National Champion versus Foreign Takeover

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ABSTRACT

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We analyze an oligopolistic market where a domestic and a foreign firm are engaged in a takeover battle for a domestic competitor. Any merger or acquisition (M&A) must be approved by a welfare maximizing domestic competition agency which may or may not be prone to "economic patriotism". A patriotic government does not (fully) count wealth of domestic shareholders as relevant producer surplus if this wealth has been generated by selling a domestic firm abroad. We show that globalization (decreasing transport costs) has a different impact on the equilibrium ownership structure of that industry, depending on the type of government. With an unbiased competition agency we find that the foreign takeover is more likely to occur the higher the level of trade openness is. However, when the domestic government is biased we find that globalization reinforces the case for promoting national champions. This may explain why some countries have recently spent considerable effort to deter foreign attempts to acquire domestic firms.

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1) Introduction

Governments in several countries are striving to defend domestic firms against acquisition attempts from abroad. For example, the French government has heavily opposed the announced takeover of the electricity and gas company *SUEZ* by the Italian competitor *ENEL*, in order to prevent a buyout of national assets by a foreign corporation. The government instead favoured a merger of *SUEZ* with the national firm *GAZ DE FRANCE* (GdF), which would create a "national champion" and one of the largest gas providers worldwide with headquarters based in France. Other recent examples include the *EON/Endesa*-case, where Spanish competition authorities were accused of "economic patriotism" by the European Commission for being excessively tough against the German prospective buyer *EON*, or the case of *DUBAI PORTS*, where the US government has spent considerable effort to deter a foreign acquisition of harbours on the East coast. Contemplating these and similar cases, it seems that the aversion against foreign takeovers, and the desire to promote national champions got stronger in recent years – parallel to (or maybe as a reaction against) a general and ongoing trend of falling trade barriers and globalization. At the same time there is hard evidence that cross-border M&A have been growing worldwide over the last decades.[1] Globalization thus seems to have an ambiguous effect: Overall, it coincides with an increasing importance of cross-border takeovers, but at least in some countries it also fuels economic patriotism when it comes to large scale takeovers. In this paper we offer a possible explanation for this ambiguity.

We set up an oligopoly model where two domestic firms and one foreign firm compete on the domestic market. The foreign firm may produce more efficiently, i.e. at lower unit costs than the national firms, but it faces transport costs for servicing the market. Starting from this initial situation we consider a three-stage game. In the first stage firms negotiate about changes in the ownership structure through M&A. In particular, the foreign firm wants to acquire one of the domestic firms in order to improve its market access; alternatively, the two domestic firms may merge to become a national champion that captures market shares from the foreign competitor. These two alternatives represent the relevant possibilities in many real world cases: Should *SUEZ* merge with *GdF*, or should it be taken over by the foreign corporation *ENEL*? This stage of the game is equivalent to an auction for the target firm, where the foreign corporation must outbid the other domestic firm. In case of a successful foreign bid, shareholders of the target firm generate wealth from selling a domestic asset abroad.

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[1] Cross-border M&A have always been the most dominant form of foreign direct investment, far more important than greenfield FDI. In the late 1980s, for example, the share of cross-border mergers over total FDI inflows among developed countries was roughly 77 per cent. For the period 1998-2001 this share has increased to almost 90 per cent. International mergers also account for a substantial and growing share among all (national and international) M&A activities (see UNCTAD 2005)

In the second stage a domestic competition agency is involved that has to approve any type of M&A. The agency aims at national welfare maximization, but it adheres to a welfare measure that may or may not include a bias against the foreign acquisition.[2] Specifically, we think of an unbiased government as one that fully accounts for the actual takeover price in its decision whether or not to approve the foreign acquisition. Since the owners of the target firm are domestic citizens, their wealth is fully counted as national welfare – even if that wealth comes from selling a domestic firm abroad. A biased or "patriotic" government may, on the other hand, account differently for this type of takeover wealth in its welfare evaluation of the different merger options. It may only interpret operating profits of active national firms as relevant producer surplus, but not (or at least not fully) the price that owners of the target firm have received from abroad. By applying a restrictive definition of producer surplus, which discounts, limits or even disregards the welfare significance of wealth that has been generated by selling national firms, the agency effectively builds up a hurdle for the foreign takeover.

The following welfare trade-off arises: Domestic consumers would benefit from the foreign takeover, because the newly created MNE can avoid transport costs, and this effect is partly passed on to consumers through lower prices. Yet, the downside is that profits of the MNE do no longer accrue inside the domestic country, but at the foreign headquarter location. In the case where the national champion is formed all profits stay entirely domestic. The foreign acquisition, thus, implies a buyout of producer surplus, which seems to be one major concern of governments in the real world. This profit loss can be compensated with the takeover price that is transformed into wealth of shareholders of the target firm. But if the government is biased and discounts the welfare significance of this wealth, this compensation can be too small, so that the profit buyout effectively dominates the consumer gain which is associated with the foreign takeover. Quite naturally, we find that a foreign takeover is less likely to emerge in equilibrium the more patriotic the domestic government is.

Yet, our main and less obvious finding is that the resulting type of M&A depends crucially on the degree of trade openness, and that globalization (trade integration) has a different impact depending on whether or not the government is biased against foreign acquisitions.

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[2] One main reservation against a foreign acquisition of a domestic firm is the fear that tangible and intangible assets (such as technological knowledge, "trade secrets", etc.) become accessible for foreign competitors. The newly created MNE may no longer maintain relations with local inputs suppliers, may restructure production differently than in the case of a national merger, which can imply mass layoffs of domestic workers etc. There is ample evidence for a nationalistic bias in industrial policy, e.g. in the areas of public procurement (see Brülhart and Trionfetti, 2001), where governments usually argue that they seek to maintain control over strategically important key industries. In the model we introduce the notion of economic patriotism with a distributive flavour, since the patriotic government discounts the significance of income/wealth of domestic citizens who have sold national assets abroad. That is, the government is not necessarily "leftist" (biased against profits of shareholders in general), but it fully accounts for profits as long as these profits arise in a domestic firm.

In the case of an unbiased government we find that higher levels of trade openness make national mergers less and foreign takeovers more likely, consistent with the recent surge in cross-border M&A as observed in the data. However, when considering a biased ("patriotic") government we obtain the opposite result. The formation of a national champion is preferable at high levels of trade openness, but not necessarily at low levels. Globalization tends to reinforce the case for promoting the national champion in this environment. This may potentially explain why governments in some countries, which tend to be prone to economic patriotism, have increasingly spent effort to deter foreign takeover recently.

1.1. Related literature

Our paper is related to two different strands of literature. Firstly, it is related to the general IO literature on mergers and coalition formation in oligopolistic industries that assumes closed economies. We go beyond the traditional merger analysis by Salant et al. (1983) and Deneckere and Davidson (1985) that has neglected conscious bargaining by firms faced with several coalition options. We explicitly model a takeover battle between the foreign and one domestic firm for the domestic acquisition target. The non-cooperative auction that is used in this paper is somewhat simpler than the approach taken in the influential paper by Horn and Persson (2001a), who have modelled M&A as a cooperative game of coalition building. Our approach is actually closer related to Inderst and Wey (2004), who consider a takeover game among symmetrical firms where one firm is the pre-designated acquisition target. They emphasize the ability of the target firm to reap the takeover gains from the bidders. Below we analyze the case where one domestic firm is pre-designated as the acquisition target, but we also consider the case where the two domestic firms are equally attractive acquisition targets.

The second related literature addresses aspects of mergers in open economies. The high policy relevance of the debate about national champion versus foreign takeovers is not well reflected, because international economics has strongly focused on the trade-off between exports and greenfield FDI (a recent example is Helpman et al 2004), but devoted relatively little attention to cross-border M&A (Neary 2007). The relatively few contributions that address mergers in the context of open economies do usually not ask if countries have an incentive to deter foreign takeovers, and if there is a welfare argument for promoting large scale national mergers.

Horn and Persson (2001b) apply their general approach of merger formation to a two-country model where four symmetrical firms (two in each country) compete in Cournot fashion subject to cross-border transport costs. Firms in their model can freely negotiate about building

any coalition structure, except for a monopoly. Horn and Persson find that trade integration tends to make cross-border mergers more likely as compared to the formation of national mergers. We obtain a consistent result for the case of an unbiased domestic government, but this leaves open the question why the national champion debate has become so prominent in many countries recently.[3] Furthermore, the setup in this paper is different, because we do not consider merger formations with symmetrical firms and countries, but we rather focus on the case with one asymmetric foreign competitor that seeks to improve market access.

Neary (2007) embeds cross-border mergers into a general equilibrium model with oligopolistic competition and shows how trade integration can trigger merger waves across countries, but he does not contrast national vs. international mergers.

A similar setup as in the present paper is studied by Huck and Konrad (2004). In their benchmark model there are two firms in one country, whereas the second country hosts only one firm. Their focus lies, however, on the interrelation between mergers and strategic trade policy. A national merger in the first country may be formed in the anticipation that export subsidies are paid to the large corporation, but not to the single firms prior to M&A. They do not consider national vs. international mergers at different stages of trade integration.

Finally, Nocke and Yeaple (2007), Norbäck and Persson (2007) and Bjorvatn (2004) present models where the foreign firm(s) can use various modes of market access, cross-border M&A, greenfield FDI, or traditional exports. Norbäck and Persson (2007) emphasize that one important reservation against foreign acquisitions (particularly in transition economies) is that takeover prices for domestic firms may be "too low". This concern also plays an important role in our model, but we place it in the context of the debate about national versus cross-border mergers which is not analyzed in that paper. Nocke and Yeaple (2007) use a model of monopolistic competition with heterogeneous firms, and do not analyze the strategic interactions in the takeover battle that are in the centre of this paper.

The rest of this paper is organized as follows: We present the basic model in section 2. In section 3 we solve the model for the equilibrium ownership structure that arises in different specific environments, and we study the effects of trade integration. Section 4 concludes.

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[3] Building on a simplified version of Horn and Persson's approach, Haufler and Nielsen (2007) and Suedekum (2006) show how adding a third market where only consumers but no firms are located introduces aspects of "strategic competition policy", where mergers are a vehicle of redirecting profits from the world market into the country bloc. Haufler and Nielsen neglect transport costs, whereas Suedekum (2006) finds a general dominance of international over national mergers due to the "tariff jumping" motive of cross-border M&A. Hence that model also does not offer an explanation why national champions have become more prominent recently.

2) The model

We consider a setup with three firms. Entry is restricted. Each firm possesses an intangible and non-reproducible asset like managerial skill which is needed to produce at all in that industry. Firms 1 and 2 are symmetrical, and its shareholders are located in the domestic country "H". Firm 3 and its shareholders are located in some outside country. In an initial situation the ownership structure is such that all three firms act independently.

In common with most of the literature we assume that firms produce a homogeneous commodity and compete non-cooperatively in Cournot fashion. We show below that all main results remain robust, however, under Bertrand competition where firms produce heterogeneous goods. Competition takes place on the market H only, which is populated by a huge mass of consumers. For the domestic firms 1 and 2 unit costs of production are constant and normalized to one. The foreign firm 3 has unit production costs $0 < c \leq 1$. That firm also faces "iceberg" transport costs for servicing the domestic market: from every unit shipped to H only a fraction $0 < g < 1$ arrives. The parameter g represents the level of trade openness, capturing all sorts of trade impediments. Effective marginal costs for the foreign firm are, thus, $c/g > 0$.

