Influence of lobbying on merger approval in a Cournot competition setting

Els Vanonckelen and Gerald Willmann

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Abstract

In a Cournot competition setting with a homogenous good, we investigate the impact of lobbying on a competition authority’s merger decision. A merger between two otherwise identical firms generates efficiency gains in terms of marginal cost. Society consists of three interest groups: the merging firms, the non merging firms and the consumers. These groups can have conflicting interests concerning the merger decision (depending on the parameter values) as the latter effects the welfare of each group differently. Like in Grossman and Helpman (1994), the competition authority attaches a certain weight to social welfare and maximises the sum of the lobby contributions and the weighted social welfare. Taking the lobby configuration as given, we analyse each lobby’s contribution function and the effect of contributions on the merger decision. We find that the merger decision can in some situations be altered by lobbying.

1 Introduction

Special interest groups are subsets of society that are generally affected differently by government policy with respect to the rest of the population. As a consequence they have incentives to influence the policy decision made by the government as the latter’s objective without political contributions differs from the former’s. The members of a particular interest group can influence the government by forming a lobby that aims to alter the policy outcome by offering contributions to that government (or the members of its staff). These contributions are not necessarily of a monetary nature. They can also be expensive vacations, future job positions in high places,…In this paper we will focus on monetary contributions. We investigate special interest groups in the context of mergers.
Mergers and acquisitions are phenomena that date back over a hundred years. The merger that created the United States Steel Corporation from twelve firms in the US in 1901 is an example (Viscusi et al., 2000). Merger regulation, however, only started in 1914 with the Clayton Act, also in the US. In Europe, merger regulation was a slow process and started off with legislation on the national level. In 1989, the EU merger regulation was enacted establishing supra national regulation in the European Union. The enactment of merger regulation results in general in the creation of a government body, the competition authority, in charge of investigating the desirability of mergers and acquisitions. After this investigation, the merger is cleared or prohibited. This decision depends on the effect of the merger on the objective of competition policy determined by the legislators. Leaving lobbying aside for the moment, this objective can be to maximise social welfare (the sum of consumer and producer surplus), consumer surplus, employment, ... or the combination of several goals (for a discussion of these goals: see Motta (2009)). In the rest of this paper, we assume that the objective is to maximise the sum of lobby contributions and social welfare.

Lobbying in the context of mergers matters as the change in interest group welfare can be quite significant. Most merger regulations place revenue
thresholds on merging firms concerning the notification of cases\(^1\). Cases that
do not reach those thresholds are said not to have a negative impact on welfare.
Thus the competition authority only deals with cases that potentially have an
adverse effect on the welfare. For instance, the thresholds for the EU merger
regulation are quite significant, indicating that the interest of the merging
firms, of the non merging firms and of consumers is high. Furthermore, the
number of merger cases notified to DG-COMP, the European competition
authority, has increased from 11 in 1990 to 309 in 2011 (Directorate General
Competition, 2004). Thus the importance of potential lobbying activities has
increased as well.

A merger or acquisition can have opposing effects on different groups in
society: some groups’ welfare increases whereas that of others is negatively
affected. These groups may try to persuade the competition authority to take
a decision in their advantage by forming a lobby: interest groups that face a
reduction in their welfare are in favour of a prohibition. Different lobby groups
might end up fighting each other to win the decision in their favour. We
distinguish three groups: the merging firms (the insiders), the other firms (the
outsiders) and the consumers. The latter are not necessarily end consumers,
but can be intermediate firms purchasing the goods from the industry in

\(^1\)For instance the European merger regulation (Directorate General Competition, 2004)

\(\S2\). A concentration has a Community dimension where:

(a) the combined aggregate worldwide turnover of all the undertakings concerned is
more than EUR 5 000 million; and

(b) the aggregate Community-wide turnover of each of at least two of the undertakings
concerned is more than EUR 250 million,

unless each of the undertakings concerned achieves more than two-thirds of its aggregate
Community-wide turnover within one and the same Member State.

\(\S3\). A concentration that does not meet the thresholds laid down in paragraph 2 has a
Community dimension where:

(a) the combined aggregate worldwide turnover of all the undertakings concerned is
more than EUR 2 500 million;

(b) in each of at least three Member States, the combined aggregate turnover of all the
undertakings concerned is more than EUR 100 million;

(c) in each of at least three Member States included for the purpose of point (b), the
aggregate turnover of each of at least two of the undertakings concerned is more
than EUR 25 million; and

(d) the aggregate Community-wide turnover of each of at least two of the undertakings
concerned is more than EUR 100 million,

unless each of the undertakings concerned achieves more than two-thirds of its aggregate
Community-wide turnover within one and the same Member State.

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which a merger occurred. Since we only consider horizontal mergers, the outsiders are located in the same industry. Insiders reveal their preference, since a merger only occurs when their joint profit increases. This implies that the competition authority cannot impose mergers that would maximise its objective function if this would be detrimental to the insiders’ profit nor can it break up firms that grow in an organic way. This also means that a lobby group’s contribution cannot be negative as this would indicate that a loss in interest groups welfare resulting from a merger can be compensated by other groups or the competition authority.

The influence of special interest groups on government decisions has been studied in several areas in economics. In public procurement, for instance, the model of Laffont and Tirole (1993) is a good example of how lobbying can affect the price in public procurement contracts. Parliament must decide on the price it is willing to pay for a certain investment, for instance a bridge. It devises an incentive scheme for the government in order for the latter to be truthful about the information on firms’ cost structures. This information is only disclosed to the government with a probability smaller than one. The incentive scheme is necessary because the firms try to influence the government not to disclose the harmful information (low cost structure) by letting it state that it hasn’t received any information at all. In other words the firms try to influence the price of the contract.

In international economics, tariff formation, taxes and subsidies have been analysed in the context of special interest groups. We present a short overview. Brock and Magee (1978) describe the effect of lobbying on the politicians’ tariff formation process in the setting of a two-man political campaign. In their paper, there is a well-organised coalition in favor of the ”special interest legislation”. This coalition is small relative to the general population. The other coalition is not organised, large and against this special interest legislation. The politicians must offset the increase in political contribution against the loss in general welfare while campaigning to be elected.

Mayer (1984) developed a formal model to examine the effect of factor ownership distribution (in his case labour and capital) on the actual tariff rate. He finds that in the case of majority voting, a tariff on capital intensive imports will only be applied if the majority of the people has a larger capital-labour ownership ratio than the population as a whole (given that there are no restrictions on voting).

Wellisz and Wilson (1986) investigate the role of group size (defined as the share of national income) in the tariff formation process of a small, developing country. They distinguish three groups: workers, landowners and capital owners. Only the last two groups are able to lobby. The smaller group, in their paper the capital owners, is shown to have an advantage when it comes
to influencing the tariff level (under the assumption that manufacturing is biased towards labour). This is because most of the deadweight loss induced by the tariff rate is absorbed by the rest of the population whereas the increase in the share of national income is only advantageous for the small group.

In the above papers, the government decision has not been explicitly modeled. This is the case in Grossman and Helpman (1994). They model the government as an agent that is incentivised by special interest groups to apply an inefficient policy. This application is costly due “to the government’s accountability to the general electorate”. In their model, different interest groups try to influence the government’s choice of trade policy (trade taxes and subsidies) by making political contributions. The government maximises its objective function, which is the sum of the contributions and weighted social welfare. The interest groups determine their contribution schedule in the first stage, taking into consideration that the tax revenue is redistributed equally across the voters. Given the state of the world, each lobby announce to donate an amount $x$ to the government if the latter applies policy $x$ in the second stage. In the second stage, the government decides upon the policy and collects the corresponding contributions from each interest group. The Grossman and Helpman (1994) paper has been examined empirically amongst others by Goldberg and Maggi (1999) and Mitra et al. (2006). Goldberg and Maggi (1999) find that the US government attaches a high weight to social welfare, indicating that lobby activities only play a minor role in the government’s decision. Mitra et al. (2006), however, claim that one cannot simultaneously estimate the percentage of society that is organised in lobbies and the weight on social welfare. They fix the former parameter at different values and subsequently estimate the weight on social welfare for each level. They find that the weight on social welfare decreases when the percentage of society organised in groups increases. Mitra (1999) endogenises lobby formation by making the special interest group pay a fixed cost if it forms a lobby. This fixed cost can vary across interest groups. The underlying reason is that when consumers are numerous or geographically dispersed, the cost to form a lobby is generally higher than the cost to form a lobby for a small group of firms. In the first stage, the interest group decides whether or not to form a lobby at a given fixed cost. If a lobby is formed, the level of the contribution is determined in the second stage. Thus, even though the insiders always gain from a merger, a high fixed cost can prevent them from persuading the competition authority to allow the merger. Finally, the government takes its policy decision.

