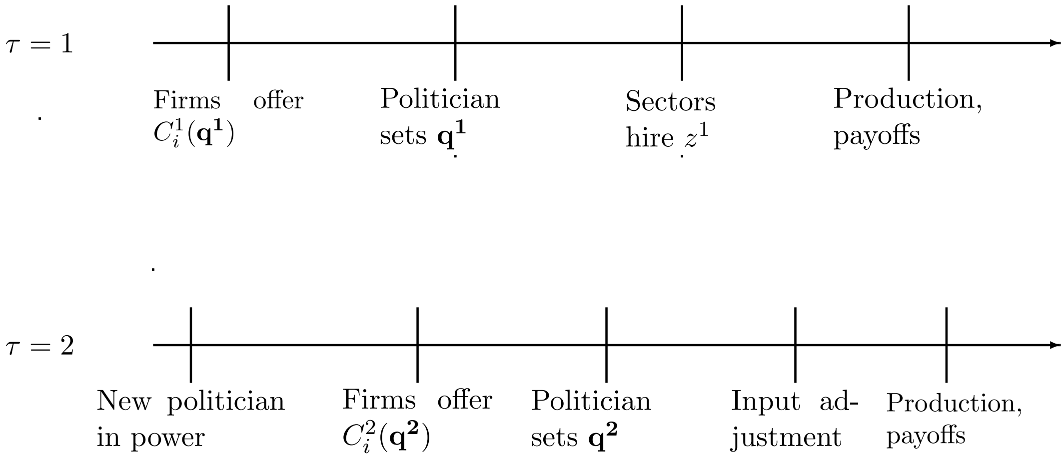

Figure 1: Timing

can be ranked by how efficiently they transfer resources to the lobby, and second that the more inefficient instrument leads to an expansion of production. Since this is true for almost all observed inefficient transfers be it a cost or price subsidy or tariffs, changing the set of policy instruments would have no impact on the qualitative results.

The second point concerns the modeling of the lobbying process. For lobbying to be effective the politician must care sufficiently about contributions. This has been justified by assuming that the politician can either use the contributions for personal consumption or to finance his next electoral campaign.[14] Reelection concerns are also one interpretation of why social welfare enters into the objective function of the politician. Note that in my model the politician will be voted out of office or resign after the first period for sure. One possible justification, besides that the politician consumes the bribes, is that the incumbent is a member of a party which is in need of resources for the next campaign. It is often argued that one of the main roles of political parties is to discipline the leader and this would also explain why the incumbent still cares about social welfare.
As we will see later in the analysis, extracting more bribes from the interest groups today goes along with less bribes to be received in the future. In the model we assume that the politician acts purely myopically, i.e. his preferences are defined over present payments from the interest groups only. This assumption simplifies the analysis a lot but one might argue that his fellow party members will also care about bribes in the future. However, it seems plausible to argue that at least a part of future bribes flow to a different party (almost any model of electoral competition has it that each competitor wins the election only with a

[14]See Grossman and Helpman (1996) for a model in which the reelection probability increases with the amount of resources spent in the campaign.

certain probability). Besides, in the case where the present government is in power in the next period for sure *and* has a relatively high discount factor the argument of the paper goes through.
As mentioned above, the lobbying process itself is modeled as a menu auction. This approach goes back to Bernheim and Whinston (1986a,b).[15] The basic idea of this approach is that lobby groups tailor their contribution to the policy which is enacted by the politician. So implicitly it is assumed that the lobby group can commit to pay the politician according to the contribution schedule it has offered once the policy has been implemented. Besides this strong assumption, the menu auction approach to lobbying has the advantage that it is tractable, as it boils down to the politician maximizing a social welfare function in which the organized groups gain additional weight.

A further issue concerns the assumption that workers who change job in the second period lose some amount ϑ. There are different interpretations possible. One could either assume that there is learning on the job and so a worker who is dismissed looses some part of his human capital. Another interpretation would be that ϑ simply measures the cost the worker has to incur to find a new job or that the worker stays unemployed for a short period and ϑ measures the difference between his wage and unemployment benefits.
Note that the only way to lose a job is to work in an organized sector and one might argue that workers have to be compensated for the risk they take. This would not allow us to fix the wage rate in the economy at one. However, as will become clear later on in the analysis, in equilibrium it never happens that workers are fired. That is also the reason why the labor market clearing conditions are neglected in the analysis.

I have assumed that the industry hires the efficient amount of labor in every period. This myopic behavior neglects possible dynamic considerations. It might be optimal for the industry to hire more than the efficient amount of labor in the first period to change the behavior of the politician later on. Although this might be in the interest of the industry as a whole it is nevertheless not optimal for a single firm belonging to the industry for standard free-riding reasons. So implicit in this assumption is that the industry consists of many firms not able to coordinate on some statically suboptimal capacity. This lack of coordination ability can be justified in three ways: either a monitoring technology is missing or too costly or if contracts on capacity can be written, by private information held by each individual firm about its optimal capacity level. The information rents which have to be granted to all firms in this latter case can render contractual arrangements too costly. Third it could also be the case that capacity agreements are forbidden by the competition authorities.

[15] A very good overview about the theory of menu auctions and its application in the field of political economy can be found in Grossman and Helpman (2001). See also Bergemann and Valimaki (2003) for an analysis of dynamic common agency games.

To conclude this section I will give a short justification for the function $\phi(\cdot)$ which measures some social cost of transferring money to the organized groups. The first reason is purely technical. In the absence of any redistribution costs the lobbies would extract money from the rest of the society until the marginal utility of income of the individuals exceeds one.[16] This however makes it impossible to measure the indirect utility of the individuals in monetary terms anymore, which in turn makes the aggregation of individual utility values and profits accruing from the specific production factor in a social welfare function more difficult. But there are also economic reasons to incorporate redistribution costs. Note that as the model stands we have assumed lump sum taxation. The function $\phi(\cdot)$ could measure the deadweight loss accruing to society in case distorting taxes must be resorted to. Alternatively, it could be interpreted as the administrative cost of collecting taxes and redistributing the revenue to interest groups. One could argue that catering too much to special interests decreases the reelection probability of the politician and therefore the value of his objective function.

3 Analysis with a Single Lobby

In this section we analyze the model in the presence of only one organized sector.[17] To save on notation we make the additional assumption that ownership is highly concentrated, so $\varphi_i = 0$.

3.1 Preliminaries

Before we start the analysis in which one sector is organized let us take a look at the benchmark case in which no lobbying occurs. In this case the politician maximizes $\mathcal{W}$ over e and t. Of course no transfers will be paid since by employing one of the two transfers social welfare is reduced by the positive cost of redistribution. Formally this can be seen by looking at the following derivatives[18]

$$\begin{aligned} \frac{\partial \mathcal{W}}{\partial e} &= -a\phi'(T(e,t)) \leq 0, \\ \frac{\partial \mathcal{W}}{\partial t} &= -aty'(p+t) - a\phi'(T(e,t))T'(e,t) \\ &= -aty'(p+t) - a\phi'(T(e,t))(y(p+t) + ty'(p+t)) \leq 0. \end{aligned}$$

[16]That means that the numeraire good is no longer consumed in equilibrium.

[17]In this section we shall drop the subscript i to indicate variables which are related to the organized group and will simply write e, t and $T(e,t)$ for e_1, t_1 and $T_1(e_1,t_1)$.

[18]See the appendix for the derivation.

Both expressions are obviously smaller than zero if e or t are positive. The second equation also reveals that the output subsidy is a less efficient transfer instrument compared to the lump sum payment. When e is marginally increased by one unit the firm's profit rises by the same amount while increasing profits by one unit using the output subsidy costs more. Formally, $\mathrm{d}\pi(p+t) = y(p+t)\mathrm{d}t$, so the output subsidy must increase by $1/[y(p+t)]$ units in order to transfer one additional unit of profit to the firm. But society bears costs of $\mathrm{d}T = y(p+t)\mathrm{d}t + ty'(p+t)\mathrm{d}t$ which, after inserting the expression for $\mathrm{d}t$, yields $\mathrm{d}T = 1 + \epsilon_{y,t}$, where $\epsilon_{y,t} > 0$ is the elasticity of supply with respect to the transfer. So part of the transfer is lost since the industry expands output. This effect is stronger the steeper the supply curve is, i.e. the stronger supply reacts to the output subsidy.