Starting from this initial situation, we consider a three-stage game:

First stage: Shareholders of the three firms negotiate about M&A

Second stage: The domestic government has to approve any change in the ownership structure

Third stage: Firms compete again non-cooperatively à la Cournot on the product market.

We focus our attention on two possible ownership structures that may emerge:

1.) The formation of a national champion through an alliance of the two domestic firms.

2.) A takeover of *one* national firm by the foreign competitor.

These two alternatives represent the relevant possibilities in several real world examples. We do not consider the case that one of the domestic firms tries to buy the foreign competitor, and we rule out by assumption that all three firms merge to a monopoly.[4] Also we will assume that both types of M&A give rise to sufficiently strong "synergy effects", i.e. reductions in

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[4] A simple justification why we do not consider an acquisition of the foreign firm 3 is that competition takes place only on market H. I.e., the foreign firm seeks to improve its market access and to avoid transport costs. Neither firm 1 nor firm 2 has a market access motive. The grand coalition (e.g. through a takeover of both domestic firms by the foreign corporation) is typically ruled out in the literature on cross-border mergers (e.g. in Neary 2007; Fridolfsson and Stennek 2005; Horn and Persson 2001b). One justification is that the domestic government would never tolerate a monopoly on the domestic market.

post-merger production costs, so that any constellation with a merger is clearly superior to the initial situation without any M&A.[5] This assumption, which is clarified formally below, allows us to focus on the comparison between national and cross-border mergers. It can also be defended by referring to many real world cases: Once a takeover battle is launched, it is often no longer considered conceivable that no merger takes place and firms just stay independent. *Which* of the two types of M&A emerges as the equilibrium ownership structure depends crucially on (i) the takeover price that is determined in the first stage, (ii) the precise objective function of the domestic government. By placing it in the second stage of the game we assume that the government is not directly involved in, but only acts *after* the firms' negotiations. The government also has no active policy tools (like subsidies) available in order to sponsor specific types of M&A. The role of the government is rather to react to firms' proposals regarding a change in the ownership structure and to make a decision whether to approve this change or not. In this sense the government in our model acts like a passive competition agency. Below we will consider different cases for the government's objective function, and different specific environments that prevail in the first stage of the game.

In the remainder of this section we derive the non-cooperative outcomes in the third stage of the game for the three possible ownership structures that exist in this model (no M&A, national champion, international takeover of one domestic firm).

2.1. Initial situation without M&A

To obtain closed form solutions we assume that demand in country H is linear and given by

$$p = a - b \cdot H \qquad\qquad a > 2, b > 0 \qquad\qquad (1)$$

p denotes the price, and $H = x_1 + x_2 + g \cdot x_3$ is the total consumption of the commodity. This consists of the domestic production by firms 1 and 2 (x_1, x_2), and the production of the foreign firm net of transport losses ($g \cdot x_3$). The three independently acting firms solve the following profit maximization problems by choosing, respectively, quantities x_1, x_2 and x_3

$$Max\ \pi_i = \left(a - b\left(x_i + x_j + g \cdot x_3\right)\right) \cdot x_i - x_i \qquad i, j = 1, 2;\ i \neq j \qquad (2)$$

$$Max\ \pi_3 = \left(a - b\left(x_1 + x_2 + g \cdot x_3\right)\right) \cdot g \cdot x_3 - c \cdot x_3 \qquad\qquad (3)$$

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[5] The assumption of general synergy effects in production is needed to deal with the well known "merger paradox" that arises in models of Cournot competition. From the seminal analysis by Salant et al. (1983) we know that mergers under Cournot competition are typically not profitable for the participants in absence of synergy effects, but that only the outsider firm would gain (see also Farrel and Shapiro 1990). By focussing on profitable mergers we also circumvent issues of strategic, or "preemptive" mergers that are studied by Fridolfsson and Stennek (2005),

This is a standard asymmetrical Cournot game that yields the following Nash equilibrium quantities (x_i), price (p) and profits (π_i) that are superscripted with "*pre*" to highlight that they pertain to the situation prior to any type of M&A:[6]

$$x_1^{pre} = x_2^{pre} = \frac{a-2+c/g}{4b}, \qquad x_3^{pre} = \frac{a+2-3c/g}{4bg}, \qquad p^{pre} = \frac{a+2+c/g}{4} \qquad (4)$$

$$\pi_1^{pre} = \pi_2^{pre} = b\left(x_i^{pre}\right)^2 = \frac{\left(a-2+c/g\right)^2}{16b}, \qquad \pi_3^{pre} = b\left(g\,x_3^{pre}\right)^2 = \frac{\left(a+2-3c/g\right)^2}{16b}$$

For the welfare evaluation of this initial situation we use the standard concepts of consumer surplus, $CS^{pre} = \left(H(a-p)\right)/2$, and total national surplus which is defined as the sum of consumer surplus plus the sum of profits of the two national firms. It is given by

$$\Omega^{pre} = \left(\pi_1^{pre} + \pi_2^{pre}\right) + CS^{pre} = \frac{\left(a-2+c/g\right)^2}{8b} + \frac{\left(3a-2-c/g\right)^2}{32b} \qquad (5)$$

2.2. National champion

If a national champion is formed we have an asymmetric Cournot duopoly in the third stage where the champion competes with the foreign firm. We denote the single national firm by $\{1+2\}$. The profit maximization problems are the following

$$Max\ \pi_{\{1+2\}} = \left(a - b\left(x_{\{1+2\}} + g \cdot x_3\right)\right) \cdot x_{\{1+2\}} - s \cdot x_{\{1+2\}} \qquad (6)$$

$$Max\ \pi_3 = \left(a - b\left(x_{\{1+2\}} + g \cdot x_3\right)\right) \cdot g \cdot x_3 - c \cdot x_3 \qquad (7)$$

Post-merger unit costs of the national champion are now equal to *s*, where $0 < s < 1$, which represents the general synergy effects of the merger. Taking first order conditions of (6) and (7), it is straightforward to compute all endogenous variables for this scenario which are denoted with the superscript "*nat*".[7]

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[6] We impose parameter restrictions which ensure that the foreign firm is active on the market. $x_3^{pre} > 0$ requires that effective marginal costs c/g are below (a+2)/3, which in turn requires that trade openness *g* is above a lower limit, given by $g_{trade} \equiv 3c/(a+2)$. Notice that transport cost shelter the domestic firms from foreign competition. Trade integration (a rise in *g*) increases profits of the foreign firm, decreases profits of the domestic firms, and benefits domestic consumers by increasing competition and lowering prices.

[7] We want to focus on the case where the change in the ownership structure does not drive the respective outsider firm completely out of the market. We therefore require that $c/g < (a+s)/2$. A priori it is unclear if this or the previous restriction on c/g is the stricter one. Below we will always require the stricter conditions to be fulfilled (i.e. $c/g < \min\left[(a+s)/2\textbf{;}(a+2)/3\right]$).

$$x_{\{1+2\}}^{nat} = \frac{a - 2s + c/g}{3b} \qquad\qquad x_3^{nat} = \frac{a + s - 2c/g}{3bg} \qquad\qquad p^{nat} = \frac{a + s + c/g}{3} \qquad (8)$$

$$\pi_{\{1+2\}}^{nat} = \frac{(a - 2s + c/g)^2}{9b} \qquad\qquad \pi_3^{nat} = \frac{(a + s - 2c/g)^2}{9b}$$

Profits $\pi_{\{1+2\}}^{nat}$ are divided among the domestic shareholders. The division rule will play an important role below in the takeover battle, but for the welfare evaluation of this ownership structure only the aggregate national profits matter. Total national surplus is now given by

$$\Omega^{nat} = \pi_{\{1+2\}}^{nat} + CS^{nat} = \frac{(a - 2s + c/g)^2}{9b} + \frac{(2a - s - c/g)^2}{18b} \qquad (9)$$

Comparing (8) and (9) with (4) and (5), we can establish some preliminary results. The proof and the definition of the threshold levels can be found in appendix A.

Lemma 1: Effects of the national champion

a) $\pi_{\{1+2\}}^{nat} > \pi_1^{pre} + \pi_2^{pre}$ requires that $s < \tilde{s}_\pi$. For a welfare gain ($\Omega^{nat} > \Omega^{pre}$) it is required

that $s < \tilde{s}_\Omega$, where $\tilde{s}_\Omega < \tilde{s}_\pi$. Finally, $CS^{nat} > CS^{pre}$ requires $s < \tilde{s}_{CS}$, where $\tilde{s}_{CS} < \tilde{s}_\Omega$.

b)   To warrant that $0 < \tilde{s}_{CS}$ (and, thus, $0 < \tilde{s}_{CS} < \tilde{s}_\Omega < \tilde{s}_\pi < 1$) the market size a must be

below an upper bound $\bar{a} \equiv 6 - c/g$. If $a > \bar{a}$ consumer prices rise even if $s \to 0$.

Proof: See Appendix A.

The national champion is profitable for the participating firms 1 and 2 if the synergy effect is sufficiently strong ($s < \tilde{s}_\pi$), reminiscent of the well known "merger paradox" (Salant et al., 1983). Yet, the creation of a national champion also reduces competition, hence consumers benefit from it only with a stronger efficiency gain, $s < \tilde{s}_{CS} < \tilde{s}_\pi$, so that prices fall despite the increase in market concentration. Since total national surplus balances consumer and producer interests we obtain a threshold level $\tilde{s}_\Omega$ that must lie in between $\tilde{s}_\pi$ and $\tilde{s}_{CS}$. The required merger synergies are stronger (i.e., all threshold levels of s are lower) the lower the production cost advantage of the foreign competitor is (the higher c is), the better the market H is sheltered through transport costs (the lower g is), and the larger market size a is.[8]

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[8] The intuition is that the domestic firms have a stronger position on the market H the higher c is and the lower g is. Already Farrell and Shapiro (1990) have shown that horizontal mergers among strong firms are less likely to be profitable than among weak firms with a low market share. A larger market size (higher a) also reduces all threshold levels of s. This is due to the fact that profit levels are increasing in a. Consequently, stronger synergy effects are needed for a profitable (welfare improving) merger. We thus need to impose an upper limit for a since

It is also instructive to consider the effect of a national champion formation on the foreign outsider firm. Traditional merger analysis has found that outsiders tend to benefit from a merger under standard Cournot conditions (Farrel and Shapiro, 1990). This can change, however, when synergy effects arise for the merging parties. Using (8) and (4) we can compute the following merger externality for the foreign firm:

$$EXT_3^{nat} \equiv \pi_3^{nat} - \pi_3^{pre} = \frac{1}{144b}\left[16\left(a+s-2c/g\right)^2 - 9\left(a+2-3c/g\right)^2\right] \tag{10}$$

Decomposing (10), it can be shown that the sign of EXT_3^{nat} depends on the term $\left(a-6+4s+c/g\right)$, which is unambiguously negative under the imposed parameter restrictions and with the condition $s < \tilde{s}_{CS}$. That is, if the synergy effect is strong enough to render the national merger welfare increasing even from a consumer perspective (a condition that is assumed to hold below), it will necessarily imply a negative externality on the foreign outsider.

