

# LICOS Centre for Transition Economics

## LICOS Discussion Papers

Discussion Paper 130/2003

### **The Political Economy of Restructuring and Subsidisation: An International Perspective**

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# The Political Economy of Restructuring and Subsidisation: An International Perspective

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June 6, 2003

## Abstract

In today's increasingly competitive business environment, many firms in declining industries have been confronted with the need to restructure. However, lobbies in these industries have often managed to attract government subsidies instead. This has led to a situation where firms in declining sectors are often cross-subsidised by firms in the growing sector of the economy by means of high taxes on the latter. The current paper looks at the decision whether to lobby for subsidies or to restructure a declining industry in the context of a contributions game where firms in the declining industry lobby for subsidies, whereas firms in the growing sector try to enforce a restructuring policy instead. The model endogenously derives the proportion of firms in the declining industry that are restructured or subsidised, as well as the unit level at which restructuring or subsidisation takes place. In fact, this is a novel way of modeling soft budget constraints. Several results stand out. Firstly, even though in the absence of lobbying, subsidisation is always preferable to firms in the declining industry, the cost of lobbying might outweigh the benefit of subsidisation. Hence, it is shown that some firms are willing to restructure, provided profits after restructuring are positive. In particular, the model predicts that, in the declining industry, the proportion of restructured firms exceeds the proportion of subsidised firms. Secondly, it is shown that the unit level of restructuring is always chosen maximally, whereas the unit subsidy varies with the primitives of the model. Thirdly, comparing the predictions of the model with the decision of a social planner, the latter always prefers to impose a policy of maximal restructuring in the entire declining sector. Therefore, allowing for political competition comes at a cost of lower economic welfare. Fourthly, countervailing tariffs on subsidised exports shift the decision in favour of restructuring, thereby hardening budget constraints. Thus, the model shows that external constraints such as countervailing tariffs can help to establish internal financial discipline.

- **JEL-Classification:** P26, F13
- **Key Words:** Soft Budget Constraints, Restructuring, Political Economy, Lobbying, Trade Policy, Declining Industries
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### **Acknowledgment**

The author has greatly benefited from discussions with Hylke Vandenbussche and Dermot Leahy. Their insights and comments have importantly contributed to the formalisation of the model and have helped to improve the paper. The author further wishes to thank Romain Houssa, Jozef Konings, Jacek Suda, Jo Swinnen, Ana Xavier and participants of the 2003 Spring Meeting of Young Economists in Leuven for valuable comments. Financial support from the FWO under research grant G.0267.01 is gratefully acknowledged, as well as research support from LICOS. Part of this paper was written while visiting University College Dublin, Ireland as a Marie Curie Fellow. The author has greatly benefited from excellent research facilities and from general staff support at UCD.

# 1 Introduction

The last decade has witnessed a remarkable shift towards creating a more competitive economic environment world-wide. Europe established its common internal market in 1992, governed by a strong European competition law. Moreover, with the fall of communism, many countries from Eastern Europe are preparing to join the single market as early as 2004. On the other side of the Atlantic, economic integration was fostered through the North American Free Trade Agreement in 1994, liberalising markets in Canada, the United States (US) and Mexico. Similarly, a major breakthrough towards liberalising world trade was achieved at the signing of the General Agreements on Tariffs and Trade which eventually led to the establishment of the World Trade Organisation (WTO) in 1995, now acting as an international body to follow up and safeguard international trade relations. More importantly, it also houses an international dispute settlement agency, dealing with international trade conflicts and unfair trade practices, such as dumping or issues of state aid.

Not only has this new economic environment boosted opportunities for trade and for exploiting the benefits of a freer global economy, it has also triggered many sectors to engage in restructuring efforts, or to heavily invest in new technologies to be able to maintain competitive positions in this increasingly competitive environment.

However, not all markets have been liberalised and government intervention has remained widely spread. Apart from setting the regulatory environment for free competition and trade, many governments (e.g. the US, the European Union) have also taken direct action to shield certain industries from international competition. This is very clearly the case for agriculture or the so-called ‘sensitive’ sectors such as iron and steel, textiles or shipbuilding. These industries continue to be sheltered from competition or remain heavily assisted through government subsidies. The best example of this are European and US agricultural policies that continue to safeguard farmers from competition and involve extensive subsidisation. Equally striking are the recently imposed tariffs on steel imports in the US. In Europe state-aid provisions for steel and shipbuilding often appear as issues of regional or sectoral aid (European Commission, 2003a).

By appealing to strategic considerations, e.g. maintaining home production to safeguard independence, or sociopolitical motives like preservation of employment or regional development, these industries have successfully lobbied for government subsidies, often despite their economic non-viability. This type of state aid is usually referred to as a case of soft budget constraints (SBCs) (Kornai, 1980). Whereas state aid to economically viable enterprises might induce positive welfare effects, the negative welfare effects of SBCs are well documented in the literature: SBCs are believed to cause shortages (Kornai, 1980), to hamper innovation (Qian and Xu, 1998), to prevent the restructuring of firms and an efficient resource allocation (Kornai, 1980; Dewatripont and Roland, 1996), to be detrimental to output (Schaffer, 1989), to economic growth (Huang and Xu, 1999) and to free trade (Everaert and Vandenbussche, 2001).

The purpose of this paper is to look at the decision when declining industries lobby for government support and when they choose to restructure. This decision is modeled in the context of a contributions game where interest groups make contributions to political parties. More specifically, we consider a two-country model, where firms in the declining sector of the home country face a competitive disadvantage as compared with firms in the foreign country.

The former are thus forced to either invest in new technologies or to lobby for subsidies in order to remain active. However, since firms in the growing sector of the home country have to finance these subsidies, they oppose lobbying efforts of the declining sector by lobbying for restructuring the declining industry instead.

Moreover, as the paper considers state aid in the form of SBCs which are known to reduce welfare, we analyse the role of external constraints in restricting uncompetitive practices such as granting SBCs.

To emphasise the endogenous nature of SBCs, special attention is given to the way SBCs enter the model. In fact, we make it a continuous variable and distinguish between the unit level of the subsidy and the proportion of firms that are subsidised. In this respect, we do not embrace the idea that political parties first contribute to buy subsequent government policies as in Grossman and Helpman (1994). The staging of choosing policies and contributions is reversed in this paper, as in Magee et al. (1989).

Thus, the timing of the model can be summarised as follows. In the first stage, two rival political parties each choose their policy programme, i.e. a unit level of restructuring and of subsidisation. Firms in the declining and the growing industry respond to the announced policies by making contributions to political parties. The former lobby for subsidisation in order to escape costly restructuring, the latter lobby for the ailing industry to restructure. More specifically, contributions determine the proportion of firms that are restructured and the proportion that receive government support, for given policy levels. As production is to be sold in the foreign market, the government of the foreign country may decide, in stage three, to levy a countervailing duty on subsidised exports. However, as restructuring leads to ‘true’ competitive advantage, a countervailing duty can only apply in the case of subsidised exports. In the final stage, firms in the home and foreign country play Cournot and sell in the foreign market.

One possible application of the model relates to the existence of SBCs in transition economies. Firms in transition countries inherited an old and obsolete capital stock and inherited production structures were pervasive of distorted incentives and inefficiencies. To be able to face competitive pressure (from) abroad, these firms were urged to engage in deep restructuring and reorganisation (Blanchard, 1997). In many cases, however, firms in transition countries have managed to receive indirect subsidies in the form of SBCs, such as soft credit conditions, tax arrears or arrears on social security contributions (Schaffer, 1998). Hence, when markets in transition countries were opened to trade there was a fear that SBCs could generate international spill-over effects, e.g. when subsidised production was exported to the European Union (EU), as noticed by Everaert and Vandebussche (2001). The response of the EU by levying a number of anti-dumping or countervailing duties on imports from Central and Eastern European Countries (CEECs) might be indicative of this (European Commission, 2000).

An equally possible application of the model could consist of a situation of continued state support to declining or sensitive sectors in advanced market economies such as agriculture, iron and steel, textiles and shipbuilding among others. These industries are typically threatened by a high degree of import competition from lower-wage countries. Even though productivity and technology enhancing restructuring could help these sectors in regaining competitiveness, such reforms are often opposed, partly due to powerful interest groups that

stand up for the industries' interests and lobby for state support or for protective measures. Moreover, high unionisation, high industry concentration and regional importance of ailing industries often go hand in hand with effective lobbying for government involvement. In this respect, farmers' lobbies for instance have been very successful (*supra*), as well as textile lobbies that have obtained prolonged protection through the Multi Fibre Arrangements. An additional danger with raising government protection is the possible postponement of the adoption of new technologies (Matsuyama, 1990; Miyagiwa and Ohno, 2001; Crowley, 2002).

In the remaining of the paper, we will focus on the case of the transition country as our principal example. 'Ailing' or 'declining' industries should then merely be interpreted in terms of (state-owned) firms from under the old regime. Economic viability of these firms is not so much jeopardised because of a shift in international comparative advantage (as is the case in declining industries in advanced market economies), but because of the inherited inefficiencies of the socialist system. In the remaining of the paper, we will use declining, ailing, old, or state-owned sector interchangeably whereas growing, new, or small- and medium-sized firms refer to the competitive firms in the model.

The model conveys several insights. Firstly, even though in the absence of lobbying, subsidisation is always preferable to firms in the declining industry, the cost of lobbying might outweigh the benefit of subsidisation. Hence, it is shown that some firms are willing to restructure, provided profits after restructuring are positive. In particular, the model predicts that, in the declining industry, the proportion of restructured firms exceeds the proportion of subsidised firms. Moreover, in the case where restructuring is not costly at all, it can be shown that lobbying for subsidisation is never interesting, such that firms will opt for complete restructuring. Secondly, the model predicts that the unit level of restructuring is always chosen maximally, whereas the unit subsidy varies with the primitives of the model - the cost of restructuring and the importance attached to welfare considerations when policy decisions are made. Thirdly, comparing the predictions of the model with the decision of a social planner, it is shown that the latter always prefers to impose a policy of maximal restructuring on the entire declining sector. Therefore, allowing for a free political system comes at a cost of lower economic welfare. Fourthly, countervailing tariffs on subsidised exports shift the decision in favour of restructuring, thereby hardening budget constraints. For the relation between transition countries and the EU this means that external constraints, such as countervailing tariffs levied by the EU on subsidised exports from transition countries, might help governments in transition countries to overcome the commitment problem to enforce hard budget discipline. In this way, foreign trade policy can help to impose financial discipline and to promote the restructuring of uncompetitive firms in transition countries, as also found in Everaert and Vandebussche (2001).

The paper links in with several strands of the literature. Firstly, this work is related to the contribution approaches in the political economy of trade policy (Magee et al., 1989; Grossman and Helpman, 1994)<sup>1</sup>. This literature typically deals with the issue of lobbying for pro-trade or pro-protectionist policies in the framework of a small, perfectly competitive economy. Closer to our work are Brainard and Verdier (1994, 1997) who explicitly consider the option of lobbying for restructuring, next to lobbying for tariff protection, but their work

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<sup>1</sup>There is a growing body of literature that empirically tests the contribution approaches for the US. See e.g. Goldberg and Maggi (1999), Baldwin and Magee (2000).

is primarily concerned with explaining the pattern of senescent industry collapse, following a seminal paper by Cassing and Hillman (1986). In this paper, we follow Hillman and Ursprung (1988) in building upon the contributions framework of Magee et al. (1989) but apply the model to the context of transition countries where lobbying takes place over the choice whether to restructure or to subsidise an uncompetitive industry. We do not consider the possibility that CEECs choose to protect uncompetitive industries through raising tariffs, as one of the major pillars of transition notably consisted of trade liberalisation. By 1995 for instance, all CEECs had signed Europe Agreements with the EU, establishing free trade in industrial products with the EU<sup>2,3</sup>. Also in contrast with previous approaches, we consider a model with imperfect competition in an international set-up. To our knowledge, only Moore and Suranovic (1993) have also studied lobbying for subsidisation with imperfect competition on the product market. However, they consider a third-country model and disregard the effects of political competition.

Secondly, our work contributes to the literature on the political economy of transition (Roland, 2000), discussing restructuring and reallocation of resources from the declining (state) sector towards the more productive and growing (private) sector<sup>4</sup>. Even though this literature has the advantage of incorporating dynamic issues, such as the optimal speed of transition and the preferred staging of reforms (Dewatripont and Roland, 1995; Roland, 2000; Castanheira and Roland, 2000), the transition itself is often modeled in a rather mechanical way, disregarding the effects of political opposition to reforms or of lobbying (e.g. Rodrik, 1995). Our paper explicitly allows for political competition between two rival political parties but leaves us within a static framework.

