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Entrepreneurial Innovations, Entrepreneurship Policy and Globalization

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ENTREPRENEURIAL INNOVATION, ENTREPRENEURSHIP POLICY AND GLOBALIZATION*

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Abstract

What explains the world-wide trend of pro-entrepreneurial policies in the last few decades? We study entrepreneurial policy in a lobbying model taking into account the conflict of interest between entrepreneurs and incumbents. It is shown that international market integration leads to more pro-entrepreneurial policies. It becomes more difficult to protect the profits of incumbent firms from entrepreneurial entry and pro-entrepreneurial policies make foreign entrepreneurs less aggressive. Making use of the Doing Business database, we find, consistent with our theory, evidence that international openness reduces barriers to entry for new entrepreneurs and that the effect is stronger in countries with more rent-seeking governments.

JEL codes: L26; L51; O31; F15; D73

Keywords: Entrepreneurship; Regulation; Innovation; Market Integration; Lobbying

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†Robin sadly passed away in August 2009. His friendship, kindness and talent will be deeply missed.

1. Introduction

In the last few decades, entrepreneurship has emerged as a key issue in the policy arena.[1] This marks a distinct break against traditional industrial policy which has focused on large established firms. The magnitude of the shift towards more pro-entrepreneurial policies is revealed in data from the World Bank's *Doing Business* project. Figure I shows how the costs incurred in the process of a start-up of a new firm, as a share of the country's GDP per capita, in 72 countries have evolved over recent years (Djankov *et. al*, 2002). On average, the cost of starting a new business declined by more than 6 percent per annum over the period 2003-08. Panel B of Figure I shows that the decline among OECD countries has been even more dramatic.

—— [FIGURE I] ——

We propose that the shift towards more pro-entrepreneurial policies can be explained by international market integration. The starting point of the analysis is the process of international integration of product and innovation markets during the last few decades, which has been driven both by policy changes such as WTO agreements (e.g. TRIPS) and the EU single market program, and by technology advances reducing international transportation and transaction costs.

Can international market integration affect entrepreneurship policy? Industrial policy as endogenous outcomes of international integration has previously been studied in the two large literatures on international R&D competition and lobbying for protection; emanating from seminal contributions by Brander and Spence (1983) and Grossman and Helpman (1994). However, these literatures have abstracted from the entrepreneur as a source of innovations. We study the effects of international integration on entrepreneurial policies taking into account the within-country conflict of interest between independent entrepreneurs and incumbent firms. The latter have an incentive to protect their position on the product market and to preserve status quo, they can lobby a policy maker to set a fee (barriers) on entrepreneurial entry.

Comparing policy outcome in autarchy with outcome in a situation where product markets and innovation markets are integrated, we establish two mechanisms that make the policy more pro-entrepreneurial as markets integrate internationally. First, integration implies that

[1] *The Economist* (14th March 2009) recently published a special report on entrepreneurship, "Global Heroes", describing this phenomenon.

incumbents now also face the threat that foreign innovation may challenge their position. This *foreign innovation threat effect* reduces the incentive to lobby for protection against the domestic entrepreneur. Second, integration introduces an interaction between entrepreneurs in different countries since the value of one innovation depends on the presence on rivalling innovations. This *strategic innovation effort effect* tends to push policies in a pro-entrepreneurial direction. The reason is that erecting barriers against the domestic entrepreneur has the negative side effect of making market entry more profitable for foreign innovators.

We also identify counteracting effects of international market integration that could make policies more anti-entrepreneurial. If integration increases incumbents' total profits, this enhances their willingness to pay to protect their market. However, we show that this *market size effect* is dominated by the *foreign innovation threat effect* and the *strategic innovation effort effect* as long as the integrated product market does not become too concentrated due to mergers and exits.

With respect to lobbying, governments differ substantially in how sensitive they are to the interest of less organized agents in the economy, notably consumers. Consumer welfare considerations are likely to induce more pro-entrepreneurial policies, since innovations benefit consumers through lower prices and a higher quality of products. The importance attached to consumer welfare is shown to affect international integration; the more weight a government puts on consumer welfare, the weaker is the reduction in entrepreneurial fees due to integration of markets. This is due to an international *consumer welfare free-riding effect* of foreign innovations.

We test the prediction of a negative relationship between barriers to entry for entrepreneurs and international market integration using the *Doing Business* cost of starting a firm as a measure of entrepreneurship policy. Our theoretical concept of international integration entails both the integration of product markets and innovation markets. Consistent with this, we draw on broad indices of globalization in the empirical analysis, using the kof index, provided by the Swiss Federal Institute of Technology in Zurich, and the csgr index, provided by University of Warwick. Both indices cover more than 120 countries over the period 1999-2004 and combine components of trade flows and foreign direct investment (FDI) flows, data on international personal contacts and information flows and involvement in international organizations.

We find a strong negative correlation between barriers to entry for entrepreneurs and the degree of international integration of the respective countries. More open countries have lower barriers to entry for new firms. This correlation holds within countries over time, also when

controlling for a general time trend. It is also robust to including country-specific measures of general institutional liberalization. We also find evidence that countries with governments that are likely to put less emphasis on consumer welfare (more corrupt countries) reduce their entrepreneurship policies much more in response to an increase in integration.

Moreover, using the fact that ten countries in our sample entered the European Union in 2004, we can devise a difference-in-difference approach. We argue that the selection of new members was exogenous and that new EU-members were integrated on the common market but not forced to reduce barriers to new firm entry. The steep decline in barriers to entry in the ten countries, subsequent to becoming members, can thus be interpreted as a causal effect of integration on entrepreneurship policy.

Innovations introduced by independent entrepreneurs, and the start-up of new firms, play an important role in an economy's innovation system.[2] Indeed, the entrepreneurship literature has proposed that the entrepreneur has returned as a prominent player in the economy's innovation system in the last few decades (Baumol 2002, 2004; Loveman and Sengenberger, 1991). One of the most frequently cited reasons for the increased importance of entrepreneurship is globalization (e.g. Gilbert *et al.*, 2004). The specific link between globalization and actual policy outcome has nevertheless been neglected. We contribute to this literature by providing a theory explaining the pro-entrepreneurial policy shift as a response to international market integration and providing empirical support for the proposed mechanism.

Our paper relates to the literature on international protection for sale (Grossman and Helpman, 1994; Imai, Katayama and Krishna, 2008; Bombardini, 2008; Goldberg and Maggi, 1999).[3] This literature has shown that higher import penetration reduces the incentive for import protection in industries that wield political influence. We differ from this literature by treating the level of trade protection as exogenous. Instead, we focus on the effect of internationalization on incumbents' incentives for protection against domestic entrepreneurial entry. By showing that domestic entry barriers can be lowered due to international integration, we provide an additional channel through which globalization affects economic policy.

[2] Moreover, using a sample period of 1965-1992, Kortum and Lerner (2000) found that VC investments, which support small innovative firms, have a positive impact on patent count at the industry level, and that this positive impact is larger than that of R&D expenditures. Hirukawa and Ueda (2008) find similar results when extending the sample period to 2001.

[3] Our paper is also related to the literature on financial development and internationalization, in particular Rajan and Zingales (2003). They present empirical evidence that openness can explain the development of financial markets over long periods of time. Perotti and Volpin (2007) and Bebchuk and Neeman (2007) formally endogenize investor protection in models with interest groups.

This paper also contributes to the literature on international R&D policy competition (e.g. Brander and Spence, 1983; Eaton and Grossman, 1986; Grossman and Helpman, 1991; Haaland and Kind, 2008; Leahy and Neary, 2008). This literature has explored how international competition affects incentives for governments to subsidize incumbent R&D and has identified a "business stealing effect" that increases the incentive for R&D subsidies when international competition increases. We differ by examining the effects of R&D policy when R&D is conducted by independent entrepreneurs rather than incumbents.[4] We then add to this literature by showing that international market integration can increase the incentive for pro-entrepreneurial policies (e.g. R&D subsidies) due to a foreign innovation threat effect and a strategic innovation effort effect (similar to the business stealing effect) and by providing empirical support for the proposed mechanism.

To the best of our knowledge, this paper provides the first theoretical and empirical work explaining the variation in formal entry barriers over time. The data on entry regulation from the World Bank's *Doing Business* survey has been extensively used in the literature (for an overview, see the Appendix, Table A.2). Primarily, it has been used to study the effect of institutions on growth (Freund and Bolaky, 2008), corruption (Svensson, 2005) and industrial structure and dynamics (Klapper, Laeven and Rajan, 2006; Barseghyan, 2008; Ciccone and Papaopannou, 2007).[5] Although the correlation between openness and entry barriers has been noted in earlier literature, the entry costs have been treated as an exogenous underlying institutional feature.

The model is spelled out in Section 2. Section 3 studies how international market integration affects the incentive to set entrepreneurial policy. We extend the base model in Section 4. The extensions we consider are: (i) policy competition between governments, and (ii) entrepreneurial innovation for sale instead of entry. The empirical analysis is conducted in Section 5. Section 6 concludes the paper.

[4] An exception is Impullitti (2009) which, to our knowledge, is the only paper in the endogenous growth literature studying how R&D subsidies (policy) are affected by international competition, and which allows both entrants and incumbents to undertake R&D. Focusing on long-run dynamic effects, the author solves the model by calibration and shows that increased foreign competition (more foreign firms) increases R&D subsidies due to a business stealing effect (our strategic innovation effort effect) and a growth effect. We differ by focusing on the direct effect which enables us to derive analytical solutions and empirically testable predictions. Moreover, studying the effects of both product market and innovation market integration enables us to identify four different effects of international integration: a foreign innovation threat effect and a strategic innovation effort effect which increase R&D subsidies and a market size effect and a consumer welfare free-riding effect that may reduce R&D subsidies.

[5] Helpman, Melitz and Rubinstein (2008) used entry barriers to construct an instrumental variable for the existence of bilateral trade between two partners. They argue that high entry costs in two countries substantially reduce the probability of the two countries exporting to each other.

2. Entrepreneurship policy in autarchy

We begin by considering an industry in autarchy and then turn to examining the effect of globalization. Consider a closed oligopolistic industry with n domestic incumbents and a domestic entrepreneur who can potentially enter the market. In stage 1, the incumbents and the entrepreneur lobby in order to influence a policy maker. The policy implemented affects the profitability of entrepreneurial ventures through an entry fee. The policy maker's objective is to maximize lobbying contributions and revenues from the entry fee (subsidy). In stage 2, the entrepreneur expends effort to increase the probability of making an innovation with a fixed quality $k > 0$. In stage 3, a successful entrepreneur enters the market and in stage 4, the entrepreneur competes with incumbents on the oligopolistic product market. If the entrepreneur is not successful, incumbents remain in *status quo*. We proceed by solving the game backwards.

2.1. Product market interaction (stage 4)

Firms are indexed $j \in \mathcal{I} \cup E$ where the entrepreneurial firm is assigned the index $j = E$ and the set of index numbers for domestic incumbent firms is $j = i \in \mathcal{I}$. The product market profit of firm j is represented by $\pi_j(\mathbf{x} : k)$, where $k > 0$ is the inherent quality of the innovation used by an entrepreneurial firm. The vector $\mathbf{x}$ contains actions for all firms selling to the product market. Firm j chooses an action $x_j \in R^+$ to maximize its product market profit $\pi_j(\mathbf{x} : k)$. Action x_j may be considered as setting a quantity or a price; exit is equivalent to inaction.

We assume there to exist a unique Nash-Equilibrium, defined as:

$$\pi_j(\tilde{x}_j, \tilde{x}_{-j} : k) \geq \pi_j(x_j, \tilde{x}_{-j} : k), \tag{2.1}$$

where $\tilde{x}_{-j}$ is the set of optimal actions taken by j's rivals. From (2.1), we can define a reduced-form product market profit for a firm j,

$$\pi_j(k) \equiv \pi_j(\tilde{x}_j(k), \tilde{x}_{-j}(k) : k). \tag{2.2}$$

We need to distinguish between two states: one where entrepreneurial entry has occurred and one where all firms are incumbents. When entry by the entrepreneur occurs in stage 3, the interaction involves firms indexed $j \in \mathcal{I} \cup E$. Thus, there are two types of firms: one is the

entrepreneurial firm which is making a profit $\pi_E^{Aut}(k) \geq 0$, and the other is an incumbent firm with a profit $\pi_i^{Aut}(k) \geq 0$. When no entry takes place, incumbents have the profit $\pi_i^{Aut}(0) \geq 0$. The argument $k = 0$ indicates that the entrepreneur has not entered the market.

The profits of both the entrepreneur and the incumbent firms are dependent on the quality of the innovation, k. The innovation enables the entrepreneur to enter the market and make a profit, $\pi_E(k) > F > \pi_E(0)$. But entry will also reduce the incumbents' profit and possibly lead to exits of incumbents. As the quality of the innovation improves, the entrepreneurial firm will strengthen its position vis-à-vis incumbent firms, which will further reduce the incumbents' profits and possibly lead to further exit. Let $\Pi_I(0) = \sum_i^n p_i(0)\pi_i(0)$ be the expected aggregate incumbent profit where $p_i(0)$ is the probability that incumbent i remains on the market. Moreover, let $\Pi_I(k) = \sum_i^n p_i(k)\pi_i(k)$ be the expected aggregate incumbent profit where $p_i(k)$ is the probability that incumbent i remains on the market under entry. We then assume that incumbents' aggregate expected profits are reduced by entrepreneurial entry, $\Pi_I^{Aut}(0) > \Pi_I^{Aut}(k)$. Thus, the aggregate expected profit of incumbent firms will be smaller if the entrepreneur participates in the product market competition. This yields incentives for incumbents to lobby against innovation.

2.2. Entry by entrepreneur (stage 3)

In stage 3, a successful entrepreneur enters the market if the fixed cost of entry F is lower than the subsequent product market profit. In what follows, we will assume k to be sufficiently large so that entry always occurs when the entrepreneur succeeds with its innovation, $\Pi_E^{Aut}(k) = \pi_E^{Aut}(k) - F > 0$.