2.3.   Foreign takeover

The alternative scenario is that firm 3 takes over one domestic firm $i = 1, 2$ whereas the other firm $j = 1, 2$ ($j \neq i$) stays as an independent competitor. Operating profits of the new MNE accrue at the foreign headquarter location. The foreign corporation pays a takeover price, denoted by λ, which is received by the domestic shareholders of the target firm i. Yet, as explained in the introduction, the government may not fully account for λ in the welfare evaluation of the foreign takeover scenario. The government may only interpret operating profits of active domestic firms as relevant producer surplus, but not (or at least not fully) the wealth of domestic shareholders who have generated this wealth by selling their productive asset abroad. To allow for this possibility we use $\tilde{\lambda} \geq 0$, with $0 \leq \tilde{\lambda} \leq \lambda$, as the welfare-relevant measure of the "takeover wealth" in the calculation of total national surplus. We will show later that a foreign takeover is less likely to emerge the stronger the government discounts takeover wealth. One can therefore think of a government with lower valuation of $\tilde{\lambda}$ as a government that is more prone to economic patriotism.

In the third stage of the game, the foreign takeover scenario gives rise to an asymmetric Cournot duopoly between the MNE and the domestic outsider firm. Transport costs play no role any longer. In addition, we assume that the international takeover gives rise to synergy effects

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otherwise the national champion cannot be profitable (welfare improving) even with very strong synergy effects. A sufficient parameter restriction such that all threshold levels of *s* are positive is $a < \bar{a}$ (see appendix A).

of identical *absolute* strength in production. That is, unit costs of the MNE after the acquisition are equal to $0 < c - (1-s) < 1$, which implies a parameter restriction $c + s > 1$. Notice that this implies stronger cost synergies of the international takeover in *relative* terms if $c < 1$.[9] The profit maximization problems are now the following:

$$Max \ \pi_j = \left(a - b\left(x_j + x_{MNE}\right)\right) \cdot x_j - x_j \tag{11}$$

$$Max \ \pi_{MNE} = \left(a - b\left(x_j + x_{MNE}\right)\right) \cdot x_{MNE} - \left(c - (1-s)\right) \cdot x_{MNE} \tag{12}$$

We compute the following endogenous variables, distinguished by the superscript "*int*":

$$x_j^{int} = \frac{a + c + s - 3}{3b} \qquad x_{MNE}^{int} = \frac{a + 3 - 2c - 2s}{3b} \qquad p^{int} = \frac{a + c + s}{3} \tag{13}$$

$$\pi_j^{int} = \frac{\left(a + c + s - 3\right)^2}{9b} \qquad \pi_{MNE}^{int} = \frac{\left(3 + a - 2c - 2s\right)^2}{9b} - \lambda$$

where the previously mentioned conditions $a > 2$ and $c + s > 1$ suffice to ensure that $\pi_j^{int} > 0$.

Using $\tilde{\lambda}$ as the welfare-relevant analogue of λ we obtain for total national surplus

$$\Omega^{int} = \pi_j^{int} + CS^{int} + \tilde{\lambda} = \frac{\left(a + c + s - 3\right)^3}{9b} + \frac{\left(2a - c - s\right)^2}{18b} + \tilde{\lambda} \tag{14}$$

With (13) and (4) we can establish three useful results regarding the takeover scenario:

Lemma 2: Effects of the international takeover

(a) If $s < \tilde{s}_\pi$, then $\pi_3^{int} \equiv \left(\pi_{MNE}^{int} + \lambda\right) > \pi_i^{pre} + \pi_3^{pre}$.

(b) If $s < \tilde{s}_{CS}$, then $p^{int} < p^{pre}$

(c) If $s < \tilde{s}_{CS}$, then $\pi_j^{int} < \pi_j^{pre}$

Proof: Appendix B.

Part (a) states that if the synergy effect is strong enough to render the national champion profitable relative to the initial situation, then the international takeover is also profitable in the sense that gross profits of the MNE (not including the takeover price) exceed the profits of the participating firms prior to the takeover. Note, however, that a synergy effect of the strength

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[9] For the national champion post-merger unit costs are *s*% of pre-merger costs, whereas for the international firm costs decline by more than *s*%. Recently, Qui/Zhou (2006) have argued that cross-border mergers yield indeed stronger synergies than national mergers, because firms learn about specific foreign market environments.

$s < \tilde{s}_{\pi}$ is only a sufficient, but not a necessary condition for gross profitability of the takeover. This is due to the fact that transport cost savings arise as an additional effect.[10] Part (b) of lemma 2 establishes a similar result from the consumer perspective. If synergy effects are strong enough to imply a lower price in the national champion scenario compared to the initial situation, then this will also be the case with the international takeover since transport cost savings arise as an additional consumer friendly effect. Finally, part (c) implies that a welfare enhancing international takeover also induces a negative externality on the (now domestic) outsider firm under the usual parameter restrictions.

3) National champion versus foreign takeover

In this section we solve the takeover game. Assume from now on that any merger induces a strong synergy effect such that $s < \tilde{s}_{CS}$. From the previous analysis we then know that both types of M&A are associated with higher joint profits of the participating firms, and with higher consumer surplus compared to the initial situation. With the assumption $s < \tilde{s}_{CS}$ we essentially rule out that no change in the ownership structure is the equilibrium outcome, which allows us to focus on the comparison between the two M&A scenarios. Also we know that any type of M&A harms the respective outsider firm.

3.1. Second stage – the government

We consider different general normative criteria for the government's decision.[11] First, the government may only care about domestic consumer surplus. Second, it may adhere to the standard definition of total national surplus and fully account for takeover wealth ($\tilde{\lambda} = \lambda$). Finally it may aim at total surplus in principle, but it does not fully count takeover wealth as relevant producer surplus ($\tilde{\lambda} < \lambda$). In this case we call it a "patriotic" government.

Since the relevant comparison for the government is between the foreign takeover and the national champion scenario, we use (8), (9), (13), and (14) to compute the following differences in producer, consumer, and total surplus, where $0 \leq \tilde{\lambda} \leq \lambda$:

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[10] Gross profits of the MNE may even increase without any synergy effects. The gross profit difference between the "int" and the "pre" scenario for the case without synergies but maximum transport cost savings ($s=1$ and $g=g_{trade}$) reads as $4(a-c)(1-c)/9b$, which is strictly positive if $c<1$. Hence, the foreign takeover can yield higher joint (gross) profits purely due to transport cost savings.

[11] There is a general discussion in competition policy if governments (should) adhere to total surplus or consumer surplus as the relevant welfare definition (see e.g. Motta 2004: 19-22 for an introduction).

$$\Delta PS \equiv \pi_{\{1+2\}}^{nat} - \pi_j^{int} - \tilde{\lambda} = \frac{1}{9b}\left[\left(a-2s+c/g\right)^2 - \left(a+s+c-3\right)^2\right] - \tilde{\lambda} \tag{15}$$

$$\Delta CS \equiv CS^{nat} - CS^{int} = -\frac{1}{18b}\left[\left(2a-s-c\right)^2 - \left(2a-s-c/g\right)^2\right] \tag{16}$$

$$\Delta\Omega \equiv \Omega^{nat} - \Omega^{int} = \Delta PS + \Delta CS \tag{17}$$

The national champion yields higher domestic producer surplus than the international take-over for any given $\tilde{\lambda}$ if (15) is positive. Respectively, positive signs of (16) and (17) indicate that the agency prefers the national champion from a welfare perspective, depending on which normative criteria it uses. Notice that $\tilde{\lambda}$ enters (15) and (17) with a negative sign, because the national option implies that country H forgoes receiving the takeover price from abroad.

If a sufficiently large foreign takeover offer for one of the domestic firms arrives, shareholders of the target firm submit the request to be taken over by the foreign firm at price λ. This request is approved by the government when it yields the higher domestic welfare gain than the alternative option, the national champion formation. When the foreign acquisition yields lower welfare than the national champion at $\tilde{\lambda}$, it is rejected, and in fact the national champion is formed. The national champion is also formed if no sufficient foreign takeover offer arrives, so that the domestic firms announce a national merger in the first place.

Since (16) does not depend on $\tilde{\lambda}$, and since $c/g \geq c$, we can readily state the following result

Proposition 1:

If the government maximizes domestic consumer surplus it always prefers the foreign take-over over the national champion if transport is costly ($\Delta CS < 0$ if g<1). If transport is cost-less the two types of M&A are equivalent for domestic welfare ($\Delta CS = 0$ if g=1)

A purely consumer-oriented domestic government would always approve the international takeover whenever it is requested, regardless of λ or $\tilde{\lambda}$, because it is always more consumer friendly due to the involved transport cost savings.[12] The national champion would only be formed with such a government if the foreign corporation does not submit a sufficient offer.

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[12] This advantage of the international option is more important the lower the initial market access of the foreign firm is (the lower *g* is), and it vanishes in the limit case with costless transport. Also notice that, despite the fact that both types of M&A induce identical absolute synergy effects, the gain for domestic consumers from allowing the international takeover is still increasing in the strength of this synergy effect ($\partial \Delta CS / \partial s > 0$). The reason is that the synergy effect is stronger in relative terms for the MNE (cif. footnote 9), and this effect is partly

Another result that follows directly from (15)-(17) refers to the case where $\tilde{\lambda} = 0$. Consider a government that pays attention to producer surplus in principle, but that is extremely patriotic and attaches welfare significance only to operating profits of active domestic firms. Regardless of the actual takeover price λ, such a government completely disregards wealth of the shareholders of firm i as a source of domestic welfare and considers a foreign acquisition *as if* the national asset were given away "for free". In this case the consumer gain from vanishing transport costs ($\Delta CS < 0$ from (16)) is traded off against the higher profits that would accrue domestically with the formation of the national champion ($\Delta PS = \pi_{\{1+2\}}^{nat} - \pi_j^{int} \equiv \Delta\Pi > 0$ if $\tilde{\lambda} = 0$).[13] We have the following result:

Proposition 2:

Consider a government that maximizes total national surplus but attaches no welfare significance to the takeover wealth (i.e., $\tilde{\lambda} = 0$). This government would always reject the foreign takeover and approve the national champion, i.e. $\Delta\Omega > 0$ if $\tilde{\lambda} = 0$.

Proof: Appendix C.

The consumer gain is more than offset by the lower domestic (operating) profits in case of the foreign acquisition. Consequently, this extremely patriotic government always prefers the national champion. Anticipating this, the foreign firm 3 would never spend any effort to acquire a domestic firm in such an environment.

The other polar case is an unbiased government that fully accounts for the actual takeover price in its approval decision ($\tilde{\lambda} = \lambda$). In this case one can use (15)-(17) to compute the minimum takeover price that the foreign firm 3 has to pay in order to gain acceptance by the unbiased domestic competition agency. This is given by

$$\Delta\Omega = 0 \quad \Leftrightarrow \quad \tilde{\lambda} = \lambda = \left(\pi_{\{1+2\}}^{nat} - \pi_j^{int}\right) - \Delta CS = \Delta\Pi - \Delta CS \tag{18}$$

$$= \frac{1}{6b}\left[2(1-s)(3+s-2a) + 2c(2-s-s/g) + (c/g)^2(1-g^2)\right] > 0$$

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passed on to the consumers. One can also show that the consumer gain is stronger the larger the market size is ($\partial\Delta CS/\partial a < 0$), and the smaller the initial cost advantage of the foreign firm is ($\partial\Delta CS/\partial c < 0$).