Thirdly, our work bears upon the SBC literature, initiated by the work of Kornai (1980). More specifically, we combine two approaches from the earlier literature that model and explain the existence of SBCs, namely the importance of political considerations (Schleifer and Vishny, 1994) and the inherent endogeneity of the SBC phenomenon (Dewatripont and Maskin, 1995). Schleifer and Vishny (1994) demonstrate how subsidies to public firms (and bribes to politicians) naturally emerge from a bargaining game between politicians and managers. The modeling of their SBC-variable, however, is restricted to the use of an explicit transfer variable. Dewatripont and Maskin (1995) model the incentives for SBCs as a dynamic commitment problem, but again, the subsidy itself is simply modeled as a monetary unit that is given to the firm after defaulting. In contrast, we call upon political economy arguments to explain SBCs, but in a framework where political competition is present and where the SBC is modeled as a *continuous* variable that is decided upon *ex-post*. We do so by endogenously deriving the proportion of firms in the old industry that are restructured or subsidised, after the unit level at which restructuring or subsidisation takes place is set. In other words, the softness of the budget constraint is not decided upon *ex-ante*<sup>5</sup>. Also, this is

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<sup>2</sup>The Europe Agreements aim to establish free trade in industrial products over a gradual, transition period, although the EU opens its markets more quickly than the associated country. Restrictions to free trade appear in only a few sectors, such as agriculture and textiles (European Commission, 2003).

<sup>3</sup>For some political economy explanations of trade policy in CEECs, see e.g. Hillman and Ursprung (1996) and Wunner (1998).

<sup>4</sup>Note that this transition is at the same time often a redirection from production in large enterprises towards a revival of small and medium sized firms.

<sup>5</sup>The idea is somewhat related to the case where governments first decide on the adoption of a rule with

the first paper we know of that models SBCs as a continuous variable, even though Kornai (1980) considered this one of the crucial characteristics of a SBC. Therefore, the model can be interpreted as a novel contribution to the literature on modeling SBCs.

Finally, the paper contributes to the literature on how external constraints can help to overcome time-inconsistent domestic policies. Policy delegation to an independent body has been a typical example of an external constraint in the field of monetary economics (Cukierman, 1992). Other examples are international agreements in the field of trade (see e.g. Staiger and Tabellini, 1999 on GATT) or on environmental protection (see e.g. Conconi and Perroni, 2003). Such agreements can help governments to commit to superior policies that would otherwise not be credible domestically. Analogously, Bertero and Rondi (2000) show how the requirements for joining the European single market disciplined Italian state-owned enterprises in respecting budget limits. We argue here that EU countervailing tariffs against subsidised exports from transition countries can be an equally powerful external constraint to enforce hard budget discipline - something to which domestic politicians from CEECs cannot credibly commit themselves<sup>6</sup>.

The structure of the paper is as follows. In Section II we introduce the model and solve for its subsequent stages by backward induction. Thus, the equilibrium concept we use is subgame perfect Nash equilibrium. We first solve for the benchmark case, i.e. the case where countervailing tariffs are absent. In Section III we introduce countervailing tariffs on subsidised exports and analyse how they affect incentives to lobby for subsidisation. The problem for the social welfare planner is addressed in Section IV. Section V discusses the implications of the model and presents some robustness checks. The final Section concludes.

## 2 The benchmark model

### 2.1 Set-up

In this section we try to shed light on the question whether firms in old industries will choose to restructure or whether they will prefer to get subsidised, and on how much restructuring or subsidisation will take place. We do so by focussing on the effects of political competition and of lobbying with political parties. More generally, the model also presents a novel way to look at SBCs.

To that end, we consider a three-stage model with two countries, a home and a foreign country, and two sectors in the home country, a declining or old sector and a growing or new sector. Firms in the old sector compete with firms from the foreign country, whereas firms in the new sector of the home country produce a different good for local consumption only.

More specifically, we consider a home country e.g. a transition economy, consisting of  $n$  small- and medium-sized enterprises (SMEs) - representing the new sector - and 1 state-owned enterprise (SOE) - representing the old industry. The latter is a normalisation. One can e.g. think of different firms in the old industry to be business units of one and the same larger state-owned company. The SMEs produce a horizontally differentiated good for the

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respect to a certain policy variable and later decide on the level of this policy variable (e.g. Grossman and Maggi, 1997).

<sup>6</sup>This idea has also been put forward in a previous paper by Everaert and Vandebussche (2001).

local home market and each firm makes a positive profit  $\frac{F}{n} > 0$  because free entry in the SME-sector has not yet driven all positive profits down to zero. In an emerging market economy or in a growing industry, this is a plausible scenario. Note also that sector profits  $F$  are completely exogenous in the model. The SOE on the other hand produces for and exports to the foreign market, e.g. the EU<sup>7</sup>. Hence, the old and the new sector of the home country are not competing with one another, neither at home nor abroad. Obviously, other topologies could be envisaged, e.g. where there is competition between the new and the old sector. However, the focus in this paper is on competition between the declining sector and the foreign firm, where the locally producing sector - in case of subsidisation - is taxed to cross-finance subsidies to the ailing industry.

A case of subsidisation might arise, since we assume that the firm in the old industry - because of inherited central planning inefficiencies - has higher marginal costs than the firm in the foreign country. More specifically, the marginal cost in the SOE,  $c$ , once faced with competition (from) abroad, turns out to be prohibitively high, making further production unprofitable. The marginal cost in the foreign country,  $c^f$ , is substantially lower:  $c > c^f$ <sup>8</sup>. Therefore, the SOE needs to restructure or to rely on government subsidies to be able to remain active<sup>9</sup>.

Throughout the model, we assume that both restructuring and subsidisation are two valuable options to make production in the home country's declining sector profitable again. However, we assume that subsidisation is more attractive, since restructuring is costly for firms in the old sector<sup>10</sup>.

We further assume that the decision of whether a firm in the declining sector will be restructured or subsidised, can be influenced by making political contributions. The latter influence the extent to which the policies of the parties in power or the election outcomes are subject to manipulation or subversion.

More specifically, we assume that the government of the home country consists of two rival political parties, a pro-reform party, and a conservative party. The former advocates restructuring whereas the latter favours a policy of subsidisation. Both parties are competing for power. Electoral results are determined both by the voting behaviour of the population and by campaign contributions that are given to political parties. Campaign contributions are important financial resources for political parties and can affect voting behaviour directly or indirectly e.g. by influencing the turn-up rate at the elections<sup>11</sup>. Assume for simplicity

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<sup>7</sup>Given that, for reasons of simplicity, we exclude consumer surplus from the model, a completely analogous result would be obtained if the home country were to import from the foreign country. However, the current set-up is more intuitive when we come to discuss the effects of countervailing tariffs on subsidised exports in Section III.

<sup>8</sup>E.g. despite cheaper labour costs in the foreign transition country,  $w$ , labour productivity in the transition country,  $g(\alpha)$  is so low as to make productivity-adjusted marginal costs higher:  $c > c^f$  where productivity  $g$  is a positive function of the level of restructuring  $\alpha$ . Low labour productivity in the transition country can be due to the presence of an old and obsolete capital stock and inefficient ways of production, as compared with Western production methods. Low product quality further necessitates restructuring.

<sup>9</sup>An alternative to restructuring and subsidisation could be exit. However, this would jeopardise employment in the home country. Therefore, we exclude this possibility.

<sup>10</sup>For other possibilities, see Appendix.

<sup>11</sup>However, explicit modeling of the voting game is beyond the scope of this paper

that employment is equally distributed among the old and the new industry<sup>12</sup> and that, in the absence of campaign contributions, workers always vote for the party that aligns with the interests of the sector in which they are employed. Then both parties have an equal chance of winning the election. Hence, in a representative democracy, each firm in the declining industry faces an equal probability of being restructured or of being subsidised. In other words, 50% of the firms in the ailing industry are restructured and the remaining receive government support. However, in our model, SOEs are not indifferent between restructuring and receiving subsidies. In fact, they prefer the subsidy option over carrying out a costly restructuring programme, since the SOE has to bear the cost of restructuring itself<sup>13,14</sup>. Neither are the firms in the growing segment of the economy indifferent between whether restructuring or subsidisation takes place in the old sector. Since the burden of taxation to finance these subsidies has to be born by the SMEs themselves, the latter strictly prefer the old firms to restructure. Thus, both groups are willing to give campaign contributions to the party they support in order to influence electoral outcomes and subsequently to influence the proportion of firms that are restructured.

Alternatively, contributions to political parties may be made in order to obtain influence over legislative decision-making by politicians in office, i.e. to buy ‘access’ to legislators (Austen-Smith, 1987). Contributions can then be seen as lobbying efforts. Election outcomes, as set out before, then give rise to a situation where the reformist and the conservative party are equally represented in the government. However, government decisions are then still subject to pressure from lobby groups. Such pressure usually comes from interest groups that seek to reinforce their case with an affiliated political party or it comes from the grassroots support of a political party, rather than it involves bribing politicians from rival parties (Austen-Smith, 1987).

Whether contributions directly affect election outcomes or whether they rather affect policy decisions made by elected officials, either interpretation of the role of contributions emphasises that it is the conflict of interest between firms in the growing industry and the uncompetitive firms in the declining sector that drives the contributions game in our model.

Even though subsidisation is assumed to be more attractive to the SOE than costly restructuring, it is shown that from a social welfare point of view<sup>15</sup>, restructuring is always better than subsidisation (see Section IV). Consequently, the presence of subsidised firms is only explained by allowing political economy considerations to exist. These lead to second-best solutions in the model which were disregarded in Everaert and Vandebussche (2001).

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<sup>12</sup>We relax this condition in Section III of the paper. The assumption however does not change the results.

<sup>13</sup>In case the SOE also prefers restructuring over subsidisation, there is no longer any conflict of interest between the SOE and the SMEs. However, we will see that positive contributions are not excluded in this case. For a full discussion, see Appendix.

<sup>14</sup>In a dynamic context, Rodrik (1995) shows that at the onset of transition, workers in SOEs might prefer low or no subsidies to increase their chance of finding a job in the growing private sector of the economy and to increase their wage pay, once they are employed in the private sector. As transition proceeds, however, this no longer holds, and workers in SOEs always prefer high subsidies. The example we take should thus classify under the latter case.

<sup>15</sup>See also Section IV.

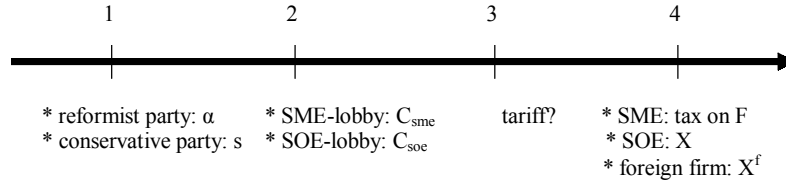


Figure 1: Timing in the model

The timing of the model is depicted in Figure 1 and can be summarised as follows. In the first stage, two rival political parties, a conservative and a reformist party respectively, choose a level of a policy parameter, a unit subsidy  $s$  and a unit level of restructuring  $\alpha$  respectively, taking into account both welfare considerations and politicians’ self-interest motives. One can think of these as announcements of the policies the respective parties want to pursue with respect to the old sector when they come into power. Notice that parties do not pre-commit to a certain budget at this stage. They rather announce that firms that would qualify for subsidisation, should receive e.g. a given subsidy per worker.

Which firms eventually will get subsidised, is determined by lobby activity in stage 2. I.e. contributions determine the proportion of firms in the declining sector that are restructured,  $q$ , respectively subsidised,  $1 - q$ , given the unit levels of restructuring  $\alpha$  and subsidy rates  $s$  at which restructuring and subsidisation takes place.

In the final stage, the old firm in the home country competes with the foreign firm in the foreign market and both firms choose quantities accordingly, i.e. we consider the case of a Cournot duopoly<sup>16</sup>.

The order of stages in the game is motivated by the idea that SBCs should be modeled endogenously and as a continuous variable, i.e. the softness of the budget constraint should not be determined ex-ante. Therefore, the unit level of the subsidy is determined before the proportion of firms, benefiting from this subsidy, is decided upon. One can easily envisage e.g. a subsidisation scheme, initiated by the government, for which some firms automatically qualify but where other firms need to lobby to be entitled to receive the subsidy. Hence, total subsidisation outlays are only known after stage 2. From this point of view, we capture the endogenous and continuous nature of a SBC and use it in our modeling as such.

In what follows, we solve for the benchmark case of the model. In section III, we will introduce countervailing tariffs.