We base our model on the Grossman and Helpman (1994) model. The lobby configuration (which groups have lobbying power) is given exogeneously. In the first stage, each group determines its contributions schedule given
the state of the world. If the competition authority clears the merger, the lobby donates $x$, if it prohibits the merger, the lobby gives $y$. In stage two, the competition authority decides whether or not to allow the merger, maximising the sum of the contributions and weighted social welfare. Note that the decision to allow or prohibit a merger is a binary variable in our paper whereas trade policy is a continuous variable in Grossman and Helpman (1994). So we only have two possible policy outcomes in stead of a continuum of possible outcomes. We also choose a specific form of competition, namely competition on the quantity dimension (Cournot competition). Grossman and Helpman (1994), by contrast, kept their model general. Because our model is based on a homogenous good, mergers with efficiency gains in a Bertrand competition setting will lead to a monopoly, leaving only the most efficient firm in the market. To avoid this, firms compete along the quantity dimension in our model. Note that in our paper the competition authority’s revenue from the contributions is not redistributed amongst the interest groups.

The outline is as follows. In section 2, we describe the demand and supply side of the model and the effects of a merger on the welfare of each interest group. In the following section, we discuss the impact of lobbying on the decision of the regulatory body taking the lobby configuration as given. Here, there is no fixed cost to lobby formation. Afterward, we examine the effect of a change in parameter value. Section 4 concludes.

## 2 The model

In our model, firms compete on the quantity dimension (Cournot competition). There is one homogenous good that is produced. All firms have the same variable cost $c$ before a merger occurs. As there are no fixed costs of production, all firms are identical. A merger between two firms, the insiders I, leads to a decrease in the variable cost of the resulting company. Its new variable cost is $ec$ with $e \in [0, 1]$. The efficiency gains parameter cannot be smaller than one as marginal cost cannot be negative. A value larger than one implies that the marginal cost of the merged firm is higher than that of the pre merger firms, reducing the competitiveness and the profitability of the insiders. We rule those out by assuming that mergers only occur when it is in the insiders’ best interest. Note that higher cost savings translate into a the lower $e$-value. The costs of the firms not participating in the merger, the outsiders O, remain unaffected. The number of firms is assumed to be larger than two, $n > 2$. That way, a merger between two firms does not lead to monopoly, as long as the efficiency gains are not so large that the outsiders leave the market ($q_{O}^{M} > 0$). We do not investigate cases in which more than two firms merge.
The inverted demand $p(Q)$ is a linear function:

$$p(Q) = \begin{cases} 
    a - bQ & \text{if } Q \leq \frac{a}{b} \\
    0 & \text{if } Q > \frac{a}{b}
\end{cases}$$

where $Q$ is the aggregate output, $\sum_{i=1}^{n} q_i$ and the parameters $a, b \in \mathbb{R}^+$. Note that $c < a$, otherwise there would be no demand.

Table 1 contains the specific values for the firms’ output and interest group welfare before and after the merger in a Nash equilibrium. Each firm takes the output of the other firms as given. By differentiating each firm’s profit function with respect to the own output, we can calculate the equilibrium output knowing that all firms are symmetric before the merger. This is due to the fact that all firms have the same cost structure and face the same demand. After the merger, the cost structure of the insiders and outsiders differ: they respectively have marginal cost $e c$ and $c$, with the latter larger than the former. Before the merger, each firm produces the Nash equilibrium output $q_{i}^N$ and makes profit $\pi_{i}^N$. Thus the insiders’ profit is twice the Nash equilibrium profit, as we assumed that it is a two firm merger. Post merger output and profit for the insiders are respectively $q_{i}^M$ and $\pi_{i}^M$. For each outsider, output and profit are $q_{O}^M$ and $\pi_{O}^M$. Next we calculate aggregate demand and the resulting price both before and after the merger. Since demand is linear, the consumer surplus equal to $\frac{1}{2}(a - p)Q$. Pre merger (post merger) consumer surplus is equal to $CS^N (CS^M)$. Finally, social welfare is the sum of the insiders’ profit, the outsiders’ profit and consumer surplus. Pre and post merger social welfare (the sum of the consumer and total producer surplus) are given by $W^N$ and $W^M$.

There are three interest groups: the insiders, the outsiders and the consumers C. A merger affects the welfare of each of these groups and not necessarily in the same direction. Insiders reveal their preference for a merger, since a merger will only occur if it is beneficial for the merging firms i.e. if the profit of the insiders after merger $\pi_{I}^M$ is larger than twice the pre merger profit $\pi_{i}^N$ (two inside firms). $\Delta \pi_{I} = \pi_{I}^M - 2 \cdot \pi_{i}^N$ is a quadratic function that has two roots. For efficiency gains smaller than $e_I$ (see table 2), a merger is beneficial for the merging parties. For efficiency gains in between $e_I$ and the second root, a merger is detrimental to the insiders’ welfare. Since the second root is larger than one when the total number of firms is larger than two (which we assumed), this root is not mentioned in the table. Since the function $\Delta \pi_{I}$ is quadratic, the larger the efficiency gains (smaller $e$), the more can insiders gain from a merger. As mentioned above, the efficiency parameter $e$ must be non negative since a negative value would result in a negative marginal cost. Therefore impose the condition $e_I \geq 0$.  

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An outsider gains from the merger as long as its post merger profit is larger than its pre merger profit: \( \Delta \pi_O = \pi_O^M - \pi_O^N > 0 \). The latter is a quadratic function as well which is negative in between \( e_1^O \) and \( e_2^O \), with \( e_2^O < e_1^O \) and positive outside this range. The intuition is the following: when the efficiency gains are small (large \( e \)), the outsiders can profit from the reduction in output by the insiders by producing more. If total output decreases, price will go up, resulting in a net gain for the outsiders. Even if prices decrease slightly, outsiders can gain as long as the the reduction in price per unit gets compensated by the extra sales. When efficiency gains increase to \( e_1^O \), this is no longer the case: a merger has a negative effect on an outsider's welfare. The effect of the insiders’ efficiency on price is to large to be compensated by extra sales. The cut-off value \( e_2^O \) is non negative only when the demand parameter \( a > c \) and \( n > 2 \), the cut-off value of the insiders is higher than the first cut-off value of the outsiders. Since both conditions are assumed: \( 0 \leq e_1^O \leq e_I < 1 \).

Consumers gain when the post merger consumer surplus is larger than its pre merger consumer surplus: \( \Delta CS = CS^M - CS^N > 0 \). As before \( \Delta CS \) is a quadratic function. Consumers start gaining from a merger at exactly the same point that outsiders start losing from it, namely when \( e \) drops below \( e_1^O \), thus the cut-off point for consumers is the same as the first cut-off point for outsiders: \( e_{CS} = e_1^O \). The second root is larger than one and therefore not mentioned. For \( e \in [e_{CS}; 1] \), consumers stand to lose from a merger. A merger with limited efficiency gains leads to a decrease in the insiders’ output. If outsiders cannot compensate this reduction, this leads to higher prices since the efficiency gains are not strong enough to depress the latter. Even if efficiency gains are strong enough to depress the price, consumers still lose if the reduction in aggregate output dominates.

We impose that the outsiders’ output is strictly positive to exclude the monopoly case. This means that for some parameter values of \( a, b, c \) and \( n \), very high efficiency gains are excluded.

In summary, the cut-off values of the efficiency gains relate to each other as follows: \( e_3^O \leq e_4^O = e_{CS} \leq e_I < 1 \).