[13] It follows immediately from (15) that the term in squared parentheses, the difference in operating profits $\Delta\Pi$, is unambiguously positive since $a > 2$, $s < 1$, and $c/g \geq c$. The intuition is that the foreign takeover induces a negative externality on the domestic outsider firm j under the imposed parameter constellation (see lemma 2). This externality has to be compensated in order to render foreign takeover socially more desirable, but with $\tilde{\lambda} = 0$ there is no possibility for the foreign corporation to achieve this compensation.

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where $\Delta\Pi > \Delta CS$ follows from proposition 2. Firm 3 can anticipate that, in order to be successful in the takeover battle with the other domestic firm, it has to place an offer that (i) exceeds the outside option for the target firm to join the national coalition, and (ii) that is at least as high as $\lambda = (\Delta\Pi - \Delta CS) > 0$, in order to convince the (unbiased) domestic government. Analogous considerations apply when the government uses some other welfare measure. Consider, e.g., that $\tilde{\lambda} = \kappa \cdot \lambda$ where $0 < \kappa < 1$ is an inverse measure of the government's bias against foreign acquisitions. In this case the foreign firm would have to offer at least $\lambda = (1/\kappa) \cdot (\Delta\Pi - \Delta CS)$, which is larger the stronger the government's bias $(1/\kappa)$ is. For a given gross profit gain the foreign takeover is thus less likely the more patriotic the government is. After a certain level of $(1/\kappa)$ the takeover becomes unattractive, simply because it is too expensive for the foreign firm to satisfy the requests from the domestic government. More generally, we denote with $\lambda_{min}^{\Omega}(\tilde{\lambda})$ the minimum actual takeover price that the foreign firm has to pay in order to gain support by the domestic competition agency.

3.2 First stage – Determination of the takeover price

In the first stage of the game, firms negotiate about M&A. We do not consider a cooperative game of coalition formation as in Horn and Persson (2001a,b), but to simplify matters, we rather consider an auction-type takeover battle for the target firm closer in spirit to Inderst and Wey (2004). We impose the following structure of sub-stages of the game: First, the two domestic firms negotiate about the national merger by specifying a division rule of the aggregate profits $\pi_{\{1+2\}}^{nat}$ in case of the national champion formation. Second, after observing the result of this domestic negotiation, the foreign firm 3 can place a higher offer for one of the domestic firms if it is interested in doing so. When placing this offer, the foreign firm anticipates the decision of the domestic government. The foreign firm knows if the government is biased or unbiased, i.e. the relation between $\tilde{\lambda}$ and λ.

We distinguish three different specific variants, which capture different strategic environments and different government types. These will lead to different equilibrium takeover prices

1. In the first setup we assume that the foreign firm 3 is only interested in buying firm i, say firm 2. It is not interested in buying the other firm j (firm 1), for some exogenous reason like e.g. an incompatibility of corporate cultures. Government fully accounts for takeover wealth ($\tilde{\lambda} = \lambda$), i.e. it is not biased against the foreign acquisition.

2. In the second setup the foreign firm is interested in buying either one of the domestic firms, 1 or 2. The government again fully accounts for takeover wealth ($\tilde{\lambda} = \lambda$)

3. Finally, in the third setup the foreign firm wants to buy either one of the domestic firms (as in the second setup), but the government accounts for takeover wealth only by a fixed amount $\tilde{\lambda} = \pi^{nat}_{\{1+2\}}/2$ when calculating total domestic surplus.

The first constellation captures the case where it is "in the air" that one of the domestic firms is the pre-designated acquisition target (e.g., *ENEL* is only interested in taking over *SUEZ*, but not at all in *GdF*). This status grants firm i strategic bargaining power, as described by Inderst and Wey (2004) in the context of symmetrical firms in a closed economy. We capture this strategic power here in a simple way by allowing firm i to place a take-it-or-leave-it-offer to the other firm j in the first step. The (credible) thread for firm j is to become the outsider of the takeover scenario, i.e., the profit level π^{int}_j. Anticipating this, firm i will make an offer that leaves firm j just indifferent between joining the national champion and becoming the sole competitor of the newly formed MNE. This happens at the following division of profits, $\pi^{nat}_i = \pi^{nat}_{\{1+2\}} - \pi^{int}_j$, $\pi^{nat}_j = \pi^{nat}_{\{1+2\}} - \pi^{nat}_i = \pi^{int}_j \Rightarrow \pi^{nat}_i + \pi^{nat}_j = \pi^{nat}_{\{1+2\}}$. Firm j will always accept this take-it-or-leave-it offer by firm i. In the second step, the foreign firm 3 decides whether it should make an offer to firm i that is slightly higher than the outside option, i.e. $\lambda = \pi^{nat}_{\{1+2\}} - \pi^{int}_j$. Also taking into account the government's involvement, firm 3 would have to pay $\lambda = \max[(\pi^{nat}_{\{1+2\}} - \pi^{int}_j); \lambda^{\Omega}_{min}]$, where $\lambda^{\Omega}_{min} = (\pi^{nat}_{\{1+2\}} - \pi^{int}_j) - \Delta CS$ as given in (18). Hence, it is clear that $\lambda^{\Omega}_{min} < (\pi^{nat}_{\{1+2\}} - \pi^{int}_j)$ holds in this case, and the equilibrium takeover price that firm 3 would have to pay in this constellation is actually given by

$$\lambda* = \pi^{nat}_{\{1+2\}} - \pi^{int}_j = \frac{\left(a - 2s + c/g\right)^2 - \left(a + s + c - 3\right)^2}{9b} \tag{19}$$

The foreign firm is willing to pay this price if $\pi^{int}_{MNE} = \pi^{int}_3 - \lambda* \geq \pi^{nat}_3$. If this condition does not hold, i.e. if $\pi^{int}_3 - \lambda* < \pi^{nat}_3$, the foreign firm will not place an offer.

In the second strategic environment, firm 3 wants to take over whichever domestic firm is cheaper to acquire, without having any particular preference for either of the two potential targets. This implies that firm i has no strategic power vis-a-vie firm j any longer, but this setup is equivalent to a competitive auction where firms 1 and 2 offer themselves as acquisi-

tion objects. The outside option is $\pi_{\{1+2\}}^{nat}$, which – due to symmetry – would be equally split if no foreign offer arrives. Hence, the foreign firm would have to offer at least $\pi_{\{1+2\}}^{nat}/2$ for one of the domestic firm. Since the government is also involved, the domestic firms can anticipate that the takeover price must also exceed $\lambda_{min}^{\Omega} = \Delta\Pi - \Delta CS$ as given in (18), hence the foreign firm would have to pay a price

$$\lambda^{**} = \max\left[\tfrac{1}{2} \cdot \pi_{\{1+2\}}^{nat}; \ \lambda_{min}^{\Omega} \right] \qquad (20)$$

in order to acquire one domestic firm, where λ_{min}^{Ω} can a priori be larger or smaller than $\pi_{\{1+2\}}^{nat}/2$. The participation constraint for the foreign firm is now $\pi_3^{int} - \lambda^{**} \geq \pi_3^{nat}$. If this condition is violated, the foreign firm will not place an offer, and the national champion would be formed, whose profits $\pi_{\{1+2\}}^{nat}$ are equally divided among firms 1 and 2.[14]

The first two scenarios assume that the domestic government is unbiased. We could extend these cases and include a government bias of the type $\tilde{\lambda} = \kappa \cdot \lambda$ (where $0 < \kappa < 1$), which would increase the minimum takeover price that the foreign firm has to pay and make the takeover less likely ceteris paribus at any given gross profit gain $\left(\pi_3^{int} - \pi_3^{nat}\right)$.

In the third specific environment we consider a competition agency with an interesting particular form of economic patriotism. It is neither completely against foreign takeovers per se ($\tilde{\lambda} = 0$), nor does it discount takeover wealth ($\tilde{\lambda} = \kappa \cdot \lambda$), but it fixes a maximum amount $\tilde{\lambda} = \pi_{\{1+2\}}^{nat}/2$ up to which it considers takeover wealth as welfare-relevant in its decision whether or not to approve the foreign acquisition. Notice that this amount would be the "normal" value of the target firm under the alternative M&A-option, the national champion, where shareholders of the two domestic firms could expect to earn exactly this profit level. The government thus decides about the foreign takeover *as if* the acquisition price were equal to this normal level. In other words, the patriotic agency assumes a value of the target firm that it thinks is reasonable. The foreign firm may be willing to pay a higher price, but such higher offers are not taken into account.

One reason for such government behaviour could be public pressure: It may be accepted that a foreign takeover is approved on the basis that it generates positive effects for consumers, competition etc., but an outbidding of a domestic firm by a foreign corporation is not considered acceptable but "excessive" or "unpatriotic". Hence the agency decides on the foreign

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[14] Intermediate cases can also be analyzed, where the foreign firm is more interested in firm i than in firm j, but where firm i can not fully exert its strategic power as the pre-designated target. The resulting takeover price would range between λ* and λ**.

takeover on the basis of the reasonable reference price that also the domestic bidder would have to pay, but it is unwilling to let its decision depend on the fact that the foreign corporation is able to outbid a domestic competitor and offer more for the acquisition target.[15]

Given this behaviour of the competition agency, there is in fact no reason for firm 3 to pay more than $\pi_{\{1+2\}}^{nat}/2$, since this price is (i) sufficient to outbid the other domestic firm in the takeover battle for the acquisition target, and (ii) all payments beyond $\pi_{\{1+2\}}^{nat}/2$ do not affect the government's approval decision in the subsequent welfare evaluation. The resulting actual equilibrium takeover price in this scenario is thus

$$\lambda*** = \tfrac{1}{2} \cdot \pi_{\{1+2\}}^{nat}, \tag{21}$$

and the respective condition for firm 3 to place an offer is now $\pi_3^{int} - \lambda*** \geq \pi_3^{nat}$. We show below that this mild version of economic patriotism will make foreign takeovers less likely effectively, even though it capitalizes in a lower takeover price (notice that $\lambda*** \leq \lambda**$), because higher price offers cannot be used by firm 3 to convince the government.

3.3. Equilibrium ownership structure

In this subsection we finally derive the equilibrium ownership structure. It turns out that the first two strategic environments (with equilibrium takeover prices $\lambda*$ and $\lambda**$), which have in common that the government is unbiased, yield qualitatively similar conclusions. This is why these two cases are grouped together and discussed first. Afterwards we turn to the third environment with the patriotic government (with equilibrium takeover price $\lambda***$).