I now turn to the case where there exists one organized group which can pay a contribution $C(\mathbf{q})$ if the politician implements a policy $\mathbf{q}$. As shown by Bernheim and Whinston (1986b) an equilibrium of the menu auction game can be characterized as follows:

Definition 3.1 $\{C^*(\mathbf{q}), \mathbf{q}^*\}$ *constitutes a Nash Equilibrium of the menu auction game if and only if the following conditions are satisfied:*
1) $\mathbf{q}^*$ *is feasible.*
2) $\mathbf{q}^* \in \arg\max_{\mathbf{q}} a\mathcal{W}(\mathbf{q}) + C^*(\mathbf{q})$
3) $\mathbf{q}^* \in \arg\max_{\mathbf{q}} \mathcal{W}_1(\mathbf{q}) + a\mathcal{W}(\mathbf{q})$
4) $\exists \mathbf{q}',\ \mathbf{q}' \in \arg\max_{\mathbf{q}} a\mathcal{W}(\mathbf{q}) + C^*(\mathbf{q})$, *such that* $C(\mathbf{q}') = 0$.

The interpretation of the second condition is that the politician responds optimally to the contribution scheme. The third condition stipulates that the optimal policy maximizes joint welfare of the lobby group and the politician. This is not surprising as the lobby can transfer utility to the politician without further cost. It is the last point which may be more difficult to understand. It states that given the equilibrium contribution schedule the politician is just indifferent between choosing the equilibrium policy $\mathbf{q}^*$ and receiving $C^*(\mathbf{q})$ or choosing some other policy $\mathbf{q}'$ and collecting no contributions. The meaning of this condition becomes more apparent if we state it in the context of our model. Here $\mathbf{q}' = \mathbf{0}$ is the policy the government would choose in the absence of any lobbies and hence with no contributions. Then condition 4 says that the lobby induces the equilibrium policy $\mathbf{q}^*$ at minimum cost as the politician is just indifferent between taking the money and implementing the equilibrium policy or neglecting the contributions of the organized group and maximizing social welfare. In the analysis below, condition 3 will be used to determine the equilibrium policy vector while the last condition pins down the contribution levels of the lobbies.

So far the solution to the menu auction game still seems to be complicated since one has to maximize over a set of functions to find the lobby's optimal strategy. Fortunately one can simplify the problem considerably by focusing without loss of generality on a subset of feasible strategies for the interest group, namely so called truthful strategies. Assuming differentiability of the welfare and the contribution functions[19] note first that the second and third condition together imply *local truthfulness* in the sense that around the equilibrium point $\nabla C^*(\mathbf{q}) = \nabla \mathcal{W}_1(\mathbf{q})$. Bernheim and Whinston (1986b) show that one can go even a step further and restrict the lobby's strategy set to *globally truthful* contribution schedules without loss of generality. They show that each lobby's best response set contains a truthful strategy regardless of the strategies employed by other players. Furthermore, only truthful contribution schedules are immune to pre-play communication in the presence of multiple lobbies and are hence coalition proof. We will therefore restrict attention to these focal strategies in the analysis to come and assume that the contribution schedule of the lobby takes the truthful form

$$C_1^T(\mathbf{q}, b) = \max\{0, \mathcal{W}_1(\mathbf{q}) - b_1\},$$

where b_1 is some number chosen by the interest group and denotes the rent the lobby extracts from bribing the policy maker. Note that this simplifies the problem considerably since now one only has to solve for the optimal b_1 to find the equilibrium contribution. Hence the contribution function can be obtained by maximizing over a set of numbers and not over a set of functions anymore.

The restriction to globally truthful contribution also makes immediately clear that the equilibrium policy $\mathbf{q}^*$ maximizes the joint welfare of the politician and the lobby. Assuming an interior solution

$$\mathbf{q}^* \in \arg\max_q a\mathcal{W}(\mathbf{q}) + C_1(\mathbf{q}) = a\mathcal{W}(\mathbf{q}) + \mathcal{W}_1(\mathbf{q}) = a\mathcal{W}_0(\mathbf{q}) + (1+a)\mathcal{W}_1(\mathbf{q})$$

has to hold. So as already mentioned above the lobbying process leads the politician to maximize a social welfare function in which the lobby gains an additional weight of 1.

3.2 The Static Game

We start the analysis with the simple case in which the game ends after the first period. As we have shown above the problem can be solved by maximizing a social welfare function in which the interest group has an increased weight. Specifically, this welfare function can be written as

$$\begin{aligned} G &= a\mathcal{W}_0(\mathbf{q}) + (1+a)\mathcal{W}_1(\mathbf{q}) \\ &= a[m + S(p(t)) - T(e,t) - \phi(T(e,t))] + (1+a)[\pi(p(t)+t) + e]. \end{aligned} \tag{4}$$

[19] Grossman and Helpman (1994) argue that differentiability of the contribution function is reasonable since the equilibrium does not change too much if one of the players makes small mistakes.

The maximization of this function yields the equilibrium policy, while the contribution function the lobby offers is obtained by employing the notion of a truthful strategy and choosing b in a way such that the politician is exactly indifferent between a world where the interest group is active and one where it is not. In the following proposition we summarize the result of the static game:

PROPOSITION 3.1 *The equilibrium policy of the static game is given by* $t^* = 0$ *and* e^* *implicitly defined by* $1 = a\phi'(e^*)$.
The lobby offers the following contribution schedule: $C^{T^*} = e - e^* + a\phi(e^*)$.

PROOF: See the appendix.

This result is reminiscent of Dixit, Grossman, and Helpman (1997) as the (more) inefficient transfer instrument is not used in equilibrium. To understand this result remember that the lobby and the politician maximize their joint welfare in equilibrium. Hence, the output subsidy is not used as it leads to a loss of resources. Turning to the contribution function, note that the lobby reimburses the politician exactly for the loss in social welfare it induces by influencing the policy choice. Evaluating C^{T^*} at the point e^* immediately reveals that the policy maker gets exactly $a\phi(e^*)$ as a contribution and so is exactly indifferent between setting $e = 0$ (which is his default policy choice in the absence of a lobby group) and implementing e^*. Note therefore that the politician gains nothing if only one interest group is active, since he is precisely held down to his reservation utility and the lobby captures all the surplus which is generated by the lobbying process. This is a very important property of menu auctions, as we will see again later in the analysis. Each lobby's rent is determined by the amount the interest group adds to the *joint surplus* of the politician and the lobby by becoming active and bribing the policy maker. That $e^* - a\phi(e^*)$ corresponds to the added joint surplus can easily be seen. Without the lobby, the politician sets $\mathbf{q} = \mathbf{0}$ and the joint surplus is given by $a\mathcal{W}(e = 0, t = 0)$. With an active lobby the optimal policy increases joint welfare by e^* as the lobby gets an additional weight of 1, but welfare is reduced by the redistribution cost $a\phi(e^*)$. The added joint surplus is of course larger if the politician cares less about society's well-being as measured by a decrease in the parameter a.

3.3 The Two Period Model

3.3.1 The Final Period

As shown by Bergemann and Valimaki (2003), the same techniques as developed by Bernheim and Whinston (1986a,b) can be applied to solve dynamic menu auction games. The aim of this section is to show how the second period output subsidy t^2 depends on first period policy, especially on the subsidy t^1 granted in $\tau = 1$.

We proceed by backward induction and begin our analysis in the second period. Assume that the politician in period 1 has implemented a policy $\mathbf{q^1} = (t^1, e^1)$ which leads the organized industry to employ an amount $z^1(p+t^1)$ of labor.[20] When the second period politician has to decide about the policy $\mathbf{q^2}$, he now also takes into account that a price subsidy in period 2 which is different from t^1 leads to a welfare loss. This is due to the fact that the firm responds optimally to equilibrium prices and adjusts the amount of labor employed. Since all workers who have to change their job lose an amount ϑ of income, welfare in the second period is given by

$$\begin{aligned} \mathcal{W} &= \mathcal{W}_0 + \mathcal{W}_1 \\ &= m + S[\mathbf{p}] - T\left(e^2, t^2\right) - \delta\vartheta\left[z^1(p+t^1) - z^2(p+t^2)\right] - \phi\left[T(e^2, t^2)\right] + \pi\left[p(t^2) + t^2\right] + e^2. \end{aligned}$$

δ is a dummy variable taking the value 1 if $t^1 \geq t^2$ and -1 otherwise. It is obvious that the second period politician will never choose a policy which implements a higher price subsidy than the one already in place. In the following analysis we will assume that t^1 is large enough, postponing the exact characterization of t^1 until the period 1 lobbying game is examined. Hence, all values derived in this section are properly interpreted as maximum values given that the output subsidy in the first period was at least as large. Since the maximization problem is the same as in the static case, the policy maker will not use the efficient transfer e^2 in the absence of an organized lobby group. However, given that a positive price subsidy has been implemented in the first period, the politician has an incentive to at least partially sustain the policy. This can be seen by examining the first order condition of $\mathcal{W}$ with respect to t^2:

$$\frac{\partial \mathcal{W}}{\partial t^2} = a\left[-ty'(p+t^2) - \phi'[T(e,t)]\left[y(p+t^2) + ty'(p+t^2)\right] + \vartheta z'^2(p+t^2)\right] = 0.$$

Under the assumption that $\mathcal{W}$ is a concave function, the equation above has a unique solution $t_{-1} > 0$. It is important to note that this solution depends on the price subsidy in period one t^1 only insofar as t_{-1} must be smaller than t^1. If this were not the case, the policy maker would *create* reallocation of workers instead of avoiding it. Formally, δ would turn negative and one would have to subtract $\vartheta z_2'(t_2)[p+t^2]$ in the first order condition above and the whole expression would be negative except at $t_{-1} = 0$. So t_{-1} denotes the maximal value of the output subsidy in the second period under the assumption that the subsidy in the first period was at least as large.