To illustrate, set the parameter values as follows: \( a = 1.5, b = 1, c = 0.5 \) and \( n = 3 \). In figure 1, the efficiency gains are depicted on the horizontal axis. The relevant range is \([0,1]\). The closer \( e \) goes to zero, the larger the efficiency gains. The blue line represents the difference in insider profit due to the merger, \( \Delta \pi_I \). It only turns negative when the efficiency gains are negligible. Thus, if there are no cost savings, it does not make sense for two firms to merge. The green and red line respectively stand for the difference in outsider profit, \( \Delta \pi_O \), and the difference in consumer surplus, \( \Delta CS \), due to a merger. The two lines clearly cross on the horizontal axis. To the left of this point,
3 Lobbying and the merger decision

When two firms want to merge, they have to notify the competition authority. We refer to the latter as the government. This government then decides to allow or prohibit the merger, by choosing the policy that maximises its objective function. Since there are multiple interest groups which are possibly affected differently by the merger, it might pay off for some of them to form a lobby to influence the government’s decision. Only groups that are represented by a lobby can make political contributions. The question is whether political contributions can change the outcome of the merger decision process. If lobbying turns out to matter, how does the contributions schedule of each lobby group look like and which factors influence it?

The lobby group configuration (which groups lobby) is taken to be exogenous and the set of interest groups that form lobbies is denoted by \( \lambda \). Since a merger only occurs if it leads to an increase in the insiders’ welfare \( e < e_I \), insiders always lobby in favour of the merger. Four different combinations of lobby groups are possible, which are shown in table 3. First, we elaborate...

### Table 1: Firms’ output and interest group welfare: before and after a merger

<table>
<thead>
<tr>
<th></th>
<th>Pre merger</th>
<th>Post merger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insiders’ output</td>
<td>( 2 \cdot q_i^N = 2 \cdot \frac{a-c}{b(n+1)} )</td>
<td>( q_I^M = \frac{a+(n-2)c-(n-1)c}{6n} )</td>
</tr>
<tr>
<td>Outsiders’ output</td>
<td>( (n-2)q_i^N = (n-2) \frac{a-c}{b(n+1)} )</td>
<td>( (n-2)q_O^M = (n-2) \frac{a-(2-e)c}{6n} )</td>
</tr>
<tr>
<td>Insiders’ welfare</td>
<td>( 2 \cdot \pi_i^N = 2 \cdot \frac{(a-c)^2}{b(n+1)^2} )</td>
<td>( \pi_I^M = \frac{(a+(n-2)c-(n-1)c)^2}{6n^2} )</td>
</tr>
<tr>
<td>Outsiders’ welfare</td>
<td>( (n-2)\pi_i^N = (n-2) \frac{(a-c)^2}{b(n+1)^2} )</td>
<td>( (n-2)\pi_O^M = (n-2) \frac{(a-(2-e)c)^2}{b(n+1)^2} )</td>
</tr>
<tr>
<td>Consumer welfare</td>
<td>( CS^N = \frac{(a-c)^2}{2b(n+1)^2} )</td>
<td>( CS^M = \frac{(n-1)a-(n-2)c-ec}{2bn} )</td>
</tr>
</tbody>
</table>

### Table 2: Efficiency cut-off values

<table>
<thead>
<tr>
<th></th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insiders</td>
<td>( e_I = \frac{(n+1)a+(n+1)(n-2)c-\sqrt{2n(a-c)}}{b(n+1)} )</td>
<td>/</td>
</tr>
<tr>
<td>Outsiders</td>
<td>( e_O^1 = \frac{(n+2)c-a}{(n+1)c} )</td>
<td>( e_O^2 = \frac{(3n+2)c-(2n+1)a}{(n+1)c} )</td>
</tr>
<tr>
<td>Consumers</td>
<td>( e_{CS} = \frac{(n+2)c-a}{(n+1)c} )</td>
<td>/</td>
</tr>
</tbody>
</table>

Consumers gain and outsiders lose as a result of a merger and vice versa. The point \( e_O^2 \) does not lie in the relevant range for the efficiency gains \( e_O^2 < 0 \). The yellow line represents the post merger outsiders’ output \( q_O^M \). This line is strictly positive for all values of \( e \in [0, 1] \). Thus, the monopoly case does not occur for these parameter values.

3 Lobbying and the merger decision

When two firms want to merge, they have to notify the competition authority. We refer to the latter as the government. This government then decides to allow or prohibit the merger, by choosing the policy that maximises its objective function. Since there are multiple interest groups which are possibly affected differently by the merger, it might pay off for some of them to form a lobby to influence the government’s decision. Only groups that are represented by a lobby can make political contributions. The question is whether political contributions can change the outcome of the merger decision process. If lobbying turns out to matter, how does the contributions schedule of each lobby group look like and which factors influence it?

The lobby group configuration (which groups lobby) is taken to be exogenous and the set of interest groups that form lobbies is denoted by \( \lambda \). Since a merger only occurs if it leads to an increase in the insiders’ welfare \( e < e_I \), insiders always lobby in favour of the merger. Four different combinations of lobby groups are possible, which are shown in table 3. First, we elaborate...
3 Lobbying and the merger decision

1.0

Figure 1: Gains from a merger for insiders, outsiders and consumers at different levels of efficiency gains

on the sequence of the game and the contribution schedule. Afterward, we discuss the four different lobby configurations.

Table 3: Lobby configuration: x = a lobby

<table>
<thead>
<tr>
<th>Combination</th>
<th>Insiders</th>
<th>Outsiders</th>
<th>Consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.  x</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2.  x</td>
<td>x</td>
<td>x</td>
<td>0</td>
</tr>
<tr>
<td>3.  x</td>
<td>0</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>4.  x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

3.1 Game set-up

The set-up is a sequential game: in the first stage, each lobby decides upon its level of political contributions taking the lobby configuration as given. In the second stage, the government decides whether or not to allow the merger given the contributions from stage 1. The game is solved using backward induction.

In stage two, the government’s merger decision is made by maximising $G$. As in Grossman and Helpman (1994), $G$ is assumed to be the sum of the political contributions made by the different lobby groups $C_i \geq 0$, $i \in \lambda$, and the social welfare $W$, the latter weighted by the parameter $\alpha \geq 0$. When $\alpha$ goes to zero, the government attaches no weight to social welfare. The contribution schedule $C_i$ is taken as given: if the government allows the merger, lobby $i$ will donate the amount $x$, if it prohibits the merger, the lobby...
will contribute the amount \( y \). The government’s decision space is represented by \( d = \{ \text{allow merger, prohibit merger} \} = \{ M, N \} \).

\[
\max_d G = \sum_{i \in \lambda} C_i(d) + \alpha W(d)
\]

This is a similar to part b) in the Bernheim-Whinston proposition in Grossman and Helpman (1994)\(^2\). The difference is that in our paper, the policy variable is a merger decision - a binary variable -, whereas the policy variable in the Grossman and Helpman (1994) paper is trade taxes and subsidies - a continuous variable.

In stage one, the lobby formation is taken as given. Each lobby determines the level of its contributions to the government by maximising its net welfare, \( w_i \). For lobby \( i, i \in \lambda \), this implies:

\[
\max_{C_i} w_i(C_i) = W_d(C_i) - C_i
\]

The net welfare depends on the gross welfare, \( W_i \), which is in itself determined by the government’s merger decision in the second stage \( d(C_i) \). The other determinant of net welfare is the contribution. The level of the contribution depends on whether it will alter the merger decision in the lobby’s favour. A lobby makes a loss in case it gives a strictly positive contribution to the government that cannot alter the latter’s decision with respect to the decision in the situation in which the lobby gave nothing. The parameters \( e \) and \( \alpha \) influence the size of the contribution. A high \( \alpha \)-value implies that the government attaches a lot of weight on social welfare. The lobby cannot hope to overturn the government’s decision and the contribution is zero. When \( \alpha \) is small, there might be a chance of overturning the decision. Thus the contribution might be non zero. The efficiency gain parameter determines influences total welfare and therefore also the level of the contributions. Note that the in contrast with Grossman and Helpman (1994) the contributions are not redistributed among the different groups in society.

Additionally, the contribution cannot exceed the difference in the interest of the gross welfare, \( W_i \), and the contribution.