## 2.2 Stage 3: Production

Consider now production decisions in the final stage of the game. The home and the foreign firm produce an identical good for the foreign market and compete in setting quantities. In case the home firm chooses to restructure - a case we denote with case  $q$  - the problem

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<sup>16</sup>Since we choose the marginal cost of the home firm to be such that it drives its market share to zero when faced with competition from the foreign firm, a case of Bertrand competition instead would maybe be intuitive. Higher marginal costs would then automatically lead to the exit of the firm with the higher marginal cost. However, Bertrand competition would equally imply that positive profits are ruled out, such that there is no money left for the lobby groups to contribute to political parties.

amounts to solving

$$\begin{aligned}\max_X \pi &= (P - c_R(\alpha))X - \gamma \frac{\alpha^2}{2} \\ \max_{X^f} \pi^f &= (P - c^f)X^f,\end{aligned}\tag{1}$$

where  $\pi$  and  $\pi^f$  are home and foreign profits respectively and where  $X$  respectively  $X^f$  stand for home and foreign production. Marginal costs after restructuring in the home country are denoted  $c_R(\alpha)$ , i.e. as a negative function of the level of restructuring  $\alpha$ . For simplicity, we assume that restructuring linearly decreases marginal costs of the home firm,  $c$ , in the following way:

$$c_R(\alpha) = c - \alpha.$$

The marginal cost for the foreign producer is denoted  $c^f$ , where  $c^f < c$ . Notice that home profits are reduced by the *total* cost of restructuring  $\gamma \frac{\alpha^2}{2}$ . I.e. investment in new technologies quadratically increases with the intensity of restructuring  $\alpha$ , as in the literature on cost-reducing investment (Brainard and Verdier, 1994; Abel et al., 1996). The parameter  $\gamma$  indicates how costly it is to restructure in general.

Inverse demand is given by

$$P = a - b(X + X^f),$$

where  $P$  is the price of the identical good produced. Without loss of generality (i.e. normalising) we can assume that

$$\begin{aligned}a &= 1 \\ c^f &= 0.\end{aligned}$$

To simplify, we further assume that

$$b = 1.$$

Cournot-Nash solutions to the maximisation problem above yield

$$\begin{aligned}X|_q &= \frac{1 - 2c + 2\alpha}{3} \\ X^f|_q &= \frac{1 + c - \alpha}{3}.\end{aligned}\tag{2}$$

Under the subsidisation regime - a case we denote with  $1 - q$  - the home firm is given a positive subsidy  $s$  to the marginal cost. We consequently solve

$$\begin{aligned}\max_X \pi &= (P - c + s)X \\ \max_{X^f} \pi^f &= (P - c^f)X^f,\end{aligned}$$

yielding

$$\begin{aligned} X|_{1-q} &= \frac{1 - 2c + 2s}{3} \\ X^f|_{1-q} &= \frac{1 + c - s}{3}. \end{aligned} \tag{3}$$

Second order conditions (SOCs) for a maximum are satisfied in both cases.

Now, we assume that productivity in the home country is so low (despite e.g. low labour costs) that no production takes place in the absence of subsidisation or restructuring<sup>17</sup>. This forces the home government to engage in some kind of reform. From (2) and (3), we can hence derive an expression for the home marginal costs, being<sup>18</sup>:

$$\alpha = s = 0 \implies X = \frac{1 - 2c}{3} = 0 \iff c = \frac{1}{2}. \tag{4}$$

Using the result from (4), we resume that, in case  $q$ , this yields optimal choices of  $X$  and  $X^f$ , a price  $P$ , and home profit  $\pi$  being:

$$\begin{aligned} X|_q &= \frac{2\alpha}{3} \\ X^f|_q &= \frac{1.5 - \alpha}{3} \\ P|_q &= \frac{1.5 - \alpha}{3} \\ \pi|_q &= \left(\frac{4}{9} - \frac{\gamma}{2}\right)\alpha^2, \end{aligned} \tag{5}$$

and in case  $1 - q$ :

$$\begin{aligned} X|_{1-q} &= \frac{2s}{3} \\ X^f|_{1-q} &= \frac{1.5 - s}{3} \\ P|_{1-q} &= \frac{1.5 - s}{3} \\ \pi|_{1-q} &= \frac{4s^2}{9}. \end{aligned} \tag{6}$$

Note also that for an interior or boundary solution, we have

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<sup>17</sup>The assumption will not rule out the possibility of zero contributions. Whether or not contributions are given, depends on how attractive subsidisation is to the SOE.

<sup>18</sup>Note that the condition  $X|_{\alpha=s=0} = 0$  places an upper bound to the possible range of values for  $c$ . Given that  $c > c^f$  we also have a supremum. In other words  $c \in ]0; \frac{1}{2}]$ . We relax the assumption that  $c = \frac{1}{2}$  in Section V of the paper.

$$\begin{aligned}
X|_q &\geq 0 \iff c_R(\alpha) \leq \frac{1}{2} \implies \alpha \geq 0 \\
X^f|_q &\geq 0 \iff c_R(\alpha) \geq -1 \implies \alpha \leq \frac{3}{2} \\
X|_{1-q} &\geq 0 \iff s \geq 0 \\
X^f|_{1-q} &\geq 0 \iff s \leq \frac{3}{2}.
\end{aligned}$$

Thus, we will restrict values of  $s$  and  $\alpha$  to the following intervals

$$\begin{aligned}
s &\in [0; \frac{3}{2}] \\
c_R(\alpha) &\in [-1; \frac{1}{2}] \implies \alpha \in [0; \frac{3}{2}] \text{ when } c_R(\alpha) = c - \alpha.
\end{aligned}$$

### 2.3 Stage 2: lobbying

We now look at lobby activity in stage 2 of the model. From expression (6) it is clear that subsidisation is attractive to the ailing industry as it yields positive profits. However, since subsidies are to be financed with taxes on profits from the growing industry, they are not attractive to the latter. Faced with this conflict of interest, firms in the new and the old sector of the home economy each form an interest group. To focus on the main ideas of the paper, we ignore possible free-riding problems associated with the formation of interest groups and simply assume that they lobby in stage 2 of the model with their affiliated political party, i.e. the reformist and the conservative party respectively, to influence the proportion of restructured and subsidised firms in the economy. We also assume that contributions are one-sided and only given to the affiliated political party. I.e. we exclude the possibility of dual contributions and the possibility that the SOE-sector also contributes to the reformist party, not to be subject to restructuring. Analogously, we assume that the SME-sector cannot bribe the members of the conservative party to convince them of the need to restructure. For a discussion, see Austen-Smith (1987) and Magee et al. (1989). The proportion of firms in the declining sector that are restructured is denoted with  $q$ , where  $q$  is related to the contributions  $C_i$ ,  $i = sme, soe$  in the following way<sup>19</sup>:

$$\begin{aligned}
q &= \frac{C_{sme} + \varepsilon}{C_{sme} + C_{soe} + 2\varepsilon} = \Pr[\text{restruct.}] \\
1 - q &= \frac{C_{soe} + \varepsilon}{C_{sme} + C_{soe} + 2\varepsilon} = \Pr[\text{subsid.}].
\end{aligned}$$

We can thus interpret  $q$  as the probability a firm gets restructured or the proportion of firms in the declining sector that are restructured, given the fact that the size of the

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<sup>19</sup>Notice that the levels of  $s$  and  $\alpha$  only affect the propensity to contribute  $C_i$ , but do not affect the probabilities  $q$  and  $1 - q$  directly. This is a difference with the set-up in Magee et al. (1989), but similar to Hillman and Ursprung (1988).

declining sector has been normalised to one. In case election outcomes are a function of campaign contributions,  $q$  can be interpreted as the probability that the reformist party wins the elections, or else, the percentage of seats in parliament this party will obtain. In case contributions buy access to politicians in office,  $q$  reflects the probability that reformist decisions are taken.

Note that we have included a term  $\varepsilon > 0$ , which reflects the ineffectiveness of lobbying, i.e. it represents the difficulty to manipulate or to subvert politicians or election outcomes. Alternatively,  $\varepsilon/2\varepsilon$  represents the importance of the growing sector in the total economy and reflects the proportion of firms that are restructured in the absence of contributions. Note also that including  $\varepsilon$  overcomes mathematical problems in case contributions are both equal to zero.

Using comparative statics we can show that higher contributions of the SME-sector will induce more firms in the SOE-sector to be restructured:

$$\frac{dq}{dC_{sme}} = \frac{C_{soe} + \varepsilon}{(C_{sme} + C_{soe} + 2\varepsilon)^2} > 0.$$

On the other hand, an increase in the contributions of the SOE to the conservative party has a negative effect on the amount of restructuring in the declining sector:

$$\frac{dq}{dC_{soe}} = \frac{-(C_{sme} + \varepsilon)}{(C_{sme} + C_{soe} + 2\varepsilon)^2} < 0.$$

Analogously, the probability a SOE gets subsidised is positively related to the contributions from the SOE, and negatively related to the contributions from the SME-sector:

$$\begin{aligned} \frac{d(1-q)}{dC_{sme}} &= \frac{-(C_{soe} + \varepsilon)}{(C_{sme} + C_{soe} + 2\varepsilon)^2} < 0 \\ \frac{d(1-q)}{dC_{soe}} &= \frac{C_{sme} + \varepsilon}{(C_{sme} + C_{soe} + 2\varepsilon)^2} > 0. \end{aligned}$$

Lobbies of the SME- and SOE-sector are assumed to have the following utility functions (Hillman and Ursprung, 1988, Magee et al., 1989):

$$\begin{aligned} L_{sme} &= -C_{sme} + q[F] + (1-q)[F - sX] \\ L_{soe} &= -C_{soe} + q[(P - c_R)X - \gamma \frac{\alpha^2}{2}] + (1-q)[(P - c + s)X]. \end{aligned}$$

Firms are risk-neutral and face the uncertainty of election outcomes. Therefore their utility consists of expected profits minus outlays for contributions  $C_i$ . In case the SOE restructures, i.e. with a probability  $q$ , cumulative after-tax profits to the SMEs are  $F > 0$ <sup>20</sup>. In case the SOE refrains from restructuring, i.e. with a probability  $1 - q$ , the SME-sector

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<sup>20</sup>Possible spill-over effects from restructuring to the SME sector are analysed in Section V.

has to cross-finance  $sX$  to the SOE. Suppose the SOE restructures, i.e. with a probability  $q$ , profits to the SOE equal  $(P - c_R)X$ , net of the investment cost  $\gamma \frac{\alpha^2}{2}$ . On the other hand, in the subsidisation regime,  $1 - q$ , the SOE benefits from a subsidy  $s$  to the marginal cost, such that profits amount to  $(P - c + s)X$ .

Note that there is an important asymmetry in the model. Whereas the cost of restructuring has to be born completely by the SOE itself and entirely in the only period of production we consider<sup>21</sup>, subsidisation is only costly to the SOE to the extent that the SOE has to contribute  $C_{soe}$  to get subsidised; the subsidies themselves are financed through taxes on profits from the SME sector.

Now, the interest groups maximise their utility by simultaneously choosing contributions accordingly. This amounts to simultaneously solving

$$\begin{aligned} \max_{C_{sme}} L_{sme} \\ \max_{C_{soe}} L_{soe}. \end{aligned}$$

First order conditions (FOCs) are

$$\begin{aligned} \frac{dL_{sme}}{dC_{sme}} &= 0 \\ \frac{dL_{soe}}{dC_{soe}} &= 0, \end{aligned}$$

and give the reaction functions for the contributions:

$$\begin{aligned} RF_{sme} : C_{soe} \mapsto C_{sme} &= -C_{soe} - 2\varepsilon + \frac{1}{2}\sqrt{4A(C_{soe} + \varepsilon)} \\ RF_{soe} : C_{sme} \mapsto C_{soe} &= -C_{sme} - 2\varepsilon + \frac{1}{2}\sqrt{-4B(C_{sme} + \varepsilon)}, \end{aligned}$$

where

$$\begin{aligned} A(\bar{s}) &= s \frac{2s}{3} \\ B(\bar{\alpha}, \bar{\gamma}, \bar{s}) &= \frac{4\alpha^2}{9} - \gamma \frac{\alpha^2}{2} - \frac{4s^2}{9}. \end{aligned}$$

The reaction functions are defined for

$$A > 0; B < 0.$$

Under the same conditions, SOC for a maximum are satisfied. The first condition,  $A > 0$ , is satisfied for positive levels of the subsidy  $s$ , and given the expression (3), for positive

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<sup>21</sup>E.g. there is no subsidy to help the firm restructuring, neither is there the possibility to spread the total cost of restructuring  $\gamma \frac{\alpha^2}{2}$  over several periods where production takes place, as the model features only 1 production stage. A more dynamic set-up of the model would be an interesting extension in this respect.

levels of  $X|_{1-q}$ . Obviously, in case there is no home production, there can no longer be any strategic interactions between the 2 players and the game will collapse. The second condition,  $B < 0$ , implies that we require firms in the declining sector to prefer subsidisation over costly restructuring:

$$\pi|_{1-q} > \pi|_q \iff \frac{4s^2}{9} > \left(\frac{4}{9} - \frac{\gamma}{2}\right)\alpha^2.$$

This is indeed the assumption we have taken at the set-up of the model<sup>22</sup>. We have also assumed that post-restructuring profits should always be positive, i.e. the cost of restructuring should be sufficiently small:

$$\left(\frac{4}{9} - \frac{\gamma}{2}\right)\alpha^2 > 0 \iff \gamma < \frac{8}{9}.$$

This assumption also ensures that restructuring is optimal for social welfare - a view taken in this paper (see Section IV).