2.3. Innovation (stage 2)

The entrepreneur undertakes an effort, e, to discover an innovation with fixed quality, k. Let innovation costs $y(e)$ be an increasing convex function in effort, i.e. y', $y'' > 0$. The probability of making an innovation is given by a function $z(e) \in [0, 1]$, where z is an increasing concave function in own effort, $z' > 0$, $z'' < 0$. Inactivity is a feasible action for the entrepreneur with $z(0) = 0$ and $y(0) = 0$. The entrepreneur makes an effort decision given an entry fee policy τ set by the government policy in stage 1. The policy reduces the profit by a fixed amount τ, if the entrepreneur innovates successfully. A fixed τ is assumed since it fits our empirical data. Alternatively, we could set τ to be proportional to entrepreneurial profits. This adds a scaling

effect, but does not change any signs of our results.[6]

The entrepreneur then solves the following problem,[7]

$$\max_{e} : W_E = z(e)\left[\Pi_E^{Aut}(k) - \tau\right] - y(e), \tag{2.3}$$

with the first-order condition:

$$\frac{dW}{de} = z'_e\left[\Pi_E^{Aut}(k) - \tau\right] - y'_e = 0, \tag{2.4}$$

which implicitly defines an optimal effexort level $e(\tau)$. The optimal effort level is decreasing in the entry fee, $e'_\tau < 0$.[8] Since $z(\tau) = z(e(\tau))$, with $z'_\tau = z'_e e'_\tau < 0$, the probability of a successful innovation is also decreasing in the entry fee.

To proceed, it will be useful to define the reduced-form expected profits for the entrepreneur and the incumbents, respectively, as a function of the entry fee τ:

$$\begin{cases} W_E^{Aut}(\tau) = z(\tau)\left[\Pi_E^{Aut}(k) - \tau\right] - y(\tau), \\ W_I^{Aut}(\tau) = \left[1 - z(\tau)\right]\Pi_I^{Aut}(0) + z(\tau)\Pi_I^{Aut}(k). \end{cases} \tag{2.5}$$

2.4. Entrepreneurial policy (stage 1)

We will assume a rent maximizing government (in Section 3.6 we will examine the case of a total surplus maximizing government). The objective function of the policy maker G is the sum of social welfare and the sum of lobbying contributions from entrepreneurs and incumbents:

$$G = W(\tau) + \sum_{h=I,E} L_h(\tau), \tag{2.6}$$

where $W(\tau) = \tau z(\tau)$, i.e. social welfare is simply the government expected income from entry fees. We assume that incumbent firms can organize themselves as an interest group and make a joint lobbying contribution. Hence, the entrepreneur and the incumbent lobbying group give the government a contribution schedule, $L_E(\tau)$ and $L_I(\tau)$, respectively. For all values of τ, these schedules give the lobbying contribution each party is willing to pay.

The lobbying contribution from group h, $L_h(\tau)$, is derived as follows. Let $G_{-h}(\tau) =$

[6] Derivations are available from the authors upon request.

[7] Note that the entrepreneur's profit is reduced by the amount spent on lobbying. In stage 2, this is a sunk cost which does not enter into the entrepreneur's problem.

[8] Which directly follows from differentiation of (2.4) and the assumptions on $z(.)$ and $y(.)$.

$L_{-h}(\tau)+W(\tau)$ be the government's objective function when group h does not lobby, and define the optimal fee for the policy maker without group being h present as $\tau_{-h}^{Gov} = \arg\max_\tau G_{-h}(\tau)$. Then, group h can only induce the government to choose another policy $\tau \neq \tau_{-h}^{Gov}$ by compensating the government by an amount:

$$C_h(\tau) = G_{-h}(\tau_{-h}^{Gov}) - G_{-h}(\tau). \tag{2.7}$$

Given the lobbying contribution offered by the other lobby group, the optimal entry fee for group h is then $\tau_h^{opt} = \arg\max_\tau W_h^{Aut}(\tau) - C_h(\tau)$, where $W_h^{Aut}(\tau)$ is given from (2.5). Which lobbying contribution will then be chosen? We will restrict the lobbying contributions to be "regret free" or "truthful". This implies that we restrict the set of possible lobbying offers $L_h(\tau)$ to those for which a lobby group gets at least its optimal net welfare, $\bar{\Omega}_h = W_h^{Aut}(\tau_h^{opt}) - C(\tau_h^{opt})$, or:

$$W_h^{Aut}(\tau) - L_h(\tau) = W_h^{Aut}(\tau_h^{opt}) - C(\tau_h^{opt}) = \bar{\Omega}_h. \tag{2.8}$$

Given that the contributions $L_h(\tau)$ are such that the entrepreneur ($h = E$) and the incumbent firms ($h = I$) are both indifferent between the offered fee τ and their optimal fees τ_h^{opt}, (2.8) constitutes a Nash-equilibrium in offered lobbying schedules (Bernheim and Whinston, 1986; Grossman and Helpman, 1994). From (2.8), we can now solve for the equilibrium lobbying contribution $L_h(\tau)$:

$$L_h(\tau) = W_h^{Aut}(\tau) - \bar{\Omega}_h. \tag{2.9}$$

Inserting (2.9) into (2.6), we can rewrite the objective function as:

$$G(\tau) = \tau z(\tau) + W_I^{Aut}(\tau) + W_E^{Aut}(\tau) - \bar{\Omega}_I^{Aut} - \bar{\Omega}_E^{Aut}. \tag{2.10}$$

The policy maker sets a fee τ so as to maximize $G(\tau)$ and thereby, from (2.9), implicitly also the lobbying contributions of the entrepreneur, $L_E(\tau)$, and the incumbent firms, $L_I(\tau)$. The first-order condition of (2.10), using (2.5) and taking into account the optimal effort by the entrepreneur in (2.4), is:

$$\frac{dG}{d\tau} = \underbrace{z'_\tau \tau}_{\text{Exp. loss (fee)}} \quad \underbrace{-z'_\tau \left[\Pi_I^{Aut}(0) - \Pi_I^{Aut}(k)\right]}_{\text{Exp.gain (incumbents)}} = 0. \tag{2.11}$$

An increase in entry fees will reduce the entrepreneurial effort and hence, decrease the proba-

bility of a successful innovation, $z'_\tau = z'_e e'_\tau < 0$. The first term reflects the consequences of this in terms of reduced policy revenues, $z'_\tau \tau^{Aut} < 0$. The second term represents the increase in the incumbents' expected profit and hence, the increase in lobbying contributions from incumbents, when the probability of a successful innovation (and hence of entrepreneurial entry) declines, $-z'_\tau n \left[\pi_I^{Aut}(0) - \pi_I^{Aut}(k)\right] > 0$. From (2.11), we obtain the optimal policy in autarchy:

$$\tau^{Aut} = \Pi_I^{Aut}(0) - \Pi_I^{Aut}(k) > 0. \tag{2.12}$$

In autarchy the fee will, in other words, be set equal to the loss of incumbents caused by an innovation.

3. Globalization and barriers to entrepreneurship

Let us now examine the impact of globalization on the optimal entry fees, τ. For expositional reasons, we first model the optimal entry fee in one country, taking the entrepreneurial policy in the rest of the world as given, $\bar{\tau}^*$. This assumption is relaxed in Section 3.5. We capture globalization as an integration of product and innovation markets. Product market integration is modeled as competition between firms, domestic and foreign, on an integrated product market. Innovation market integration is captured by competition between domestic and foreign entrepreneurs for making innovations and thus a subsequent market entry. We will assume that entrepreneurial entry on the integrated product market requires a global patent for the innovation, k. Even if entrepreneurs from both countries are successful, only one of them will obtain a global patent (and enter the product market). This patent right is then allocated by a 50-50 lottery. Other assumptions that we impose are that neither incumbents nor entrepreneurs can engage in cross-border lobbying and that the policy makers in the two countries are not able to cooperate. We discuss the effects of cross-border lobbying in Section 4.1.

3.1. Integration of product markets (stage 4)

In the integrated product market, let the set of indices for foreign incumbents and the entrepreneur be denoted I^* and E^*, while I and E represent domestic incumbents and the entrepreneur, respectively. Product market competition may then entail firms indexed $j \in I \cup I^*$, $j \in I \cup I^* \cup E$

or $j \in I \cup I^* \cup E^*$. In either case, the Nash-equilibrium is given as:

$$\pi_j^{Int}(\tilde{x}_j, \tilde{x}_{-j} : k) \geq \pi_j^{Int}(x_j, \tilde{x}_{-j} : k), \tag{3.1}$$

from which we define a reduced-form profit $\pi_j^{Int}(k) \equiv \pi_j^{Int}(\tilde{x}_j(k), \tilde{x}_{-j}(k) : k)$. In what follows, we will once more assume that incumbents' aggregate expected profits are reduced by entry, i.e. $\Pi_I^{Int}(0) > \Pi_I^{Int}(k)$.

3.2. Entry (stage 3)

In stage 3, a successful entrepreneur enters the market at a fixed cost. It is once more assumed that $\Pi_E^{Int}(k) = \pi_E^{Int}(k) - F > 0$ if the domestic entrepreneur is successful, and $\Pi_{E^*}^{Int}(k) = \pi_{E^*}^{Int}(k) - F^* > 0$ if a foreign entrepreneur is successful.

3.3. Entrepreneurial innovation (stage 2)

The domestic and foreign entrepreneur both expend effort to innovate. Let the effort by the foreign entrepreneur be denoted e^*. The foreign entrepreneur's probability of success is determined by the same function as that of the domestic entrepreneur, $z(\cdot)$. We can then write the probability that the domestic entrepreneur successfully enters as $z_E^{win}(e, e^*) = z(e)\left[1 - z(e^*)\right] + 0.5z(e)z(e^*)$, where $z(e)\left[1 - z(e^*)\right]$ is the probability of entry if the domestic entrepreneur alone is successful and $0.5z(e)z(e^*)$ is the probability of the domestic entrepreneur winning the lottery in case of simultaneous innovations. Simplifying, we obtain $z_E^{win}(e, e^*) = z(e)\left[1 - 0.5z(e^*)\right]$. The probability that the foreign entrepreneur enters the integrated market is symmetric, $z_{E^*}^{win}(e, e^*) = z(e^*)\left[1 - 0.5z(e)\right]$.

In the integrated market, we can write the entrepreneurs' maximization problems as follows:

$$\max_e W_E = z_E^{win}(e, e^*)\left[\Pi_E^{Int}(k) - \tau\right] - y(e), \tag{3.2}$$

$$\max_{e^*} W_{E^*} = z_{E^*}^{win}(e, e^*)\left[\Pi_E^{Int}(k) - \bar{\tau}^*\right] - y(e^*). \tag{3.3}$$

The Nash-equilibrium in efforts is given from:

$$\frac{\partial W_E}{\partial e} = z_e'(1 - 0.5z^*)\left[\Pi_E^{Int}(k) - \tau\right] - y_e' = 0, \tag{3.4}$$

$$\frac{\partial W_{E^*}}{\partial e^*} = z_{e^*}'(1 - 0.5z^*)\left[\Pi_{E^*}^{Int}(k) - \bar{\tau}^*\right] - y_{e^*}' = 0. \tag{3.5}$$

From (3.4) and (3.5), the optimal entrepreneurial efforts can be derived as functions of the domestic entry fee, $e(\tau)$ and $e^*(\tau)$. In the Appendix, we show that (3.4) and (3.5) imply that entrepreneurial efforts e and e^* are strategic substitutes:[9] more effort expended by the foreign entrepreneur, e^*, reduces the effort of the domestic entrepreneur, e. It also follows that an increase in the entry fee τ for the domestic entrepreneur must reduce the optimal effort by the domestic entrepreneur, while increasing the optimal effort of its foreign rival, $e'_\tau < 0$ and $e^{*\prime}_\tau > 0$. Noting that $z(\tau) = z(e(\tau))$ and $z^*(\tau) = z(e^*(\tau))$, and assuming that the stability criteria of the Nash-equilibrium in (3.4) and (3.5) are met, we have the following result:

Lemma 1. *Increasing the entry fee τ for the domestic entrepreneur increases the effort by the foreign entrepreneur and the probability of foreign entry, while decreasing the effort level and the probability of domestic entry, $z'^*_\tau = z'_{e^*} e^{*\prime}_\tau > 0$ and $z'_\tau = z'_e e'_\tau < 0$.*

Proof. See the Appendix. ■

Once more, it will be useful to define a reduced-form expected profit for the entrepreneur and the incumbents as a function of the entry fee, τ. Let $z_E^{win}(\tau)$ be the reduced-form probability that the domestic entrepreneur wins and let $z^{entry}(\tau)$ be the reduced-form probability that either the domestic or the foreign entrepreneur enters the product market:

$$\begin{cases} z_E^{win}(\tau) = z(e(\tau))\left[1 - 0.5z(e^*(\tau))\right] \\ z^{entry}(\tau) = 1 - \left[1 - z^*(\tau)\right]\left[1 - z(\tau)\right]. \end{cases} \tag{3.6}$$

We then have:

$$\begin{cases} W_E^{Int}(\tau) = z_E^{win}(\tau)\left[\Pi_E^{Int}(k) - \tau\right] - y(\tau), \\ W_I^{Int}(\tau) = \left[1 - z^{entry}(\tau)\right]\Pi_I^{Int}(0) + z^{entry}(\tau)\Pi_I^{Int}(k). \end{cases} \tag{3.7}$$

3.4. Entrepreneurial Policy (Stage 1)

In the integrated market, each government maximizes the sum of social welfare and the sum of lobbying contributions from entrepreneurs and incumbents, choosing its entry fee taking as given the entry fee of the other government. To highlight the effects of globalization, assume that only domestic firms can lobby against the domestic policy maker. As previously mentioned, for expositional reasons we first model the optimal entry fee in one country taking the

[9] If entrepreneurial effort instead involved spill-overs, thus enhancing the performance of the other entrepreneur, we could have a situation where entrepreneurial efforts are strategic complements. This would change the sign on the *strategic innovation effort effect* discussed in the next subsection .

entrepreneurial policy in the rest of the world as given, $\bar{\tau}^*$. These assumptions are relaxed below.