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\(^2\)Grossman and Helpman (1994): Proposition 1 (Bernheim-Whinston): \( \{\{C_i^e\}_{i \in L}, \{p^e\}\} \) is a sub-game perfect Nash equilibrium of the trade-policy game if and only if

- a) \( C_i^e \) is feasible for all \( i \in L \);
- b) \( p^e \) maximizes \( \sum_{i \in L} C_i^e(p) + aW(p) \) on \( P \);
- c) \( p^e \) maximizes \( W_j(p) - C_j^e(p) + \sum_{i \in L} C_i^e(p) + aW(p) \) on \( P \) for every \( j \in L \);
- d) for every \( j \in L \) there exists a \( p^j \in P \) that maximizes \( \sum_{i \in L} C_i^e(p) + aW(p) \) on \( P \) such that \( C_j^e(p^j) = 0 \).
group’s welfare generated by the merger ($\Delta \pi_I$, $\Delta \pi_O$ or $\Delta CS$). If it does, the interest group would be worse off compared to the situation in which it donated nothing\(^3\). A contribution is feasible if it is smaller than the difference in the interest group’s welfare. For instance, suppose that a merger generates 10 extra units of welfare for the insiders and that the required political contribution for a merger approval is 12. Making the contribution would lead to a loss of 2 units. Therefore the insiders will not donate anything.

Furthermore, a lobby donates exactly the amount that makes the government indifferent between approving or prohibiting the merger when it wants to overturn the government’s decision. Donating more is an inefficient use of resources. The reason is that the game is sequential, giving the lobby a first mover advantage over the government. Thus all the bargaining power lies with the lobby. Essentially, the lobby group maximises its net welfare $w_i$: its gross welfare, determined by the government’s decision, minus its contribution. For instance, for insiders this $\max_{C_I} \pi_I^{d(C_I)} - C_I$, with $d = \{M, N\}$.

Finally, the size of the contribution depends on the lobby configuration. In other words, a lobby’s contribution schedule differs across the different games. Whether or not the interests of the lobby groups are aligned depends on the parameter space, as shown in figure 1. When two lobbies have the same interest, they can join forces and split the contribution that is required to change the government’s decision in their favour. This effectively lowers the lobbies contribution. However, different lobby groups can also have conflicting interests, as the merger’s impact on their welfare can have a different sign. In the other case, the lobbies’ interest differ. Take a situation in which there are two lobbies, one that gains and one that loses from the merger. The merger’s effect on the loser’s welfare must be large enough, to compensate sum of the change in social welfare and the effect on the welfare of the rivaling lobby induced by the change in merger decision. So, given the contribution schedules of the other lobbies, each lobby determines its contributions schedule.

In conclusion, the contribution schedule is determined by the parameter setting, the difference in the lobby’s welfare generated by the merger and the type of game that is played. Now we will discuss the four different lobby configurations in the order given by table 3: insiders lobby, insiders and outsiders lobby, insiders and consumers lobby and all interest groups lobbies. We focus on the contribution schedules and the government’s merger decision in the Nash equilibrium. Assume that a merger approval takes the value one and a prohibition the value zero. The change in the government’s decision due to lobbying by group $i$ is $\Delta d_{NL,i} = d_{NL,i}^{p} - d_{NL,i}^{n}$. The variables $d_{NL,i}^{p}$ and $d_{NL,i}^{n}$ respectively denote the optimal policy decision under the exogenously

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\(^3\)This is parallel to the feasibility condition in the Grossman and Helpman (1994).
determined lobby configuration (L) and the optimal policy decision in case lobby \( i \) deviates from this configuration (NL,i). \( \Delta d_{NL,i}^* \) takes the value one if the merger was approved when \( i \) lobbies, but not when \( i \) deviates from lobbying. \( \Delta d_{NL,i}^* \) turns zero if the merger decision is unchanged and minus one if the merger gets prohibited in case group \( i \) consider to lobby whereas it is prohibited when they deviate. In each case, we use the following parameter values: \( a = 2, b = 1, c = 0.5 \) and \( n = 3 \).

\subsection{3.2 Only insiders lobby}

Suppose only the insiders form a lobby. We examine the Nash equilibrium outcome. Can insiders change the government’s decision by lobbying compared to the case in which they would donate nothing? In case the insiders consider making contributions, the governments objective function is \( G_L = C_I(d) + \alpha W(d) \). When the insiders decide not to donate anything in any situation, the governments objective function is \( G_{NL} = \alpha W(d) \). The optimal government decision is respectively \( d_L^* \) and \( d_{NL}^* \). The difference in government decision between L and NL,I is represented by \( \Delta d_{NL,I}^* = d_L^* - d_{NL,I}^* \). So only when \( \Delta d_{NL,I}^* \) equals one is it possible for insider lobbying to change the government’s decision. In all other cases, the insiders will never make positive contributions. The level of the contributions in case \( \Delta d_{NL,I}^* = 1 \) cannot exceed the difference in insider welfare: \( C_I \leq \Delta \pi_I \). This is the feasibility condition. In other words, whenever the loss in social welfare is larger than the difference in insider profit, \( \Delta \pi_I \leq |\Delta W| \), the contribution is zero. Furthermore, when the contribution is non zero, the contribution will be equal to the loss in welfare: \( C_I = |\Delta W| \).

The reason is that the lobby groups have the first mover advantage in the sequential game. As a consequence, the remaining surplus, \( \Delta \pi_I - C_I \), goes entirely to the lobby group. The optimised contribution schedule can be summarised as:

\[
\begin{cases} 
C_I = |\Delta W| & \text{if } \Delta d_{NL,I}^* = 1 \text{ and } \Delta \pi_I \leq |\Delta W|, \\
C_I = 0 & \text{otherwise.}
\end{cases}
\]

Figure 2 depicts the \( \Delta \pi_I + \alpha \Delta W = 0, \alpha \Delta W = 0 \) and \( \Delta \pi_I = 0 \) in (panel a) and the insiders’ optimised contribution schedule (panel b). In panel a, the efficiency gains \( e \) are displayed on the horizontal axis and the weight on social welfare \( \alpha \) is depicted on the vertical axis. In panel b, the independent variables are the efficiency gain and weight on social welfare. The vertical axis denotes the size of the contribution \( C_I \). We first discuss panel a. Later we analyse panel b.

We exclude the cases in which a merger would have a negative effect on the insiders, \( \Delta \pi_I < 0 \). In figure 2a, these cases can be found to the right of the
thick line, which represents $\Delta \pi_I = 0$. We focus on cases to the left of this line. The thin, full line (referred to as the normal line) stands for $\Delta \pi_I + \alpha \Delta W = 0$. At this line, the government is indifferent between approving and prohibiting the merger in case the insiders lobby and donate all of the change in their welfare to the government. The feasibility condition is binding here: the loss in social welfare equals the change in insiders’ profit. When the $(e, \alpha)$ combination is to the left of this curve, the merger gets cleared. When it is to the right, the merger is prohibited. The dashed line represents an indifferent government when the insiders refrain from lobbying, $\alpha \Delta W = 0$. Again, $(e, \alpha)$ combination is to the left (right) of this curve represents a clearance (prohibition). In the area between the dashed and full line, it is possible that making contributions larger than zero alters the government decision in favour of the insiders: it is possible that $\Delta d^*_{NL,I} = 1$. In the area to the left of the dotted line, mergers get cleared whether or not the lobby makes positive contributions, hence $\Delta d^*_{NL,I} = 0$. The intuition is the following. When the efficiency gains are high, a merger has a positive effect on social welfare. Therefore the government will approve the merger regardless of the contribution made by the insiders. The last area of interest is the one between the full and thick line. Here, the gain in the insiders’ welfare is too small to compensate the loss in social welfare: $\Delta \pi_I < |\Delta W|$. Therefore, all mergers get prohibited regardless whether the regime is L or NL: $\Delta d^*_{NL,I} = 0$.