The solution t_{-1} will obviously be larger the smaller $\phi'(\cdot)$ and $y'(p+t)$ are, i.e. the smaller the cost of transferring money to the lobby via the output subsidy.

[20] Remember that throughout the analysis, subscripts denote the lobby group while superscripts stand for the time period.

As in the static case, when deciding over the policy the politician maximizes the following expression:

$$
\begin{aligned}
G^2 &= a\mathcal{W} + \mathcal{W}_1 \\
&= a\left[m + S[p(t^2)] - T(e^2, t^2) - \vartheta\left[z^1[p+t^1] - z^2[p+t^2]\right] - \phi[T(e^2, t^2)]\right] \\
&\quad +(1+a)\left[\pi[p+t^2] + e^2\right]
\end{aligned}
$$

Assumption 3.1 *G^2 is quasiconcave in t^2 and exhibits an interior maximum with respect to e^2.*

This assumption is necessary since G^2 depends on t^2 in two ways: first, increasing t^2 leads to a welfare loss lowering G^2 and this loss is the larger the larger t^2. On the positive side is that increasing t^2 saves reallocation costs. This positive effect depends on the labor demand function which normally is convex. Hence we subtract a convex function from a convex function and the assumption makes sure that the welfare loss dominates, leading to a well-behaved objective function. The interior solution with respect to e^2 is guaranteed if the redistribution cost function $\phi(\cdot)$ is not too convex and simplifies the analysis considerably.

We will now provide the solution to the lobbying game in the second period.

Lemma 3.1 *Let $\widehat{t^2}$ be the solution to the following equation:*

$$
-(1+a)\left(t^2 y'[p+t^2]\right) + a\vartheta z'(t^2) = 0.
$$

In the second period the politician will implement $\mathbf{q^{2*}} = (e^{2*}, t^{2*})$, where $t^{2*} = \min\{t^1, \widehat{t^2}\}$ and e^{2*} solves $a\phi'[T(e^{2*}, t^{2*})] = 1$.

Proof: See the appendix.

The interpretation of this lemma is as follows. First, given that $e^2 > 0$ in equilibrium, the lobby will extract resources from the policy maker until its marginal benefit equals marginal redistribution cost. t^2 is characterized by a joint optimality condition of the politician and the interest group. Note that $\widehat{t^2}$ is the maximal sustainable output subsidy in the second period. The equilibrium transfer will be smaller than $\widehat{t^2}$ whenever the subsidy implemented in the first period is smaller. This is an important property of the model. When the lobby tries to increase the output subsidy in the first period it automatically increases the second period subsidy *by the same amount* (so t^2 as a function of t^1 is the identity function). From this reasoning, one can immediately deduce why no worker reallocation takes place in equilibrium.

3.3.2 The First Period

The above analysis was carried out under the assumption that the price subsidy implemented in the first period is positive. This must be the case in order for the equilibrium policy in the second period to entail a positive subsidy. We will now show that in the first period the interest group can decide between two options. First, by trying to receive the subsidy, which comes at a cost in the current period, since part of the transfer which must be paid is lost but increases the rent which can be captured in the second period. Or secondly, by lobbying solely for the efficient transfer, which has no effect on the future.
In order to determine the equilibrium policy of the game we therefore have to investigate first how the rent in the second period varies dependent on the price subsidy in the first period. We start with an important lemma.

LEMMA 3.2 *The optimal price subsidy in the first period t^{1^*} is equal to t^{2^*}.*

The proof is obvious and therefore we will only give the intuition for the result. We have already established in the last section that the politician in the second period will never increase the level of the price subsidy, hence $t^{2^*} \leq t^{1^*}$. Now assume that the price subsidy in the first period strictly exceeds the one in the second, i.e. $t^{1^*} > \widehat{t^2}$. Then the interest group and the politician can improve on their joint welfare by reducing the price subsidy in the first period and using the efficient transfer instead. By doing this the rent of the lobby in the second period remains unchanged (since t^{2^*} does not change) but the joint welfare in the first period increases as distortions on the product market are avoided.

We are now in the position to examine the rent the lobby receives in the second period depending on the subsidy in the first one. Again, the politician is exactly indifferent between receiving payments from the interest group and implementing his preferred policy and neglecting contributions altogether. Note that the default policy the politician chooses in absence of the lobby is given by $e^2 = 0$ and t_{-1}. Since it is a priori not clear whether t_{-1} is smaller or larger than t^{2^*} one has to distinguish between two cases.
First consider the case where $t_{-1} > t^{2^*}$. Since t^{2^*} and e^{2^*} are implemented in equilibrium the rent b^2 for the lobby is given by the following condition.[21]

$$a\mathcal{W}(t^{2^*}) = a\mathcal{W}(t^{2^*}, e^{2^*}) + C^2(e^{2^*}, t^{2^*})$$

$$\Longleftrightarrow$$

$$a\mathcal{W}(t^{2^*}) = a\mathcal{W}(t^{2^*}, e^{2^*}) + \pi(p + t^{2^*}) + e^{2^*} - b^2$$

[21] Remember that given t^{2^*} it is optimal to have $t^{1^*} = t^{2^*}$. But that means that the politicians default policy is also t^{1^*} and *not* t_{-1} anymore!

Beside the redistribution cost, the welfare of the society is the same. Defining $\bar{T}$ as the equilibrium amount of transfers society has to pay with $a\phi'(\bar{T}) = 1$, we can write b^2 as follows:

$$b^2 = a\left[\phi(t^{2^*}y(p+t^{2^*})) - \phi(\bar{T})\right] + \pi(p+t^{2^*}) + e^{2^*} \tag{5}$$

Now it is important to remember that t^2 and t^1 vary exactly together in equilibrium as long as t^1 is smaller than $\widehat{t^2}$, the maximum output subsidy in the second period. Therefore, one could write b^2 as a function of t^1 as well by replacing t^{2^*} with t^1. In what follows it will be convenient to think of b^2 as directly controlled by the choice of the subsidy in the first period. One can immediately see that inducing a positive subsidy in the first period might be beneficial for the lobby since it does not have to compensate the policy maker for the full amount of redistribution costs anymore. However, note also that implementing the price subsidy causes a subtle cost for the lobby. Since the sum of transfers to the lobby is bounded by the redistribution cost function at $\bar{T}$, the amount of the lump sum transfer in period 1 shrinks whenever the output subsidy is positive, i.e. $e^{2^*} = \bar{T} - t^{2^*}y(p+t^{2^*})$. In the following lemma we will show that this latter effect dominates whenever $t_{-1} > t^{2^*}$.

LEMMA 3.3 *If $t_{-1} > t^{2^*}$ the interest group will only lobby for the efficient transfer e.*

PROOF: See the appendix.

The intuition behind this result is that for $t_{-1} > t^{2^*}$ it is necessary that the cost of redistribution is very low. Hence the cost saving in the second period from inducing the output subsidy in the first period is rather low and the interest group prefers the efficient transfer.[22] Thus, the result makes clear that a politician who puts only little weight on welfare and caters a lot to interest groups (i.e. a politician with a small value of a) has an ambiguous effect on welfare: on the one hand total transfers increase but on the other hand, the more efficient transfer instrument is used.