The lobbying game then has the same structure as in autarchy. Thus, in integrated markets, the objective function of the policy maker in (2.10) now becomes:

$$\max_{\tau} G = z_E^{win}(\tau)\tau + W_I^{Int}(\tau) + W_E^{Int}(\tau) - \bar{\Omega}_I^{Int} - \bar{\Omega}_E^{Int}, \tag{3.8}$$

where (with a slight abuse of notation) $\bar{\Omega}_h^{Int} = W_E^{Int}(\tau_h^{opt}) - C_h(\tau_h^{opt})$ are constants defined as the optimal (net) profit for the entrepreneur and the incumbent lobby.

Using the entrepreneur's optimality condition (3.4), the reduced-form probabilities in (3.6) and (3.7), the policy maker's first-order condition is:

$$\begin{aligned} \frac{\partial G}{\partial \tau} \quad = \quad & \underbrace{z'_\tau(1-0.5z^*)\tau}_{\text{Expected loss (fees)}} \quad \underbrace{-z'_\tau(1-z^*)\left[\Pi_I^{Int}(0) - \Pi_I^{Int}(k)\right]}_{\text{Expected gain (incumbents)}} \\ & \underbrace{-z^{*\prime}_\tau(1-z)\left[\Pi_I^{Int}(0) - \Pi_I^{Int}(k)\right]}_{\text{Expected loss (incumbents)}} - \quad \underbrace{0.5z^{*\prime}_\tau z \Pi_E^{Int}(k)}_{\text{Expected loss (entrepreneur)}} = 0. \end{aligned} \tag{3.9}$$

To infer the effect of globalization on entrepreneurial policy, it is instructive to compare the first-order condition under integrated markets in (3.9) to that under autarchy in (2.11).

The first line in (3.9) once more reflects the trade-off between a lower expected income from the entry fee and the increase in lobbying contributions from incumbents (when the domestic entrepreneur reduces her innovation effort in response to an increase in the fee). However, as compared to autarchy, both effects are discounted by the presence of the foreign entrepreneur, where we note that the gain in the lobby contributions is more heavily discounted than the loss in entry fees, since $(1-0.5z^*) > (1-z^*)$. The key is that incumbents lose their "gain" from domestic lobbying each time the foreign entrepreneur is successful, whereas the loss in entry fee will not be eliminated each time the foreign entrepreneur is successful, since it might lose the lottery against the domestic entrepreneur if it is also successful. This is what we refer to as the *foreign innovation threat effect*.

The second line in (3.9) adds new effects as compared to autarchy. Both represent reductions in lobby contributions due to the presence of the foreign entrepreneur. We refer to them as *strategic innovation effort effects*. The first term in the second line represents a decrease in lobbying contributions from incumbents, emerging from the fact that increasing the entry fee increases the effort by the foreign entrepreneur and hence, the probability of a foreign innovation.

The second term captures an incentive for the entrepreneur to lobby more to avoid the risk of losing the patent lottery. The entrepreneur has an incentive to lobby for low fees, committing to a high effort in stage 2 and thus keeping down the effort of the foreign entrepreneur.

Let us now examine if integration reduces entry barriers. From (3.9), we can solve for the entry fee under integration and compare it to the autarchy fee in (2.12):

$$\tau^{Aut} - \tau^{Int} = \underbrace{\left[\Pi_I^{Aut}(0) - \Pi_I^{Aut}(k)\right]}_{(+)} - \{\underbrace{\lambda_I}_{\in(0,1)} \underbrace{\left[\Pi_I^{Int}(0) - \Pi_I^{Int}(k)\right]}_{(+)} + \underbrace{\lambda_E}_{(-)} \Pi_E^{Int}(k)\}. \tag{3.10}$$

In (3.10), the first term spells out the entry fee under autarchy while the second term is the entry fee under integration. In the integrated market, the entry fee trades off the reduction in incumbents' profit and the creation of entrepreneurial rents. Note that in the integrated market, the reduction in incumbents' profits is discounted by the term $\lambda_I = \frac{z'_\tau(1-z^*)+z^{*\prime}_\tau(1-z)}{z'_\tau(1-0.5z^*)}$. Since $z^{*\prime}_\tau > 0 > z'_\tau$ and $z, z^* \in [0,1]$, it follows that $\lambda_I \in (0,1)$. The term λ_I reflects a reduction in lobby contributions from incumbents which realize that stopping the domestic entrepreneur is worth less due to the probability of foreign entry. Moreover, attempts at decreasing the innovation effort of the domestic entrepreneur have the negative side effect of amplifying the risk of foreign entry. The term $\lambda_E = \frac{0.5z^{*\prime}_\tau z}{z'_\tau(1-0.5z^*)} < 0$ reflects the fact that entry fees are kept down by lobbying contributions from the domestic entrepreneur which has an incentive to avoid losing a patent lottery against the foreign entrepreneur.

From (3.10), we can state the following proposition.

Proposition 1. *If incumbent losses from entry in the integrated market $\Pi_I^{Int}(k) - \Pi_I^{Int}(0)$ are not substantially larger than incumbent losses from entry in autarchy $\Pi_I^{Aut}(k) - \Pi_I^{Aut}(0)$ then, due to a foreign innovation threat effect and a strategic innovation effort effect, entry barriers will be lower in the integrated market, $\tau^{Aut} - \tau^{Int} > 0$.*

Proof. Using (2.12) and (3.10), we can rewrite $\tau^{Aut} - \tau^{Int} > 0$ as:

$$\frac{\Pi_I^{Int}(k) - \Pi_I^{Int}(0)}{\Pi_I^{Aut}(k) - \Pi_I^{Aut}(0)} < \zeta = \frac{1}{\lambda_I} - \frac{\lambda_E}{\lambda_I} \frac{\Pi_E^{Int}(k)}{\Pi_I^{Aut}(k) - \Pi_I^{Aut}(0)} > 1, \tag{3.11}$$

where $\zeta > 1$ follows from noting that $\lambda_I = \frac{z'_\tau(1-z^*)+z^{*\prime}_\tau(1-z)}{z'_\tau(1-0.5z^*)} \in (0,1)$ and $\lambda_E = \frac{0.5z^{*\prime}_\tau z}{z'_\tau(1-0.5z^*)} < 0$. ■

Proposition 1 suggests that international integration will reduce the barriers to entry for entrepreneurs since such barriers, all else equal, promote opportunistic behavior by foreign

entrepreneurs and reduce the lobby contributions of incumbents. The influence by the foreign entrepreneur may lead to lower entry barriers in integrated markets than in autarchy, even when incumbents' losses from entry is higher in the integrated market.

Whether incumbent losses from entry are higher in the integrated market than in autarchy depends on the underlying assumptions made in the oligopoly model. Below, we will provide a linear Cournot model where (3.11) is fulfilled and $\tau^{Aut} - \tau^{Int} > 0$. We will also use this model to show the existence of Nash-equilibrium in entry fees τ^{Int} and τ^{Int^*} such that $\tau^{Int} = \tau^{Int^*} < \tau^{Aut}$. Moreover, we will show that if international integration is followed by a sufficiently large product market concentration due to mergers or exit, international integration will increase the entry barriers, i.e. $\tau^{Aut} - \tau^{Int} < 0$.

3.5. A parametric example

In the Linear-Cournot model (LC-model), there are two symmetric countries, each with n incumbents. The oligopoly interaction in period 4 is Cournot competition in homogenous goods. The product market profit is $\pi_j^m = (P^m - c_j)q_j^m$ where firms face inverse demand $P^m = a - \frac{1}{s^m}\sum_{j=1}^{N^m} q_j$, for $m = \{Aut, Int\}$, where $a > 0$ is a demand parameter, s^m may be interpreted as the size of the market with $s^{Aut} = s$ and $s^{Int} = 2s$. N^m is the total number of firms in the market. There are no exits of incumbents. Thus, in autarchy, $N(k)^{Aut} = n + 1 > N(0)^{Aut} = n$, whereas in the integrated market, $N^{Int}(k) = 2n + 1 > N^{Aut}(0) = 2n$.

Ownership of the innovation reduces the marginal cost. Making a distinction between firm types, we have:

$$c_I = c, \qquad c_E = c - k. \tag{3.12}$$

In the LC model, (3.1) and (2.2) take the form $\frac{\partial \pi_j^m}{\partial q_j} = P^m - c_j - \frac{q_j^m}{s} = 0 \; \forall j$, $m = Aut, Int$, which can be solved for optimal quantities $\tilde{q}^m(k)$ under entry and $\tilde{q}^m(0)$ without entry. Since $\frac{\partial \pi_j^m}{\partial q_j} = 0$ implies $P^m - c_j = -\frac{q_j^m}{s^m}$, reduced-form profits are quadratic in own output, $\pi_j^m(k) = \frac{1}{s^m}\left[\tilde{q}_j^m(k)\right]^2$ and $\pi_j^m(0) = \frac{1}{s^m}\left[\tilde{q}_j^m(0)\right]^2$, with optimal quantities given as:

$$\begin{gathered}
\tilde{q}_E^{Aut}(k) = s\tfrac{\Lambda+(n+1)k}{n+2} \qquad \tilde{q}_j^{Aut}(k) = s\tfrac{\Lambda-k}{n+2} \qquad \tilde{q}_j^{Aut}(0) = s\tfrac{\Lambda}{n+1} \\
\tilde{q}_E^{Int}(k) = 2s\tfrac{\Lambda+(2n+1)k}{2n+2} \quad \tilde{q}_j^{Int}(k) = 2s\tfrac{\Lambda-k}{2n+2} \quad \tilde{q}_j^{Int}(0) = 2s\tfrac{\Lambda}{2n+1},
\end{gathered} \tag{3.13}$$

where $\Lambda = a - c$. We have the following Lemma:

Lemma 2. *In the linear Cournot model with symmetric countries and with $\bar{\tau}^*$ being exogenous,* $\Pi_I^{Aut}(k) - \Pi_I^{Aut}(0) > \Pi_I^{Int}(k) - \Pi_I^{Int}(0)$*, which from (3.11) implies that* $\tau^{Aut} - \tau^{Int} > 0$.

Proof. See the Appendix. ■

By assuming a parametric form of the probability and cost functions that enter into the entrepreneur's problem, we can extend the linear Cournot model to derive a full solution to the model by solving the entry fee game between governments.

Assumption A1: The probability of a successful innovation and the effort cost is determined by $z(e) = 1 - \exp(-\gamma e^2)$ and $y(e) = \theta e^2$ for the domestic entrepreneur, and $z(e^*) = 1 - \exp(-\gamma e^{*2})$ and $y(e^*) = \theta e^{*2}$ for the foreign entrepreneur.

Assume that Assumption A1 holds. In stage 4, optimal quantities are then given from (3.13). In the integrated market, (3.4) and (3.5) give the useful relation $\frac{z_\tau'^*}{z_\tau'} = -\frac{(1-z^*)}{(2-z)}$ in stage 2. Reduced form probabilities will now include both the domestic and the foreign entrepreneurship policy:

$$\begin{cases} z_E^{win}(\tau,\tau^*) = z(e(\tau,\tau^*))\left[1 - 0.5z(e^*(\tau,\tau^*))\right] \\ z_{E^*}^{win}(\tau,\tau^*) = z(e^*(\tau,\tau^*))\left[1 - 0.5z(e(\tau,\tau^*))\right] \\ z^{entry}(\tau,\tau^*) = 1 - \left[1 - z^*(\tau,\tau^*)\right]\left[1 - z(\tau,\tau^*)\right]. \end{cases} \tag{3.14}$$

Turning to government policies in stage 1, and assuming truthful lobbying contributions, the objective functions of the domestic and foreign government are:

$$G(\tau,\tau^*) = z_E^{win}(\tau,\tau^*)\tau + W_I^{Int}(\tau,\tau^*) + W_E^{Int}(\tau,\tau^*) - \bar{\Omega}_I^{Int}(\tau^*) - \bar{\Omega}_E^{Int}(\tau^*), \tag{3.15}$$

and:

$$G^*(\tau,\tau^*) = z_{E^*}^{win}(\tau,\tau^*)\tau^* + W_{I^*}^{Int}(\tau,\tau^*) + W_{E^*}^{Int}(\tau,\tau^*) - \bar{\Omega}_{I^*}^{Int}(\tau) - \bar{\Omega}_{E^*}^{Int}(\tau). \tag{3.16}$$

The constants entering the domestic government's problem, $\bar{\Omega}_h^{Int}(\tau^*) = W_h^{Int}(\tau_h^{opt},\tau^*) - C_h(\tau_h^{opt},\tau^*)$ and the foreign government's problem, $\bar{\Omega}_{h^*}^{Int}(\tau) = W_{h^*}^{Int}(\tau_h^{opt},\tau) - C_{h^*}(\tau_{h^*}^{opt},\tau)$, only depend on the policy in the other country. Hence, these will drop out of the first-order conditions of the two governments. The expected profits, $W_h^{Int}(\tau,\tau^*)$ and $W_{h^*}^{Int}(\tau)$, are as in (3.7), but with probabilities depending on the policies in both countries, as shown in (3.14). Deriving the re-

action functions $\tau(\tau^*) = \arg\max_\tau G(\tau, \tau^*)$ and $\tau^*(\tau) = \arg\max_{\tau^*} G^*(\tau, \tau^*)$ and solving for τ and τ^*, we then have the following proposition:

Proposition 2. *In the linear Cournot model with symmetric countries and under Assumption A1, (i) the entrepreneurship policies are strategic complements, i.e.* $\frac{d\tau}{d\tau^*} > 0$ *and (ii) there exists a symmetric equilibrium* τ^{Int} *and* τ^{Int^*} *such that* $\tau^{Int} = \tau^{Int^*} < \tau^{Aut}$.