Panel b represents the optimal contribution level of the insiders. The contributions are zero in the areas where $\Delta d^*_{NL,I} = 0$. We observe positive contributions in the area in which the insiders have a chance to overturn the governments decision. These non zero contributions indicate that the government has changed its decision from a prohibition to a clearance in favour of the insiders. When the weight on social welfare increases is high, the government cannot be compensated for the loss in social welfare and the contributions are always zero. We discussed that the insiders’ contribution equals the social welfare loss caused by the merger in order to make the government indifferent between approving or prohibiting the merger when it wants (or is capable) to over turn the government’s decision and that they keep the remaining gain in insider welfare to themselves. In this example, the value for $\Delta \pi_I$ at $(e; \alpha) = (0.85; 0.5)$, the insiders’ change in profit due to the merger, is 0.02125 whereas the size of the contribution $C_I$ is 0.00125. The change in social welfare, $\Delta W$, however, is -0.00125. The insiders net welfare gain for the insiders is $w(C_I) = 0.02$.

In this scenario, the contribution schedule of the insiders is not affected by the presence of other lobbies, since it is the only lobby present. This is no longer the case in the following three cases. We will focus on how the presence of other lobbies affects the contribution decision of other lobbies in
3 Lobbying and the merger decision

3.3 Insiders and outsiders lobby

Suppose that insiders and outsiders lobby. The government objective function given that both groups lobby (L) is $G_L = C_I(d) + C_O(d) + \alpha W(d)$. The decision that maximises $G_L$ is represented by $d^*_L$. When the insiders (outsiders) deviate from lobbying, NL, I (NL, O), the government maximises $G_{NL,I} = C_O(d) + \alpha W(d)$ ($G_{NL,O} = C_I(d) + \alpha W(d)$). The respective optimal merger decision is $d^*_{NL,I}$ and $d^*_{NL,O}$. There are two possibilities in this game: the firms’ interest are aligned: both insiders and outsiders gain from the merger. Or the insiders gain from the merger whereas the outsiders stand to lose from it. The outsiders’ cut-off points are $e^1_O$ and $e^2_O$ (see section 2). When $e > e^1_O$ or $e < e^2_O$, the interest are aligned. In between the cut-off points outsiders lose. Note that $e^2_O$ might be negative and therefore not relevant for the analysis ($e^2_O < e^1_O < e_I$).

We first discuss the case in which $e^2_O < e < e^1_O$. Given that $e < e_I$, insiders are always pro-merger. As before, the contribution of the insiders is zero when it cannot make a difference (get the merger approved) compared to the case when it deviates from lobbying ($d^*_L = d^*_{NL,I}$). In case that the merger decision changes from an prohibition to a clearance, the insiders have an
incentive to make non zero contributions ($\Delta d_{NL,I}^* = 1$). As stated above, the contribution level is equals to the amount that makes the government indifferent between both possible policy outcomes, $C_I = -\Delta W - \Delta \pi_O$ as long as the contribution level does not exceed the difference in insider welfare generated by the merger (feasibility condition). The difference in social welfare enters with a negative sign for the following reason. If a merger has a negative impact on social welfare, the government must be compensated for this loss by the opposite amount. Since we are considering the case in which the outsiders welfare decreases due to the merger, $\Delta \pi_O$ is negative. If both the outsiders’ welfare and the welfare of society as a whole are damaged by the merger, the contribution of the insiders must be larger compared to the previous section, as it must not only compensate the government for the loss in social welfare but also compensate for the best possible contribution offer the outsiders can make to the government, $|\Delta \pi_O|$. If the merger’s effect on social welfare is positive, the contribution that is required to turn the government’s decision in its favour is smaller than $|\Delta \pi_O|$. Note that $C_I$ cannot turn negative because that would imply that the merger has a positive effect on social welfare that cannot be offset by any feasible contribution by the outsiders. The merger would be cleared regardless of the contribution of the insiders and therefore the contribution is zero.

The outsider’s contributions are zero when $d_{L}^*$ is the same as $d_{NLO}^*$. Only when the outsiders can shift the government’s decision from a clearance in the deviating from lobbying state to a prohibition in the lobbying state ($\Delta d_{NLO}^* = -1$), can the contribution be non zero. In case $\Delta d_{NLO}^* = -1$, the contribution is equal to the sum of the change in social welfare and the change in outsider profits: $C_O = \Delta W + (n-2)\Delta \pi_O$. In other words, $C_O$ is the amount that makes the government indifferent between approving and prohibiting the merger given that the contribution level is feasible. If the merger has a negative effect on social welfare, the required contribution is lower than when it is positive. This is logical as the government is more inclined to prohibit a merger in the former case. In the latter case, the contribution must not only cover the gain in social welfare (lost in case of a prohibition), but must also counter the best possible offer by the insiders. $C_O$ cannot turn negative. The reasoning is similar as above.

Now we turn to the case in which the interests of the insiders and outsiders are aligned: $e > e_1^O$ or $e < e_2^O$. Like before, the contributions of a lobby are zero whenever lobbying cannot change the situation in its favour compared to the case in which it deviates. When $\Delta d_{NL,I}^* = 1$ ($\Delta d_{NLO}^* = 1$), the insiders (outsiders) possibly donate non zero amounts. In the Nash equilibrium when both insiders and outsiders lobby, each lobby donates a fraction of the welfare loss in this case. This fraction equals the lobby’s share in the change total.
producer surplus: $\Delta \pi_I / \Delta \pi_I + (n-2)\Delta \pi_O$ for the insiders and $\Delta (n-2)\pi_O / \Delta \pi_I + (n-2)\Delta \pi_O$ for the outsiders. This means that the contribution burden is carried by both parties and that there are two feasibility conditions. The reason is the following: if one lobby knows the other lobby cannot afford to donate the necessary fraction, it does not contribute anything. The contribution schedules, with $\nu_2 = -\Delta W / \Delta \pi_I + (n-2)\Delta \pi_O$, are summarised as follows:

- $e^2_O < e < e^1_O$
  - Insiders:
    \[
    \begin{cases} 
    C_I = -\Delta W - \Delta \pi_O & \text{if } \Delta d_{NL,I}^* = 1 \text{ and } \Delta \pi_I \geq -\Delta W - \Delta \pi_O, \\
    C_I = 0 & \text{otherwise}. 
    \end{cases}
    \]
  - Outsiders:
    \[
    \begin{cases} 
    C_O = \Delta W + \Delta \pi_I & \text{if } \Delta d_{NL,O}^* = -1 \text{ and } \Delta \pi_O \geq \Delta W + \Delta \pi_I, \\
    C_O = 0 & \text{otherwise}. 
    \end{cases}
    \]

- $e < e^2_O$ or $e^1_O < e$
  - Insiders:
    \[
    \begin{cases} 
    C_I = \nu_2 \Delta \pi_I & \text{if } \Delta d_{NL,I}^* = 1, \Delta \pi_I \geq \nu_2 \Delta \pi_I \text{ and } \Delta \pi_O \geq \nu_2 \Delta \pi_O \\
    C_I = 0 & \text{otherwise}. 
    \end{cases}
    \]
  - Outsiders:
    \[
    \begin{cases} 
    C_O = \nu_2 (n-2) \Delta \pi_O & \text{if } \Delta d_{NL,O}^* = 1, \Delta \pi_I \geq \nu_2 \Delta \pi_I \text{ and } \Delta \pi_O \geq \nu_2 \Delta \pi_O \\
    C_O = 0 & \text{otherwise}. 
    \end{cases}
    \]

Figures 3a and 3b depict the change in the optimal government decision due to insider (panel a) or outsider (panel b) lobbying. The left panel is completely blank, indicating that insider lobbying activity does not affect the government’s decision. In panel b, the gray (black) area represents the case in which there is (is not) a change in decision due to outsider lobbying: $\Delta d_{NL,O}^* = 1$ ($\Delta d_{NL,O}^* = 0$). Clearly there is scope for lobbying for the outsiders in the lower right corner. We now turn to the contribution schedules. Figures 4a and 4b respectively represent the contribution schedules of the insiders and the outsiders. The contribution level is depicted on the vertical axis. The independent variables, efficiency gains $e$ and weight on social welfare $\alpha$, are represented by the other two axes.