Let us now turn to the second case where $t_{-1} < t^{2^*}$. Here, the contributions of the interest group make it optimal for the politician to increase the subsidy beyond his default policy. To examine the incentives of the lobby to receive such a transfer scheme, we again have to investigate how the rent in the second period depends on the subsidy in the first one. The rent of the lobby is calculated in the usual manner by compensating the politician exactly for the change in welfare induced by the lobbying process. Specifically, the rent b^2 can be

[22]This point can most easily be seen by looking at the extreme case where total transfers are bounded by $\bar{T}$ but no further redistribution costs accrue. In this case $b^2 = \pi(p+t^{2^*}) + e^{2^*} = \bar{T} - t^{2^*}y(p+t^{2^*}) + \pi(p+t^{2^*})$ and one can immediately see that setting t^{2^*} equal to zero is optimal. The reason is that the lobby does not have to compensate the politician for any redistribution costs and therefore gets transfers for free.

obtained from the following equation:

$$a\mathcal{W}(t_{-1}) - a\vartheta[z^1(t^1) - z^2(t_{-1})] = a\mathcal{W}(t^{2^*}, e^{2^*}) + \pi(p + t^{2^*}) + e^{2^*} - b^2.$$

Note that no cost stemming from worker reallocation accrues in equilibrium since $t^{1^*} = t^{2^*}$. We can rewrite the above expression to obtain

$$b^2 = a[\mathcal{W}(t^{2^*}, e^{2^*}) - \mathcal{W}(t_{-1})] + a\vartheta[z^1(t^{2^*}) - z^2(t_{-1})] + \pi(p + t^{2^*}) + e^{2^*},$$

which after inserting $e^{2^*} = \bar{T} - t^{2^*}y(p + t^{2^*})$ can be rearranged to

$$\begin{aligned} b^2 &= (1+a)\left[\pi(p + t^{2^*}) - t^{2^*}y(p + t^{2^*})\right] + a\left[t_{-1}y(p + t_{-1}) - \pi(p + t_{-1})\right] \\ &\quad -a[\phi(\bar{T}) - \phi(t_{-1}y(p + t_{-1}))] + a\vartheta\left[z^1(t^{2^*}) - z^2(t_{-1})\right] + \bar{T} \end{aligned} \tag{6}$$

From the formula one can see two channels by which it might be beneficial for the lobby to induce a positive price subsidy in the first period. The second and the third term indicate that the interest group does not have to compensate the politician for the full welfare cost but only for the difference between the cost the politician would have been willing to incur in case of no active lobby group and the equilibrium cost. Hence, the interest group reimburses the policy maker just for the difference in redistribution cost and the difference in the deadweight loss which is associated with the inefficient transfer. The second channel, given by the last term, concerns worker reallocation. Since, in the absence of the lobby, the policy maker would tolerate some reallocation, the reservation utility of the politician goes down. This results in less compensation necessary to guarantee the politician's participation. This effect becomes stronger the further t^1 is expanded beyond t_{-1}.

However the first term in the above expression is an opposite force. Note that this term denotes the difference between what society has to pay for a given level of output subsidy and how much additional profit the output subsidy generates. Since the subsidy leads to an inefficient output expansion of the industry part of the resources spent is lost. This negative effect becomes stronger the higher the output subsidy is and will therefore limit the amount of inefficient redistribution.

After we have characterized the rent in the second period depending on the first period's implemented policy, we can now turn to the policy choice in the first period. If the interest group submits a truthful contribution schedule, it will not only take into account how a certain policy choice affects current profits but also its impact on future payoffs. Clearly, the efficient transfer e does not influence future rents while the output subsidy does. Hence, the contribution schedule offered in the first period reflects both current and future profits:

$$C^1(e^1, t^1) = e^1 + \pi(p + t^1) + b^2(t^1) - b^1.$$

Again the chosen policy will be jointly optimal and maximizes

$$G^1(e^1, t^1) = a\mathcal{W}(e^1, t^1) + C^1(e^1, t^1) \tag{7}$$

over the two policy instruments e^1 and t^1.
The solution to this problem is summarized in the following proposition.

PROPOSITION 3.2 *Given that* $t^{2^*} > t_{-1}$, *the equilibrium subsidy* $t^{1^*} = t^{2^*}$ *is implicitly defined by the following equation:*

$$-2(1 + a)t^{1^*}y'(p + t^{1^*}) + a\vartheta z'(p + t^{1^*}) = 0.$$

The lump sum transfer e^{1^*} *is given by* $a\phi'[e^{1^*} + t^{1^*}y(p + t^{1^*})] = 1$.
The interest group offers the contribution schedule

$$C^1(e^1, t^1) = e^1 + \pi(p + t^1) - a[\mathcal{W}(t^{1^*}, e^{1^*}) - \mathcal{W}(0, 0)] - \pi(p + t^{1^*}) - e^{1^*}.$$

PROOF: See the appendix.

As the labor demand function $z(p + t)$ is strictly increasing whenever $y'(\cdot) \neq 0$, the output subsidy will be positive in equilibrium. Therefore, we have established that the inefficient transfer is used despite the fact that an efficient redistribution device is available. The intuition for this result can be derived from our discussion of the rent b^2. It is shown in the appendix that if the interest group expands the output subsidy beyond t_{-1} the marginal change in the rent is given by

$$\left.\frac{\partial b^2}{\partial t^1}\right|_{t^1 \geq t_{-1}} = -(1 + a)t^1 y'(p + t^1) + a\vartheta z'(p + t^1).$$

The interest group thus faces two effects. The first effect is negative and measures the loss of resources the output subsidy entails. This loss accrues both to society (and is therefore weighted with a) and to the lobby which forgoes some amount of the transfer.[23]
But as mentioned above, a positive subsidy in the first period leads to overcapacities in the

[23]Remember that the total sum of transfers society has to pay for is fixed at $\bar{T}$. If the politician wants to transfer some fixed amount of money to the interest group by using the subsidy the deadweight loss associated with this transfer results in a higher payment for the society. That means that the interest group can extract only a smaller amount of the lump sum transfer. It is for this reason that the loss of resources is additionally weighted with 1.

industry and makes the politician reluctant to cut back the transfer in the second period. In the case we consider where $t_{-1} < t^{2^*}$, the parameters are such that the policy maker is nevertheless willing to tolerate some amount of worker reallocation in the absence of a lobby. However, this decreases his reservation utility and for this reason the interest group has to pay less compensation. Thus, as t^1 is increased beyond t_{-1}, the interest group gains exactly the additional welfare loss which would be inflicted on society if the lobby was absent in the second period.

The comparative statics of the equilibrium output subsidy are straightforwardly calculated. As one would expect, the subsidy is increasing in ϑ, the welfare cost of worker reallocation. A more surprising effect is obtained when considering the parameter a. As the sign of $\frac{\partial t^{1^*}}{\partial a}$ is the same as the derivative of the equilibrium condition for t^{1^*} stated in the proposition, we have

$$\text{sign}\left[\frac{\partial t^{1^*}}{\partial a}\right] = \text{sign}\left[-2t^{1^*}y'(p+t^{1^*}) + \vartheta z'(p+t^{1^*})\right] > 0.$$

The last expression is positive at the equilibrium value since the first (negative) term is weighted less while the second positive term is weighted more compared to the equilibrium condition. Thus ceteris paribus politicians who care more about social welfare will implement a higher output subsidy. The explanation for this phenomenon is simple: a higher value of a means that the politician cares more about society's wellbeing relative to interest group profit. Hence, the policy maker is more willing to avoid reallocation cost and to tolerate less industry profits. We subsume the comparative statics of the single lobby model in the following corollary:

COROLLARY 3.1 *The implemented level of the price subsidy is increasing in reallocation cost ϑ and the politician's concern for social welfare a.*

To understand the condition for the equilibrium value of the subsidy, note that the interest group's willingness to pay[24] for it consists of two parts: the profit generated by it and the future rent which can be obtained. Hence, when the lobby decides whether to pay for the output subsidy, it takes into account the loss of resources entailed in the first period (which is again given by $(1+a)t^1y'(p+t^1)$). Adding up the first period loss and the change in the second period's rent yields the condition stated in the proposition.

Given the optimal value of the subsidy, the lump sum transfer e^1 is expanded until the marginal profit to the firm equals marginal redistribution cost. Once the equilibrium policy is fixed, the contribution schedule can easily be obtained by employing the notion of truthfulness and pushing the politician down to his reservation utility.

[24]Remember that we are still considering an equilibrium in truthful strategies so the contribution schedule offered just reflects willingness to pay.

In summary, we have established that in a dynamic setting strategic considerations might lead interest groups to lobby for an inefficient transfer. The key in the model is that the preferences of succeeding politicians can be altered through an output subsidy. Specifically, compensation for the second period's policy maker can be lowered as sustaining the output subsidy avoids social costs through worker dismissal.

4 Multiple Lobbies

One cumbersome property of the menu auction approach to lobbying is the fact that with two or more lobbies competition between organized groups gets extremely fierce. If one considers a model with inefficient transfer instruments only, the result that the benefits from lobbying activity go down is still intuitive. However if one allows for the availability of an efficient transfer the rents lobbies can appropriate are immediately driven down to zero. To see the point first note that in static settings only the most efficient redistribution device is employed. Since the politician must still get his reservation utility each interest group must design its contribution schedule in such a way that the policy maker is just indifferent between catering to this interest group or disregarding it altogether. Put differently each interest group must compensate the politician exactly for the joint welfare change of society and all other lobby groups induced by the policy change. So if only the efficient redistribution device is used, how does the utility of the politician change upon a new interest group entering the political arena? Since the well-being of the society as a whole is not affected by lump sum redistribution and the politician does not care which lobby gets the money, the utility of the politician is unaffected by the entry of a new lobby. That means that the policy maker does not lose anything if he disregards one lobby and caters instead to the other one(s), resulting in a very strong bargaining position. Hence the competition between interest groups is of a Bertrand type. By raising its contribution (i.e. lowering the rent) marginally over its rival each lobby can appropriate all the funds which are available. Consequently interest groups will raise their bids until their rent is zero.