Proof. See the Appendix. ■

The propositions have hitherto been conditional on incumbents' losses due to an innovation being smaller in autarchy than in integrated markets. This hinges on assumptions regarding the relative size of the domestic and the foreign market and on the number of firms relative to market size in autarchy and in integrated markets. The larger is size of the foreign market and the fewer firms that serve it in autarchy, relative to the home country, the more likely is it that this assumption is violated. Moreover, as an implication of heterogeneous firms in a Melitz (2003) model, aggregate profit among incumbent firms may increase when markets are integrated.[10] To make this point in our Cournot model, assume that integration is followed by a sufficiently large product market concentration due to mergers or exit, leading to $m < 2n$ active firms in the international integrated markets. We can then derive the following result:

Proposition 3. *In the linear Cournot model under Assumption A1, there exists a* $\hat{m}$, $\hat{n}$ *and* $\hat{k}$ *such that for* $0 < m < \hat{m}$, $n > \hat{n}$ *and* $0 < k < \hat{k}$: $\tau^{Int} > \tau^{Aut}$.

Proof. See the Appendix. ■

3.6. A total surplus maximizing government

Let us now relax the assumption of a rent maximizing government. To highlight the effects, we once more take the foreign policy as given. Starting with autarchy, we then let social welfare be $W(\tau) = \tau z(\tau) + \alpha\{z(\tau)CS^{Aut}(k) + [1 - z(\tau)]CS^{Aut}(0)\}$, i.e. social welfare is the government expected income from entry fees and the expected consumer surplus where $CS^{Aut}(0)$ denote the consumer surplus in the pre-innovation state and $CS(k)$ the consumer surplus with entrepreneurial firm entry and α is a preference parameter that shifts the importance attached

[10] We have abstracted from coordination problems in the formation of a lobbying group. Taking this into account it is possible that the total amount of lobbying contributions from incumbents increase, if the number of incumbent firms is reduced, even if aggregate profit decreases.

to consumer welfare. Proceeding as in Section 3.4, the government's objective function in (2.10) now becomes:

$$\begin{aligned}\max_{\tau} G(\tau) &= \tau z(\tau) + W_I^{Aut}(\tau) + W_E^{Aut}(\tau) - \bar{\Omega}_I^{Aut} - \bar{\Omega}_E^{Aut} \\ &\quad + CS^{Aut}(0) + \alpha z(\tau)[CS^{Aut}(k) - CS^{Aut}(0)].\end{aligned} \tag{3.17}$$

It is reasonable to assume that $CS^{Aut}(k) > CS^{Aut}(0)$, if an innovation implies lower production costs, or higher quality products and if, at the same time, competition increases as a new firm enters the product market competition. Turning to the integrated market, a symmetric argument gives that the policy maker's objective function in integrated markets (3.8) becomes:

$$\begin{aligned}\max_{\tau} G(\tau) &= \tau z_E^{win}(\tau) + W_I^{Int}(\tau) + W_E^{Int}(\tau) - \bar{\Omega}_I^{Int} - \bar{\Omega}_E^{Int} \\ &\quad + \alpha \left\{ CS^{Int}(0) + z^{entry}(\tau)[CS^{Int}(k) - CS^{Int}(0)] \right\},\end{aligned} \tag{3.18}$$

where we once more assume that $CS^{Int}(k) > CS^{Int}(0) > 0$. We can now examine how entry barriers are affected by integration. Solving (3.17) and (3.18), we obtain:

$$\begin{aligned}\tilde{\tau}^{Aut} - \tilde{\tau}^{Int} &= \underbrace{\left[\Pi_I^{Aut}(0) - \Pi_I^{Aut}(k)\right]}_{(+)} - \underbrace{\tilde{\lambda}_I}_{(0,1)} \underbrace{\left[\Pi_I^{Int}(0) - \Pi_I^{Int}(k)\right]}_{(+)} + \underbrace{\tilde{\lambda}_E}_{(-)} \Pi_E^{Int}(k) \\ &\quad - \alpha \{ \underbrace{CS^{Aut}(k) - CS^{Aut}(0)}_{(+)} - \underbrace{\tilde{\lambda}_I}_{\in(0,1)} \underbrace{[CS^{Int}(k) - CS^{Int}(0)]}_{(+)} \}.\end{aligned} \tag{3.19}$$

The first line in (3.19) is once more conducive to lower entry barriers when going from autarchy to integration, However, ambiguities arise from the second line in (3.19). Moreover, it is plausible that the difference $CS^{Aut}(k) - CS^{Aut}(0)$ is larger than $CS^{Int}(k) - CS^{Int}(0)$, since both the effect of an innovation and of an additional firm increasing competition is larger in the autarchy market. This leads to the following proposition:

Proposition 4. *A higher weight α on consumer surplus will tend to reduce the difference $\tilde{\tau}^{Aut} - \tilde{\tau}^{Int}$, if $CS^{Aut}(k) - CS^{Aut}(0) > CS^{Int}(k) - CS^{Int}(0)$, thereby making the effect of integration on the entrepreneurial fee weaker.*

In the Cournot model with linear demand and symmetric countries, it is verified that

$CS^m(k) > CS^m(0)$ from the increase in output due to the cost-reducing innovation and the entry of an additional firm. Moreover, it also shown that $\left[CS^{Aut}(k) - CS^{Aut}(0)\right] > \left[CS^{Int}(k) - CS^{Int}(0)\right]$ since the entry of an innovative entrepreneurial firm is more important in the autarchy economy where the initial output is lower.

Corollary 1. *Assuming that the number of firms is unchanged by integration, the linear Cournot model introduced in Section 3.5 yields:*

$$\left[CS^{Aut}(k) - CS^{Aut}(0)\right] > \left[CS^{Int}(k) - CS^{Int}(0)\right].$$

Proof. In the Appendix. ■

4. Extensions

In this section, we consider two extensions. First, we allow for a global incumbent lobbying group that can simultaneously give contributions to the domestic and the foreign policy maker. We then study the case of entrepreneurial innovation for sale.

4.1. Global incumbent lobbying

Now, relax the assumption that incumbents can only lobby their domestic policy maker. Instead, assume that incumbent firms come together as one global lobbying group, giving contributions to both the domestic and the foreign policy maker. Entrepreneurs are, as previously, restricted to only lobby against their own policy maker, and the policy maker once more takes the other policy maker's fee as exogenous.

For each pair of policies (τ, τ^*), the incumbent lobbyist is willing to pay a total contribution of L_I^{Global}. This contribution is split between the domestic and the foreign policy maker: $L_I + L_I^* = L_I^{Global}$. Extending the framework of truthful bids, introduced in section (2.4), raises the issue of policy complementarity. The reason is that a global lobbying group will take the change in policy of one government into account when lobbying against the other, even though governments are assumed not interact directly. In technical terms, the amount the lobbying group must compensate one government (Cf. eq.2.7) is decreased by a term representing the reduction in compensation that the group must give to the policy maker in the other country. This yields the possibility of asymmetric equilibria where all lobbying effort is concentrated to one government. In the extreme case, a global lobby succeeds in driving the probability of

innovation in one country to zero, effectively leaving the other country in a situation similar to autarchy. To get around this problem, and be able to retain the notion of truthful bids, we make the assumption that the lobbying group sends a delegate to each country. The two delegates are each equipped with a schedule of what lobbying contributions they are allowed to give the policy maker for any entrepreneurship policy in that country. The two delegates are not allowed to communicate once the lobbying game has started, so that the lobbying offered for a policy in one country is independent of the offer to the other country. When devising the delegates' schedules, the lobbying organization considers:

$$\left(\tau_I^{opt}, \tau_I^{*opt}\right) \in \arg\max_{\tau,\tau^*} W_I^{Global}(\tau, \tau^*) - C(\tau) - C^*(\tau^*), \tag{4.1}$$

where $W_I^{Global}(\tau, \tau^*)$ is the expected income of the global incumbent lobbying group. Moreover, due to the assumptions of no communication and the absence of policy interaction, we have:

$$C(\tau) = G_{-inc}^{Int}(\tau_{-inc}^{opt}) - G_{-inc}^{Int}(\tau) \tag{4.2}$$

$$C^*(\tau^*) = G_{-inc}^{*Int}(\tau_{-inc}^{*opt}) - G_{-inc}^{*Int}(\tau^*). \tag{4.3}$$

Given a pair $\left(\tau_I^{opt}, \tau_I^{*opt}\right)$, we can restrict the set of lobbying contributions to truthful ones and state the lobbying function as:

$$\begin{aligned} L_I^{Tot}(\tau, \tau^*) &= W_I^{Global}(\tau, \tau^*) - \left[W_I^{Global}(\tau_I^{opt}, \tau_I^{*opt}) - C(\tau_I^{opt}) - C(\tau_I^{*opt})\right] \\ &= W_I^{Global}(\tau, \tau^*) - \bar{\Omega}_I^{Global}. \end{aligned} \tag{4.4}$$

It remains to show how much of the total lobbying contribution that is spent on the domestic and the foreign policy maker, respectively. Incumbents' expected revenues are a function of profits and the probability that one of the entrepreneurs is successful, $z^{entry}(\tau, \tau^*) = 1 - [1 - z(\tau, \tau^*)]\,[1 - z^*(\tau, \tau^*)]$. This implies that incumbents' revenues are maximized for fees such that $z(\tau, \tau^*) = z^*(\tau, \tau^*)$. Due to symmetry, this requires that $\tau = \tau^*$. However, the allocation is also dependent on the compensation functions $C(\tau)$ and $C^*(\tau^*)$, which are more involved in the general case. If these are convex functions with $C_\tau(\tau), C_{\tau\tau}(\tau) > 0$ and $C_{\tau^*}^*(\tau), C_{\tau^*\tau^*}^*(\tau) > 0$, the costs are, once more due to symmetry, minimized when $\tau = \tau^*$. We can show this to hold in our parametric example in Section 3.5. If the optimal fees for the incumbent lobbying group are such that the policy makers set $\tau = \tau^*$, this yields, by symmetry, that the lobbying contribution

is split in two equal halves. Lobbying contributions from the incumbent lobbying group to the domestic policy maker can, in other words, be written as:

$$L_I(\tau, \tau^*) = 0.5L_I^{Global}(\tau, \tau^*) = 0.5W_I^{Global}(\tau, \tau^*) - 0.5\bar{\Omega}_I^{Global}. \tag{4.5}$$

Now consider the entrepreneur. Due to the presence of a global incumbent lobbying group, the compensation that the entrepreneur will have to give the policy maker in order to deviate from its optimal policy, absent the entrepreneur, will look different. However, it will only change the benchmark optimal revenues (net of lobbying contributions). The lobbying contribution from the entrepreneur is thus the same as in (2.9), with only the constant $\bar{\Omega}_h^{Int}$ being different.

Hence, the only difference from the case where the incumbent firms were only allowed to lobby against the policy maker in their own country is the multiple 0.5 in front of the incumbents' expected revenues. In the case of symmetric countries, it is easily realized that the problem, and the optimal fee, are the same in both cases.

Proposition 5. *If policy makers take the other country's fee as given, and countries are symmetric, then under the assumption of no communication between delegates, the optimal fee in integrated markets is not changed when incumbent firms are allowed to lobby against both policy makers.*

Corollary 2. *We show that in the parametric model in Section 3.5, the optimal fees for the incumbent lobbying group are such that* $\tau = \tau^*$.

Proof. In the Appendix. ■

4.2. Entrepreneurial innovations for sale

In the analysis, we have assumed that entrepreneurs enter the market. In practice, we observe that entrepreneurs often sell their innovation. Indeed, we observe a significant amount of inter-firm technology transfers, ranging from joint ventures and licensing to outright acquisitions of innovations.[11] The venture capital industry provides some evidence of the relation between

[11] Granstrand and Sjölander (1990) present evidence from Sweden, and Hall, Berndt and Levin (1990) present evidence from the US of firms acquiring innovative targets to gain access to their technologies. Bloningen and Taylor (2000) find evidence from US high-tech industries of firms making a strategic choice between the acquisition of outside innovators and in-house R&D. In the biotech industry, Lerner and Merges (1998) note that acquisitions are important for know-how transfers.

innovation for sale and innovation for entry. Figure II depicts the quarterly value of exits through M&As and IPOs, respectively, in the US in the stage 1999 to 2005. Note that M&As dominate as the exit mode, except at the beginning of the stage.

[FIGURE II]

However, it can be shown that our identified mechanism is still valid as long as there is bidding competition over the innovation. The reason is that the entrepreneur then exerts similar negative externalities as in case of entry, and globalization affects these externalities in a similar fashion. To see this, assume that all n incumbents are homogeneous and consider the following sale model: If a sale takes place, the entrepreneur sells its innovation (firm) through a first price perfect information auction with externalities. The acquisition auction is solved for Nash equilibria in undominated pure strategies. There is a smallest amount, ε, chosen such that all inequalities are preserved if ε is added or subtracted.

In autarchy, the n incumbents simultaneously post bids, which are accepted or rejected by the entrepreneur. In the case of the closed economy, only domestic incumbents bid and in the case of the integrated economy, both domestic and foreign incumbents bid. Each incumbent announces a bid, b_i, where $b = (b_1, ..., b_i, ...b_n) \in R^n$ is the vector of these bids. Following the announcement of b, the innovation is sold to the incumbent with the highest bid ($b_i = S_E$). If more than one incumbent has the highest bid, each such incumbent obtains the innovation with equal probability. In the integrated market, there are $n + n^*$ incumbents bidding.

Instead of separating the incumbents' and the entrepreneur's product market profits, we must now distinguish between the profit of an acquiring and a non-acquiring incumbent firm. Denote the former $\pi_A^m(k)$ and the latter $\pi_N^m(k) < \pi_A^m(k)$ for $m = Aut, Int$. Given this, we can write an incumbent's valuation of obtaining the innovation as:[12]

$$v^m = \pi_A^m(k) - \pi_N^m(k), \ m = Aut, Int. \tag{4.6}$$

From this it is straightforward that:

Lemma 3. *The equilibrium sale price is* $S_E = v^m$.