Unbiased government (prices $\lambda*$ and $\lambda**$)

In the first scenario firm i is the pre-designated acquisition target. Plugging the equilibrium takeover price $\lambda*$, as given in (19), into (15) we readily find that the domestic producer surplus difference is equal to zero, $\Delta PS(\lambda*) = 0$, because the share price $\lambda* = \tilde{\lambda} = \pi_{\{1+2\}}^{nat} - \pi_1^{int}$ exactly compensates the negative externality on the domestic outsider firm j. The total surplus difference is thus equivalent to the consumer surplus difference, i.e. $\Delta\Omega(\lambda*) = \Delta CS < 0$ from (17), which is generally in favour of the international option. In the second scenario, where

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[15] One can argue that even a patriotic government should try to maximize the actual takeover price that the foreigners pay, and then tax away and redistribute the takeover wealth from the shareholders of firm i. However, the government in our model is a competition agency that has no power of taxation or subsidization.

firms 1 and 2 are competitive bidders to be taken over, the equilibrium price is λ^{**} as given in (20), which includes the constraint $\lambda \geq \lambda_{min}^{\Omega}$. Firm 3 would always have to place an offer which ensures that $\Delta\Omega(\lambda^{**}) \leq 0$. Hence, if the foreign firm is willing to take over one domestic firm at price λ^* or at price λ^{**}, this would in fact always be approved by the domestic government.[16] The relevant question in both scenarios is, thus, only if firm 3 is *willing* to pay these particular prices for the target firm. If it is willing, the takeover actually arises. Otherwise the foreign firm places no offer and the national champion is formed.

The expressions for the net willingness to pay are $\left(\pi_3^{int} - \pi_3^{nat}\right) - \lambda^*$ and $\left(\pi_3^{int} - \pi_3^{nat}\right) - \lambda^{**}$, respectively, where λ^*, λ^{**} are given in (19), (20), and the gross profit difference gain reads as $\left(\pi_3^{int} - \pi_3^{nat}\right) = \left(\left(3 + a - 2c - 2s\right)^2 - \left(a + s - 2c/g\right)^2\right)\Big/9b > 0$. With this we can prove the following results:

Proposition 3: *Assume that* $2 < a < \bar{a}$, $0 < s < \tilde{s}_{CS}$, $\mathbf{max}\left[g_{trade}, g'_{trade}\right] < g \leq 1$, *and* $1 - s < c \leq 1$.

(a) *The foreign firm 3 is willing to take over firm i for the price λ^* if trade openness g exceeds some lower bound $\tilde{g}_{(1)}(a, c, s)$ as defined in appendix D. The foreign firm is not willing to pay the takeover price λ^* if $g < \tilde{g}_{(1)}$.*

(b) *The foreign firm 3 is willing to take over firm i for the price λ^{**} if trade openness g exceeds some lower bound $\tilde{g}_{(2)}(a, c, s)$ as defined in appendix D. The foreign firm is not willing to pay the takeover price λ^{**} if $g < \tilde{g}_{(2)}$.*

(c) *The foreign firm is never willing to take over firm i (neither at the price λ^* nor at λ^{**}) if it does not have an initial cost advantage (if c=1). If the cost advantage is sufficiently strong (c sufficiently low) the foreign firm would always (for all values of g) be willing to take over firm i. The threshold level $\tilde{g}_{(1)}$ is strictly larger than $\tilde{g}_{(2)}$ if c<1.*

Proof: See Appendix D

This proposition implies, somewhat surprisingly, that the foreign firm is more likely to take over firm i the *higher* trade openness g is. This is true when firm i is the pre-designated acquisition target (price λ^*), but also when firms i and j are equally attractive targets (price λ^{**}). A priori one might have expected the foreign takeover to be more attractive the *lower* trade openness is, because the improvement of market access seems to be more valuable then. No-

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[16] With λ^{**} the government can be indifferent between the national champion and the foreign takeover, whereas with λ^* the foreign takeover is strictly preferred by the government as long as $g < 1$.

tice, however, that the takeover prices are endogenous and entails precisely this market access advantage. One can show that $\partial\left(\pi_3^{int} - \pi_3^{nat}\right)\big/\partial g < 0$, i.e., the lower g is, the higher is the *gross* profit gain for the foreign firm from entering the domestic market. Yet, the higher are also the endogenous prices that the MNE has to pay for this market access, which can be verified by noting that $\partial\lambda*/\partial g < 0$ and $\partial\lambda**/\partial g < 0$.

We also find that the foreign firm is not interested in the takeover (neither for $\lambda*$ nor for $\lambda**$) if it does not have an initial cost advantage. This follows from the fact that $\tilde{g}_{(1)} = \tilde{g}_{(2)} = 1$ if $c = 1$, so that $g > \tilde{g}_{(x)}$ can never be true in the relevant range of g. Another instructive case is when the foreign firm does indeed have a cost advantage ($c < 1$), but transport costs are absent ($g = 1$). In this case we find that $\lambda* = \lambda**$, since $\Delta CS = 0$, and the foreign firm's net willingness to pay for the takeover is $2(1-s)(1-c)/b > 0$. This term is positive as long as $c < 1$, and it is larger the stronger the initial cost advantage of firm 3 is (the lower c is) and the stronger the synergy effect is (the lower s is). The foreign firm will successfully acquire one domestic firm with $g = 1$ and $c < 1$. It pays a takeover price that fully compensates the domestic country for the profit loss of firm j, and the target firm i does not reap the full takeover gain from the foreign bidder. Finally, if the cost advantage of the foreign firm becomes sufficiently large, one finds that first $\tilde{g}_{(2)}$ and then $\tilde{g}_{(2)}$ fall short of $\mathbf{max}\left[g_{trade}, g'_{trade}\right]$; in fact: $\tilde{g}_{(1)} \to 0, \tilde{g}_{(2)} \to 0$ as $c \to 0$. This implies that the foreign firm would be willing to pay the respective price $\lambda*$ or $\lambda**$ over the whole admissible range of g if the parameter c is sufficiently low. In general, the range of g for which the foreign firm would engage in the takeover is larger with the price $\lambda**$ than with $\lambda*$, since the gross profit gain is independent of the takeover price, but $\lambda* > \lambda**$ due to the higher strategic power of firm i when it is the pre-designated acquisition target.[17]

These results are illustrated in figure 1, where we have used the parameter constellation $a = 2.3$, $b = 1$, $s = 0.5$, and $c = 0.99$, which implies that $\mathbf{max}\left[g_{trade}, g'_{trade}\right] = 0.7071 < g \leq 1$, $\tilde{g}_{(1)} = 0.9457$ and $\tilde{g}_{(2)} = 0.7263$.

[FIGURE 1 HERE]

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[17] $\lambda* - \lambda** = \left(\pi_{\{1+2\}}^{nat}\big/2 - \pi_1^{int}\right) > 0$ follows directly from lemmas 1 and 2.

The upper part of the figure depicts the gross profit gain $\left(\pi_3^{int} - \pi_3^{nat} \right)$ and the two equilibrium prices $\lambda *$ and $\lambda **$ which result in the two different strategic environments. If the respective price is lower (higher) than the gross profit gain, the foreign firm's net willingness to pay for the takeover is positive (negative), and the takeover finally occurs (does not occur). The respective net willingness to pay at $\lambda *$ and $\lambda **$ is depicted in the lower part of figure 1.

In sum, we find that the national champion is more likely in equilibrium the *lower* trade openness g is, whereas trade integration (rising g) makes the foreign takeover more likely. This result is consistent with the theoretical predictions by Horn and Persson (2001b), who also find that trade integration triggers cross-border M&A. We explicitly show here that the reason for the occurrence of the national champion at low levels of g is that the foreign firm is not interested in the acquisition, because it endogenously leads to an acquisition price that is "too expensive". This result is also consistent with the finding by Neary (2007) that trade integration triggers cross-border merger waves, although he does not explicitly compare national vs. international mergers.

Patriotic government (takeover price $\lambda ***$)

We now turn to the environment where the patriotic domestic government accounts for takeover wealth only up to the maximum amount of $\tilde{\lambda} = \pi_{\{1+2\}}^{nat}/2$, which leads to an equilibrium takeover price $\lambda *** = \tilde{\lambda} = \pi_{\{1+2\}}^{nat}/2$ as given in (21). Using $\lambda ***$ in (15) and (17) we compute the domestic producer surplus and total surplus gains from forming a national champion:

$$\Delta PS\left(\lambda *** \right) = \frac{1}{18b}\left[\left(a - 2s + c/g \right)^2 - 2\left(a + c + s - 3 \right)^2 \right] \tag{22}$$

$$\Delta \Omega \left(\lambda *** \right) = \frac{1}{18b}\left[\left(a - 2s + c/g \right)^2 - 2\left(a + c + s - 3 \right)^2 - \left(2a - s - c \right)^2 + \left(2a - s - c/g \right)^2 \right] \tag{23}$$

Furthermore the constraint must be taken into account that the foreign firm 3 has to be willing to place a takeover offer at price $\lambda ***$. This constraint reads as

$$\pi_3^{int} - \pi_3^{nat} - \lambda *** \geq 0 \iff \frac{1}{9b}\left[\left(3 + a - 2c - 2s \right)^2 - \tfrac{1}{2}\left(a - 2s + c/g \right)^2 - \left(a + s + 2c/g \right)^2 \right] \geq 0 \tag{24}$$

Using (22) and (24) we can state the following results:

Proposition 4*: Assume that* $2 < a < \bar{a}$, $0 < s < \tilde{s}_{CS}$, $\max\left[g_{trade}, g'_{trade}\right] < g \leq 1$, *and* $1 - s < c \leq 1$. *Furthermore assume that the takeover price is* λ^{***} *as in (21). The following results hold:*

(a)   The foreign firm is always willing to buy the domestic target firm for the price λ^{***}.

(b)   The national champion yields higher domestic producer surplus than the foreign takeover with λ^{***}.

Proof: See Appendix E

The foreign firm is generally willing to buy the domestic acquisition target for a price as low as λ^{***}, in order to avoid becoming the outsider of the national alliance. Unlike in the previous cases, however, the domestic government now may or may not approve the request for foreign takeover. In fact, part (b) of proposition 4 states that the foreign takeover is associated with lower domestic producer surplus than the national champion. The intuition for this result is similar as for proposition 2, where the patriotism of the domestic government has been even more extreme since takeover wealth was completely ignored ($\tilde{\lambda} = 0$). For that case we have shown that the national merger would clearly lead to more domestic producer surplus and that this even generally outweighs the consumer gain that is inherent to the international takeover. In the present case with $\tilde{\lambda} = \frac{1}{2}\pi^{nat}_{\{1+2\}}$ the government is not entirely biased against a foreign acquisition, but it accounts for takeover wealth only up to a maximum amount. That amount is too low, however, to compensate for the negative externality on the domestic outsider firm j. Hence, there is more domestic producer surplus with the national champion than with the foreign takeover.[18]

In its final decision whether or not to approve the foreign takeover the competition agency, therefore, trades off the gain for consumers against the lower domestic producer surplus. Using (23) we can derive the following results that compare the two M&A scenarios with respect to total domestic surplus for the price λ^{***}:

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[18] The gain in domestic producer surplus that comes with the national champion is larger, the more substantial the negative externality of the foreign takeover on firm j would be. For example, if g is low, the stronger adversely affected is the outsider firm j. Since λ^{***} is only an insufficient compensation for this negative externality, more profits are maintained in the domestic country with the national merger the lower g is ($\partial \Delta PS / \partial g < 0$). A similar intuition applies with respect to the parameters s and a. We find that $\partial \Delta PS / \partial s < 0$ and $\partial \Delta PS / \partial a > 0$.