For the parameter values $a = 2$, $b = 1$, $c = 0.5$ and $n = 3$, the tipping point $e^1_O$ above which the merger is beneficial to the outsiders is one quarter. Thus when $e \in [0; 0.25]$ the insiders and outsiders have conflicting interests.
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When $e \in [0.25; e_I]$ they both gain from the merger. The contribution schedule of the insiders, represented by figure 4a, clearly looks different from the contribution schedule when it is the only lobbying group (figure 2b). In the right lower corner, there is no longer an area with non zero contributions. The insiders decide whether or not to deviate from contributing given that the outsiders still contribute. When the insiders deviate, the merger still gets cleared in the previously non zero area because the outsiders still donate their fraction of the welfare loss and the weight on social welfare is low. The insiders cannot gain anything from making a non zero contribution, therefore $C_I = 0$. The type of game that is played clearly influences the shape of the contribution schedule.

The outsiders’ contribution schedules does have an area in which the contributions are non zero, namely the lower right corner in panel b. This was already indicated in figure 3b.

3.4 Insiders and consumers lobby

Assume now that insiders and consumers lobby. When both groups lobby, the government’s objective function is $G_L = C_I(d) + C_C(d) + \alpha W(d)$. The merger decision that maximises $G_L$ is $d^*_L$. In case the insiders (outsiders) deviate from lobbying, NL.I (NL.O), the government maximises $G_{NL.I} = C_C(d) + \alpha W(d)$ ($G_{NL.C} = C_I(d) + \alpha W(d)$). The respective optimal merger decision is $d^*_{NL.I}$ and $d^*_{NL.C}$. As in the previous section, there are two possible scenario’s: either
Lobbying and the merger decision

(a) Insiders’ contribution function

(b) Outsiders’ contribution function

Figure 4: Exogeneous lobbying by the insiders and outsiders \((a = 2, b = 1, c = 0.5 \text{ and } n = 3)\)

both groups benefit from the merger \((e < e_{CS} - \text{see section 2})\), or the insiders gain from the merger in contrast to the consumers whose welfare is reduced \((e > e_{CS})\).

We first discuss the case in which \(e_{CS} < e\), i.e. the case with the conflicting interests. We only consider cases in which \(e < e_{I}\). As before, the lobby group’s contributions are zero when the government’s decision is unaffected by their lobbying \((d^{*}_{L} = d^{*}_{NL,I} \text{ or } d^{*}_{L} = d^{*}_{NL,C})\). In case that \(\Delta d^{*}_{NL,C} = -1\), the merger decision alters from a clearance to an prohibition. As a consequence the consumers have an incentive to make non zero contributions. As stated above, the contribution level is equals to the amount that makes the government indifferent between both possible policy outcomes, \(C_{C} = \Delta W + \Delta \pi_{I}\). The consumers compensate the government for the forgone maximum contribution from the insiders, the change in insider profits, and the forgone social welfare change. The latter can be negative, leading to a contribution that is lower than \(\Delta \pi_{I}\).

The insiders will only contribute if \(\Delta d^{*}_{NL,I} = 1\). The contribution equals \(C_{I} = -\Delta W - \Delta CS\). We are in the case in which \(\Delta CS\) is negative. If both the consumers’ welfare and the welfare of society as a whole are negatively affected, the contribution of the insiders must be larger compared to section 3.2. If the merger’s effect on social welfare is positive, the contribution that is required to overturn the government’s decision in insiders’ favour is smaller than \(|\Delta CS|\).

Now we turn to the case in which the interest of the insiders and consumers are aligned: \(e < e_{CS}\). Like before, when \(\Delta d^{*}_{NL,I} = 0 \text{ (} \Delta d^{*}_{NL,C} = 0\text{)}, then \(C_{I} = 0 \text{ (} C_{C} = 0\text{)}\). When \(\Delta d^{*}_{NL,I} = 1 \text{ (} \Delta d^{*}_{NL,C} = 1\text{)}, the insiders (consumers) might donate non zero amounts. Suppose that the contributions of both lobbies are non zero. Then each lobby donates a fraction of the welfare.
loss. This fraction equals the lobby’s share in the change total producer surplus: $\frac{\Delta \pi_I}{\Delta \pi_I + \Delta CS}$ for the insiders (consumers). Again there are two feasibility conditions. The contribution schedules, with $\mu_3 = -\frac{\Delta W}{\Delta \pi_I + \Delta CS}$, are summarised as follows:

- $e_{CS} < e$
  - Insiders:
    \[
    \begin{align*}
    C_I &= -\Delta W - \Delta CS & \text{if } \Delta d_{NL,I}^* = 1 \text{ and } \Delta \pi_I \geq -\Delta W - \Delta CS, \\
    C_I &= 0 & \text{otherwise}.
    \end{align*}
    \]
  - Consumers:
    \[
    \begin{align*}
    C_C &= \Delta W + \Delta \pi_I & \text{if } \Delta d_{NL,C}^* = -1 \text{ and } -\Delta CS \geq \Delta W + \Delta \pi_I, \\
    C_C &= 0 & \text{otherwise}.
    \end{align*}
    \]

- $e < e_{CS}$
  - Insiders:
    \[
    \begin{align*}
    C_I &= \mu_3 \Delta \pi_I & \text{if } \Delta d_{NL,I}^* = 1, \Delta \pi_I \geq \mu_3 \Delta \pi_I \text{ and } \Delta CS \geq \mu_3 \Delta CS, \\
    C_I &= 0 & \text{otherwise}.
    \end{align*}
    \]
  - Consumers:
    \[
    \begin{align*}
    C_C &= \mu_3 \Delta CS & \text{if } \Delta d_{NL,C}^* = 1, \Delta \pi_I \geq \mu_3 \Delta \pi_I \text{ and } \Delta CS \geq \mu_3 \Delta CS, \\
    C_C &= 0 & \text{otherwise}.
    \end{align*}
    \]

The change in government decision due to lobby activity is represented by figure 5a and 5b. The left panel is completely blank indicating that the lobbying activity of the insiders does not change merger outcome. In the right panel, the black (gray) area represents $\Delta d_{NL,C}^* = -1$ ($\Delta d_{NL,C}^* = 0$). The presence of the black area implies that the consumers’ contribution schedule in the corresponding area is non zero. Figure 6 shows the contribution schedules generated by this lobby structure. Panel a represent the insiders’ schedule and panel b shows that of the consumers. The area to the left of the cut-off point in the insiders’ contribution schedule did not change compared to the case in which only the insiders lobby. To the right of the cut-off point, we notice that the contribution has changed compared to the case in which the insiders are the only lobby group: their contributions are now always zero. This is due to the presence of the consumer lobby: its contribution is larger than that of the insiders and therefore the latter do not contribute at all. In the non zero contribution area in the consumers’ contribution schedule (figure 6b), efficiency gains are limited. The loss in consumer surplus generated by the...
3 Lobbying and the Merger Decision

(a) Effect of insider lobbying on government’s decision
(b) Effect of consumer lobbying on government’s decision

Figure 5: Exogeneous lobbying by the insiders and the consumers ($a = 2$, $b = 1$, $c = 0.5$ and $n = 3$)

(a) Insiders’ contribution function
(b) Consumers’ contribution function

Figure 6: Exogeneous lobbying by the insiders and the consumers ($a = 2$, $b = 1$, $c = 0.5$ and $n = 3$)

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merger is large enough to compensate the welfare change and the difference in insiders’ profit: $\Delta CS > \Delta \pi_I + \Delta W$. As the efficiency gains increase, the insiders’ profits increase as well, while the loss in consumer surplus decreases (as long as the outsiders’ output is non zero) and the negative welfare effect diminish. As a consequence, the consumers’ contribution required to overturn the government decision is positively correlated with the efficiency gains. In other words, as $e$ decreases, the consumer’s contribution must increase. The tipping point between consumers contributing and insiders contributing actively occurs around the value $e = 0.76$. At this point, the change insiders’ profits are as large as the change in the sum of the weighted social welfare and consumer surplus. When $e$ decreases, consumer loss goes down and therefore the contribution from the insiders required to persuade the government to approve the merger decrease as well, even though the insiders’ profits increase.

### 3.5 Each interest group lobbies

In the final case, every group lobbies. The government’s objective function is $G = C_I(d) + C_O(d) + C_C(d) + \alpha W(d)$. This situation is identical to the one in which no lobbying occurs. The group or groups that gain the most, are able to contribute the most, resulting in a decision in favour of the outcome which renders the largest social welfare. In case group $j$ deviates from lobbying, the objective function turns into: $\sum_{i \in \lambda, j \neq i} C_i(d) + \alpha W(d)$.