Summarising, we solve the model under the condition that

$$\pi|_{1-q} > \pi|_q > 0$$

or

$$0 \leq \frac{8}{9}\left(1 - \frac{s^2}{\alpha^2}\right) < \gamma < \frac{8}{9}. \quad (7)$$

We further restrict ourselves to positive contribution schedules, i.e. functions lie in the first quadrant, provided  $\varepsilon$  is sufficiently small (Appendix).

Comparative statics for the reaction functions are intuitive and are summarised in Table 1. A graphical exposition of the comparative statics is presented in Figures 2 and 3.

From Table 1 and Figures (2) and (3), it is clear that for low values of the contributions, the reaction functions are upward sloping such that contributions are strategic complements, but when contributions are large, the slopes of the reaction functions become negative and contributions become strategic substitutes. The reaction functions thus have an inverse U-shape. This is because at a certain point, the cost of increasing lobbying contributions -  $C_{soe}$  or  $C_{sme}$  respectively - outweighs the benefit of not having to restructure or not having to pay extra taxes respectively.

As for the ineffectiveness of lobbying,  $\varepsilon$ , we see that the reaction functions shift down when the ineffectiveness of lobbying increases. This is a very intuitive result as e.g. with complete ineffectiveness of lobbying, one would expect contributions to be zero.

The cost of restructuring,  $\gamma$ , only enters the reaction function  $C_{soe}$ . Increasing its value leads to an upward shift in the reaction function of the SOE, for a given level of  $C_{sme}$ . Given that subsidisation is already attractive, higher costs of restructuring make the latter option even less popular and encourage the SOE to give higher contributions, to increase

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<sup>22</sup>The reverse case would imply that both the SOE and the SMEs prefer restructuring. There would consequently be no longer any conflict in interest. Therefore, we assume that  $B < 0$ . For a discussion, see Appendix.

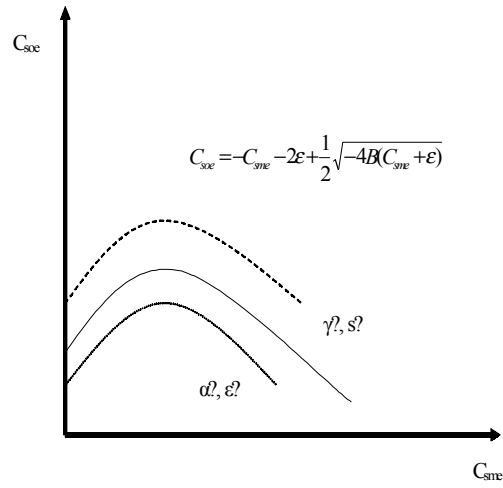


Figure 1: Reaction function  $C_{soe}$

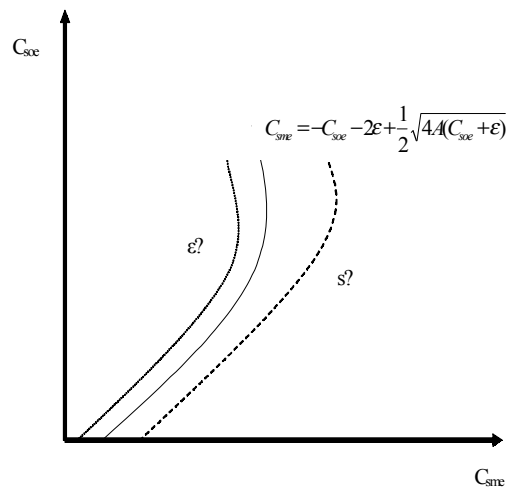


Figure 2: Reaction function  $C_{sme}$

	$C_{sme} = -C_{soe} - 2\varepsilon$ $+ \frac{1}{2}\sqrt{4A(C_{soe} + \varepsilon)}$	$C_{soe} = -C_{sme} - 2\varepsilon$ $+ \frac{1}{2}\sqrt{-4B(C_{sme} + \varepsilon)}$
$\frac{dC_i}{dC_j}$	$> 0 \Leftrightarrow C_{soe} < \frac{s^2}{6} - \varepsilon$	$> 0 \Leftrightarrow C_{sme} < \frac{-B}{4} - \varepsilon$
$\frac{dC_i}{d\varepsilon}$	$< 0$	$< 0$
$\frac{dC_i}{d\gamma}$	$= 0$	$> 0$
$\frac{dC_i}{d\alpha}$	$= 0$	$< 0 \iff \gamma < \frac{8}{9}$
$\frac{dC_i}{ds}$	$> 0$	$> 0$

Table 1: Comparative statics results reaction functions

the probability to get subsidised. In other words, the benefit from not having to restructure always outweighs the cost of extra contributions, for a given level of  $C_{sme}$ .

Similarly, a higher level of restructuring  $\alpha$  causes no change in the reaction function of the SMEs. The SOE however, decreases its contributions in response to increasing levels of  $\alpha$  provided  $\gamma < \frac{8}{9}$ , i.e. if profits after restructuring are positive. This can be understood as follows. As long as the cost of restructuring is not too high,  $\gamma < \frac{8}{9}$ , the marginal benefit of restructuring after total restructuring costs is always positive, rendering restructuring marginally more profitable, even though in absolute terms subsidisation is still the more profitable alternative. In fact, the SOE can save on contributions  $C_{soe}$  whereas at the same time it benefits from *relatively* higher profits after restructuring. This discourages the SOE from lobbying for more subsidisation, for a given level of  $C_{sme}$ .

Finally, given that subsidisation is attractive to the SOE, but not to SMEs, making subsidisation even more attractive to the SOE by increasing  $s$ , will shift the contribution scheme of the SMEs upwards in the hope that fewer firms in the declining sector will benefit from these increasing subsidy rates. This means that the benefit of not having to cross subsidise more to the SOE outweighs the cost of contributing more  $C_{sme}$ . At the same time however, increasing levels of the subsidy rate  $s$  also encourage the SOE to lobby more for this increasingly interesting policy, i.e. benefits from receiving more subsidisation outweigh the cost of lobbying for more subsidisation.

Equilibrium values of the contributions are found at the intersection point of both reaction functions, as shown in Figure 4. Solving for the equilibrium values by substitution, it can be shown that this will always yield at least one real solution (see Appendix). Restricting ourselves to a positive, real solution (see Appendix) yields

$$C_{sme}^* = -\varepsilon - \frac{A^2 B}{(A - B)^2}, \quad (8)$$

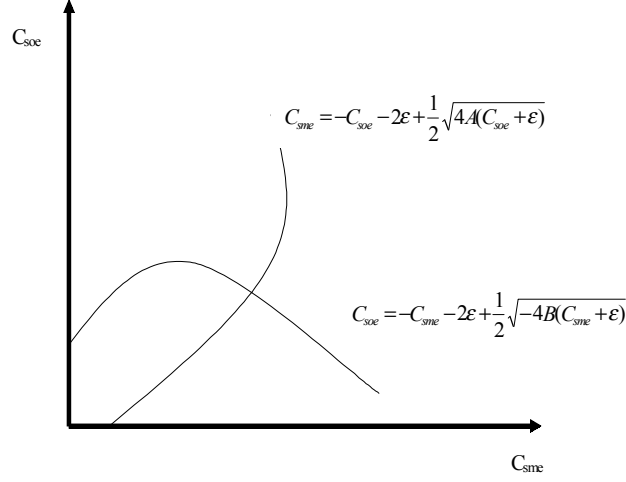


Figure 3: Reaction functions equilibrium

and via the reaction function we also find the solution for  $C_{soe}^*$

$$C_{soe}^* = -\varepsilon + \frac{AB^2}{(A-B)^2}. \quad (9)$$

Provided  $\varepsilon$  is sufficiently small, equilibrium contributions are positive and fall in the first quadrant.

One can show that, at the equilibrium, the slopes of the reaction functions have an opposite sign, i.e.

$$\begin{aligned} \frac{dC_{sme}}{dC_{soe}} \Big|_{C_{soe}^*} &= -1 + \frac{1}{2} \frac{(A-B)}{-B} > 0 \\ &\iff A+B > 0 \\ \frac{dC_{soe}}{dC_{sme}} \Big|_{C_{sme}^*} &= -1 + \frac{1}{2} \frac{(A-B)}{A} < 0 \\ &\iff A+B > 0. \end{aligned}$$

For stability of the equilibrium, this means that we require<sup>23</sup>

$$-\frac{dC_{sme}}{dC_{soe}} \Big|_{C_{soe}^*} * \frac{dC_{soe}}{dC_{sme}} \Big|_{C_{sme}^*} < 1. \quad (10)$$

Given (8) and (9), the expressions for  $q$  and  $1-q$  reduce to

$$\begin{aligned} q &= \frac{A}{A-B} \\ 1-q &= \frac{-B}{A-B}. \end{aligned}$$

<sup>23</sup>The system will oscillate before converging to equilibrium, provided condition (10) holds. This condition can also be found in Moore and Suranovic (1993). For a full exposition, we refer to the Appendix.

	$C_{sme}^* = -\varepsilon - \frac{A^2 B}{(A-B)^2}$	$C_{soe}^* = -\varepsilon + \frac{AB^2}{(A-B)^2}$
$\frac{dC_i^*}{d\varepsilon}$	$= -1$	$= -1$
$\frac{dC_i^*}{d\gamma}$	$> 0 \iff A > -B$	$> 0$
$\frac{dC_i^*}{d\alpha}$	$< 0 \iff \gamma < \frac{8}{9}$	$< 0 \iff \gamma < \frac{8}{9}$
$\frac{dC_i^*}{ds}$	$> 0$	$> 0$

Table 2: Comparative statics equilibrium values

Now, since we assume that  $\gamma < \frac{8}{9}$ , it is easy to see that in equilibrium  $A > -B$  will follow

$$\gamma < \frac{8}{9} \implies \frac{2s^2}{9} > \alpha^2 \left( \frac{\gamma}{2} - \frac{4}{9} \right), \forall \alpha, s \quad (11)$$

such that

$$\gamma < \frac{8}{9} \implies C_{sme}^* > C_{soe}^* \implies q > \frac{1}{2}. \quad (12)$$

In other words, in equilibrium, there will be more restructured firms than state-supported firms. This leads us to the following proposition.

**Proposition 1** *Provided (7) holds, contributions of the SME-sector will always exceed the contributions of the SOE in equilibrium such that more than 50% of the firms in the declining sector will be subject to restructuring.*

The intuition behind this result is recognised by realising that the outside option for the SOE, restructuring, still yields positive profits. This reduces the incentives to make contributions for subsidisation  $C_{soe}$ . On the other hand, incentives to resist high taxes remain very strong for firms in the new sector, since the latter have more to lose from not lobbying. In other words, losers lobby harder, as in Baldwin and Robert-Nicoud (2002)<sup>24</sup>.

Comparative statics for the equilibrium values are summarised in Table 2. Changes in the equilibrium contributions are now due to changes along and of the best-response curves.

Following an increase in the ineffectiveness of lobbying  $\varepsilon$ , both reaction curves shift inward, decreasing equilibrium contributions with one unit. Hence, the more ineffective is the lobbying process, the lower optimal choices of the equilibrium contribution will be.

An increase in the cost of restructuring  $\gamma$ , however, only shifts the reaction function of the SOE upward. Since the reaction function of the SMEs is upward sloping around the equilibrium<sup>25</sup>, the strategic reaction of the SMEs to increasing contributions from the SOE

<sup>24</sup>Baldwin and Rober-Nicoud (2002) rely on asymmetries in effectiveness of lobbying to arrive at a situation where losers lobby harder.

<sup>25</sup>From (11),  $\gamma < \frac{8}{9}$  is a sufficient condition for  $\frac{dC_{sme}^*}{d\gamma} > 0$ .