Proposition 5: *Assume that $2 < a < \bar{a}$, $0 < s < \tilde{s}_{CS}$, $\max\left[g_{trade}, g'_{trade}\right] < g \le 1$, and $1 - s < c \le 1$.*
Furthermore assume that the takeover price is $\lambda ^{***}$. The following results hold:

(a)   *With costless transport (g=1) the national champion yields higher total domestic sur-*
plus than the foreign takeover ($\Delta\Omega\left(\lambda ^{***}, g = 1\right) > 0$)

(b)   *With maximum transport costs ($g = \max\left[g_{trade}, g'_{trade}\right]$) the national champion may*
yield higher or lower total domestic surplus than the foreign takeover. If leads to
higher total surplus if c is above some threshold level $\hat{c}$, so that $1 - s < \hat{c} < c < 1$. It
leads to lower total surplus if c is below that threshold level, i.e. if $1 - s < c < \hat{c} < 1$.

(c)   *The total welfare gain from the national champion is increasing in trade openness, i.e.*
$\partial\Delta\Omega\left(\lambda ^{***}\right)/\partial g > 0$.

Proof: See Appendix F

Proposition 5 implies that the national champion is the welfare maximizing ownership struc-
ture for high transport costs, and that it may be the welfare maximizing option even over the
whole range of g if the initial foreign cost advantage c is not too large. Otherwise, if c is low
enough, the international takeover is the preferred scenario at low levels of trade openness.
Importantly, part (c) of proposition 5 implies that the national champion becomes more attrac-
tive for the domestic competition agency in the course of trade integration. If the foreign cost
advantage is strong enough (if c is low enough to fall short of $\hat{c}$), the national champion is not
preferable over the entire range of g, but there is a critical level of trade openness below
which the agency would prefer the international takeover and above which it would rather
promote the national champion. That case is illustrated in figure 2

[FIGURE 2 HERE]

With the price $\lambda ^{***}$ the national champion always yields higher domestic producer surplus.
The national champion is, on the other hand, always inferior from the consumer perspective,
but this negative effect is less important the higher g is. Total national surplus, which is given
by the thick solid curve, aggregates producer and consumer interests. At low levels of trade
openness the foreign takeover yields higher welfare since the positive effect on consumers is
prevalent. Yet, if g rises up to a critical level (which is equal to 0.4283 in the depicted nu-
merical example) the national champion becomes the preferred option for the domestic com-
petition policy. I.e., globalization reinforces the case for the national champion.

3.4. Robustness check: The Bertrand case with differentiated products

It is well known that the nature of strategic interaction (quantities vs. prices) sometimes crucially affects the main results of an oligopolistic model. This distinction is also relevant for merger analysis. Salant et al. (1983) have shown that, absent sufficiently strong synergy effects, bilateral mergers are not profitable under Cournot competition. This is not true, however, in a model where firms' actions are strategic complements rather than strategic substitutes (Deneckere and Davidson 1985). It is therefore worth investigating if our main results hinge on the assumption of Cournot competition. They do not.

We have solved a version of our model where the three firms produce differentiated commodities and compete in prices (à la Bertrand) rather than in quantities on the domestic market. More specifically, we have assumed the following standard form of consumer preferences

$$U = v(x_1 + x_2 + x_3) - \frac{3}{2(1+\gamma)} \left[x_1^2 + x_2^2 + x_3^2 + \frac{\gamma}{3}(x_1 + x_2 + x_3)^2 \right] + x_0 \qquad (25)$$

where $x_1 - x_3$ are the consumed quantities of the commodity produced by firm i=1,2,3, x_0 is some outside good where all income effects accrue, $v > 2$ is a scaling parameter, and $\gamma > 0$ measures product substitutability. The demand function that every firm faces is given by

$$x_i = \frac{1}{3} \left[v - p_i(1+\gamma) + \frac{\gamma}{3} \cdot \sum_{j=1}^{3} p_j \right] \qquad \text{for i=1,2,3} \qquad (26)$$

and firms maximize profits by choosing an optimal price p_i. The main results of this model version shall be sketched briefly in this subsection.[19]

In the initial situation with three independently acting firms, profits of the two domestic firms are given by $\pi_i = (p_i - 1) q_i$ for i=1,2, whereas profits of the foreign firm are $\pi_3 = (p_3 - c/g) g \, q_3$. In case of a national merger or a foreign takeover of one domestic firm, a multi-product company emerges that optimally sets brand-specific prices so as to maximize company profits. Post-merger unit costs are equal to s for the national champion, and $c - (1-s)$ for the MNE, and we again assume $s < \tilde{s}_{CS}$ in order to focus on the choice between the two M&A scenarios.[20] We compute the equilibrium takeover prices in the three different

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[19] The model is straightforward to solve in the same principal way as for the Cournot case, but analytical expressions become much more cumbersome in the Bertrand case. This is why we suffice with reporting numerical simulations of the main results. More detailed results are available from the author upon request.

[20] Notice that it is not necessary to assume strong synergy effects to achieve profitability of a merger in this standard Bertrand model (see e.g. Motta 2004, p. 244-250), since mergers are profitable even without synergies as prices are strategic complements. However, synergy effects are needed to make the merger welfare improving.

strategic environments, i.e. $\lambda^* = \pi_{\{1+2\}}^{nat} - \pi_j^{int}$, $\lambda^{**} = \max\left[\frac{1}{2} \cdot \pi_{\{1+2\}}^{nat}; \lambda_{min}^{\Omega}\right]$ and $\lambda^{***} = \pi_{\{1+2\}}^{nat}/2$, and plug these, respectively, into the functions $\Delta PS(\tilde{\lambda})$, ΔCS and $\Delta\Omega(\tilde{\lambda})$ which depict the producer/consumer/total surplus difference between the national champion and the foreign takeover scenario for given takeover wealth valuation $\tilde{\lambda}$. We again find that $\Delta CS < 0$, i.e. the foreign takeover is generally more consumer friendly due to the involved transport cost savings. Furthermore, $\Delta\Omega(\lambda^*) = \Delta CS < 0$ and $\Delta\Omega(\lambda^{**}) \leq 0$, i.e. in the two scenarios with an unbiased government only the foreign firm's willingness to pay for the takeover determines which form of M&A will actually arise in equilibrium. For the biased government ($\tilde{\lambda} = \pi_{\{1+2\}}^{nat}/2$) we also find that $\Delta PS(\lambda^{***}) > 0$ and $\pi_3^{int} - \pi_3^{nat} > \lambda^{***}$. Hence, the foreign firm is interested in taking over the domestic target for the price λ^{***}, but the competition agency trades off the consumer gain against the domestic profit loss.

[FIGURE 3 HERE]

The main results of the Bertrand model are illustrated in figure 3. In the upper panel we depict, over the range of trade openness *g*, the gross profit gain of the foreign takeover (thick solid line), the share price λ* (thin solid line) and the foreign firm's net willingness for takeover (broken line). At low levels of trade openness obtaining full market access is most valuable for the foreign firm in gross terms, but also most expensive, so that the net willingness to takeover is negative. A rise in *g* will make the foreign takeover more likely, since the net willingness to pay by the foreign firm turns positive. A slight difference between the Bertrand and the Cournot case is that it is now possible that beyond a certain level of *g* the foreign firm is again not willing to pay the price λ*, because the gross profit gain declines faster in *g* than the necessary market access price does. A similar picture arises for the price λ**, which is lower than λ*, and thus increases the range of g for which a foreign takeover will actually occur.

In the lower panel of figure 3 we depict the total surplus difference between the national champion and the foreign takeover scenario when the government is biased and the takeover price is λ***. As for the Cournot case (see figure 2) we find that the foreign takeover yields higher total surplus at low levels of g, since the consumer gain is particularly large then, but trade integration reinforces the case for the national champion. After a certain level of g the national champion is favoured, because it implies a larger amount of profits accruing domestically. The main results of the Cournot model, thus, remain robust with Bertrand competition.

4) Conclusion

In this paper we have studied a model with two domestic and one foreign firm, where either a national merger is formed or one of the domestic firms is taken over by the foreign corporation. A competition agency is involved in this game that has to approve any type of M&A. Whether the national champion or the multinational enterprise arises in equilibrium depends crucially on the level of trade openness. Globalization makes the foreign takeover more likely in countries where the government is not biased against acquisitions of national firms by foreigners. In our model such a government type would fully count the received takeover price in its welfare evaluation of the international M&A option. The result that trade integration makes cross-border M&A more likely is consistent with the empirical fact that there has been a surge of this important type of FDI recently, particularly among developed countries. This result is also consistent with previous results from the theoretical literature on cross-border mergers (Horn and Persson 2001b, Neary 2007, Bjorvatn 2004). In this paper we explicitly show why a foreign takeover does not occur at low levels of trade openness: Although it is most attractive in these cases, it is also most expensive.

The general surge in cross-border M&A notwithstanding, one can also observe a trend at least in some countries that globalization seems to reinforce the case for promoting national champions. The theoretical literature has so far not provided a sufficient explanation for this phenomenon. We introduce a measure of "economic patriotism" into the model and find – quite naturally – that more patriotic governments are less likely to accept a foreign takeover. Yet, contemplating a particular form of economic patriotism, we obtain the crucial insight that *globalization makes national mergers more likely*. Even a patriotic government may allow a foreign takeover if trade openness is low, because the consumer gain from vanishing transport costs is most substantial. Yet, as trade becomes freer, the domestic competition agency opts for the national champion beyond a certain point, in order to prevent a buyout of domestic producer surplus by a foreign corporation. This result of our model is, to the best of our knowledge, a novel theoretical explanation for why trade integration may induce certain countries to promote national champions.

Future work should try to provide some further empirical or theoretical foundations for patriotic behaviour of governments in merger policy. Moreover, it seems interesting to explore possible interrelations between the "passive" competition policy, which the government in our model is pursuing, with some more "active" tools of industrial policy like subsidies or state aid that are typically also at the disposal of governments.