[12] If the quality of the innovation k is low there is also an entry deterring valuation for incumbents. However, for a sufficiently high quality k it can be shown that we need only consider (4.6)

In a symmetric model without exits $\Pi_I^m(k) = \pi_A^m(k) - v^m + (n-1)\pi_N^m(k) = n\pi_N^m(k)$ and $\Pi_I^m(0) = n\pi_N^m(0)$ and hence, $\Pi^m(0) > \Pi_I^m(k)$. Thus, from Lemma 3 it follows that the previous results carry over to the case of sale.[13] We can thus state the following result:

Proposition 6. *In the case with innovation for sale with a sufficiently large number of symmetric incumbents, the optimal entrepreneurial policy τ will be more pro-entrepreneurial when the product and innovation markets integrate internationally, i.e. $\tau^{Aut} - \tau^{Int} > 0$.*

Consequently, since innovations are, by definition, unique assets and bidding competition then seems natural, our identified result also seems relevant for the case of entrepreneurs selling their innovation.

5. Econometric Analysis

The prediction emerging from Proposition 1 suggests that globalization in terms of the integration of markets should reduce the domestic entry barriers for entrepreneurs. As shown by Proposition 4, this effect may also be stronger in countries where governments are to a larger extent rent extracting. Moreover, by Proposition 2, we expect entry barriers to be lower when neighboring countries are more pro-entrepreneurial. To test these predictions, we now turn to an empirical analysis of how barriers to entry are affected by a country's international openness. Descriptive statistics for all variables involved are put in appendix Table A.1.

5.1. Econometric Model

To examine Proposition 1, we will estimate a reduced-form model of how the international openness of a country affects the cost of entry for domestic entrepreneurs. For country i, at time t, we have:

$$Entry\_cost_{i,t} = \alpha_0 + \underset{(-)}{\alpha_1} Globalization_{i,t} + \mathbf{X}'_{i,t}\boldsymbol{\beta} + \gamma_i + \gamma_t + \varepsilon_{i,t}, \tag{5.1}$$

where $Entry\_\text{cost}_{i,t}$ is the entry cost, $Globalization_{i,t}$ is proxied by measures of globalization, $X_{i,t}$ is a vector of controls, γ_i is a country-specific effect, γ_t a time-specific effect and u_{ij} is the usual error term. From Proposition 1, the entry barriers should be negatively correlated with measures of globalization, $\alpha_1 < 0$. We discuss all variables affecting entry barriers, the choice of

[13] Calculations for the post oligopoly case are available from the authors upon request.

proxies and the data in the sections below. Descriptive statistics are presented in the Appendix, Table A1.

To examine Proposition 4, we will augment (5.1) and compare the impact of globalization in countries with high and low corruption where rent-seeking governments should be associated with a higher level of corruption:

$$\begin{aligned} Entry\_cost_{i,t} &= \alpha_0 + \underset{(-)}{\alpha_1} Globalization_{i,t} + \underset{(+)}{\alpha_2} Corruption_{i,t} + \\ &\quad \underset{(-)}{\alpha_3} Corruption_{i,t} \times Globalization_{i,t} + \mathbf{X}'_{i,t}\boldsymbol{\beta} + \gamma_i + \gamma_t + \varepsilon_{i,t}. \end{aligned} \tag{5.2}$$

As shown by Proposition 4, we would expect countries associated with a higher level of corruption to have higher entry barriers, but also to be more strongly affected by globalization, $\alpha_2 > 0$ and $\alpha_3 < 0$. The argument is that governments in countries with a high level of corruption are less likely to care about consumer welfare.

Our approach of establishing a correlation running *from globalization to entry barriers* differs from the previous literature which has used entrepreneurial polices acting as an explanatory variable. Table A.2 provides an overview. For instance, the level of entry barriers has been found to be a very good predictor of the level of corruption (Svensson 2005). Entry barriers have been discussed as a factor determining how apt a country is at using trade liberalization to generate growth (Freund and Bolaky, 2008; Fisman and Sarria-Allende, 2004). In addition, entry barriers have been found to have a strong negative effect on sector-level productivity and dynamics (Klapper *et al.*, 2006; Barseghyan, 2008). As compared to (5.1) and (5.2), previous studies have used entry costs as an explanatory variable. While our approach is novel, this generates a concern for endogeneity and reverse causality.[14] We try to deal with this in a number of ways.

First, we include country-specific effects and use the time variation in entry barriers, whereas previous studies have used data for one year, frequently the data for 1999 used in Djankov *et al.* (2002). Second, we try to exploit the exogenous variation in globalization using the expansion of the EU in 2004 to a number of Eastern European countries to identify the effect of globalization on entry barriers. Third, we will try to control for an omitted variable in the form of a general

[14] Measures of openness may be endogenous if a reduction in entry barriers leads to the entry of export-oriented firms affecting measures of openness as suggested by the recent trade literature of heterogenous firms (see, for instance, Helpman, Melitz and Rubinstein, 2008). In the literature on corruption, there is also an established link between entry barriers and the level of corruption (see Svensson, 2005).

country-specific trend in institutional quality.

5.1.1. Dependent variable: Entry barriers

To proxy the cost τ levied on entrepreneurial entry, we will use data from the World Bank's *Doing Business* project. The World Bank's *Doing Business* project was initiated by Djankov *et al.* (2002), and collects country-level data on the cost of setting up a limited liability company.[15] Djankov *et al.* (2002) collected data for entry barriers for a sample of 85 countries in 1999. The extension of this project has collected data for approximately 120 countries since 2003. The most recent wave in the survey is for 2007. The entry costs include official fees and fees for the legal or professional services needed to fulfil the procedures required by law. The aim is to net out unofficial costs due to corruption and costs pertaining to bureaucratic inefficiencies. To control for differences in the level of development, the cost for setting up a new business is scaled by country per capita income. To adjust for the skewness in the distribution, we will take the log of entry costs.

5.1.2. Explanatory variable: International market integration

We use two indices to measure the international integration of product and innovation markets. As a first measure, we use the kof index provided by the Swiss Federal Institute of Technology in Zurich. Our second measure is the *csgr index* provided by University of Warwick.[16] Data for the csgr index is available from 1999 to 2004 and data for the kof index is available for the period 1999-2005. Both indices cover more than 120 countries. Figure III shows a strong negative correlation between the kof globalization index and the entry costs, giving some initial support for Proposition 1.

[FIGURE III]

The two indices build on partly overlapping sources and are constructed by similar methods capturing economic, social and political aspects of globalization. The main components of the economic parts are trade flows and in- and outflows of direct and portfolio investments. The social parts build on information on international personal contacts and information flows.

[15] The same project also collects data on other dimensions of barriers to entry: the number of procedures and the time it takes to start a new company and the capital requirement. The reason why we focus on the cost measure is that this is the most direct and most readily interpreted aspect.

[16] Examples of previous studies using these indices include Dreher (2006) and Joyce (2006).

Political globalization is measured by membership in international organizations and participation in UN missions. The main difference between the two indices pertains to the weighting procedures.[17] The indices are described in detail in appendix Table A.3.

The globalization that we have theoretically depicted contains the integration of both product and innovation markets. How these relate to our empirical measures of economic, social as well as political aspects is not straightforward. The *foreign innovation threat* and the *strategic innovation effort* effects identified in (3.10) imply a negative correlation between entry barriers and international integration. Arguably, these two effects are closer to political integration such as participation in international organizations. Countries that enforce international patent rights are more likely to see the profits of domestic incumbents being pushed down by the entry of foreign innovative firms. To some extent, a higher degree of social integration paves the way for foreign entrants in a similar manner. Conversely, it is plausible that entry on foreign markets is facilitated for innovators originating from countries that are highly politically and socially integrated.

However, Proposition 1 predicted a negative correlation between entry barriers and international integration conditional on some properties of incumbents' profits. Empirically, it is likely that economic integration, entailing a reduction in the barriers that a company meets when selling on a foreign market, will affect incumbents' profits. However, social as well as political integration also affect the de facto barriers faced by a company when expanding its business abroad.

To the best of our knowledge, there exists no established methodology in the literature on how to separate product and innovation market integration. In view of this, our main explanatory variable will be the aggregate index, although we also present the results for each sub index separately.

5.1.3. Other covariates

The cross-country effect of openness $Open_{i,t}$ on entry barriers $Entry\_cost_{i,t}$ in (5.1) is likely to be confounded with a range of variables. Among these, the income level and the features of the overall institutional setup (formal-legislative as well as their implementation) stand out as the

[17] Other differences are due to classification. This mainly concerns how remittances by foreign nationals are classified. In the kof index, these are part of economic globalization whereas the csgr index considers these as part of social globalization. Another difference is that the kof index includes a measure for cultural proximity (proxied as the presence of multinational firms such as McDonald's and Ikea) as part of social globalization.

most serious ones. In our main specification, we therefore control for country-specific effects, γ_i. This mitigates the concerns with income level and other institutions.

The main omitted variable problem that remains concerns changes in institutions over the time period studied. Formal institutions may affect both the level of globalization and the barriers to entry. Implementation and enforcement of institutions, reflected in government efficiency and the prevalence of corruption, and income level are hard to control for since these are likely to be endogenously affected by entry barriers. However, we argue that endogeneity may be less of a concern with respect to formal institutions. There is less reason to believe that formal institutions, as put down in a country's legislation, are influenced by legislation specifically pertaining to entry barriers.

To control for the omitted variable problem, we construct a measure intended to capture the extent to which a country's legislation is aligned to free-market valuations. This index is constructed as the principal component of those parts of the Heritage Foundation index that are collected from legal documents.[18]

When examining Proposition 4 by estimating (5.2), we also include a measure of corruption as an interaction variable with openness. The index is the so-called KKM (Kaufmann, Kraay and Mastruzzi, 2007) available from the World Bank.

5.2. Results

We first run different specifications of the model in eq 5.1. As shown in the first column of Table I, openness is highly correlated with entry barriers across countries. The effect is also large, one standard deviation decrease in the kof-index amounts to nearly a doubling of the entry costs, and the effect of the csgr index is similar. Adding a control for other institutions in column (ii), the effects of openness are decreased but still highly significant. The magnitudes of the effect of the control for institutions and entry barriers are roughly equal. Adding year dummies in (iii) does not change these results. Controlling for continent in (iv) and (v) reduces the effects, in particular for the csgr index. The estimated coefficients for openness are still significant at conventional levels, however.

The effects are also robust to the inclusion of country-specific effects in (vi). A decrease in openness equal to one standard deviation increases the cost of entry by some 55 (kof) and 60

[18] These are: trade freedom (tariffs), fiscal freedom (tax levels), government size (government expenditures), financial freedom (regulation of banks) and protection of property rights.

(csgr) percent. Adding both country and time effects reduces the estimate for the kof index below conventional significance levels. The estimates for the csgr index are still significant, the effect of a one standard deviation change in the index amounts to a change in costs in the order of 35 percent.

[TABLE I]

Table II breaks down the indices into their subcomponents in cross-country regressions. All three aspects of openness tend to have a negative effect on entry barriers. The strongest and most significant effects are found for social integration. The estimates for economic openness are weaker, however. In fact, as shown in columns (iv), the independent effect of economic openness, when controlling for social and political integration, tends to have a positive effect on entry costs.

In this interpretation, the weak results for economic integration presented in Table II are consistent with the ambiguous theoretical prediction in Proposition 1 of whether the incumbent's losses from innovation increase with trade liberalization. The stronger results for a negative effect on entry fees from political and social integration are consistent with an interpretation where these dimensions more closely reflect that globalization reduces the fee due to *foreign innovation threat* and *strategic innovation effort* effects.

[TABLE II]

Rent seeking governments Proposition 4 shows that globalization in terms of increased openness should have a stronger effect on the entry barriers erected by governments with stronger preferences for rent-shifting. To investigate Proposition 4, we employ interaction effects between openness and corruption. To alleviate the concerns of endogeneity, we construct dummy variables for corruption levels above the mean. Figure IV clearly shows that the correlation between openness and barriers to entry is much stronger in the high-corrupt subsample. The regression results are reported in Table III. The interaction effects in columns (ii) come out as highly significant with both corruption indices. Consistent with Proposition 4, countries that score higher on the corruption index are those with the largest negative effect on the cost of entry from being more open. The results are similar for the csgr and the kof index. In the latter

case, the interaction term dominates the main effect of openness, whereas openness still has a significant main effect with the csgr index.

[FIGURE IV]

[TABLE III]

Policy complements Proposition 2 shows that the entrepreneurial policies set by governments in different countries are strategic complements. The domestic policy maker will be induced to reduce the barriers to entry if neighboring countries set more pro-entrepreneurial policies. One way of testing this proposition is to construct an average neighbor for each country. This is done by, for each country, summing the distance-weighted entry barriers in all other countries in the sample. The results from this exercise are reported in Table IV. Column (i) reports the results without country-specific effects and without a time trend. The coefficient on the distance-weighted neighbors' cost of entry is positive – indicating that countries with more entrepreneurial friendly governments also have lower barriers to entry – and strongly significant. This result is robust to adding a time trend in column (ii), and country-specific effects in column (iii). When we add both country-specific effects and a time trend in column (iv), the estimates only remain significant for specifications using the kof index.

[TABLE IV]

5.3. Difference-in-difference

To estimate the effects of a greater openness on entry barriers, we also employ an alternative strategy. As an exogenous shock to openness, we use entry into the European Union. In the 2004 enlargement, 10 countries entered as new members of the EU. The selection of new EU members was exogenous in the sense that only countries belonging to a specific geographical region are eligible to apply for membership.

Membership forced these countries to integrate their product and innovation markets into the EU single market. However, one institutional feature that to a large extent escaped the harmonization process was entry barriers as long as they were not discriminatory.[19] Moreover,

[19] The Treaty of Lisbon has one paragraph where the promotion of small- and medium sized companies is mentioned (§157). However, the wording is much vaguer than in the paragraphs stipulating commitment to free movement of trade and services (§§23-31).

it should be noted that although entry barriers are substantially lower in EU countries than in other countries in the sample, there is substantial heterogeneity among EU countries.[20] This reduces the concern that new members were subject to informal pressure from other members to reduce their barriers to entry. Hence, we argue that any variation in barriers to entry subsequent to entering the EU is likely to be due to a changed benefit from protection for incumbents vis-à-vis entrepreneurial firms.