	$q = \frac{C_{sme} + \varepsilon}{C_{sme} + C_{soe} + 2\varepsilon} = \frac{A}{A-B}$
$\frac{dq}{d\varepsilon}$	$= 0$
$\frac{dq}{d\gamma}$	$< 0$
$\frac{dq}{d\alpha}$	$> 0 \iff \gamma < \frac{8}{9}$
$\frac{dq}{ds}$	$< 0 \iff \alpha > 0; \gamma < \frac{8}{9}$

Table 3: Comparative statics for  $q$

is to equally respond with increased  $C_{sme}$  (strategic complements). This yields an upward shift along the reaction curve of the SMEs and higher contributions for both parties in equilibrium.

Analogously, higher levels of  $\alpha$  only shift the reaction curve of the SOE downward. Since the reaction function of the SMEs is upward sloping around the equilibrium (supra), this yields lower contributions for both parties in equilibrium, provided  $\gamma < \frac{8}{9}$ .

Finally, an increase in the level of the subsidy  $s$  shifts both reaction curves upward and results in an increase in both equilibrium values of the contributions. The autonomous upward shift of the contribution schedule of the SMEs, following an increase in  $s$ , leads to a downward shift of  $C_{soe}$  along the reaction curve of the SOE, as the reaction function of the SOE is downward sloping around the equilibrium<sup>26</sup>. However, at the same time this downward shift of  $C_{soe}$  is compensated by the autonomous upward shift of the contribution schedule of the SOE, which autonomously increases contributions of the SOE and endogenously raises  $C_{sme}$ , reinforcing the autonomous upward movement of  $C_{sme}$  that already took place. Thus, in equilibrium, both contributions are higher.

Remarkably, these comparative statics results always go in the same direction for both equilibrium values, either increasing or decreasing lobby contributions. Ultimately, however, we are interested in which contributions increase the more such that results for  $q$  and  $1 - q$  can be derived. Therefore we calculate comparative statics with respect to  $q$  and  $1 - q$  and summarise them in Table 3.

As changes in the ineffectiveness of lobbying  $\varepsilon$  affect the size of the equilibrium contributions in an identical way, the overall effect on the proportion of firms that are restructured versus subsidised cancels out. This is in line with the intuition.

An increase in the cost of restructuring  $\gamma$  decreases the proportion of restructured firms in equilibrium since the contributions of the SOE will rise more sharply than those of the SMEs. Again, this is a very intuitive result.

Higher levels of restructuring  $\alpha$ , on the other hand, for costs of restructuring sufficiently low, i.e.  $\gamma < \frac{8}{9}$ , give rise to a higher proportion of firms in equilibrium under the restructuring regime. Here, contributions of the SOE decrease more sharply than those of the SMEs.

<sup>26</sup>From (11),  $\gamma < \frac{8}{9}$  is a sufficient condition for  $\frac{dC_{soe}}{dC_{sme}} \Big|_{C_{sme}^*} < 0$ .

Finally, the relation between the proportion of restructured firms and the level of the subsidy is negative. The increase of the contribution by the SOE is stronger than the increase of the contribution by the SME-sector, such that, on average, more firms will escape restructuring.

We summarise the comparative statics results in the following propositions:

**Proposition 2** *The ineffectiveness of lobbying  $\varepsilon$  influences the propensity to contribute, but has no effect on the proportion of firms restructured.*

**Proposition 3** *A higher cost of restructuring  $\gamma$ , i.e. lower profitability of restructuring, unambiguously prevents more firms from being restructured.*

**Proposition 4** *Higher levels of restructuring  $\alpha$ , provided the cost of restructuring is not sufficiently low ( $\gamma < \frac{8}{9}$ ) encourage more firms to restructure. In case costs of restructuring are very high ( $\gamma > \frac{8}{9}$ ), a policy of deep restructuring (Blanchard, 1997) will not be credible, i.e. with  $\gamma > \frac{8}{9}$ , in equilibrium, fewer firms will choose the restructuring regime when  $\alpha$  increases.*

**Proposition 5** *Higher levels of the subsidy decrease the proportion of restructured firms.*

## 2.4 Stage 1: choosing policy levels

In the first stage, political parties choose policy levels. Suppose political parties not only care about maximising general welfare, but also about their chance of re-election (Magee et al., 1989)<sup>27</sup>. Utility functions of political parties  $U_{ref}$  and  $U_{con}$  are then a weighted average of total welfare in the home country,  $W$ , and of the probability of re-election,  $q$  and  $1 - q$  respectively. The parameter  $\vartheta$  indicates the relative importance of the self-interest motive in politicians' decisions. This parameter  $\vartheta$  is enclosed in  $[0; +\infty[$ . Home welfare  $W$  consists of home profits only, since consumption takes place in the foreign country. We thus have to find solutions to

$$\begin{aligned}
\max_{\alpha} U_{ref}(q, W) &= \vartheta q + W \\
&= \vartheta q + q[F + (\frac{4}{9} - \frac{\gamma}{2})\alpha^2] \\
&\quad + (1 - q)[F - \frac{2s^2}{9}] \\
\max_s U_{con}(1 - q, W) &= \vartheta(1 - q) + W \\
&= \vartheta(1 - q) + q[F + (\frac{4}{9} - \frac{\gamma}{2})\alpha^2] \\
&\quad + (1 - q)[F - \frac{2s^2}{9}].
\end{aligned}$$

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<sup>27</sup>In Magee et al. (1989) political parties only care about their chance of re-election.

FOCs are

$$\begin{aligned}\frac{dU}{d\alpha} &= \vartheta \frac{dq}{d\alpha} + \frac{dq}{d\alpha} \left[ \left( \frac{4}{9} - \frac{\gamma}{2} \right) \alpha^2 \right] + q \left[ \left( \frac{8}{9} - \gamma \right) \alpha \right] + \frac{dq}{d\alpha} \left[ \frac{2s^2}{9} \right] \\ &= 0 \\ \frac{dU}{ds} &= -\vartheta \frac{dq}{ds} + \frac{dq}{ds} \left[ \left( \frac{4}{9} - \frac{\gamma}{2} \right) \alpha^2 \right] + \frac{dq}{ds} \left[ \frac{2s^2}{9} \right] + (1-q) \left[ -\frac{4s}{9} \right] \\ &= 0.\end{aligned}$$

It is easy to see that the solution for  $\alpha$  will be given by

$$\alpha^* = \frac{3}{2},$$

given that  $\alpha$  is restricted in  $\alpha \in [0; \frac{3}{2}]$ , and that

$$\frac{dq}{d\alpha} > 0,$$

and

$$\frac{dW}{d\alpha} > 0 \quad \text{with} \quad \gamma < \frac{8}{9}.$$

Thus, the choice of the policy parameter of the reformist party is not influenced by the relative weight of welfare considerations, neither by the choice of the policy programme of the conservative party. We summarise this in the following proposition.

**Proposition 6** *Independent of  $\vartheta$  and of  $s$ , the level of restructuring is chosen maximally.*

Since  $\alpha^*$  and  $s^*$  are simultaneously set in the first stage and given the above proposition, we can continue to solve for  $s^*$  by considering:

$$\left. \frac{dU_{con}}{ds} \right|_{\alpha^* = \frac{3}{2}} = 0.$$

Restricting the solutions to be positive and to satisfy  $A > 0; B < 0$ , we have the following solution to  $s^{*28}$ , provided  $\frac{8}{9} - \frac{16}{27}\vartheta < \gamma < \frac{8}{9}$ :

$$s^* = \frac{3}{20} \sqrt{40 - 45\gamma + 5\sqrt{-729\gamma^2 + 1296\gamma - 576 - 540\gamma\vartheta + 480\vartheta}}.$$

This can be interpreted as follows. Provided costs of restructuring  $\gamma$  are not too low, there will be an optimal level of subsidy that maximises politicians' utility  $U_{con}$ . For very low costs of restructuring, however, subsidisation and lobbying for subsidisation will no longer be interesting anymore, such that conservative politicians would also favour restructuring, eliminating all competition on the political market. It can be noted, however, that in the case of transition economies, costs of restructuring were significant, given the old inherited capital stock and the low quality of the products sold. The case where  $\frac{8}{9} - \frac{16}{27}\vartheta < \gamma < \frac{8}{9}$  is consequently the only relevant one. SOCs for a maximum are also satisfied. We summarise our result for  $s^*$  in the following proposition.

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<sup>28</sup>At the equilibrium values  $\alpha^*$  and  $s^*$ , condition (10) for stability of the contributions equilibrium, is always satisfied for sufficiently high values of  $\vartheta$  ( $\vartheta > 1.94$ ). For lower values of  $\vartheta$  ( $\vartheta < 1.94$ ), we also require that  $\gamma > \frac{984 - 596\vartheta + 64\sqrt{2}\vartheta}{1107}$ , which is a slightly stricter condition than  $\gamma > \frac{8}{9} - \frac{16}{27}\vartheta$ .

**Proposition 7** *Provided restructuring is sufficiently costly, an optimal level of the subsidy will be found that satisfies  $A > 0$  and  $B < 0$ . However, when restructuring is not very costly, the optimal level of the subsidy will be zero and complete restructuring will take place.*

Two special cases for  $s^*$  stand out. Firstly, in the case where  $\vartheta = 0$ , i.e. when politicians maximise social welfare  $U_{con} = W$ , the choice of  $s^*$  will involve zero levels of the subsidy (see Section IV). However, this eliminates all competition on the political market. Both parties will be in favour of maximal restructuring. This is in fact the solution of a social welfare planner (see section IV).

Secondly, the case where political parties care only about their self-interest, i.e. for  $\vartheta \rightarrow +\infty$  and  $U_{con} = 1 - q$ , the choice of  $s^*$  is given by  $\lim_{\vartheta \rightarrow +\infty} s^*(\vartheta)$ . This expression goes to infinity for  $\gamma < \frac{8}{9}$ , but since choices of  $s$  are restricted to yield non-negative production levels, the subsidy will be chosen to maximally, i.e.  $s^* = \frac{3}{2}$ . Alternatively, it is easy to show that, given  $\alpha^* = \frac{3}{2}$

$$\frac{d(1-q)}{ds} \Big|_{\alpha^*=\frac{3}{2}} > 0, \forall \gamma < \frac{8}{9},$$

and therefore, subsidy levels will also be chosen maximally, i.e.

$$s^* = \frac{3}{2},$$

provided they do not squeeze SME profits below zero:

$$F \geq s^* X |_{1-q, s^*}.$$

In case

$$F < s^* X |_{1-q, s^*}$$

the optimal choice of subsidy level will be constraint by the tax-raising capacity of the SME-sector (Rodrik, 1995) and will yield

$$s^{**} < s^* \text{ s.t. } s^{**} X |_{1-q, s^{**}} = F.$$

### 3 Countervailing tariffs

In the previous section, we have concentrated on explaining the main characteristics of our model and presented it as a new way of modeling SBCs. Given that SBCs are believed to be negative for economic welfare, we analyse in this section whether external constraints, such as countervailing duties, can help to promote restructuring and harder budget constraints.

Therefore, we now introduce an additional stage in the model (see Figure 1) where the foreign government may decide to levy countervailing duties  $t$  on subsidised imports and we look at how this affects the propensity to contribute and the proportion of firms that are subsidised. I.e. countervailing duties may alter the incentives in the home country to lobby for subsidisation. Restructuring, however, is assumed to lead to ‘true’ competitive

advantage and the WTO rules out the use of countervailing measures in this case. The results for restructuring from section II therefore continue to hold unchanged. Home profits under the subsidisation regime, however, are now

$$\pi |_{1-q} = (P - c + s - t)X.$$

Solutions for the production stage in case of subsidisation are

$$\begin{aligned} X |_{1-q,t} &= \frac{2s - 2t}{3} \\ X^f |_{1-q,t} &= \frac{1.5 - s + t}{3} \\ P |_{1-q,t} &= \frac{1.5 - s + t}{3} \\ \pi |_{1-q,t} &= \frac{4(s - t)^2}{9}. \end{aligned}$$

The foreign government may choose a countervailing tariff against subsidised exports, i.e. in case  $1 - q$ . This tariff is chosen to maximise foreign welfare  $W^f$ <sup>29</sup> that consists of foreign profits  $\pi^f = (P - c^f)X^f$ , tariff revenue  $tX$  and - given that consumption takes place in the foreign market - also consumer surplus  $(X + X^f)^2 \frac{1}{2}$ . The problem is thus the following:

$$\begin{aligned} \max_t W^f(t, s) &= (P - c^f)X^f + tX + (X + X^f)^2 \frac{1}{2} \\ &= \frac{(t - s + 1.5)^2}{9} + t \frac{-2t + 2s}{3} + \frac{(-t + s + 1.5)^2}{18}. \end{aligned}$$

This results in a tariff rate

$$t^* = \frac{0.5 + s}{3}.$$

SOCs for a maximum are satisfied.