This result raises two concerns: first only efficient redistribution takes place in equilibrium, which can hardly be reconciled with reality. Second, each interest group has nothing to gain from the lobbying process and would be as well off by unilaterally withdrawing its contributions. It is important to note that this prisoners dilemma type of situation does not occur if only inefficient transfer instruments are available. As inefficient redistribution causes welfare costs for which the politician must be compensated, each lobby is less aggressive leading to positive equilibrium rents. To save the plausibility of this type of model the extant literature resorted to the following argument:[25] since lobbies fare so poorly in equilibrium

[25]See Dixit, Grossman, and Helpman (1997).

they will ex-ante agree on a constitution specifying that interest group are allowed to lobby only for inefficient transfers. Since it is unclear whether such a contract is enforceable before a court the argument relies at least partially on a repeated game setting in the background. This being said, it seems to be worthwhile to investigate whether competition between lobbies has the same detrimental effect on interest group payoffs in our model.

Throughout we will stick to the same assumptions as in the monopolistic lobby case, except that we now allow for a second organized sector.[26] We will also assume that both industries are completely symmetric and are characterized by the same production technology.

4.1 The Static Game

To illustrate the arguments outlined above we will start with the static case. The subscripts 1 and 2 denote the two lobbies.

In the presence of two lobbies which submit truthful contribution schedules the equilibrium policy is determined by the maximization of the following function:

$$G(e_1, e_2, t_1, t_2) = a\mathcal{W} + \mathcal{W}_1 + \mathcal{W}_2. \tag{8}$$

As in the setting with only one lobby only the efficient transfer will be used.

Proposition 4.1 *In equilibrium $t_1^* = t_2^* = 0$. The efficient transfers e_1^* and e_2^* are set such that $a\phi'(e_1^* + e_2^*) = 1$.*

Proof: See the appendix.

First note that the total amount of resources redistributed does not change compared to the single lobby case. Since the cost of redistribution depends on the *sum* of transfers the marginal payment to compensate the politician for the last unit of redistribution still equals marginal benefit of the lobby and is therefore equal to one. The second property of the equilibrium worth emphasizing is that although the total sum of transfers is fixed at $\bar{T}$ it is not clear how $\bar{T}$ is distributed among the groups. This indeterminacy is due to the fact that the policy maker is indifferent about the exact allocation of resources as long as only lump sum payments are used. This leads us directly to the investigation of the equilibrium rents b_i^*, $i = 1, 2$.

As outlined before given b_j^* the rent b_i is determined such that the policy maker is indifferent between disregarding lobby i's contribution and just dealing with lobby j, $j \neq i$, and taking

[26] Since two lobbies are sufficient to drive rents down to zero in the extant literature this assumption seems obvious. An extension to more than two lobbies has no impact on our core results (see section 4.2).

both contributions into account and changing equilibrium policy accordingly. First of all we need to determine which policy would have been chosen in the absence of one lobby. Since only two industries are organized we can resort to the results of the previous section. Clearly, each lobby would get an amount of $\bar{T}$ of the efficient transfer. We denote the transfer to lobby j in the absence of lobby i with $\tilde{e}_j$. Formally the contribution schedule $C_1(e_1, b_1^*)$ of lobby 1 must satisfy the following requirement:

$$a\mathcal{W}(\tilde{e}_2) + C_2(\tilde{e}_2, b_2^*) = a\mathcal{W}(e_1^*, e_2^*) + C_2(e_2^*, b_2^*) + C_1(e_1^*, b_1^*).$$

The left hand side is the payoff of the politician with just lobby 2 active while at the right hand side both lobbies are active. Note first that the welfare of the society as a whole remains unchanged since the sum of transfers is not altered. Moreover as $\tilde{e}_2 = \bar{T}$ and $e_2^* = \bar{T} - e_1^*$ we can rewrite the above condition employing truthful strategies:

$$\bar{T} - b_2^* = \bar{T} - e_1^* - b_2^* + e_1^* - b_1^* \quad \Rightarrow b_1^* = 0.$$

The problem for lobby 2 is exactly the same so we can conclude that both interest groups derive no benefit from the lobbying process. Thus the static model replicates well known results from the extant literature. Both lobbies bid for transfers which are available in fixed total sum so competition drives their payoffs down to zero.

4.2 Analysis of the Dynamic Game

Again we proceed by backward induction and first analyze the second period. Total welfare in the society is given by an expression analogous to the monopolistic case:

$$\mathcal{W} = \mathcal{W}_0(e_1^2, e_2^2, t_1^2, t_2^2) + \mathcal{W}_1(e_1^2, e_2^2, t_1^2, t_2^2) + \mathcal{W}_2(e_1^2, e_2^2, t_1^2, t_2^2) =$$

$$m + S[\mathbf{p}] - \sum_{i=1,2} T_i(e_i^2, t_i^2) - \sum_{i=1,2} \delta_i \vartheta[z_i^1(p+t_i^1) - z_i^2(p+t_i^2)] - \phi\left[\sum_{i=1,2} T_i(e_i^2, t_i^2)\right] + \sum_{i=1,2}\{\pi_i[p(t_i^2) + t_i^2] + e_i^2\}.$$

δ_i is an indicator variable which takes on the value 1 if $t_i^1 > t_i^2$ (resulting in a compression of the amount of labor hired in industry i) and the value -1 otherwise. Some results of the single lobby case naturally carry over to the competitive case. Obviously the politician has no incentive to increase the output subsidy beyond the level stipulated in the first period. Second for the same reasons as in the monopolistic lobby case there will be no worker reallocation in equilibrium or, put differently, the subsidy implemented in the first period will not exceed the one in the second period.

As in the single lobby case we first investigate the maximal sustainable output subsidy in the second period, neglecting the equilibrium level until we analyze the first period of the game. For this we maximize the objective function of the politician

$$G^2(e_1^2, e_2^2, t_1^2, t_2^2) = a\mathcal{W}(e_1^2, e_2^2, t_1^2, t_2^2) + \mathcal{W}_1(e_1^2, e_2^2, t_1^2, t_2^2) + \mathcal{W}_2(e_1^2, e_2^2, t_1^2, t_2^2)$$

we respect to the policy instruments. The following lemma comprises the results.

LEMMA 4.1 *Let $\widehat{t}_i$ be defined by*

$$-(1+a)\widehat{t}_i y'(p+\widehat{t}_i) + a\vartheta z_i'(\widehat{t}_i) = 0, \quad i = 1, 2.$$

Second period equilibrium policy is given by $\mathbf{q^{2}}^* = (t_i^{2^*}, e_i^{2^*})_{i=1,2}$ with $t_i^{2^*} = \min\{\widehat{t}_i, t_i^1\}$ where t_i^1 denotes the output subsidy for industry i implemented in the first period.
The equilibrium lump sum transfers are determined by $a\phi'\left(\sum_{i=1,2} T_i(t_i^{2^*}, e_i^{2^*})\right) = 1$.

PROOF: See the appendix.

The result is striking if one compares the condition for the maximal sustainable output subsidy with the single lobby case. The expressions are equal, meaning that the presence of an additional lobby does not alter the set of possible output subsidies which can be implemented by the interest groups. Again, once the level of output subsidies is fixed the amount of the efficient transfer to each lobby is obtained by equalizing marginal benefit with marginal redistribution cost.
However for the determination of the policy vector actually chosen by the politician one again has to look at the incentives to introduce the inefficient transfer in the first place. As we know already from the analysis of the single lobby case the crucial factor is how the second period equilibrium rent changes with t_i^1, the output subsidy implemented in the first period. To obtain this rent we first have to derive the default policy which is implemented in the absence of a lobby.[27] Of course if an interest group is not active it will not receive the efficient transfer. The level of the output subsidy instead is determined by the derivative of $G_{-1} = a\mathcal{W} + \mathcal{W}_2$ with respect to t_1^2. It can be shown (see the appendix) that

$$\frac{\partial G_{-1}}{\partial t_1^2} = -(1+a)t_1^2 y_1'(p+t_1^2) - y_1(p+t_1^2) + a\vartheta z_1'(t_1^2).$$

It is important to note that the maximizer of this derivative $t_{-1} \geq 0$ is always smaller compared to the monopolistic setting. Again we have to distinguish between two different cases as in the single lobby case. If $t_{-1} > t_1^{1^*}$ there is no incentive for the interest group to obtain the output subsidy. In what follows we focus exclusively on the more interesting case

[27] The following analysis is conducted for lobby 1, the problem for lobby 2 is exactly the same.

where $t_{-1} < t_1^{1^*}$.

Knowing the default policy of the politician it is by now straightforward albeit somewhat tedious to calculate the equilibrium rent of lobby 1.