With respect to the previous case, the consumers can overturn less mergers decisions in their favour (a prohibition) in case $e > e_{CS}$. The reason is that now the outsiders’ profit gain helps to push the government’s decision in favour of an approval. To overturn the government’s decision, the following must hold: $\Delta CS > \Delta \pi_I + \Delta O + \alpha \Delta W$. We observe the extra $\Delta \pi_O$ term in the right hand side compared to the previous section. The contribution schedule is, with $\mu_4 = \frac{-(\Delta W + \Delta CS)}{\Delta \pi_I + (n-2) \pi_O}$ and $\nu_4 = \frac{-(\Delta W + (n-2) \Delta \pi_O)}{\Delta \pi_I + \Delta CS}$:

- $e_{CS} = e_1 < e$
  - Insiders:
    \[
    \begin{cases}
    C_I = \mu_4 \Delta \pi_I & \text{if } \Delta d^*_{NL,I} = 1, \Delta \pi_I \geq \mu_4 \Delta \pi_I \text{ and } \Delta \pi_O \geq \mu_4 \Delta \pi_O, \\
    C_I = 0 & \text{otherwise.}
    \end{cases}
    \]
  - Outsiders:
    \[
    \begin{cases}
    C_O = \mu_4 (n-2) \Delta \pi_O & \text{if } \Delta d^*_{NL,O} = 1, \Delta \pi_I \geq \mu_4 \Delta \pi_I \text{ and } \Delta \pi_O \geq \mu_4 \Delta \pi_O, \\
    C_O = 0 & \text{otherwise.}
    \end{cases}
    \]
  - Consumers:
    \[
    \begin{cases}
    C_C = \Delta W + \Delta \pi_I + (n-2) \Delta \pi_O & \text{if } \Delta d^*_{NL,C} = -1, \\
    C_C = 0 & \text{otherwise.}
    \end{cases}
    \]

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(a) Effect of insider lobbying on government’s decision

(b) Effect of outsider lobbying on government’s decision

(c) Effect of consumer lobbying on government’s decision

Figure 7: Exogeneous lobbying by insiders, outsiders and consumers ($a = 2$, $b = 1$, $c = 0.5$ and $n = 3$)

(a) Insiders’ contribution function

(b) Outsiders’ contribution function

(c) Consumers’ contribution function

Figure 8: Exogeneous lobbying by insiders, outsiders and consumers ($a = 2$, $b = 1$, $c = 0.5$ and $n = 3$)

\begin{itemize}
  \item $e_O^2 < e < e_{CS} = e_O^1$
    \begin{itemize}
      \item Insiders:
        \begin{align*}
          C_I &= \nu_4 \Delta \pi_I & \text{if } \Delta d_{NL,I} = 1, \Delta \pi_I \geq \nu_4 \Delta \pi_I \text{ and } \Delta CS \geq \nu_4 \Delta CS \\
          C_I &= 0 & \text{otherwise.}
        \end{align*}
      \end{itemize}
    \end{itemize}

  \item Outsiders:
    \begin{align*}
      C_O &= \Delta W + \Delta \pi_I + \Delta CS & \text{if } \Delta d_{NL,O} = -1, \\
      & & \text{and } -(n-2)\Delta \pi_O \geq \Delta W + \Delta \pi_I + \Delta CS \\
      C_O &= 0 & \text{otherwise.}
    \end{align*}

  \item Consumers:
    \begin{align*}
      C_C &= \nu_4 \Delta CS & \text{if } \Delta d_{NL,C} = 1, \Delta \pi_I \geq \nu_4 \Delta \pi_I \text{ and } \Delta CS \geq \nu_4 \Delta CS \\
      C_C &= 0 & \text{otherwise.}
    \end{align*}
\end{itemize}
Figure 7 represents the change in government decision due to lobbying by the insiders (panel a), the outsiders (panel b) or the consumers (panel c). Figure 8 shows the contributions schedule of each lobby group. Since figures 7a and 7b are blank, the insiders nor the outsiders can change the merger decision by lobbying. As a consequence, they will always make zero contributions, which can be observed in figure 8a and 8b. The black area in figure 7c represents cases for which the consumers can overturn the government’s decision. Note that this area is smaller than in figure 6b (section 3.4: insiders and consumers lobby), since consumers must now also compensate for the gain in outsider profit on top of the gain in insider profit and the change in social welfare. For efficiency gains smaller than 0.77, the consumer surplus is too small to compensate the government. In the previous section, this e-value was 0.76. Furthermore, the consumers’ contribution is larger: for the parameter values \( a = 2, b = 1, c = 0.5, n = 3, e = 0.8 \) and \( \alpha = 0.5, C_C = 0.083 \), whereas it was 0.058 in section 3.4.

### 3.6 Comparison

In the above sections, we have shown that the lobby configuration influences the contribution schedule of a lobby. In this section, we analyse the effect of a parameter change on the contribution schedules. First we discuss lobby configuration 1: only insiders lobby. Then we turn to the case in which both insiders and outsiders lobby. Afterward we discuss the insider and consumer case. We do not analyse the case in which all interest groups lobby since it is similar to the other cases. It is the case that a change in a parameter value can alter a lobby’s contribution decision. However, the main point is that lobbying can occur for some parameter configurations and thus that lobbying can influence the merger decision.

#### 3.6.1 Insiders lobby

For the parameter values used in the above discussion \((a = 2, b = 1, c = 0.5, \alpha = 0.5)\), an increase in the number of firms from three to four (or higher) turns the contribution schedule to zero for various e-values. The reason is that the total insider output decreases in case of a merger. The outsiders benefit in the region with low efficiency gains by increasing their output. The more outsiders, the higher the increases in the outsiders’ output. This is not beneficial for the insiders.

The demand parameter \( a \) affects the size of the insiders’ contribution, which can be observed in figure 9a. The effect of \( a \) on \( C_I \) is depicted for four different levels of efficiency gains: the e-values are 0.6, 0.7, 0.8 and 0.9, in the range...
of possible negative welfare effects. For each level of £, we observe a zero contribution when a is close to c, the latter indicates that profit margin is low. Subsequently we see a steep rise in contributions followed by a vertical drop after which the level of contributions turns zero again. The maximum contribution level differs across the different efficiency gain levels as well as the start in the contribution rise. The reason is that a effects the change in social welfare and insider profits that result from the merger. As a consequence, the area in which the government might change its decision also alters (shift to the left compared to figure 2a). As a consequence, areas in which the insiders are able to change the government’s decision in their favour shift as well. The white area in figure 11a depicts the cases for which the insiders’ contribution is non zero (for the parameter values b = 1, c = 0.5, n = 3 and a = 0.5). The fine white line represents the effect of a on £I. The higher a, the higher the efficiency levels for which there are positive contributions\(^4\).

The size of the contribution is equal to the negative welfare effect. The change in social welfare is negatively affected by a as can be seen in figure 10a. Thus the larger a, the larger the necessary contribution for a given £-value. For instance, in case £ = 0.6, the merger has a negative effect on welfare from the moment a is larger than 4.25. Since the insider profit is positive, the insiders are interested in altering the government’s decision. They are able to do so until a is about 5.4. From this point onwards, the change in insider profit is no longer large enough to compensate for the welfare loss. The contributions are zero for a > 5.4. Furthermore, the welfare decline is stronger for low efficiency gains. As a consequence, the length of the interval of the £-variable for which the contributions are zero is smaller when £ is high.