The less than proportional reaction of  $t^*$  to  $s$  is immediately clear since

$$\frac{dt^*}{ds} = \frac{1}{3}.$$

Substituting this result back into the results from stage 4 in case  $1 - q$  yields

$$\begin{aligned} X |_{1-q} &= \frac{-1 + 4s}{9} \\ X^f |_{1-q} &= \frac{5 - 2s}{9} \\ P |_{1-q} &= \frac{5 - 2s}{9} \\ \pi |_{1-q} &= \left(\frac{4s - 1}{9}\right)^2. \end{aligned}$$

---

<sup>29</sup>If the tariff entirely closes the the gap, created by the introduction of a subsidy, i.e.  $s = t$ , all incentives to lobby for subsidisation will disappear and restructuring will be the best way to go, provided  $\gamma < \frac{8}{9}$  makes restructuring attractive indeed.

without tariff		with tariff
$X _{1-q} = \frac{2}{3}s$	$>$	$X _{1-q} = \frac{4s-1}{9}$
$\pi _{1-q} _{1-q} = \frac{4}{9}s^2$	$>$	$\pi _{1-q} = (\frac{4s-1}{9})^2$
$RF : C_{soe} \longrightarrow C_{sme}$	$>$	$RF : C_{soe} \longrightarrow C'_{sme}$
$RF : C_{sme} \longrightarrow C_{soe}$	$>$	$RF : C_{sme} \longrightarrow C'_{soe}$
$q = \frac{A}{A-B}$	$<$	$q' = \frac{A'}{A'-B'}$

Table 4: Comparing the Baseline model with the Countervailing Regime

The results for the lobbying in stage 2 continue to hold, but now, we define  $A'$  and  $B'$  as

$$A' = s \frac{4s-1}{9}$$

$$B' = \frac{4\alpha^2}{9} - \gamma \frac{\alpha^2}{2} - (\frac{4s-1}{9})^2.$$

and compare both regimes, for given levels of  $s$  in Table 4.

Given that, for given levels of  $s$  and  $\alpha$ , the proportion of firms that are restructured under the tariff regime  $q'$  is higher than when countervailing tariffs are absent  $q$ , countervailing tariffs act as a constraint on the size of the subsidised sector. We summarise this in the following proposition.

**Proposition 8** *Countervailing tariffs induce more firms to restructure and fewer firms to get subsidised.*

In other words, the countervailing tariff will endogenously enforce more restructuring to take place - something which is also beneficial for total welfare in the home country. Remarkably, this result comes about when the foreign government acts fully in its own interest, optimising its own social welfare. I.e. it simultaneously acts favourable to the home country as well given that this country cannot credibly commit to imposing hard budget discipline.

Finally, to be able to compare total outlays for subsidisation under the two regimes, with and without a tariff, we also need to find the solution to  $s^*$  in the former case. The total subsidy budget consists of the unit subsidy  $s^*$  multiplied by the number of production units  $X|_{1-q,s^*}$ , times the proportion of firms that are subsidised  $(1-q)|_{s^*,\alpha^*}$ . It is easy to show that in the countervailing regime, the optimal solution for  $\alpha^*$  is found at  $\frac{3}{2}$ , as in the benchmark case. However, to find the optimal solution to  $s^*$  we need to rely on numerical simulations. Figures 5 and 6 compare total subsidy outlays  $s^*X|_{1-q,s^*}(1-q)|_{s^*,\alpha^*}$  under the two regimes for different values of  $\gamma$  and  $\vartheta$ . The relative weight of politicians' self-interest motive versus their concern for general welfare, i. e.  $\vartheta$ , is indicated on the X-axis. The

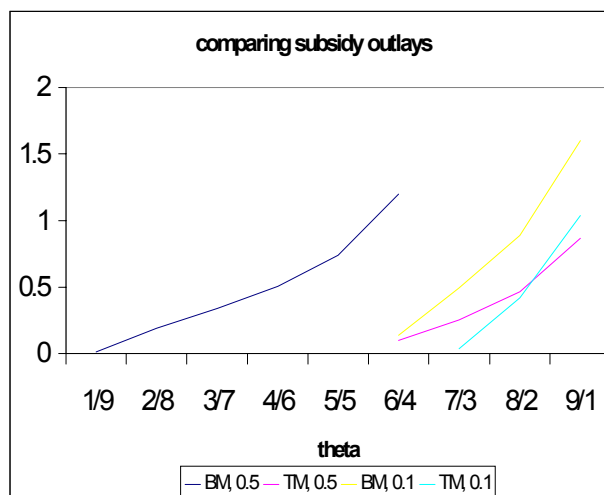


Figure 4: Total subsidy outlays,  $\gamma = 0.1; 0.5$

abbreviations BM and TM refer to results from the benchmark model and the tariff model respectively. The value for  $\gamma$  is specified after the comma.

Notice that  $s^*$  is not defined for all combinations of  $\vartheta$  and  $\gamma$ , something we have also encountered in the benchmark model. Comparing total subsidy spending under the two regimes for values of  $\gamma$  and  $\vartheta$  where  $s^*$  is defined leads us to an even stronger conclusion than proposition 8. Not only are the proportion of subsidised firms lower under the countervailing regime for given levels of  $s$ ; also at optimal levels of  $s^*$  total subsidisation outlays are lower in the presence of countervailing tariffs. We summarise this in the following proposition.

**Proposition 9** *Countervailing duties restrict the total budget on subsidisation.*

This shows that an external constraint, such as EU trade policy, can help to harden budget constraints in transition countries, as found in Everaert and Vandebussche (2001). Hardening of budget constraints both works via promoting restructuring in uncompetitive firms, as well as through restricting the total budget spending on subsidisation.

## 4 The Social Planner

We now discuss the implications for social welfare and look at the cost of political competition (freedom) compared with the outcomes in the case policies are decided and implemented by a (dictatorial) social planner<sup>30</sup>. More specifically we compare

$$W|_q = F + (P - c^R(\alpha))X - \gamma \frac{\alpha^2}{2} = F + \frac{4\alpha^2}{9} - \gamma \frac{\alpha^2}{2},$$

<sup>30</sup>Note that a (dictatorial) social planner is not subject to lobby behaviour and that we thus can leave out the contributions in calculating aggregate welfare.

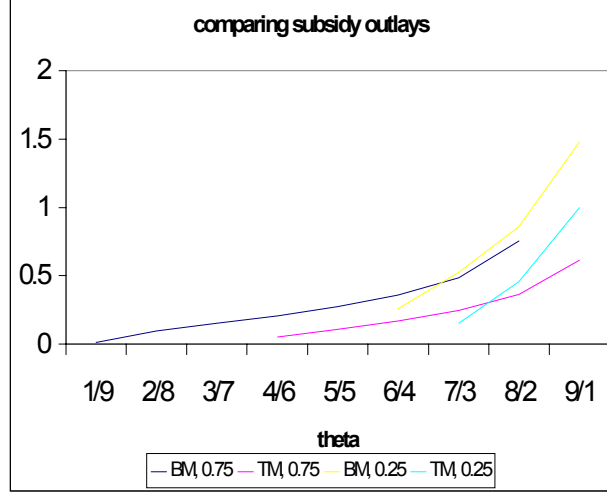


Figure 5: Total subsidy outlays,  $\gamma = 0.75; 0.25$

and

$$W|_{1-q} = F - sX + (P - c + s)X = F - \frac{2s^2}{3} + \frac{4s^2}{9} = F - \frac{2s^2}{9},$$

where it is easy to see that

$$W|_q > W|_{1-q}, \forall s > 0, \gamma < \frac{8}{9}.$$

Moreover, we can show that

$$\frac{dW}{d\alpha} > 0 > \frac{dW}{ds}.$$

The following proposition summarises this result.

**Proposition 10** *The social welfare planner prefers to impose a maximal restructuring policy on the entire declining sector of the economy.*

We can interpret this result by noticing that SBCs are never welfare-enhancing, whereas more restructuring is always welfare-improving. This will induce the social planner to choose a maximal restructuring policy.

## 5 Discussion and Extensions

In this section we further discuss some extensions of the model and perform some robustness checks with respect to the model set-up and the assumptions. We discuss how we can interpret the softness of the budget constraint within this framework.

## 5.1 The SBC interpreted

The model developed above, allows for the SBC to be endogenously determined as the total outlays for subsidisation in the economy will ultimately depend on the contributions of the SME-lobby and the SOE-lobby and the announced policy  $s^*$ . Given the fact that, without contributions, firms face an equal probability of being subsidised versus restructured, i.e.  $q = 1 - q = \frac{1}{2}$ , we take  $S$  to be a measure for the softness of the budget constraint

$$S = s^* X |_{1-q, s^*} [(1 - q) - \frac{1}{2}] = s^* X |_{1-q, s^*} (\frac{1}{2} - q).$$

Given the result from Proposition 1,

$$S < 0.$$

As a corollary of this approach, our SBC variable is also continuous. This is a nice feature of our model, since - according to Kornai (1980) - this should be an essential characteristic of a SBC variable. To our knowledge, this is the first study that combines continuity together with endogeneity and political elements in a model of SBCs.

In an extensive survey on SBCs, Mitchell (2000, p.66) describes SBCs as a situation in which a firm is ‘*allowed to continue operating even though its assets would yield a greater return in an alternative use*’. Since we have shown in the previous section that aggregate welfare is higher under complete restructuring, the definition applies to our model as well.

## 5.2 The assumptions:

### 5.2.1 Comparative Advantage

In the framework above, we have assumed that  $c = \frac{1}{2}$  and that  $c > c^f$ . Moreover,  $c$  was chosen to be prohibitively high such that  $X |_{s=\alpha=0} = 0$ . Relaxing this constraint, i.e.  $0 < c < \frac{1}{2}$ , will make the restructuring outcome less likely. To see why, notice that the relative magnitudes of the probabilities  $q$  and  $1 - q$  are crucially dependent on the relative magnitudes of  $A$  and  $-B$  ( $q = \frac{A}{A-B}$ ;  $1 - q = \frac{-B}{A-B}$ ). With  $c = \frac{1}{2}$ , we have shown (Section II) that  $A > -B, \forall s \in ]0; \frac{3}{2}[$  and  $\gamma < \frac{8}{9}$ . With  $c < \frac{1}{2}$  a sufficient condition for  $A > -B$  is to look at the threshold  $s^\tau$  for which  $A > \pi |_{1-q}$ , since we assume that  $\gamma < \frac{8}{9}, \pi |_q > 0$ . In other words,

$$A > \pi |_{1-q}$$

assures that

$$A > -B$$

Therefore

$$\begin{aligned} A > \pi |_{1-q} &\iff s \frac{(1 - 2c + 2s)}{3} > \frac{(1 - 2c + 2s)^2}{9} \\ &\iff s^t = 1 - 2c; 0 < c < \frac{1}{2} \end{aligned}$$

This means that lower marginal costs increase the threshold for  $s$  for  $A$  to exceed  $-B$ , as  $A$  will only exceed  $-B$  if  $s \in ]s^\tau; \frac{3}{2}[$ , i.e. this makes  $A > -B$  less likely, and consequently, decreases the probability of firms being restructured. This leads to the following proposition:

**Proposition 11** *The proportion of subsidised firms will be higher when comparative disadvantage with the competing country is smaller, for a given level of  $s$ <sup>31</sup>.*

We can interpret this result by noting that for lower levels of the marginal cost, a small subsidy is sufficient to be fully competitive with the other producer. The tax burden on the SME-sector - which increases quadratically with increasing  $s$  - will therefore be relatively low, compared to costs of restructuring and thus the probability that  $-B > A$  will be higher.

### 5.2.2 Population and industry distribution

In the above analysis, we have implicitly assumed that 50% of the population favours subsidisation and that the other 50% is in favour of restructuring in absence of any contributions. This could be because the SME-sector and the SOE-sector create equal proportions of employment and output in the economy. Consequently, employees in the SMEs vote in favour of restructuring whereas the workforce in the SOE vote for subsidisation, as long as there is no lobby activity. This yields voting outcomes  $q = 1 - q = \frac{1}{2}$  in the absence of contributions.

Now, assume the SME-sector only represents 20% of total economic activity, whereas the SOE is responsible for the remaining 80% of production and employment. How does this affect our results?