Lemma 4.2 *The equilibrium rent of lobby* 1 *in the second period* $b_1^{2^*}$ *is given by*

$$b_1^{2^*} = (1+a)\left[\pi(p+t_1^{2^*}) - t_1^{2^*} y(p+t_1^{2^*})\right] + a[t_{-1}y(p+t_{-1}) - \pi(p+t_{-1})] + a\vartheta\left[z^1(t_1^{2^*}) - z^2(t_{-1})\right].$$

Proof: See the appendix.

The first term measures the welfare loss associated with an output subsidy of $t_1^{2^*}$ which is weighted with $1+a$, the weight attached to industry profits by the politician. This is intuitive as the use of the output subsidy reduces the amount of additional profits which can be shifted to the lobby. Both other terms are positive and well known from the discussion of the equilibrium rent in the monopolistic lobby case. The first one displays how much of the output subsidy and thus loss of resources the politician would have been willing to tolerate in the absence of the interest group. The second one indicates the cost of worker reallocation society would have to bear if group one was not active.

It might be surprising that this expression is very similar to the monopolistic case. Comparing the formula above with equation (6) the first thing to note is that in the competitive case the interest group does not have to compensate the politician for any redistribution cost. This makes sense since in the monopolistic case the lobby had to reimburse the policy maker for the *additional* redistribution cost caused by active lobbying. Here however, if lobby 1 is not active all resources available for redistribution will flow to lobby 2 resulting in social cost of $a\phi(\bar{T})$ anyway. Besides this the expressions for second period rents are identical but note that t_{-1} is smaller in the competitive case.

For the determination of equilibrium policy however the crucial factor is how $b_1^{2^*}$ behaves as t_1^1 and therefore $t_1^{2^*}$ changes. Assuming that $t_{-1} < t_1^{2^*}$ the derivative of $b_1^{2^*}$ with respect to t_1^1 is given by

$$\frac{\partial b_1^{2^*}}{\partial t_1^1} = -(1+a)t_1^1 y_1'(p+t_1^1) + a\vartheta z_1'(t_1^1). \tag{9}$$

Note that this expression is exactly identical to the monopolistic case. We are now able to pin down the equilibrium policy vector.

Proposition 4.2 *The equilibrium output subsidies* $t_i^{1^*}$, $i = 1, 2$ *are implicitly defined by*

$$-2(1+a)t_i^{1^*} y_i'(p+t_i^{1^*}) + a\vartheta z_i'(p+t_i^{1^*}) = 0.$$

The equilibrium lump sum transfers $e_i^{1^*}$, $i = 1, 2$ *are given by* $a\phi'\left(\sum_{i=1,2} T_i(e_i^{1^*}, t_i^{1^*})\right) = 1.$

Proof: See the appendix.

Hence competition between lobbies only affects the amount of the efficient transfer the interest groups can appropriate. The level of the output subsidy does not change. The intuition for this result is as follows. In the competitive case lobby 1 competes for transfers against lobby 2. But in the monopolistic case the interest group also takes into account that if it increases the output subsidy marginally, the amount of the efficient transfer it can appropriate goes down. One can therefore say that the lobby competes against itself. Furthermore equilibrium policy is characterized by a joint optimality condition and for the politician it makes no difference which lobby suffers from a reduction in available transfers. Hence the willingness to pay for the subsidy on the interest group's side and the willingness to give on the politician's side remain unchanged.

Since the equilibrium condition does not change compared to the monopolistic case the same interpretation and the same comparative statics apply. A more interesting point concerns the comparison of social welfare. First of all remember that in the monopolistic case a necessary condition for a positive output subsidy was that the second period policy maker was sufficiently reluctant to transfer resources inefficiently. We stipulated that if the costs of redistribution are too low it is optimal for the interest group to lobby for the efficient transfer only. Intuitively, as the lobby gets any transfer almost costlessly it does not pay to waste resources in the first period to influence the preferences for redistribution of the succeeding politician. This scenario happens in the competitive case only with a smaller probability. Here the presence of another lobby makes it more costly to obtain transfers since interest groups compete against each other. Hence more organized industries make the political equilibrium more inefficient since political insulation of policies becomes more attractive.

A second effect going in the same direction does not concern the probability that the output subsidy is used but the total amount of inefficient redistribution. Since equilibrium subsidies are the same for each lobby independently of the degree of competition, total waste in the economy increases as the number of organized industries goes up. It is also straightforward to see that if the number of active lobbies grows sufficiently large, all resources available for redistribution will be exhausted by subsidy payments. Hence if a society exhibits a growing number of organized special interests, lump sum transfers will no longer be observed in equilibrium.

We can therefore state that more competition among lobbies leads to a more and more inefficient political equilibrium.

5 Conclusion

The paper has developed a dynamic theory of inefficient redistribution to interest groups. It did so by considering a two period game where in each period interest groups have the possibility to bribe the politician in exchange for a favorable policy. As a main point we have shown that inefficient transfers can occur in equilibrium and that competition between interest groups is not effective in eliminating them but even makes things worse. The paper therefore contributes to our understanding of the lobbying process.

However we have treated some aspects of the game as a black box. First we have an incomplete understanding of which industries manage to get organized and how possible incentive problems within an interest group are overcome. Second politicians are hardly unitary actors but are members of organizations which constrain their behavior. To our knowledge a more explicit modeling of parties has not been embedded into the lobbying literature so far.[28] A model of the inner workings of parties would also help us to give a more solid microfoundation for the objective function generally assumed in the lobbying literature. For this point see also the discussion in the second section of this paper. Finally instead of assuming that both social welfare and received bribes increase the reelection probability one should incorporate the voting behavior explicitly into the model. Coate (2004a,b) goes along these lines and finds interesting results. More campaign spending does not automatically lead to better reelection prospects as voters anticipate that generous support of the campaign by interest groups must be paid back later in form of favorable policies. It is hence questionable whether more funds translate into higher reelection probabilities.

All of these topics seem to be worth future investigation.

[28] The role of political parties in general is only poorly understood so far. See Caillaud and Tirole (1999), Caillaud and Tirole (2002) and Levy (2004) for first steps in that direction.

Appendix

Derivation of $\frac{\partial \mathcal{W}}{\partial t}$

$$\frac{\partial \mathcal{W}}{\partial t} = a[-\frac{\partial T}{\partial t} + \frac{d\pi}{dt} - \frac{d\phi}{dT(e,t)}\frac{\partial T}{\partial t}].$$

Using $\pi'(\cdot) = y(\cdot)$ by Hotelling's lemma we obtain

$$a[-y(p+t) - ty'(p(t)+t) + y(p+t) - \phi'(T(e,t))T'(e,t)]$$

Hence we get the desired result:

$$\frac{\partial \mathcal{W}}{\partial t} = a[-ty'(p+t) - \phi'(T(e,t))T'(e,t)]$$

$\|$

Proof of Proposition 3.1

The first order conditions can be written as

$$\begin{aligned} \frac{\partial G}{\partial e} &= 1 - a\phi'(T(e,t)) = 0 \\ \frac{\partial G}{\partial t} &= -aty'[p+t] + y[p+t] - a\phi'(T(e,t))(y[p+t] + ty'[p+t]) \end{aligned}$$

Making use of the fact that in an optimum $a\phi'(T(e,t)) = 1$ the second condition can be written as

$$-(1+a)ty'[p+t] < 0.$$

Hence $t^* = 0$ and e^* is defined by the first condition. To derive the equilibrium rent of the lobby note that the politician must be just indifferent between paying e^* to the lobby and getting the contribution or neglecting the interest group. Hence

$$\begin{aligned} a[\mathcal{W}(e=0)] &= a[\mathcal{W}(e^*)] + C^{T*} \\ &\Leftrightarrow \\ a[\mathcal{W}(e=0)] &= a[\mathcal{W}(e^*)] + \mathcal{W}_1(e^*,t) - b \\ &\Leftrightarrow \\ a[\mathcal{W}(e=0)] &= a[\mathcal{W}(e^*)] + e^* - b \\ &\Leftrightarrow \\ b^* &= e^* - a\phi(e^*) \end{aligned}$$

The contribution function stated in the proposition follows immediately. ||

Proof of Lemma 3.1

Maximization of G^2 leads to the following first order conditions:

$$\begin{aligned}
\frac{\partial G^2}{\partial e^2} &= -a\phi'(T(e^2,t^2))+1=0 \\
\frac{\partial G^2}{\partial t^2} &= a\{-t^2y'[p+t^2]+\vartheta z'^2(t^2) \\
&\quad -\phi'(T(e^2,t^2))[t^2y'[p+t^2]+y[p+t^2]]\}+y[p+t^2]=0
\end{aligned}$$