The effect of the marginal cost on the insiders’ contribution level is depicted in figure 9b. The contribution level changes with the marginal cost and the level of efficiency gains. For high efficiency gains, the contribution peak comes earlier than for lower levels (higher £-values). This is due to the fact that c influences the cut-off parameter £I (the parameter that determines whether a merger is profitable for the insiders). The white area in figure 11b represents the case for which the insiders make a non zero contributions, the line depicts £I for varying levels of marginal cost. Only to the right and in the neighbourhood of £I will the insiders find it beneficial to donate non zero amount. As can be seen in the figure, £I increases with c. The £-values for which non zero contributions are made, shifts as well. For low values of c, the area includes lower levels of £. For instance for c = 0.2, the £-value 0.6 lies in the contributing region. When c increases, these £-values fall out of the

\(^4\)Note that the insiders will not donate at £I or points very close against £I because the gain in insider profit cannot compensate the welfare loss.
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Figure 9: Insiders’ contribution schedule for lobby configuration 1

Figure 10: Effect on the change in welfare (normal line) and the change in insider profit (thick line) for lobby configuration 1
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(a) Non zero contribution areas for varying levels of $a$ ($c = 0.5$)
(b) Non zero contribution areas for varying levels of marginal cost ($a = 2$)

Figure 11: The effect of a change in $a$ lobby configuration 1 ($b = 1$, $n = 3$ and $\alpha = 0.5$)

area. For $c = 0.6$, $e = 0.6$ no longer lies in that area, but $e = 0.9$ does. An additional point is that the level of contributions depends on the e-value. The change in insider profit is negatively affected by $e$ (see equation 1), meaning ceteris paribus the higher the efficiency gains, the higher the gain in profit. This implies that the welfare loss that can be offset is larger in absolute values as well.

$$\Delta \pi_I = \frac{(a+c((n-2)-(n-1)e))^2}{\pi^2} - \frac{(a-c)^2}{(1+n)^2}$$

(1)

3.6.2 Insiders and outsiders lobby

We do not analyse the insiders’ contribution schedule, since it was zero above and it is unaltered by a change in the number of firms, $a$ and $c$. We focus on the change in the contribution schedule of the outsiders represented in figure 12. Keep in mind that the contribution levels are determined by maximising the net outsider welfare in a Nash equilibrium setting (taking the insider lobby contributions in the case both insiders and outsiders lobby as given). The effect of $a$ and $c$ on the outsiders’ contribution schedule looks similar to that on the insiders’ contribution schedule in the previous section. We start by analysing the effect of $a$. In figure 12a, we see that the initial point at which contributions start to be positive arises at a lower $a$ when the efficiency gains are lower (higher $e$). For a given e-value, the interval for $c$ for
which there are non zero contributions is larger compared to the insider case in section 3.6.1. This is because \( a \) has a positive effect on the outsider profit (see figure 13a). In the previous section, \( a \) first had a positive effect on the change in insider profit, but the latter turned negative for higher \( a \)-values. So here, the negative welfare effect can be offset for more \( c \)-values. Note that the consumers always lose due to a merger approval when \( a \) is larger than 2.5 for the set values of the other parameters.

Now we analyse the effect of the marginal cost. For a given \( e \), the interval for which the contributions are positive ends when the change in welfare turns positive. Like in the previous section, the levels of efficiency gain for which the contributions are non zero depend on the level of marginal cost. This is due to the fact that both the cut-off value for merger formation \( e_I \) and the upper outsider profitability cut-off \( e_O^I \) are determined by \( c \). When \( c \) is low, the contribution level is positive for lower values of \( e \).

The level of outsider profit is negatively affected by efficiency gains, as can be observed in the first term in equation 2. This is logical as high efficiency gains lead to a lower effective marginal cost for the insiders depressing the price, leading to a lower outsider profitability. Therefore the contributions can be higher for lower values of \( e \).

\[
(n - 2)\Delta \pi_O = (n - 2) \frac{(a + (c(e-2)))^2}{n^2} \frac{(a-c)^2}{(1+n)^2} \quad (2)
\]

### 3.6.3 Insiders and consumers lobby

The insiders’ contribution schedule is not analysed since it was zero in section 3.4 and a change in the demand parameter \( a \) or the marginal cost \( c \) does
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not have an effect. We turn to the contribution schedule of the consumers. Keep in mind that for \( e > e_{\text{CS}} \), the consumers are lobbying against the merger, since the latter leads to a loss in consumer welfare. We therefore depict the absolute value of the change in consumer surplus in the graphs.

The consumer contribution is negatively affected by the number of firms. This can be seen by comparing panel a and panel b in figure 14 (parameter values \( a = 2, b = 1, c = 0.5 \)). The contribution area is larger when there is only one outsider firm. Also the contribution level has diminished when moving from the 1 outsider to the two outsider situation. There are two explanations for this. When the number of outside firms is higher, a merger has a smaller effect on prices (price increases) when efficiency gains are small. Therefore, the consumers are less hurt by a two-firm merger. Thus the change in consumer surplus has a smaller effect on the change in social welfare. The second reason is that the change in insider profits is smaller when there are more outsiders. Therefore, the maximum insider contribution that the consumers must off-set to obtain a prohibition is smaller as well. When the number of firms is larger than four, the consumers’ contributions are zero.

Now we turn to the effect of \( a \) on the consumers’ contribution function. As in the two previous sections, the levels at which the consumers make non zero contributions change with \( a \). At a low \( a \)-value, there are only contributions at high e-values. Note that the contributions in the figure are all made in order to obtain a prohibition. We also observe that for a given e-value, the amount of contributions is decreasing in \( a \) once a positive contribution level is attained. The reasoning goes as follows. A higher \( a \)-value leads to a higher welfare loss for a given level of efficiency gains (see figure 13a). Since the consumers want to obtain a prohibition, a larger loss in welfare means that the government is more inclined to prohibit the merger. As a consequence,
Figure 14: Consumers’ contribution schedule for lobby configuration 3 \((a = 2, b = 1 \text{ and } c = 0.5)\)

Figure 15: Effect on the change in welfare (normal line) and the change in outsider profit (thick line) for lobby configuration 2

the required consumer contribution to overturn the government’s decision is smaller.

The marginal cost affects the consumers contribution level, as can be observed in figure 15b. For a given level of efficiency gains, the level of donations is increasing in \(c\). This is due to the fact that the change social welfare is also increasing in \(c\), which can be seen in figure 12b. Thus, in order to obtain a prohibition, the consumers must contribute more when \(c\) is higher.
4 Conclusion

We investigated whether lobbying can influence the outcome in a merger decision process. In a Cournot competition setting with a homogenous good and linear demand, a merger occurred between two identical firms and rendered efficiency gains on the marginal costs. The competition authority decided whether the merger could go through based on the merger’s effect on its objective function. As in Grossman and Helpman (1994), the objective function was the sum of all political contributions and weighted social welfare. A merger created three interest groups, namely the insiders (the merging firms), the outsiders (the other firms) and the consumers. As the merger affected the welfare of each group differently, it was possible that these groups had opposing interests in the merger decision process. As a consequence, they might wanted to persuade the government to take a decision in their favour by offering political contributions. An interest group could only make these contributions if it was organised in a lobby.

We took the lobby configuration (which interest groups organised into lobbies) as given and investigated the contribution schedules of the lobbies and the effect of lobbying on the merger decision of the competition authorities. There are two decision stages in the game. In the first stage, each lobby group determined its level of political contributions. If the competition authority cleared the merger, it gave an amount \( x \). If the decision was a prohibition, it donated \( y \). Note that the contribution level could not turn negative, implying that an interest group could not be compensated if its welfare was negatively affected by the merger. Therefore, interest groups that stand to lose from the merger cannot be persuaded to support the merger.

In the second stage, the competition authority decided whether or not to clear the merger taking the contributions from the first stage as given. The parameter setting and the presence of other lobbies turned out to be important factors for the level of the contributions. The authorities are more susceptible to political contributions when the weight on social welfare is limited. The level of efficiency gains affects social welfare, the welfare of the interest groups and therefore also the level of the political contributions. The presence of other lobbies affects the contribution schedule in two ways. The presence of an opposing lobby can induce a lobby to contribute more compared to the situation in which it would not have been there. This is due to the treat that the opposing lobby overturns the competition authority’s decision to the detriment of the other lobby. When the interests of the lobbies are aligned, they share the burden of the contributions. A positive contribution only makes sense if the merger decision of the competition authority is overturned in favour of the contributing lobby.
The area in which political contributions are made and the level of the contributions depend on the parameter setting. By varying a parameter, the contributions decision and as a result the influence on the merger decision can alter. The number of firms has a negative influence on the contributions. The effect of a change in marginal cost and the demand parameter $a$ depends on the efficiency level of the merger. The reason is that a change in these variables alters the profitability cut-off values for each of the interest groups and therefore also the contributing area. However, the main finding still holds: in some cases the competition authority’s merger decision does get influenced by lobbying.
References


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