Using countries that were members of the EU throughout the period 2000–2007, we can use a difference-in-difference design to isolate the effect of entry into EU on entry barriers. Figure V shows the trend lines for entry barriers for new EU members, old EU members and all other countries. The new EU members clearly show a kink around 2004, after which they reduced their entry barriers almost to the same level as the mean for old members.

[FIGURE V]

[TABLE V]

The decrease in cost of entry also clearly emerges from the regression results shown in Table V where the estimate for new members is negative and significant. The average cost of entry among the new membership was 30 percent lower in the period 2004–2007 than in 2000–2003.

5.4. Robustness

Considering the heterogeneity in our country sample, it might be suspected that the observed effect of openness on entry barriers pertains to some sub-sample or is driven by outliers. The first two columns of Table VI show estimates for a sample where the income bottom or top 20-percentile of the sample has been dropped. If anything, this tends to strengthen the results. Next, some countries that have been subjected to aid programs have been forced to comply with some institutional improvement program. One concern is that this creates a spurious relation between entry costs and openness for some countries. As a robustness check, we exclude sub-Saharan countries from our sample in column (iii).

[20] EU countries had an average cost of starting a new business of approximately 10 percent of GDP per capita. The same number is around 30 percent for the whole sample (excluding sub-Sahara Africa). However, whereas countries such as Denmark, Sweden, Finland and the UK had a cost of approximately 1 percent, Spain had 16 percent, Italy 18 percent and Greece 28 percent. The numbers reported above are averages over all observed years.

Next, our data on entry costs is collected both from the 1999 Djankov *et al.* (2002) sample and from the more recent extension of the survey. There might be some concerns about changes in the measurement driving our result. In column (iv), we exclude observations from the older sample, which reduces both the size and the significance of the effects. The results for the csgr index still pass significance tests at conventional levels and are substantial in magnitude. As a final robustness check in column (v), we exclude some countries where extreme variation makes us concerned about measurement error.

[TABLE VI]

6. Conclusion

Industrial policy worldwide has shifted the attention towards small and entrepreneurial firms. Our analysis explains this as an endogenous response to the ongoing international integration of product and innovation markets. In more open economies, it becomes more difficult to protect the profits of incumbent firms from independent innovators, and innovation efforts become more intertwined across countries, thus making foreign entrepreneurs more aggressive. This reduces the incumbents' incentive to pay for protection against the domestic entrepreneur, hence reducing the entry barriers. The data supports our theory by indicating a strong negative correlation between openness and the degree of barriers to entry into entrepreneurship.

We also find that the reduction of barriers to entry into entrepreneurship is larger in more corrupt countries. Consequently, the ongoing process of international agreement on trade and investment such as WTO agreements (e.g. TRIPS), and the enlargement of the EU single market program might be of particular benefit for entrepreneurs and consumers in the most corrupt countries.

In our analysis, we also identify the effects of international market integration that could make policies more anti-entrepreneurial. If international market integration is accompanied by merger and exit waves, incumbents' profits may increase to such an extent that their willingness to pay to protect their market increases to such an extent that policies can become more anti-entrepreneurial. Consequently, if entrepreneurial activity is considered to have positive externalities on societies in general, policies preventing the internationally integrated markets from becoming too concentrated seem warranted. Internationally active and coordinated merger and anti-predatory policies then seem to be natural ways of achieving this.

What other factors could explain the recent trend towards pro-entrepreneurial policies? One potential explanation is the increased importance of international policy benchmarking. The inception of new indices, such as, e.g., the *Doing Business* index, is likely to make governments more prone to evaluate their policy relative to other countries. Theoretically, we can incorporate this effect by showing that entrepreneurship policies are indeed strategic complements when governments interact. We also find empirical evidence that one country's entrepreneurship policy is influenced by the policies of neighboring countries.

The existing entrepreneurship literature has typically explained the shift towards more pro-entrepreneurial policies as a consequence of the increased advantage of small scale activities and technological development favoring small scale production (Achs and Audretsch, 2005; Loveman and Sengenberger, 1991; Baumol, 2002). These explanations do not contradict our explanation, but rather interact with our political economy explanation. Exploring this interaction in detail is left to future research.

Let us end by using our framework to briefly shed some light on the world welfare effects of product and innovation market integration when entrepreneurial innovations are present. Starting with the effects on consumers, we note that when markets become integrated, they will benefit from lower consumer prices for two reasons. First, if no innovation takes place, product competition will be tougher, thus reducing consumer prices. Second, it is more likely that consumers can benefit from the use of a successful innovation since also the foreign innovation will be used in their market. The size of these effects will then depend on how much total effort spending by the entrepreneurs is affected by integration and changes in policy. Moreover, the total producer surplus might increase or decrease because competition is increased both in the product market and in the innovation market, while more efficient technology will be used and the duplication cost will be reduced. A more detailed study of this is left to future research.

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TABLE I
MAIN RESULTS, EFFECTS ON COST OF ENTRY FROM OPENNESS

	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)
Panel 1: Openness measured by the kof-index							
Openness	-4.67 (0.24)***	-2.99 (0.36)***	-2.99 (0.36)***	-2.02 (0.37)***	-1.98 (0.36)***	-2.60 (1.03)***	-0.28 (1.16)
Institutions		-0.29 (0.05)***	-0.30 (0.05)***	-0.29 (0.05)***	-0.301 (0.05)***	-0.02 (0.06)	-0.05 (0.06)
Region effects	No	No	No	Yes	Yes	No	No
Year effects	No	No	Yes	No	Yes	No	Yes
Country effects	No	No	No	No	No	Yes	Yes
Obs	533	523	523	523	523	523	523
R2	0.44	0.46	0.47	0.25	0.27	0.04	0.25
Panel 2: Openness measured by the csgr-index							
Openness	-4.24 (0.27)***	-2.56 (0.36)***	-2.50 (0.37)***	-1.15 (0.42)***	-1.02 (0.42)**	-3.39 (0.61)***	-1.58 (0.737)**
Institutions		-0.34 (0.05)***	-0.35 (0.05)***	-0.36 (0.06)***	-0.38 (0.06)***	0.01 (0.08)	-0.09 (0.08)
Region effects	No	No	No	Yes	Yes	No	No
Year effects	No	No	Yes	No	Yes	No	Yes
Country effects	No	No	No	No	No	Yes	Yes
Obs	363	360	360	360	360	360	360
R2	0.42	0.48	0.49	0.22	0.24	0.13	0.21

Robust standard errors reported in parentheses. *** indicates p-value<0.01, ** p-value<0.05 and * p-value<0.1. Region effects are continent-specific effects: East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, North America, South Asia, Sub-Saharan Africa.

TABLE II
RESULTS BROKEN DOWN BY SUBCOMPONENT OF GLOBALIZATION INDEX

	kof-index				csgr-index			
	(i)	(ii)	(iii)	(iv)	(i)	(ii)	(iii)	(iv)
Economic openness	-0.78 (0.35)**			0.44 (0.34)	-1.81 (1.14)			2.86 (1.00)***
Social openness		-3.96 (0.41)***		-4.47 (0.50)***		-3.81 (0.40)***		-4.33 (0.54)***
Political openness			-1.15 (0.022)***	-0.72 (0.20)***			-1.55 (0.32)***	-0.75 (0.31)***
Institutions	-0.57 (0.04)***	-0.19 (0.06)***	-0.57 (0.03)***	-0.11 (0.06)*	-0.61 (0.04)***	-0.21 (0.05)***	-0.55 (0.04)***	-0.12 (0.05)**
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	524	566	567	523	384	416	456	360
R2	0.42	0.51	0.46	0.52	0.43	0.53	0.46	0.54

Regressions do not include country-specific effects. Robust standard errors reported in parentheses. *** indicates p-value<0.01, ** p-value<0.05 and * p-value<0.1.

TABLE III
INTERACTION BETWEEN OPENNESS AND LEVEL OF CORRUPTION

	kof-index		csgr-index	
	(i)	(ii)	(i)	(ii)
Openness	-2.61 (0.37)***	-0.58 (0.55)	-2.12 (0.38)***	-1.47 (0.52)***
High corruption	0.74 (0.14)***	2.47 (0.36)***	0.58 (0.18)***	-1.23 (0.29)***
Interaction Openness*High corruption	-	-3.18 (0.65)***	-	-2.43 (0.88)***
Institutions	-0.16 (0.06)***	-0.26 (0.06)***	-0.24 (0.06)***	-0.31 (0.07)***
Year effects	Yes	Yes	Yes	Yes
Country Effects	No	No	No	No
Obs	523	523	360	360
R2	0.50	0.52	0.50	0.51

Regressions without country-specific effects. Robust standard errors reported in parentheses. *** indicates p-value<0.01, ** p-value<0.05 and * p-value<0.1.

Table IV
Policy Complements.

	(i)	(ii)	(iii)	(iv)
Panel 1: Openness measured by the kof-index				
Openness	-3.25 (0.34)***	-3.23 (0.34)***	-0.93 (1.12)	-0.25 (1.14)
Distance-Weighted Neighbours' Cost of entry	1.15 (0.18)***	1.09 (0.19)***	2.81 (0.40)***	1.10 (0.44)**
Institutions	-0.33 (0.05) ***	0.33 (0.05)***	0.04 (0.06)	-0.02 (0.06)
Year effects	No	Yes	No	Yes
Country effects	No	No	Yes	Yes
Obs	517	517	517	517
R2	0.48	0.49	0.00	0.01
Panel 2: Openness measured by the csgr-index				
Openness	-2.54 (0.35)***	-2.49 (0.35)***	-2.43 (0.69)***	-1.56 (0.65)**
Distance-Weighted Neighbours' Cost of entry	1.29 (0.27)***	1.27 (0.27)***	2.17 (0.61)***	0.08 (0.99)
Institutions	-0.41 (0.05)***	-0.42 (0.05)***	0.01 (0.09)	-0.06 (0.08)
Year effects	No	Yes	No	Yes
Country effects	No	No	Yes	Yes
Obs	355	355	355	355
R2	0.50	0.50	0.20	0.43

Robust standard errors reported in parentheses. *** indicates p-value<0.01, ** p-value<0.05 and * p-value<0.1.

TABLE V
DIFFERENCE-IN-DIFFERENCE RESULTS FOR NEW EU-MEMBERS

	(i)	(ii)
EU member	-0.77 (0.18)***	-0.33 (0.17)**
Institutions	-0.05 (0.06)	-0.07 (0.05)
Year Dummies	No	Yes
Obs	797	797
R2	0.21	0.18

Regressions include country-specific effects. Identification on countries that switch from being outside the EU to becoming members in 2004. Robust standard errors are reported in parentheses.

TABLE VI
ROBUSTNESS CHECKS

	(i)	(ii)	(iii)	(iv)	(v)
Panel 1: Openness measured by the kof-index					
Openness	-3.85 (0.74)***	-3.04 (1.14)***	-2.34 (1.11)***	-1.88 (1.38)	-1.81 (1.02)*
Institutions	0.001 (0.06)	0.02 (0.07)	-0.01 (0.06)	0.02 (0.05)	0.002 (0.05)
Year effects	No	No	No	No	No
Country effects	Yes	Yes	Yes	Yes	Yes
Obs	408	448	428	383	475
R2	0.12	0.05	0.03	0.03	0.02
Panel 2: Openness measured by the csgr-index					
Openness	-3.26 (0.59)***	-3.83 (0.63)***	-3.91 (0.63)***	-1.30 (0.47)***	-3.68 (0.62)***
Institutions	0.01 (0.09)	0.01 (0.09)	-0.03 (0.07)	0.16 (0.11)	0.05 (0.06)
Year effects	No	No	No	No	No
Country effects	Yes	Yes	Yes	Yes	Yes
Obs	268	326	309	236	325
R2	0.13	0.16	0.19	0.04	0.21

Regressions include country-specific effects. Robust standard errors reported in parentheses. *** indicates p-value<0.01, ** p-value<0.05 and * p-value<0.1. The following observations have been dropped: column (i) the top 20-percentile in income/capita; (ii) the bottom 20-percentile; (iii) sub-Sahara countries; (iv) observations before 2002: and (v) countries with extreme variation (Ghana, Indonesia, Uganda, Zimbabwe, Jordan, Mexico, Nigeria, Zambia and Dominican Republic).

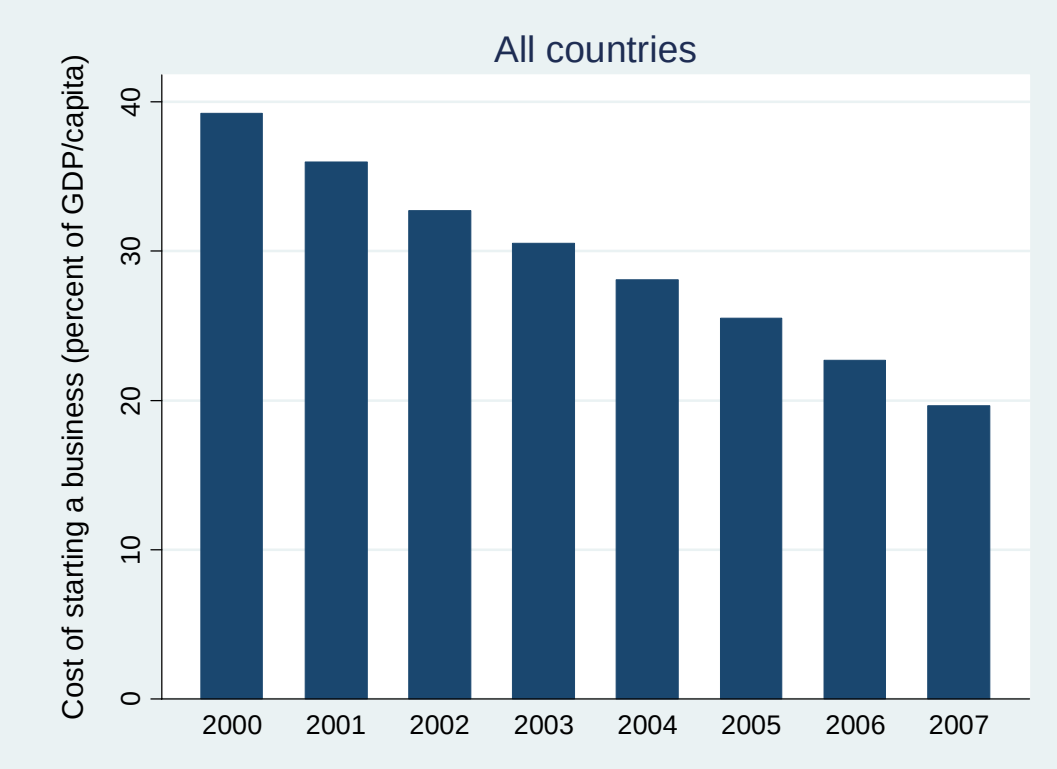

FIGURE I, PANEL A
Average Cost of Starting a New Business 2000 –2007 Among 72 Countries.