Plugging in $a\phi'(T(e_2,t_2))=1$ in the second equation yields

$$-(1+a)\{t^2y'[p+t^2]\}+a\vartheta z'^2(t^2)=0 \tag{10}$$

||

Proof of Lemma 3.2

We plug in $e^{2*}=\bar{T}-t^{2*}y(p+t^{2*})$ in the formula for b^2 and form the derivative with respect to t^{2*}.

$$\begin{aligned}
\frac{\partial b^2}{\partial t^{2*}} &= a\phi'(t^{2*}y(p+t^{2*}))\left[y(p+t^{2*})+ty'(p+t^{2*})\right]+y(p+t^{2*})-t^{2*}y'(p+t^{2*})-y(p+t^{2*}) \\
&= a\phi'(t^{2*}y(p+t^{2*}))\left[y(p+t^{2*})+ty'(p+t^{2*})\right]-t^{2*}y'(p+t^{2*}).
\end{aligned}$$

Now if $t_{-1}>t^{2*}$ it must be that $\frac{\partial \mathcal{W}}{\partial t}(t^{2*})>\frac{\partial G^2}{\partial t}(t^{2*})$ and hence

$$a\left[-t^{2*}y'(p+t^{2*})-\phi'[T(e,t)][y(p+t^{2*})+ty'(p+t^{2*})]+\vartheta z'^2(p+t^{2*})\right]>$$

$$-(1+a)\{t^{2*}y'[p+t^{2*}]\}+a\vartheta z'^2(t^{2*})$$

$$\Longleftrightarrow$$

$$t^{2*}y'(p+t^{2*})>a\phi'[T(e,t)][y(p+t^{2*})+ty'(p+t^{2*})].$$

Therefore b^2 is decreasing at t^{2*} and so it is optimal for the lobby to decrease t^2. But since among all positive output subsidies t^{2*} is optimal the best the interest group can do is to set $t^1=t^2=0$. ||

Proof of Proposition 3.2

First we have to derive b^2 for the case $t_{-1}<t^1$ which is given by

$$b^2=a[\mathcal{W}(t^{2*},e^{2*})-\mathcal{W}(t_{-1})]+a\vartheta[z^1(t^{2*})-z^2(t_{-1})]+\pi(p+t^{2*})+e^{2*}$$

$$\Longleftrightarrow$$

$$b^2 = a[-t^{2*}y(p+t^{2*}) + \pi(p+t^{2*}) + t_{-1}y(p+t_{-1}) - \pi(p+t_{-1})] - a[\phi(\bar{T}) - \phi(t_{-1}y(p+t_{-1}))]$$
$$+a\vartheta[z^1(t^{2*}) - z^2(t_{-1})] + \pi(p+t^{2*}) + e^{2*}.$$

Taking into account that $e^{2*} = \bar{T} - t^{2*}y(p+t^{2*})$ this reduces to

$$(1+a)[\pi(p+t^{2*}) - t^{2*}y(p+t^{2*})] + a[t_{-1}y(p+t_{-1}) - \pi(p+t_{-1})]$$
$$-a[\phi(\bar{T}) - \phi(t_{-1}y(p+t_{-1}))] + a\vartheta[z^1(t^{2*}) - z^2(t_{-1})] + \bar{T}.$$

We can now calculate the derivative of b^2 with respect to t^{2*}.

$$\left.\frac{\partial b^2}{\partial t^{2*}}\right|_{t^1 \geq t_{-1}} = \left.\frac{\partial b^2}{\partial t^1}\right|_{t^1 \geq t_{-1}} - (1+a)t^1 y'(p+t^1) + a\vartheta z'(p+t^1).$$

Since $t^{2*} = t^1$, $\frac{\partial b^2}{\partial t^1}$ is the same as $\frac{\partial b^2}{\partial t^1}$.
Having derived this the equilibrium policy is given by the maximization of

$$G(e^1, t^1) = a\mathcal{W}(e^1, t^1) + C^1(e^1, t^1) = a\mathcal{W}(e^1, t^1) + e^1 + \pi(p+t^1) + b^2(t^1) - b^1$$

The first order conditions are given by

$$\begin{aligned}
\frac{\partial G}{\partial e^1} &= -a\phi'(T(e^1, t^1)) + 1 = 0 \\
\frac{\partial G}{\partial t^1} &= -aty'[p+t^1] - a\phi'(T(e^1, t^1))(y[p+t^1] + ty'[p+t^1]) + y[p+t^1] \\
&\quad -(1+a)t^1 y'(p+t^1) + a\vartheta z'(p+t^1) = 0
\end{aligned}$$

Replacing the cost function $a\phi'(\cdot)$ with 1 we obtain

$$-2(1+a)ty'[p+t^1] + a\vartheta z'(p+t^1).$$

$\|$

Proof of Lemma 4.1

The proof is almost identical to the single lobby case. Maximization of $G(e_1, e_2, t_1, t_2) = a\mathcal{W} + \mathcal{W}_1 + \mathcal{W}_2$ with respect to e_1, e_2, t_1 and t_2 yields the following first order conditions:

$$\begin{aligned}
\frac{\partial G}{\partial e_1} &= \frac{\partial G}{\partial e_2} = a\phi'\left(\sum_{i=1,2} T_i(e_i, t_i)\right) - 1 \stackrel{!}{=} 0 \\
\frac{\partial G}{\partial t_i} &= a\left\{-t_i y'[p+t_i] + -\phi'\left(\sum_{i=1,2} T_i(e_i, t_i)\right)[t_i y'[p+t_i] + y[p+t_i]]\right\} + y[p+t_i] \leq 0, \quad i = 1, 2.
\end{aligned}$$

Substituting for $a\phi'(\cdot)$ yields

$$-(1+a)t_i y'[p+t_i] < 0.$$

Hence $t_1 = t_2 = 0$. Plugging that into the first equation gives the equilibrium condition for e_1 and e_2. ||

Proof of Lemma 4.1

From maximization of $G^2(e_1^2, e_2^2, t_1^2, t_2^2)$ we obtain the following first order conditions:

$$\begin{aligned}
\frac{\partial G^2}{\partial e_i^2} &= a\phi'\left(\sum_{i=1,2} T_i(e_i^2, t_i^2)\right) - 1 \stackrel{!}{=} 0 \\
\frac{\partial G^2}{\partial t_i^2} &= a\left\{-t_i^2 y'[p+t_i^2] + -\phi'\left(\sum_{i=1,2} T_i(e_i^2, t_i^2)\right)\left[t_i^2 y'[p+t_i^2] + y[p+t_i^2]\right] + \vartheta z_i'(t_i^2)\right\} + y[p+t_i^2] = 0, \\
& i = 1, 2.
\end{aligned}$$

Plugging in for $a\phi'(\cdot)$ yields the condition stated in the lemma. ||

Derivation of $\frac{\partial G_{-1}}{\partial t_1^2}$

$$\begin{aligned}
\frac{\partial G_{-1}}{\partial t_1^2} &= -a\left[t_1^2 y'(p+t_1^2) - \phi'\left(T_2(\tilde{e}_2^2, \tilde{t}_2^2) + t_1^2\right)\left[y_1(p+t_1^2) + t_1^2 y_1'(p+t_1^2)\right] + \vartheta z_1'(t_1^2)\right] \leq 0, \\
& t_1^2 \geq 0, \;\; t_1^2 \cdot \frac{\partial G_{-1}}{\partial t_1^2} = 0.
\end{aligned}$$

Since lobby 2 is active $a\phi'(\cdot) = 1$ in equilibrium. Plugging in yields

$$\frac{\partial G_{-1}}{\partial t_1^2} = -(1+a)t_1^2 y_1'(p+t_1^2) - y_1(p+t_1^2) + a\vartheta z_1'(t_1^2).$$

||

Proof of Lemma 4.2

We will indicate the transfers to lobby 2 in the absence of lobby 1 with a tilde. b_1^{2*} is characterized by the following equation

$$a\mathcal{W}(\tilde{e}_2^2, \tilde{t}_2^2, t_{-1}) + C_2^2(\tilde{e}_2^2, \tilde{t}_2^2, b_2^{2*}) \stackrel{!}{=} a\mathcal{W}(e_1^{2*}, e_2^{2*}, t_1^{2*}, t_2^{2*}) + C_2^2(e_2^{2*}, t_2^{2*}, b_2^{2*}) + C_1^2(e_1^{2*}, t_1^{2*}, b_1^{2*}).$$

Observe that since the condition for t_i^{2*} is the same in the competitive as in the monopolistic case $\tilde{t}_2^2 = t_i^{2*}$. Hence we have that

$$C_2^2(e_2^{2*}, t_2^{2*}, b_2^{2*}) - C_2^2(\tilde{e}_2^2, \tilde{t}_2^2, b_2^{2*}) = e_2^{2*} - \tilde{e}_2^2.$$