Note first that probabilities over restructuring and subsidisation will be affected accordingly, i.e. in the absence of contributions, 20% of economic activity in the SOE-sector will be subject to restructuring, whereas the other 80% of production will be subsidised:

$$\begin{aligned} q &= \frac{C_{sme} + \varepsilon}{C_{sme} + C_{soe} + 5\varepsilon} \\ 1 - q &= \frac{C_{soe} + 4\varepsilon}{C_{sme} + C_{soe} + 5\varepsilon}. \end{aligned}$$

For the reaction functions, this means we now have

$$\begin{aligned} C_{sme} &= -C_{soe} - 5\varepsilon + \frac{1}{2}\sqrt{4A(C_{soe} + 4\varepsilon)} \\ C_{soe} &= -C_{sme} - 5\varepsilon + \frac{1}{2}\sqrt{-4B(C_{sme} + \varepsilon)}. \end{aligned}$$

Except for a level change, this does not affect our results.

Equilibrium values are now

$$\begin{aligned} C_{sme}^* &= -\varepsilon - \frac{A^2 B}{(A - B)^2} \\ C_{soe}^* &= -4\varepsilon + \frac{AB^2}{(A - B)^2}. \end{aligned}$$

Again, there is only a level change in the value of  $C_{soe}^*$  and other results are unaffected. Again, if  $A = -B \implies q = \frac{1}{2}$  and results go through. However, the entire tax-absorbing capacity of the SMEs could be smaller in case their share in the economy is relatively small. Effects of this kind, can however also be analysed in the framework presented above.

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<sup>31</sup>More precisely, we have  $c_1 < c_2 < \frac{1}{2} \implies \int_0^{\frac{3}{2}} P[1 - q > q] ds |_{c_1} > \int_0^{\frac{3}{2}} P[1 - q > q] ds |_{c_2}$

### 5.2.3 Spill-over effects of restructuring to the SME-sector

Suppose restructuring efforts in the declining sector not only benefit the growing sector indirectly by relieving its tax burden, but also by directly increasing profits by an amount  $\delta \frac{\alpha^2}{2}$ , i.e. proportionally to the amount of restructuring carried out by the SOE. The parameter  $\delta$  captures the strength of these spill-over effects<sup>32</sup>. This profit increase could take place because of a better resource allocation in the economy after restructuring, or because of decreased labour overstaffing and decreased demand for other inputs such as energy and raw materials, since after restructuring they are now used in a more efficient way<sup>33</sup>. These inputs are consequently more cheaply available for the growing sector in the economy, increasing its profits.

Including spill-over effects into the lobby utilities yields:

$$\begin{aligned} L_{sme} &= -C_{sme} + q[F + \delta \frac{\alpha^2}{2}] + (1 - q)[F - sX] \\ L_{soe} &= -C_{soe} + q[(P - c_R)X - \gamma \frac{\alpha^2}{2}] + (1 - q)[(P - c + s)X]. \end{aligned}$$

Equilibrium contributions are completely analogous

$$\begin{aligned} C_{sme}^* &= -\varepsilon - \frac{A''^2 B}{(A'' - B)^2} \\ C_{soe}^* &= -\varepsilon + \frac{A'' B^2}{(A'' - B)^2}, \end{aligned}$$

but now

$$A'' = s \frac{2s}{3} + \delta \frac{\alpha^2}{2}.$$

Assuming spill-over effects to the SME-sector are strictly positive, i.e.  $\delta > 0$ , it is easy to see that, for given levels of  $\alpha$  and  $s$ , more firms will be restructured, since

$$A'' > A > -B$$

Note also that the comparative statics results will be affected accordingly, as we now have  $\frac{dA}{d\alpha} \neq 0$ .

Alternatively, one could argue that positive spill-over effects only manifest themselves after considerable restructuring effort and that small restructuring efforts or one-sided reforms generate even adverse spill-over effects. In our specification, this would imply for instance that we have

$$A''' = s \frac{2s}{3} + \delta_1 \frac{\alpha^2}{2} + \delta_2 \alpha \quad \text{where} \quad \delta_2 < 0 < \delta_1$$

These kind of specifications however greatly complicate the comparative statics results. We therefore have opted for a simple specification where spill-over effects are assumed to be non-existent.

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<sup>32</sup>In a way, this term can be considered as the counterpart of the cost of restructuring  $\gamma \frac{\alpha^2}{2}$  by the firm in the declining sector.

<sup>33</sup>Notice that Kornai (1980) precisely identified SBCs as the cause of perpetual shortages in socialist economies. It was a situation where supply could not keep pace with demand.

### 5.2.4 Bertrand competition

For a discussion, see footnote 16.

## 6 Conclusion

In this paper we developed a political-economy framework to analyse a firm's choice between investing in new technologies and lobbying for state support. We did so by developing a two-country, two-sector model with political competition between a reformist and a conservative party. Lobby groups in our model try to affect policy outcomes by contributing to political parties, which in turns determines the relative proportion of restructured versus subsidised firms. However, the levels of restructuring and subsidy levels are chosen in a previous stage by the respective parties, as in Magee et al. (1989). This approach was taken to emphasise the endogenous nature of state aid to firms, especially if we consider state support to firms under the form of soft budget constraints. The model led to several insights. Firstly, it was shown that firms in the declining industry face a trade-off between the cost of lobbying and the benefit from being subsidised, as the former might outweigh the latter. In particular, the model predicts that, in the declining industry, the proportion of restructured firms exceeds the proportion of subsidised firms. Secondly, it was shown that the unit level of restructuring is always chosen maximally, whereas the unit subsidy varies with the primitives of the model. Thirdly, the solution of the model involves too much subsidisation: a social welfare planner chooses for complete restructuring. Therefore, allowing for political competition comes at a cost of lower economic welfare. Fourthly, countervailing tariffs on subsidised exports shift the decision in favour of restructuring and restrain total budget spending on subsidisation, thereby hardening budget constraints. Thus, the model shows that external constraints such as countervailing tariffs can help to establish internal financial discipline.

The paper also leaves some issues unaddressed. Further research could try to explicitly incorporate dynamic issues in the model, either by repeating the stage game of the model or by allowing for different production periods. Other possible routes to explore are to give the foreign country also the option to restructure or to make the cost of restructuring  $\gamma$  dependent on the level of restructuring  $\alpha$ . Finally, a case where firms receive subsidies to support ongoing restructuring efforts could also be envisaged.

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## Appendix:

### A Benchmark case: $\pi|_{1-q} > \pi|_q > 0$

#### A.1 Conditions for reaction functions to fall at least partially in positive quadrant

- Deriving the reaction functions from the FOCs  $\frac{dL}{dC_i} = 0$  gives rise to solving a second order equation. The solutions for the reaction functions used above refer to only 1 root of this equation, i.e. the positive one. The other root involves reaction functions in the negative quadrant. I.e. in fact we have

$$\begin{aligned} C_{sme} &= -C_{soe} - 2\varepsilon \pm \frac{1}{2}\sqrt{4A(C_{soe} + \varepsilon)} \\ C_{soe} &= -C_{sme} - 2\varepsilon \pm \frac{1}{2}\sqrt{-4B(C_{sme} + \varepsilon)} \end{aligned}$$

Since we want to restrict the solution of the Nash equilibrium in contributions to positive values, we rule out the possibility of

$$\begin{aligned} C_{sme} &= -C_{soe} - 2\varepsilon - \frac{1}{2}\sqrt{D_{sme}} \\ C_{soe} &= -C_{sme} - 2\varepsilon - \frac{1}{2}\sqrt{D_{soe}} \end{aligned}$$

and we have only reaction functions left that are possibly positive for some values of the other lobby's contributions.

- The reaction function of  $C_{sme}$  exhibits positive values if

$$\begin{aligned} -C_{soe} - 2\varepsilon - \sqrt{4A(C_{soe} + \varepsilon)} &> 0 \\ C_{soe}^2 + (4\varepsilon - A)C_{soe} + 4\varepsilon^2 - A\varepsilon &< 0 \end{aligned}$$

Since the coefficient of  $C_{soe}^2$  is positive, if the second order equation has no roots,  $C_{soe}^2 + (4\varepsilon - A)C_{soe} + 4\varepsilon^2 - A\varepsilon < 0$  will never be satisfied. Therefore, we need

$$\begin{aligned} D &= A^2 - 4A\varepsilon > 0 \\ \frac{A}{4} &> \varepsilon \end{aligned}$$

i.e.  $\varepsilon$  needs to be sufficiently small. We then have  $C_{sme} > 0 \iff C_{soe} \in ]\frac{-(4\varepsilon - A) - \sqrt{D}}{2}; \frac{-(4\varepsilon - A) + \sqrt{D}}{2}[$ . Since  $-(4\varepsilon - A) + \sqrt{D} > 0 \iff -4\varepsilon + A + \sqrt{D} > 0$  for small values of  $\varepsilon$ , the reaction function will lie in the positive quadrant I indeed (and not in quadrant II where  $C_{soe} < 0, C_{sme} > 0$ ).

- The reaction function of  $C_{soe}$  exhibits positive values if, completely analogously,  $\varepsilon < \frac{-B}{4}$  and  $C_{soe} > 0 \iff C_{sme} \in ]\frac{-(4\varepsilon+B)-\sqrt{D}}{2}; \frac{-(4\varepsilon+B)+\sqrt{D}}{2}[$ . With  $-(4\varepsilon+B) + \sqrt{D} > 0 \iff -4\varepsilon - B + \sqrt{D} > 0$  for small values of  $\varepsilon$ , the reaction function will lie in the positive quadrant where both  $C_{soe}, C_{sme} > 0$ .

## A.2 Conditions for existence of intersection of the reaction function: equilibrium

Substitution of the reaction function  $C_{soe}$  into  $C_{sme}$  gives rise to solving a second order equation in  $C_{sme}$ .

$$\frac{(A-B)^2}{A^2}C_{sme}^2 + (8\varepsilon\frac{(A-B)^2}{A^2} + 4B)C_{sme} + 4\varepsilon^2\frac{(A-B)^2}{A^2} + 4\varepsilon B = 0$$

Solutions exist when the discriminant is positive. Since the discriminant equals  $16B^2$  there will always be at least one real solution.

$$C_{sme}^* = \frac{-\varepsilon(A-B)^2 - A^2B}{(A-B)^2}; -2\varepsilon$$

Solutions will intersect once in the positive quadrant, and once in the negative quadrant. Restricting ourselves to a positive solution yields

$$C_{sme}^* = \frac{-\varepsilon(A-B)^2 - A^2B}{(A-B)^2} = -\varepsilon - \frac{A^2B}{(A-B)^2}$$

and via the reaction function  $C_{soe}^*$ .

$$\begin{aligned} C_{soe}^* &= \varepsilon + \frac{A^2B}{(A-B)^2} - 2\varepsilon + \sqrt{-B(-\varepsilon - \frac{A^2B}{(A-B)^2} + \varepsilon)} \\ &= -\varepsilon + \frac{A^2B}{(A-B)^2} + \left| \frac{AB}{(A-B)} \right| \\ &= -\varepsilon + \frac{A^2B}{(A-B)^2} - \frac{AB}{(A-B)} \\ &= -\varepsilon + \frac{AB^2}{(A-B)^2} \end{aligned}$$

## A.3 Conditions for existence and stability of the equilibrium: alternative approach

Interpret the reaction functions as a (dynamic) system of difference equations:

$$\begin{aligned} C_{sme,t} &= -C_{soe,t-1} - 2\varepsilon + \frac{1}{2}\sqrt{4A(C_{soe,t-1} + \varepsilon)} \\ C_{soe,t} &= -C_{sme,t-1} - 2\varepsilon + \frac{1}{2}\sqrt{-4(C_{sme,t-1} + \varepsilon)B} \end{aligned}$$

To write this into matrix notation, do a linear approximation (Taylor expansion) around the intersection point  $C_{sme}^*, C_{soe}^*$  which gives

$$\begin{aligned} C_{sme,t} &= C_{sme}^* + \frac{dC_{sme,t}}{dC_{soe,t-1}} \Big|_{C_{soe}^*} (C_{soe,t-1} - C_{soe}^*) \\ &= x + ricocsme * C_{soe,t-1} - ricocsme * y \\ C_{soe,t} &= C_{soe}^* + \frac{dC_{soe,t}}{dC_{sme,t-1}} \Big|_{C_{sme}^*} (C_{sme,t-1} - C_{sme}^*) \\ &= y + ricocsoe * C_{sme,t-1} - ricocsoe * x \end{aligned}$$

which is of the form

$$u_t = Au_{t-1} + b$$

and can easily be rewritten subtracting  $u^* = Au^* + b$  as

$$z_t = Az_{t-1}$$

A solution to  $u_t = Au_{t-1} + b$  exists if  $(I - A)^{-1}$  exists, i.e. if  $\det(I - A) \neq 0$ .

$$\det(I - A) \neq 0 \iff ricocsme * ricocsoe \neq 1$$

Stability is guaranteed if the characteristic roots  $\lambda_i$  associated with  $\det(A - \lambda I) = 0$  are  $|\lambda_i| < 1$ .

$$\begin{aligned} \det(A - \lambda I) = 0 &\iff \lambda = \pm \sqrt{-ricocsme * ricocsoe} \\ |\lambda_i| < 1 &\iff -ricocsme * ricocsoe < 1 \end{aligned}$$

where we have oscillating behaviour towards reaching stability:

$$z_t = 2(\sqrt{-ricocsme * ricocsoe})^t * \left\{ (c_1 \cos(t\frac{\pi}{2}) - c_2 \sin(t\frac{\pi}{2})) \begin{bmatrix} 1 \\ 0 \end{bmatrix} - (c_2 \cos(t\frac{\pi}{2}) + c_1 \sin(t\frac{\pi}{2})) \begin{bmatrix} 0 \\ \frac{\sqrt{-ricocsme * ricocsoe}}{ricocsme} \end{bmatrix} \right\}$$

where  $c_1, c_2$  relate to the initial values at time  $t = 0$ , i.e. relate to  $z_0$  where our dynamic system starts.