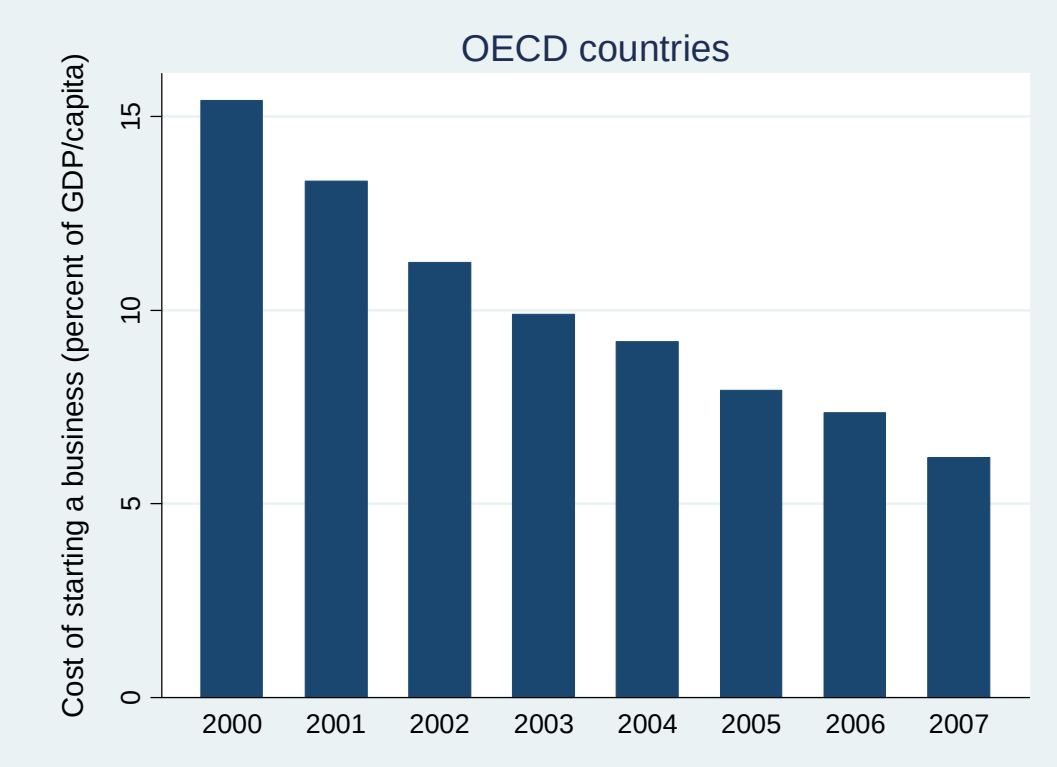

FIGURE I, PANEL B
Average Cost of Starting a New Business 2000 –2007 Among OECD Countries.

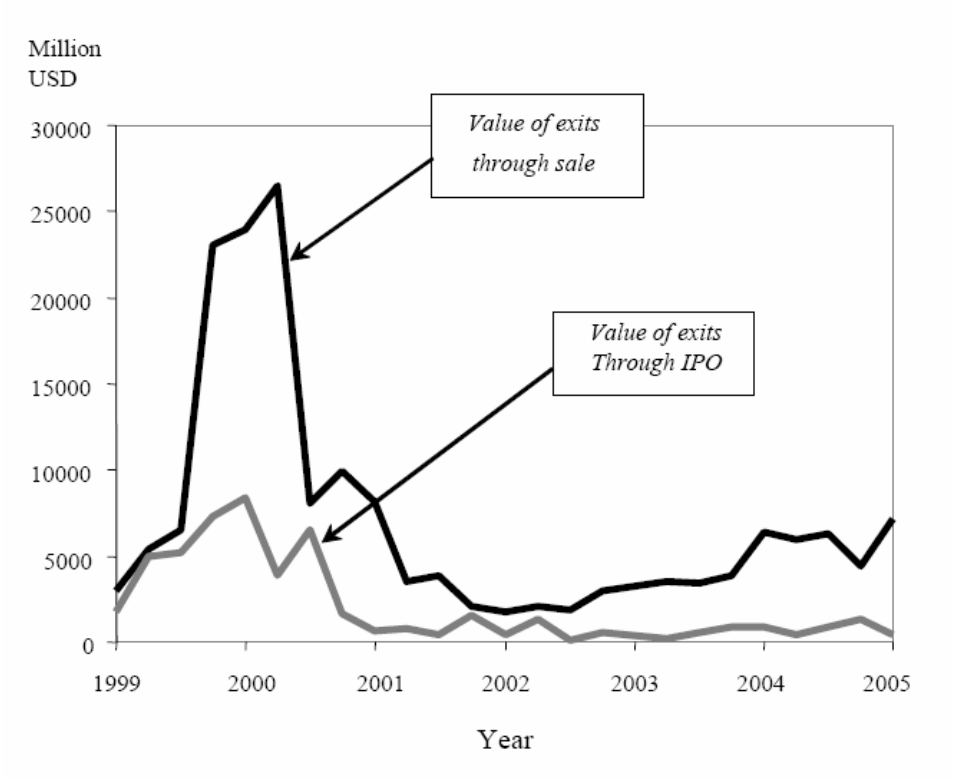

FIGURE II
The value of exits through M&A and IPO in the US.
Source: Thomson Venture Economics/National Venture Capital Association.

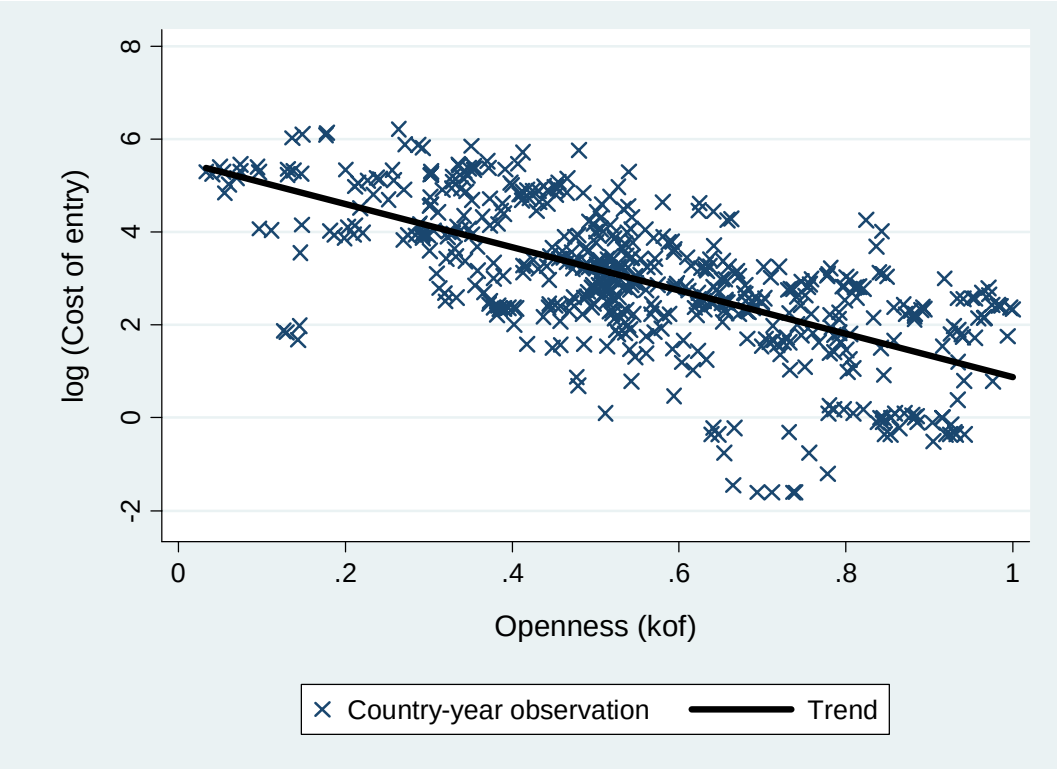

FIGURE III
Correlation Between Openness and Barriers to Entry.

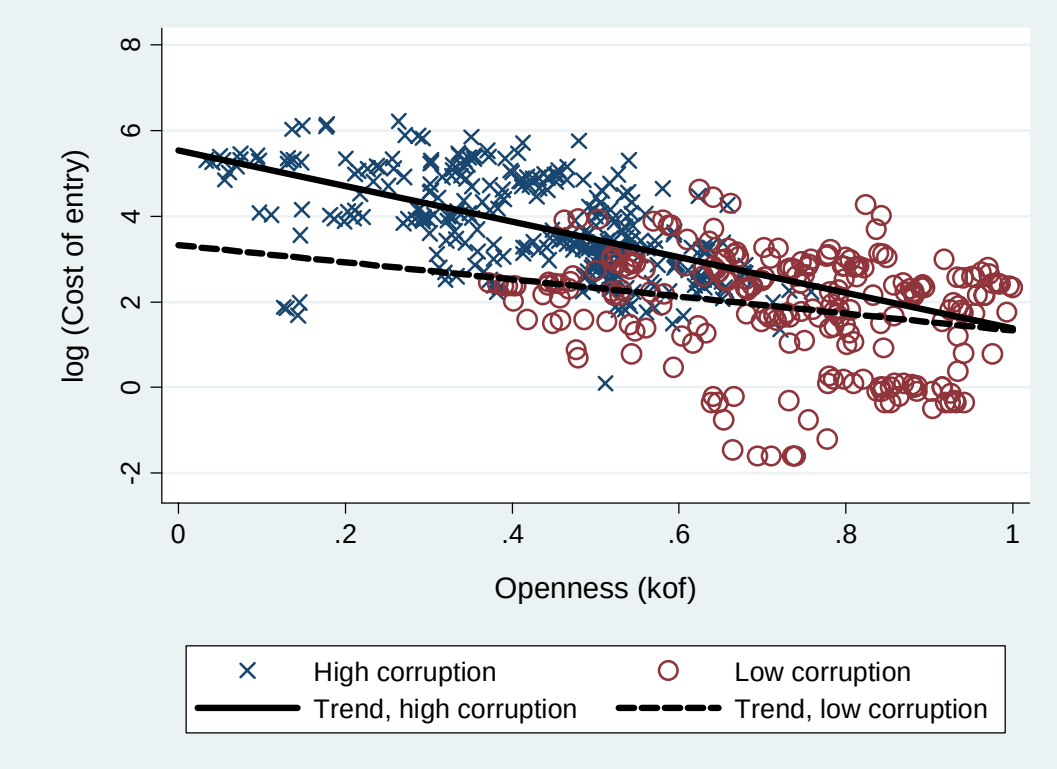

FIGURE IV
Correlation Between Openness and Barriers to Entry by Level of Corruption.

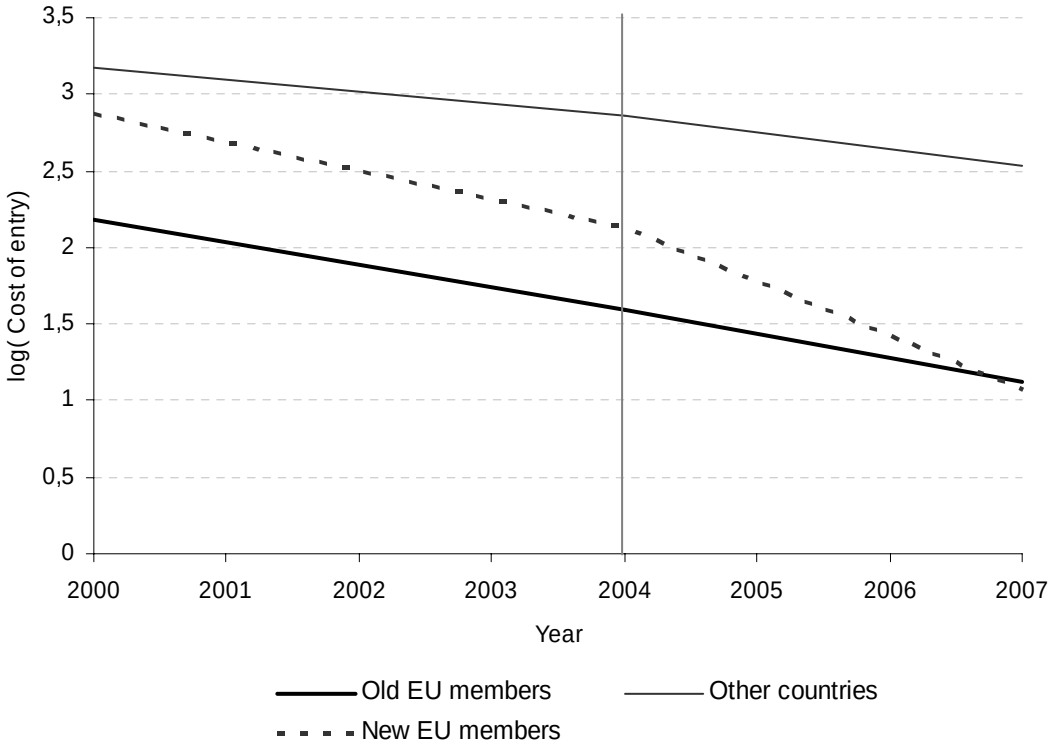

FIGURE V
Barriers to Entry Among New EU Members.