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Appendix

Appendix A: Proof of lemma 1

Using (4), (5), (8) and (9) we can compute the following profit, consumer surplus and total surplus differences:

$$\pi_{\{1+2\}}^{nat} - \pi_1^{pre} - \pi_2^{pre} = \frac{1}{72b}\left[8\left(a-2s+c/g\right)^2 - 9\left(a-2+c/g\right)^2\right] \tag{A1}$$

$$\Omega^{nat} - \Omega^{pre} = \frac{\left(a-2s+c/g\right)^2}{9b} - \frac{\left(a-2+c/g\right)^2}{8b} + \frac{\left(2a-s-c/g\right)^2}{18b} - \frac{\left(3a-2+c/g\right)^2}{32b} \tag{A2}$$

$$CS^{nat} - CS^{pre} = \frac{a-6+4s+c/g}{12} \tag{A3}$$

Setting (A1), (A2) equal to zero and solving for s yields the required synergy effect for a profitable, and respectively for a total surplus increasing national merger. In both cases we obtain two solutions, one of which always falls out of the relevant range $0 < s < 1$ under the parameter restrictions $a > 2$, $0 < c \leq 1$ and $\mathbf{max}\left[g_{trade}, g'_{trade}\right] < g \leq 1$. In (A4) and (A5) we report only the relevant solutions for $\tilde{s}_\pi$ and $\tilde{s}_\Omega$ that may fall into the relevant range:

$$\tilde{s}_\pi = \frac{4\left(a+c/g\right) - 3\sqrt{2}\left(a-2+c/g\right)}{8} \tag{A4}$$

$$\tilde{s}_\Omega = \frac{4\left(2a+c/g\right) - \sqrt{\left(17a-30+13c/g\right)\left(5a-6+c/g\right)}}{12} \tag{A5}$$

Setting (A3) equal to zero and solving for s yields a unique solution $\tilde{s}_{CS}$ as given in (A6)

$$\tilde{s}_{CS} = \frac{6-a-c/g}{4} \tag{A6}$$

It can be verified that $\tilde{s}_{CS} < \tilde{s}_\Omega < \tilde{s}_\pi < 1$ always holds under the imposed parameter restrictions. Hence, the additional restriction $a < \bar{a} \equiv 6 - c/g$ ensures that $\tilde{s}_{CS} > 0$, and thus that $0 < \tilde{s}_{CS} < \tilde{s}_\Omega < \tilde{s}_\pi < 1$. $\qquad\square$

Appendix B: Proof of lemma 2

part (a): Using (4) and (13) we compute the gross profit difference for the MNE

$$\pi_3^{int} - \pi_2^{pre} - \pi_3^{pre} = \frac{1}{144b}\left[16\left(3+a-2c-2s\right)^2 - 9\left(\left(a+2-3c/g\right)^2 + \left(a-2+c/g\right)^2\right)\right] \tag{B1}$$

It readily follows that this gross profit difference is larger the stronger the synergy effect is (the lower s is). At $s = \tilde{s}_\pi$ the first term inside the squared parentheses in (B1) becomes

$$\left(3\left(a\sqrt{2}+4-2\sqrt{2}\right) + \tfrac{c}{g}\cdot\left(3\sqrt{2}-4-8g\right)\right)^2 > 0$$

which is always larger than the negative second term in squared parentheses in (B1), hence $\pi_3^{int} > \pi_2^{pre} + \pi_3^{pre}$ when $s < \tilde{s}_\pi$ and consequently $\pi_3^{int} > \pi_2^{pre} + \pi_3^{pre}$ when $s < \tilde{s}_{CS}$.

part (b): The difference in the consumer price is given by

$$p^{int} - p^{pre} = \frac{(a - 6 + 4s) + \frac{c}{g} \cdot (4g - 3)}{12} \tag{B2}$$

Note that $\partial\left(p^{int} - p^{pre}\right)/\partial s > 0$. At $s = \tilde{s}_{CS}$ we have $p^{int} - p^{pre} = -\left(c(1-g)/3g\right) < 0$, hence $p^{int} < p^{pre}$ whenever $s < \tilde{s}_{CS}$ since (B2) is continuous is s.

part (c): Consider the externality of the foreign takeover on the domestic outsider firm

$$\pi_1^{int} - \pi_1^{pre} = \frac{1}{144b}\left[16(a + s + c - 3)^2 - 9(a - 2 + c/g)^2\right] \tag{B3}$$

It is readily verified that $\partial\left(\pi_1^{int} - \pi_1^{pre}\right)/\partial s > 0$. Furthermore, at $s = \tilde{s}_{CS}$, eq. (B3) becomes

$$\pi_1^{int} - \pi_1^{pre} = -\frac{1}{18b}\left[\frac{c}{g} \cdot (1 - g)(3a - 6 + 2c + c/g)\right] < 0 \qquad \text{since } a > 2$$

Hence, if $s < \tilde{s}_{CS}$, then $\pi_1^{int} < \pi_1^{pre}$ since (B3) is also continuous in s. □

Appendix C: Proof of proposition 2

At $g = 1$ we have $\Delta\Omega\left(\tilde{\lambda} = 0, g = 1\right) = \frac{1}{3b}\left[(1-s)(2a + 2c - s - 3)\right] > 0$. At $g = g_{trade}$ we have:

$$\Delta\Omega\left(\tilde{\lambda} = 0, g = g_{trade}\right) = \frac{1}{54b}\left[a^2 + a(40 - 42s) + 24s + 9c(4 - c) + 18s(s - c) - 50\right] > 0$$

Similarly, one can show that $\Delta\Omega\left(\tilde{\lambda} = 0, g = g'_{trade}\right) > 0$. I.e., at minimum and maximum trade openness the total surplus difference $\Delta\Omega\left(\tilde{\lambda} = 0\right)$ is positive. Furthermore, we find that $\partial(\Delta\Omega)/\partial g = -\frac{c}{3bg^3}(c - gs)$ with $\tilde{\lambda} = 0$, which can change sign at most once (and from positive to negative) over the range of g. Hence, it follows directly that $\Delta\Omega\left(\tilde{\lambda} = 0\right)$ must be positive over the whole admissible range of g. □

Appendix D: Proof of proposition 3

part (a): Solving $\left(\pi_3^{int} - \pi_3^{nat}\right) = \lambda*$ for g we obtain two solutions, out of which falls out of the admissible range between zero and one. The other solution is given by

$$\tilde{g}_{(1)} = \frac{5c}{a + 4s + \sqrt{(a - 5c)^2 + 8as + 50cs + 16s^2 - 90(c + s - 1)}} \tag{D1}$$

with $\tilde{g}_{(1)}(c = 0) = 0$, $\tilde{g}_{(1)}(c = 1) = 1$ and $0 < \tilde{g}_{(1)} < 1$ if $0 < c < 1$.

part (b): Solving $\left(\pi_3^{int} - \pi_3^{nat}\right) = \lambda**$ for g we obtain two solutions, out of which falls out of the admissible range between zero and one. The other solution is given by

$$\tilde{g}_{(2)} = \frac{11c}{4a + 7s + \sqrt{\left(4a - 11c\right)^2 + 56as + 242cs + 49s^2 - 396\left(c + s - 1\right)}} \tag{D2}$$

with $\tilde{g}_{(2)}\left(c = 0\right) = 0$, $\tilde{g}_{(2)}\left(c = 1\right) = 1$ and $0 < \tilde{g}_{(2)} < 1$ if $0 < c < 1$.

part (c): From the comparison of (D1) and (D2) it also follows directly that $0 < \tilde{g}_{(2)} < \tilde{g}_{(1)} < 1$ generally holds if $0 < c < 1$. If $c = 1$, we have $\tilde{g}_{(1)} = \tilde{g}_{(2)} = 1$ so that $g > \tilde{g}_{(1)}$ or $g > \tilde{g}_{(2)}$ can never be true. Similarly, as $c \to 0$ we have $\tilde{g}_{(1)} \to 0$, $\tilde{g}_{(2)} \to 0$, so that $\tilde{g}_{(1)}, \tilde{g}_{(2)}$ will eventually fall short of $\max\left[g_{trade}, g'_{trade}\right]$ and $g < \tilde{g}_{(1)}$ or $g < \tilde{g}_{(2)}$ can no longer be true. $\qquad\square$

Appendix E: Proof of proposition 4

part (a): The producer surplus gain, eq. (15), becomes $\Delta\Pi\left(\lambda***\right) = \frac{1}{2} \cdot \pi_{\{1+2\}}^{nat} - \pi_1^{int}$. This term must be positive with $0 < s < \tilde{s}_{CS}$, since $\frac{1}{2} \cdot \pi_{\{1+2\}}^{nat} > \pi_1^{pre} > \pi_1^{int}$ then follows directly from lemmas 1 and 2.

part (b): Using (24), the net willingness to pay $WTP \equiv \pi_3^{int} - \pi_3^{nat} - \lambda***$ at $g = 1$ is equal to

$$\frac{\left(3 + a - 2c - 2s\right)^2}{9b} - \frac{\left(a + c - 2s\right)^2}{18b} - \frac{\left(a + s - 2c\right)^2}{9b} > 0 \tag{E2}$$

Imposing $0 < s < \tilde{s}_{CS}$, this term is clearly positive. At minimum trade openness $g = g_{trade}$ the term $WTP \equiv \pi_3^{int} - \pi_3^{nat} - \lambda***$ becomes

$$\frac{\left(3 + a - 2c - 2s\right)^2}{9b} - \frac{2 + a^2 - 2s\left(2 + a\right) + 3s^2}{9b} > 0 \tag{E3}$$

which is also positive given $0 < s < \tilde{s}_{CS}$. A similar result holds for $g = g'_{trade}$. That is, the foreign firm is willing to taken over the target at maximum and minimum trade openness for the price $\lambda***$. Furthermore we have $\partial WTP / \partial g = \frac{c}{3bg^3}\left[3c - g\left(a + 2s\right)\right]$. This term can change sign at most once (and from positive to negative) over the range of g. It then follows directly that $\pi_3^{int} - \pi_3^{nat} - \lambda***$ must be positive over the whole admissible range of g. $\qquad\square$

Appendix F: Proof of proposition 5

part (a): This result follows directly because $\Delta\Pi(\lambda^{***}, g=1) > 0$, $\Delta CS(g=1) = 0$, hence $\Delta\Omega(\lambda^{***}, g=1) = \Delta\Pi(\lambda^{***}, g=1) > 0$. This can be verified by noting that

$$\Delta\Omega(\lambda^{***}, g=1) = \frac{(a+c-2s)^2}{18b} - \frac{(a+c+s-3)^2}{9b} > 0 \quad \text{whenever } 0 < s < \tilde{s}_{CS}$$

part (b): At low levels of trade openness (g_{trade}, g'_{trade}) the welfare gain (23) becomes, respectively

$$\Delta\Omega(\lambda^{***}, g = g_{trade}) = \frac{2(2a+1-3s)^2}{81b} + \frac{(2-5a+3s)^3}{162b} - \frac{(2a-c-s)^2 + 2(a+c+s-3)^3}{18b} \quad \text{(F1)}$$

$$\Delta\Omega(\lambda^{***}, g = g'_{trade}) = \frac{(a-s)^2}{4b} - \frac{(2a-c-s)^2}{18b} - \frac{(a+c+s-3)^2}{9b} \quad \text{(F2)}$$

Both expressions (F1) and (F2) may be positive or negative under the imposed parameter restrictions. Using MATHEMATICA one can derive a sufficient condition to ensure that both expressions are negative, namely $1 - s < c < \hat{c} < 1$, where

$$\hat{c} = 2 - s - \frac{1}{3\sqrt{3}} \cdot \sqrt{13a(8-a) - 78as + 45s^2 - 2(23+6s)} \quad \text{(F3)}$$

Provided c is above this threshold, i.e. if $1 - s < \hat{c} < c < 1$, both (F1) and (F2) are positive.

part (c): The comparative statics of the welfare difference can be computed from (23). In particular, we find

$$\frac{\partial\Delta\Omega(\lambda^{***})}{\partial g} = \frac{c(2a-s-c/g)^2}{9b(g)^2} - \frac{c(a-2s+c/g)^2}{9b(g)^2} = \frac{c(a+s-2c/g)}{9b(g)^2} > 0 \quad \text{(F4)}$$