#### A.4 Conditions for equilibrium values to be positive

- for  $C_{sme}^*$

$$\begin{aligned} C_{sme}^* &= -\varepsilon - \frac{A^2 B}{(A - B)^2} \\ &> 0 \iff \varepsilon < \frac{-A^2 B}{(A - B)^2} \end{aligned}$$

	$C_{sme} = -C_{soe} - 2\varepsilon + \frac{1}{2}\sqrt{4A(C_{soe} + \varepsilon)}$	$C_{soe} = -C_{sme} - 2\varepsilon + \frac{1}{2}\sqrt{-4B(C_{sme} + \varepsilon)}$
$\frac{dC_i}{dC_j}$	$= -1 + \frac{\frac{2s^2}{3}}{\sqrt{4A(C_{soe} + \varepsilon)}}$ $> 0 \Leftrightarrow C_{soe} < \frac{s^2}{6} - \varepsilon$	$= -1 + \frac{-\left(\frac{4\alpha^2}{9} - \gamma\frac{\alpha^2}{2} - \frac{4s^2}{9}\right)}{\sqrt{-4(C_{sme} + \varepsilon)B}}$ $> 0 \Leftrightarrow C_{sme} < \frac{-B}{4} - \varepsilon$
$\frac{dC_i}{d\varepsilon}$	$= -2 + \frac{\frac{2s^2}{3}}{\sqrt{4A(C_{soe} + \varepsilon)}}$ $< 0 \Leftrightarrow \varepsilon > \frac{-s^2}{24} - C_{soe}$	$= -2 + \frac{-\left(\frac{4\alpha^2}{9} - \gamma\frac{\alpha^2}{2} - \frac{4s^2}{9}\right)}{\sqrt{-4(C_{sme} + \varepsilon)B}}$ $< 0 \Leftrightarrow \varepsilon > \frac{-B}{16} - C_{sme}$
$\frac{dC_i}{d\gamma}$	$= 0$	$= \frac{(C_{sme} + \varepsilon)\alpha^2/2}{\sqrt{-4(C_{sme} + \varepsilon)B}}$ $> 0$
$\frac{dC_i}{d\alpha}$	$= 0$	$= \frac{-(C_{sme} + \varepsilon)\left(\frac{8}{9} - \gamma\right)\alpha}{\sqrt{-4(C_{sme} + \varepsilon)B}}$ $< 0 \Leftrightarrow \gamma < \frac{8}{9}$
$\frac{dC_i}{ds}$	$= \frac{\frac{4s}{3}(C_{soe} + \varepsilon)}{\sqrt{4A(C_{soe} + \varepsilon)}}$ $> 0$	$= \frac{\frac{8s}{9}(C_{sme} + \varepsilon)}{\sqrt{-4(C_{sme} + \varepsilon)B}}$ $> 0$

Table 5: Comparative statics results reaction functions

- for  $C_{soe}^*$ .

$$C_{soe}^* = -\varepsilon + \frac{B^2 A}{(A - B)^2}$$

$$> 0 \Leftrightarrow \varepsilon < \frac{AB^2}{(A - B)^2}$$

## A.5 Comparative statics, reaction functions

See Table 5.

## A.6 Comparative statics, equilibrium values

See Table 6.

	$C_{sme}^* = -\varepsilon - \frac{A^2 B}{(A-B)^2}$ $A = s \frac{2s}{3}$	$C_{soe}^* = -\varepsilon + \frac{AB^2}{(A-B)^2}$ $B = \frac{4\alpha^2}{9} - \gamma \frac{\alpha^2}{2} - \frac{4s^2}{9}$
$\frac{dC_i^*}{d\varepsilon}$	$= -1$ $< 0$	$= -1$ $< 0$
$\frac{dC_i^*}{d\gamma}$	$= \frac{A^2(A+B)}{(A-B)^3} \frac{\alpha^2}{2}$ $> 0 \iff A > -B$	$= \frac{-\alpha^2 B A^2}{(A-B)^3}$ $> 0$
$\frac{dC_i^*}{d\alpha}$	$= \frac{(-A-B)A^2(\frac{8}{9}-\gamma)\alpha}{(A-B)^3}$ $< 0 \iff \gamma < \frac{8}{9} \implies A > -B$	$= \frac{2A^2 B(\frac{8}{9}-\gamma)\alpha}{(A-B)^3}$ $< 0 \iff \gamma < \frac{8}{9} \implies A > -B$
$\frac{dC_i^*}{ds}$	$= \frac{\frac{8s}{9}A(A^2+3B^2+AB)}{(A-B)^3}$ $> 0$	$= \frac{\frac{-4s}{9}B(3AB+4A^2+3B^2)}{(A-B)^3}$ $> 0$

Table 6: Comparative statics equilibrium values

## A.7 Comparative statics, $q$

Remark first that

$$\begin{aligned} \left. \frac{\partial q}{\partial C_{sme}^*} \right|_{C_{sme}^*} &= \frac{1}{A} > 0 \\ \left. \frac{\partial q}{\partial C_{soe}^*} \right|_{C_{soe}^*} &= \frac{1}{B} < 0 \end{aligned}$$

Since  $A > -B$ ,

$$\left| \left. \frac{\partial q}{\partial C_{sme}^*} \right|_{C_{sme}^*} \right| < \left| \left. \frac{\partial q}{\partial C_{soe}^*} \right|_{C_{soe}^*} \right|$$

i.e. increasing  $C_{soe}^*$  at the equilibrium has a stronger (negative) effect on  $q$  than increasing  $C_{sme}^*$  has (in the positive direction). Also, since

$$\begin{aligned} A &= A(\bar{s}) \\ B &= B(\bar{s}, \bar{\alpha}, \bar{\gamma}) \end{aligned}$$

$\left. \frac{\partial q}{\partial C_{sme}^*} \right|_{C_{sme}^*}$  and  $\left. \frac{\partial q}{\partial C_{soe}^*} \right|_{C_{soe}^*}$  vary with the value of  $s$ ,  $\alpha$ , and  $\gamma$ .

## B Case: $\pi|_q > \pi|_{1-q} > 0$

### B.1 Stage 2: Contributions

Suppose  $B = 0$ , i.e.  $\pi|_q - \gamma \frac{\alpha^2}{2} > \pi|_{1-q}$ . This means that restructuring is now also the preferable policy to the SOE<sup>34</sup>. The ‘inherent’ incentive to contribute has thus changed.

<sup>34</sup>For instance, because  $\gamma < 0$ .

	$q = \frac{C_{sme} + \varepsilon}{C_{sme} + C_{soe} + 2\varepsilon} = \frac{A}{A-B}$
$\frac{dq}{d\varepsilon}$	$= 0$
$\frac{dq}{d\gamma}$	$= \frac{\alpha^2}{2} \frac{-A}{(A-B)^2}$ $< 0$
$\frac{dq}{d\alpha}$	$= \frac{\alpha A (\frac{8}{9} - \gamma)}{(A-B)^2}$ $> 0 \iff \gamma < \frac{8}{9} \implies A > -B$
$\frac{dq}{ds}$	$= \frac{4}{9} \frac{s}{(A-B)^3} (-2A^2 - AB + 3B^2)$ $< 0 \iff \alpha > 0; \gamma < \frac{8}{9}$

Table 7: Comparative statics for q

Note that the ‘inherent’ incentive is related to the proportion of the population preferring a restructuring policy. This incentive used to be

$$q|_{C_{i,j}=0} = \frac{\varepsilon}{2\varepsilon}.$$

Now, since both the SMEs and the SOE prefer restructuring,

$$q|_{C_{i,j}=0} = \frac{2\varepsilon}{2\varepsilon} = 1.$$

Moreover, since there is no longer any conflict in interest, no contributions will be given, i.e.  $C_{i,j}^* = 0$ . I.e.  $L_{i,j}$  is maximised for  $C_{i,j}^* = 0$ .

## B.2 Stage 1: policy levels

Since

$$q \neq q(\alpha, s)$$

politicians’ utility is now maximised at

$$\begin{aligned} \frac{dW}{d\alpha} &> 0 \implies \alpha^* = \frac{3}{2} \\ \frac{dW}{ds} &= 0 \implies s^* \in [0; \frac{3}{2}] \end{aligned}$$

## C Case: $\pi|_q = \pi|_{1-q} > 0$

### C.1 Stage 2: contributions

Suppose  $B = 0$ , i.e.  $\pi|_q - \gamma \frac{\alpha^2}{2} = \pi|_{1-q}$ . This could be because  $\gamma = 0$ . We can take 2 assumptions here.

#### C.1.1 Only restructuring takes place

In this case, we are back in the case where restructuring is strictly preferable.

### C.1.2 50% of the SOE gets restructured, the other gets subsidised

It is immediately clear that an incentive to contribute on the part of the SMEs will continue to exist in this case.

Again, taking into account the ‘inherent’ incentive to restructure,  $q$  should be defined

$$q|_{C_{i,j}=0} = \frac{3\varepsilon}{4\varepsilon}$$

Lobby utility  $L_{soe}$  will be maximised for the SOE at  $C_{soe}^* = 0$ , but an explicit incentive to contribute will exist on the part of SMEs. They maximise their utility

$$L_{sme} = -C_{sme} + \frac{3\varepsilon + C_{sme}}{4\varepsilon + C_{sme}}F + \frac{\varepsilon}{4\varepsilon + C_{sme}}\left(F - \frac{2}{3}s^2\right)$$

at

$$C_{sme}^* = \begin{cases} -4\varepsilon + \sqrt{\frac{2}{3}\varepsilon}s & \varepsilon < 2\sqrt{6}s \\ 0 & \varepsilon > 2\sqrt{6}s \end{cases}$$

## C.2 Stage 1: policy levels

We solve for the 2 assumptions taken.

### C.2.1 Only restructuring takes place

In this case, we are back in the case where restructuring is strictly preferable.

### C.2.2 50% of the SOE gets restructured, the other gets subsidised

For the reformist party, we again have

$$\max_{\alpha} U_{ref} \implies \alpha^* = \frac{3}{2}.$$

The conservative party faces the analogous problem

$$\max_s U_{con}.$$

We solve for both the case where  $C_{sme}^* = -4\varepsilon + \sqrt{\frac{2}{3}\varepsilon}s$  and where  $C_{sme}^* = 0$ . This corresponds with the case where  $\varepsilon$  is small, respectively large.

In the latter case, with  $\varepsilon$  is large,  $s^* = 0$ . The intuition behind this result is that, since contributions are zero,  $q$  and  $1 - q$  are not a function of  $s$ , such that  $U_{con}$  is maximised where  $W$  reaches a maximum. This is at the lowest possible level of  $s$ .

In the case where  $\varepsilon$  is small,  $C_{sme}^* > 0$ . As  $\frac{d(1-q)}{ds} < 0$  in this case and  $W$  a concave function, we find for low values of  $\vartheta$  a non-negative solution for  $s^*$ . On the other hand, with  $\vartheta$  high, the sign of  $\frac{d(1-q)}{ds}$  dominates. this results in  $s^* = 0$ . Summarising

$$s^* = \begin{cases} 0 & \varepsilon > 2\sqrt{6}s \\ \sqrt{\frac{9}{2}(-\vartheta + 1 - \frac{9}{8}\gamma)} & \varepsilon < 2\sqrt{6}s; \vartheta < 1 \end{cases}$$