Furthermore as the total sum of transfers is unaffected by the entry of the second lobby redistribution costs remain unchanged. Thus

$$a\mathcal{W}(e_1^{2^*}, e_2^{2^*}, t_1^{2^*}, t_2^{2^*}) - a\mathcal{W}(\tilde{e}_2^2, \tilde{t}_2^2, t_{-1}) =$$

$$a\left[\pi_1(p + t_1^{2^*}) - t_1^{2^*} y_1(p + t_1^{2^*}) + t_{-1} y_1(p + t_{-1}) - \pi_1(p + t_{-1}) + \vartheta\left(z_1(t_1^{2^*}) - z_1(t_{-1})\right)\right]$$

Since $C_1^2(\cdot)$ is truthful we obtain

$$b_1^{2^*} = a\left[\pi_1(p + t_1^{2^*}) - t_1^{2^*} y_1(p + t_1^{2^*}) + t_{-1} y_1(p + t_{-1}) - \pi_1(p + t_{-1}) +\right.$$

$$\left.\vartheta\left(z_1(t_1^{2^*}) - z_1(t_{-1})\right)\right] + e_2^{2^*} - \tilde{e}_2^2 + e_1^{2^*} + \pi_1(p + t_1^{2^*}).$$

The derivation of $b_1^{2^*}$ as stated in the lemma is complete if one sets $\tilde{e}_2^2 = \bar{T} - t_2^{2^*} y_2(p + t_2^{2^*})$ and $e_1^{2^*} = \bar{T} - t_1^{2^*} y_1(p + t_1^{2^*}) - t_2^{2^*} y_2(p + t_2^{2^*}) - e_2^{2^*}$. Substituting gives

$$b_1^{2^*} = (1+a)\left[\pi(p + t_1^{2^*}) - t_1^{2^*} y(p + t_1^{2^*})\right] + a[t_{-1} y(p+t_{-1}) - \pi(p+t_{-1})] + a\vartheta\left[z^1(t_1^{2^*}) - z^2(t_{-1})\right].$$

||

Proof of Proposition 4.2

The procedure should be standard by now. The equilibrium policy maximizes

$$G^1 = a\mathcal{W}(e_1^1, e_2^1, t_1^1, t_2^1) + C_2^1(e_2^1, t_2^1, b_1^2) + C_1^1(e_1^1, t_1^1, b_1^1).$$

Taking into account that the marginal contribution just reflects marginal willingness to pay and considering the impact of a policy on *both* periods, i.e.

$$\frac{\partial C_i^1}{\partial t_i^1} = \frac{\partial \mathcal{W}_i}{\partial t_i^1} + \frac{\partial b_i^2}{\partial t_i^1}$$

yield the following first order conditions:

$$\begin{aligned}
\frac{\partial G^1}{\partial e_i^1} &= -a\phi'\left(\sum_{i=1,2} T_i(e_i^1, t_i^1)\right) + 1 = 0, \quad i = 1, 2. \\
\frac{\partial G^1}{\partial t_i^1} &= -a\phi'\left(\sum_{i=1,2} T_i(e_i^1, t_i^1)\right)[y_i(p + t_i^1) + t_i^1 y_i'(p + t_i^1)] \\
&\quad -a t_i^1 y_i'(p + t_i^1) + y_i(p + t_i^1) - (1 + a) t_i^1 y_i'(p + t_i^1) + a\vartheta z_i'(p + t_i^1) = 0, \quad i = 1, 2.
\end{aligned}$$

Plugging in $a\phi'(\cdot) = 1$ in the second condition immediately gives the equation stated in the proposition. Using the optimal values for the output subsidy in the first equation pins down e_i^{1*}. ||

References

Acemoglu, D. (2003): "Why not a political Coase theorem? Social conflict, commitment, and politics," *Journal of Comparative Economics*, 31(4), 620–652.

Acemoglu, D., and J. Robinson (2001): "Inefficient Redistribution," *American Political Science Review*, 95, 649–661.

——— (2005): *Economic Origins of Dictatorship and Democracy*. Cambridge University Press.

Aghion, P., and P. Bolton (1990): "Government Domestic Debt and the Risk of Default: A Political-economic Model of the Strategic Role of Debt," in *Capital Markets and Debt Management*, ed. by R. Dornbusch, and M. Draghi. MIT Press.

Alesina, A., and G. Tabellini (1990): "A Positive Theory of Fiscal Deficits and Government Debt," *Review of Economic Studies*, 57(3), 403–14.

Becker, G. S. (1983): "A Theory of Competition among Pressure Groups for Political Influence," *The Quarterly Journal of Economics*, 98(3), 371–400.

Becker, G. S., and C. B. Mulligan (1998): "Deadweight Costs and the Size of Government," NBER Working Papers 6789, National Bureau of Economic Research, Inc.

Bergemann, D., and J. Valimaki (2003): "Dynamic common agency," *Journal of Economic Theory*, 111(1), 23–48.

Bernheim, B. D., and M. D. Whinston (1986a): "Common Agency," *Econometrica*, 54(4), 923–42.

——— (1986b): "Menu Auctions, Resource Allocation, and Economic Influence," *The Quarterly Journal of Economics*, 101(1), 1–31.

Besley, T., and S. Coate (1998): "Sources of Inefficiency in a Representative Democracy: A Dynamic Analysis," *American Economic Review*, 88(1), 139–56.

Caillaud, B., and J. Tirole (1999): "Party Governance and Ideological Bias," *European Economic Review*, 43, 779–789.

——— (2002): "Parties as Political Intermediaries," *Quarterly Journal of Economics*, 117, 1453–1489.

Coate, S. (2004a): "Pareto-Improving Campaign Finance Policy," *American Economic Review*, 94(3), 628–655.

——— (2004b): "Political Competition With Campaign Contributions and Informative Advertising," *Journal of the European Economic Association*, 2(5), 772–804.

Coate, S., and S. Morris (1995): "On the Form of Transfers in Special Interests," *Journal of Political Economy*, 103(6), 1210–35.

——— (1999): "Policy Persistence," *American Economic Review*, 89(5), 1327–1336.

de Figueiredo, R.J.P., J. (2002): "Electoral Competition, Political Uncertainty, and Policy Insulation," *American Political Science Review*, 96, 321–333.

Dixit, A. (1996): "Special Interest Lobbying and Endogenous Commodity Taxation," *Eastern Economic Journal*, 22, 375–388.

Dixit, A., G. M. Grossman, and E. Helpman (1997): "Common Agency and Coordination: General Theory and Application to Government Policy Making," *Journal of Political Economy*, 105(4), 752–69.

Drazen, A., and N. Limao (2004): "Government Gains from Self-Restraint: A Bargaining Theory of Inefficient Redistribution," NBER Working Papers 10375, National Bureau of Economic Research, Inc.

Gisser, M. (1993): "Price Support, Acreage Controls, and Efficient Redistribution," *Journal of Political Economy*, 101(4), 584–611.

Grossman, G. M., and E. Helpman (1994): "Protection for Sale," *American Economic Review*, 84(4), 833–50.

——— (1996): "Electoral Competition and Special Interest Politics," *Review of Economic Studies*, 63(2), 265–86.

Grossman, G. M., and E. Helpman (2001): *Special Interest Politics*. MIT Press.

Jones, R. (1965): "The Structure of Simple General Equilibrium Models," *Journal of Political Economy*, 73, 557–572.

Levy, G. (2004): "A Model of Political Parties," *Journal of Economic Theory*, 115, 250–277.

Milesi-Ferretti, G. M., and E. Spolaore (1994): "How cynical can an incumbent be? Strategic policy in a model of government spending," *Journal of Public Economics*, 55(1), 121–140.

Mussa, M. (1974): "Tariffs and the Distribution of Income: The Importance of Factor Specificity, Substitutability, and Intensity in the Short and Long Run," *Journal of Political Economy*, 82, 1191–1203.

Neary, J. (1978): "Short-Run Capital Specificity and the Pure Theory of International Trade," *Economic Journal*, 88, 488–510.

Persson, T., and L. E. O. Svensson (1989): "Why a Stubborn Conservative Would Run a Deficit: Policy with Time-Inconsistent Preferences," *The Quarterly Journal of Economics*, 104(2), 325–45.

Rodrik, D. (1986): "Tariffs, Subsidies and Welfare with Endogenous Policy," *Journal of International Economics*, 21, 285–299.

Stigler, G. J. (1971): "The Theory of Economic Regulation," *Bell Journal of Economics*, 2(1), 3–21.

Tullock, G. (1983): *Economics of Income Redistribution*. Kluwer-Nijhoff, Boston.

Wilson, J. (1990): "Are Efficiency Improvements in Government Transfer Policies Self-Defeating in Political Equilibrium?," *Economics and Politics*, 2, 241–258.

Wittman, D. (1989): "Why Democracies Produce Efficient Results," *Journal of Political Economy*, 97(6), 1395–1424.