Under the imposed parameter restrictions $0 < s < \tilde{s}_{CS}$, $2 < a < \bar{a}$, $\max\left[g_{trade}, g'_{trade}\right] < g < 1$ and $c + s > 1$. Similarly, one can show that under the imposed parameter restrictions

$$\frac{\partial\Delta\Omega(\lambda^{***})}{\partial s} = -\frac{4a + 3c + c/g - 6 - 2s}{9b} < 0 \quad , \quad \frac{\partial\Delta\Omega(\lambda^{***})}{\partial a} = \frac{6 - a - 4s - c/g}{9b} > 0 \qquad \square$$

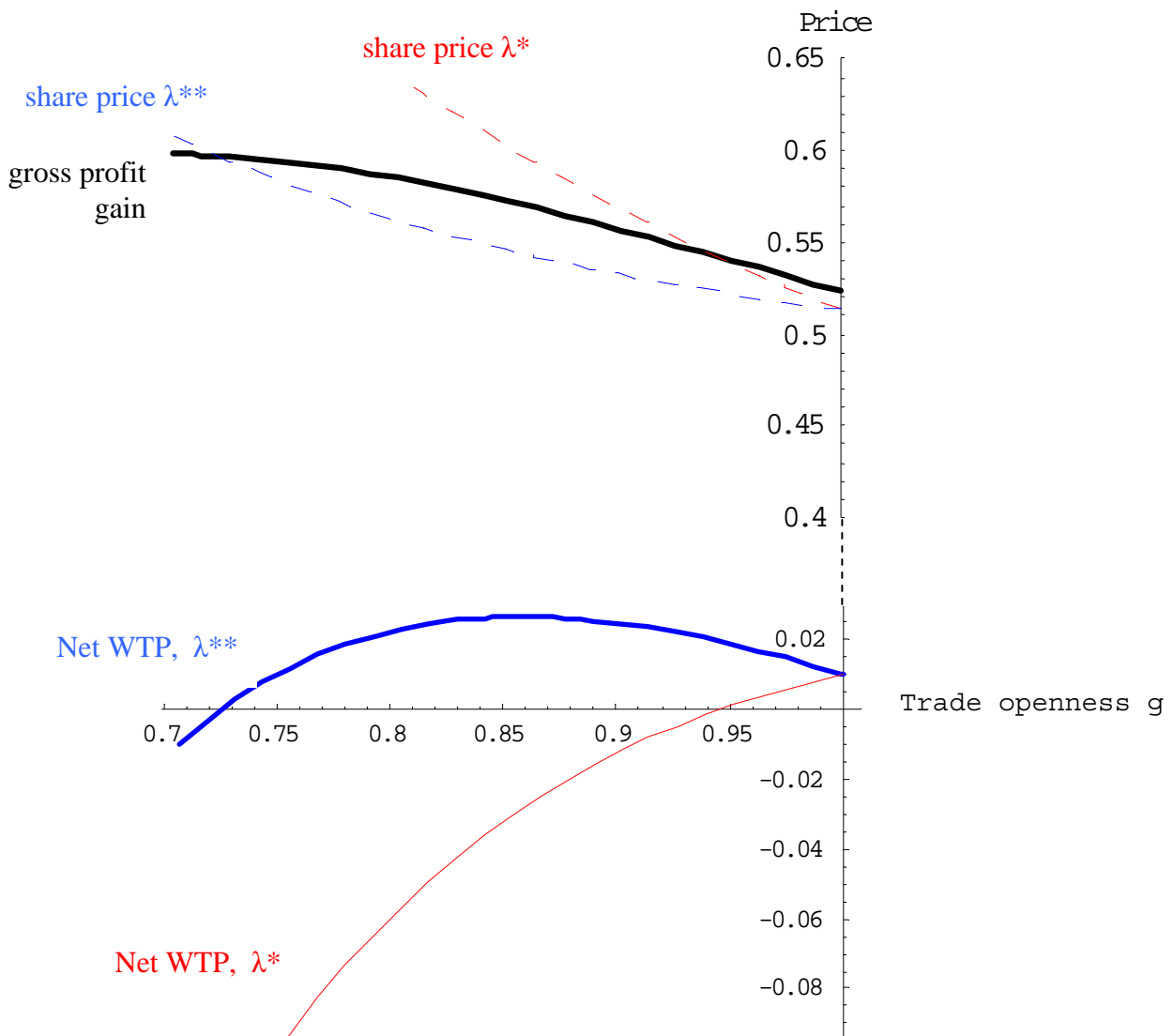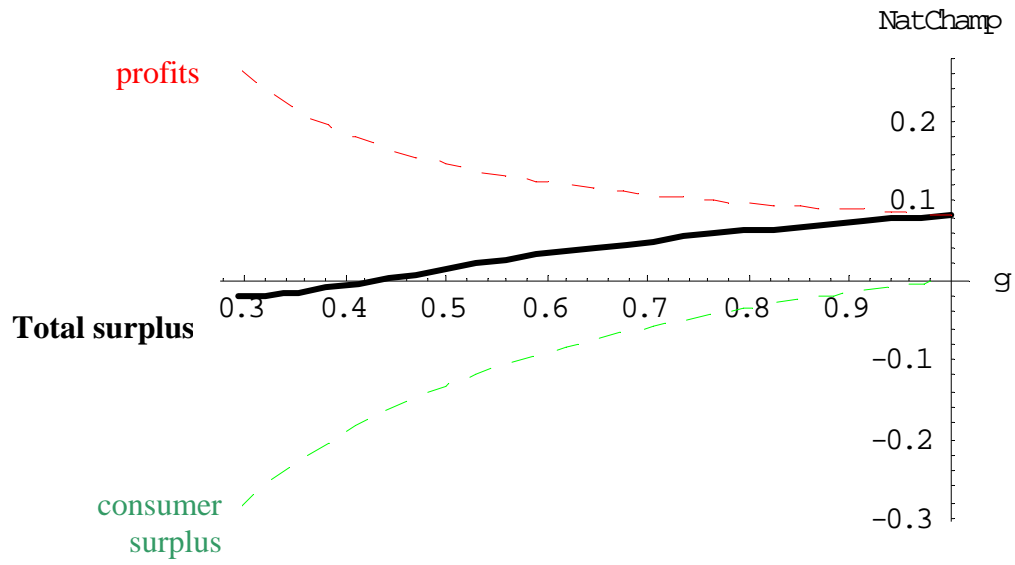# Figure 1: Foreign firm's willingness to takeover at prices λ^*, λ^{**}

share price λ^*

share price λ^{**}

gross profit gain

Price

0.65

0.6

0.55

0.5

0.45

0.4

Net WTP, λ^{**}

0.02

Trade openness g

0.7   0.75   0.8   0.85   0.9   0.95
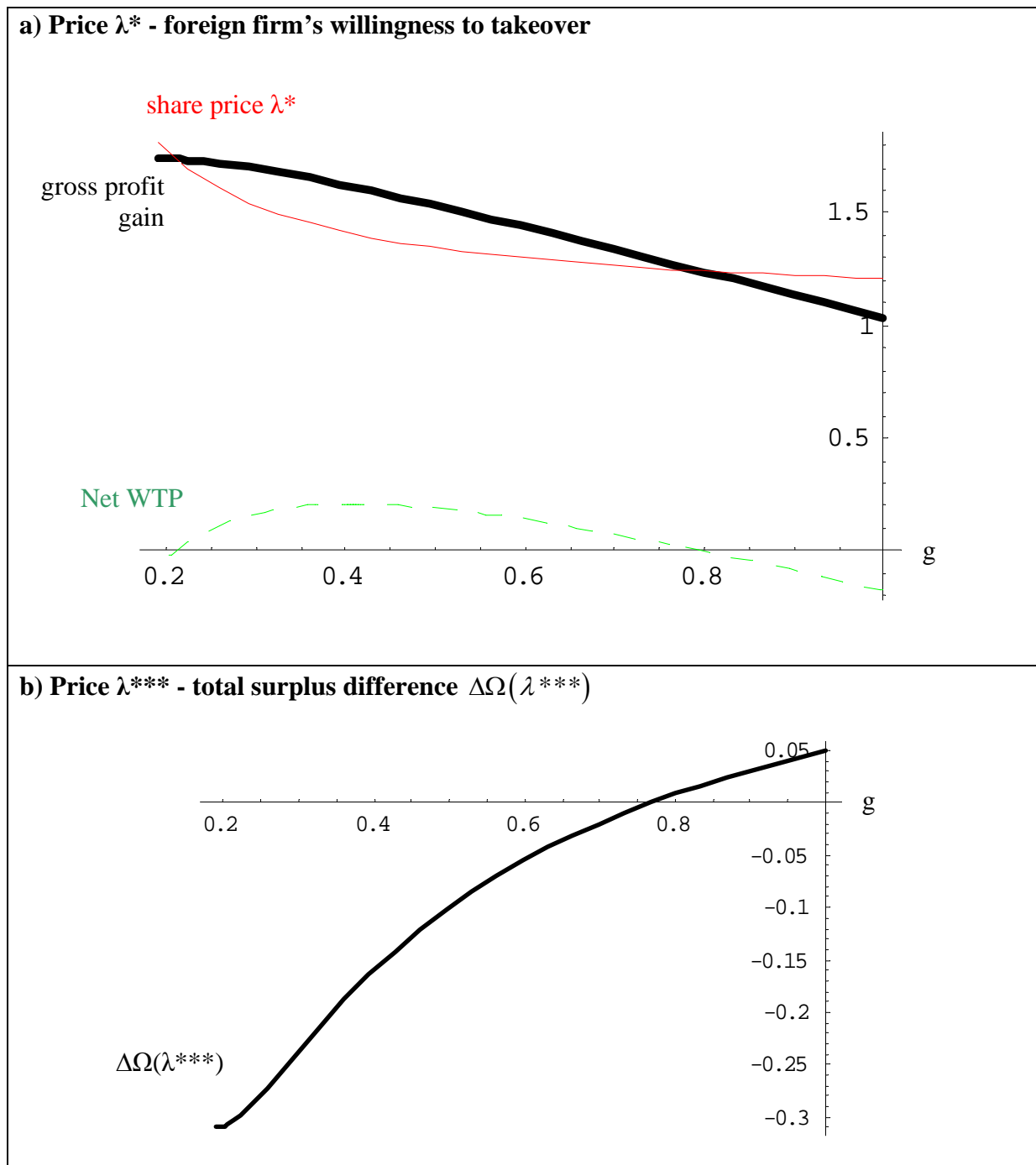
−0.02

−0.04

−0.06

Net WTP, λ^*

−0.08

Figure 2: Gains from a national champion (price λ***)

parameter constellation: $a = 2.1$, $b = 1$, $s = 0.632$, and $c = 0.4$.

$\rightarrow$ admissible trade openness range: $\mathbf{max}\left[g_{trade}, g'_{trade}\right] = 0.2928 < g \leq 1$.

Figure 3: Bertrand case

a) Price λ* - foreign firm's willingness to takeover

b) Price λ*** - total surplus difference $\Delta\Omega(\lambda^{***})$

Parameter values: $\nu = 3.5$, $\gamma = 1/2$, $c = 6/10$, $s = 7/10$ $\rightarrow$ $\max\left[g_{trade}, g'_{trade}\right] \approx 0.189$