Appendix

Lemma 1

Take logs of the domestic and foreign policy makers' FOCs:

$$\begin{aligned} \log z'_e + \log(1-0.5z^*) - \log y'_e &= -\log\left[\pi_E^{Int}(k) - F - \tau\right] \\ \log z'_{e^*} + \log(1-0.5z^*) - \log y'_{e^*} &= -\log\left[\pi_E^{Int}(k) - F - \bar{\tau}^*\right]. \end{aligned}$$

Differentiate. First note that

$$\frac{de^*}{de} = \left[\frac{0.5z'_e}{(1-0.5z)}\right] / \left[\frac{z''_{e^*e^*}}{z'_{e^*}} - \frac{y''_{e^*e^*}}{y'_{e^*}}\right] < 0.$$

Then write in matrix form

$$\left[\begin{array}{cc} \frac{z''_{ee}}{z'_e} - \frac{y''_{ee}}{y'_e} & -\frac{0.5z'^*_{e^*}}{(1-0.5z^*)} \\ -\frac{0.5z'_e}{(1-0.5z)} & \frac{z''_{e^*e^*}}{z'_{e^*}} - \frac{y''_{e^*e^*}}{y'_{e^*}} \end{array}\right] \left[\begin{array}{c} \frac{de}{d\tau} \\ \frac{de^*}{d\tau} \end{array}\right] = \left[\begin{array}{c} \frac{1}{\left[\pi_E^{Int}(k)-F-\tau\right]} \\ 0 \end{array}\right]. \tag{1}$$

Under the assumption of stability, $0 > \frac{de^*}{de} > -1$, we have that the determinant D is positive. Therefore

$$\left[\begin{array}{c} \frac{de}{d\tau} \\ \frac{de^*}{d\tau} \end{array}\right] = \frac{1}{D}\left[\begin{array}{c} \left[\frac{z''_{e^*e^*}}{z'_{e^*}} - \frac{y''_{e^*e^*}}{y'_{e^*}}\right]\left[\frac{1}{\left[\pi_E^{Int}(k)-F-\tau\right]}\right] \\ \left[\frac{0.5z'_e}{(1-0.5z)}\right]\left[\frac{1}{\left[\pi_E^{Int}(k)-F-\tau\right]}\right] \end{array}\right],$$

so that $\frac{de}{d\tau} < 0$ and $\frac{de^*}{d\tau} > 0$. Therefore, we have

$$\begin{aligned} z'_\tau &= \frac{dz}{de}\frac{de}{d\tau} < 0 \\ z^{*\prime}_\tau &= \frac{dz}{de^*}\frac{de^*}{d\tau} > 0. \end{aligned}$$

Lemma 2

Given the profits in (3.13), we study

$$\frac{\left[\Pi_I^{Aut}(0) - \Pi_I^{Int}(0)\right]}{\left[\Pi_I^{Aut}(k) - \Pi_I^{Int}(k)\right]} = \frac{(\Lambda)^2}{(\Lambda-k)^2}\left(\frac{(n+1)^{-2} - 2(2n+1)^{-2}}{(n+2)^{-2} - 2(2n+2)^{-2}}\right). \tag{2}$$

We have that

$$\frac{(\Lambda)^2}{(\Lambda-k)^2} > 1$$

and

$$(n+1)^{-2} - 2(2n+1)^{-2} > (n+2)^{-2} - 2(2n+2)^{-2}, \text{ for } n > 1$$

thus

$$\left[\Pi_I^{Aut}(0) - \Pi_I^{Int}(0)\right] > \left[\Pi_I^{Aut}(k) - \Pi_I^{Int}(k)\right].$$

Proposition 2

Assume probabilities on the form $z(e) = 1 - \exp(-\gamma e^2)$ and effort cost according to δe^2. The first-order conditions in (3.4) and (3.5) can then be written as:

$$\begin{aligned}(1-z)(2-z^*) &= \delta\left[2\gamma(\pi-\tau)\right]^{-1} \\ (1-z^*)(2-z) &= \delta\left[2(\pi-\tau^*)\gamma\right]^{-1}.\end{aligned}$$

Taking logs, differentiating and writing in matrix form we have:

$$\begin{bmatrix} -\frac{z'}{1-z} & -\frac{z^{*\prime}}{2-z^*} \\ -\frac{z'}{2-z} & -\frac{z^{*\prime}}{1-z^*} \end{bmatrix} \begin{bmatrix} \frac{de}{d\tau} \\ \frac{de^*}{d\tau} \end{bmatrix} = \begin{bmatrix} \frac{1}{\pi-\tau} \\ 0 \end{bmatrix}.$$

With a determinant $D > 0$, so that:

$$\begin{bmatrix} \frac{de}{d\tau} \\ \frac{de^*}{d\tau} \end{bmatrix} = \frac{1}{D} \begin{bmatrix} -\frac{z^{*\prime}}{1-z^*} & \frac{z^{*\prime}}{2-z^*} \\ \frac{z'}{2-z} & -\frac{z'}{1-z} \end{bmatrix} \begin{bmatrix} \frac{1}{\pi-\tau} \\ 0 \end{bmatrix}.$$

We thus have

$$\frac{de}{d\tau} \Big/ \frac{de^*}{d\tau} = \left[-\frac{z^{*\prime}}{1-z^*}\right] \Big/ \left[\frac{z'}{2-z}\right],$$

and

$$\frac{dz}{d\tau} \Big/ \frac{dz^*}{d\tau} = \left[\frac{z'}{z^{*\prime}}\right] \left[\frac{de}{d\tau} \Big/ \frac{de^*}{d\tau}\right] = -\frac{2-z}{1-z^*}.$$

Using this to rewrite the FOC of the policy maker in integrated markets (3.10) yields:

$$\begin{aligned}\tau^{Int} &= \left[\Pi_I^{Int}(0) - \Pi_I^{Int}(k)\right] \left[\frac{(1-z^*)}{(1-0.5z^*)(2-z)}\right] \\ &\quad -\Pi_E^{Int}(k) \frac{(1-z^*)}{(2-z)} \frac{0.5z}{(1-0.5z^*)}.\end{aligned}$$

Differentiate with respect to foreign policy τ^* and rearrange to get

$$\begin{aligned}
&\frac{d\tau}{d\tau^*} + z_\tau^{*\prime}\frac{d\tau}{d\tau^*}\left[\Pi_I^{Int}(0) - \Pi_I^{Int}(k)\right]\left[\frac{2}{(2-z^*)(2-z)} + \frac{2}{(2-z^*)^2(2-z)}\right] \\
&+z_\tau^{*\prime}\frac{d\tau}{d\tau^*}\Pi_E^{Int}(k)\left[\frac{2}{(2-z)(2-z^*)} + \frac{z}{(2-z^*)^2(2-z)}\right] \\
= \;& \left[\Pi_I^{Int}(0) - \Pi_I^{Int}(k)\right]\left[z'_{\tau^*}\left[\frac{2\,(1-z^*)}{(2-z^*)(2-z)^2} + \frac{2}{(1-z)\,(2-z^*)(2-z)}\right]\right] \\
&+\Pi_E^{Int}(k)\left[z'_{\tau^*}\left[\frac{2\,(1-z^*)}{(2-z^*)(2-z)^2} + \frac{1}{(1-z)\,(2-z^*)}\frac{z}{(2-z)}\right]\right].
\end{aligned}$$

Solving for $\frac{d\tau}{d\tau^*}$ and diving through yields (noting that $z_\tau^{*\prime}, z'_{\tau^*} > 0$):

$$\frac{d\tau}{d\tau^*} > 0.$$

Proposition 3

We have

$$\begin{aligned}
\tau^{Aut} - \tau^{Int} \;=\; & \left[\Pi_I^{Aut}(0) - \Pi_I^{Aut}(k)\right] + \\
& \left[\frac{(1-z^*)}{(1-0.5z^*)(2-z)}\right]\left[0.5z\Pi_E^{Int}(k) + \Pi_I^{Int}(k) - \Pi_I^{Int}(0)\right]
\end{aligned}$$

With profits given by (3.13). We note that

$$\frac{d}{dn}\left[\Pi_I^{Aut}(0) - \Pi_I^{Aut}(k)\right] < 0$$

and

$$\left[\Pi_I^{Aut}(0) - \Pi_I^{Aut}(k)\right] \to 0 \text{ as } n \to \infty.$$

Assume that n is large so that

$$\tau^{Aut} - \tau^{Int} \approx \left[\frac{(1-z^*)}{(1-0.5z^*)(2-z)}\right]\left[0.5z\Pi_E^{Int}(k) + \Pi_I^{Int}(k) - \Pi_I^{Int}(0)\right]$$

To prove existence of an m such that $\tau^{Aut} - \tau^{Int} < 0$ we then need to show that

$$\left[0.5z\Pi_E^{Int}(k) + \Pi_I^{Int}(k) - \Pi_I^{Int}(0)\right] < 0$$

This inequality will hold if the number of firms in the integrated market m is small and the quality of the innovation is k is sufficiently small. More specifically, assume $m = 1$ and $z = 1$ which gives:

$$\begin{aligned} & \left[0.5z\Pi_E^{Int}(k) + \Pi_I^{Int}(k) - \Pi_I^{Int}(0)\right] \\ = & \frac{1}{2}\left(\tfrac{\Lambda+2k}{3}\right)^2 + \left(\tfrac{\Lambda-k}{3}\right)^2 - \left(\tfrac{\Lambda}{2}\right)^2 < 0, \end{aligned}$$

where the inequality holds provided that $k < \frac{1}{2}\Lambda$.

Corollary 1

First, note that the LC model yields the following expressions for consumer welfare

$$\begin{aligned} CS^{Aut}(0) &= 0.5Nn^2(n+1)^{-2}(\Lambda)^2 \\ CS^{Aut}(k) &= 0.5N(n+2)^{-2}(\Lambda + k + An - cn)^2 \\ CS^{Int}(0) &= 0.5Nn^2(2n+1)^{-2}(2\Lambda)^2 \\ CS^{Int}(k) &= 0.5N(2n+2)^{-2}(\Lambda + k + 2n\Lambda)^2. \end{aligned}$$

Next, consider the change in consumer surplus

$$\begin{aligned} & \left[CS^{Aut}(k) - CS^{Aut}(0)\right] - \left[CS^{Int}(k) - CS^{Int}(0)\right] \\ = & -\left[CS^{Aut}(0) - CS^{Int}(0)\right] + \left[CS^{Aut}(k) - CS^{Int}(k)\right]. \end{aligned}$$

First note that if we set $k = 0$, meaning that an entrepreneur enters with an ineffective innovation, we still have that

$$-\left[CS^{Aut}(0) - CS^{Int}(0)\right] + \left[CS^{Aut}(k) - CS^{Int}(k)\right] > 0,$$

since the entry of a new firm is more important in autarchy, where the initial number of firms is small. Then, show that the difference is increasing in k:

$$\frac{d\left[CS^{Aut}(k) - CS^{Int}(k)\right]}{dk} > 0,$$

with the intuition that the increase in output due to the innovation is more important in the autarchy market with a smaller number of firms.

Corollary 2

To find its optimal lobbying schemes, the global incumbent lobbying group solves the following problem

$$\max_{\tau,\tau^*} W(\tau,\tau^*) - C(\tau) - C^*(\tau^*),$$

where $C(\tau)$ and $C^*(\tau^*)$ are given by (4.2) and (4.3). Using the parametric model, and combining the two first-order conditions, we obtain:

$$\frac{\tau}{\tau^*} = \frac{(1-z^*)}{(1-z)} \frac{2\left[\Pi_I(0) - \Pi_I(k)\right] + z(\pi_E(k) - F)}{2\left[\Pi_I(0) - \Pi_I(k)\right] + z^*(\pi_E^*(k) - F)}, \tag{3}$$

where $\Pi_I(0)$ and $\Pi_I(k)$ are the aggregate profit of domestic and foreign incumbent firms absent and with entrepreneurial entry, respectively. Now, assume that $\tau > \tau^*$, then (by symmetry) $z < z^*$. This leads to a contradiction since the RHS of (3) is < 1, whereas the LHS is > 1. Symmetrical reasoning leads to a contradiction if $\tau < \tau^*$. Hence, to satisfy the first-order condition, we must have that $\tau = \tau^*$.

TABLE A.I
SUMMARY STATISTICS

	Year	Observations	Mean	Std.dev	Min	Max
log(cost)	2000-2008	889	2.973	1.610	-2.302	7.163
log(cost)	2000-2005	541	3.083	1.523	-1.743	7.163
log(cost)	2000-2004	431	3.084	1.504	-1.743	7.163
kof	2000-2005	642	0.584	0.166	0.184	0.934
kof economic	2000-2005	756	0.634	0.197	0.119	1.000
kof social	2000-2005	847	0.522	0.216	0.106	0.954
kof political	2000-2005	854	0.564	0.261	0.078	0.990
csgr	2000-2004	444	0.363	0.225	0.080	1.000
csgr economic	2000-2004	584	0.154	0.082	0.062	1.000
csgr social	2000-2004	630	0.163	0.195	0.000	0.985
csgr political	2000-2004	732	0.373	0.199	0.098	0.948
Institution	2000-2005	706	-0.018	1.620	-3.470	4.253
Institution	2000-2004	588	-0.015	1.608	-3.351	4.253
Distance-Weighted Neighbours' Cost of entry	2000-2008	968	0.487	0.252	0.119	1.808

TABLE A.2
STUDIES USING THE WORLD BANK'S DOING BUSINESS INDEX.

	Dependent	Entry Barrier	Method	Result
Djankov et. al., (2002)	Corruption	Cost, procedures and time	Cross-country regressions (N=78) controlling for gdp/capita.	Positive effect (more corruption) in countries with higher entry barriers.
Svensson (2005)	Corruption	Procedures	Cross-country regressions (N=60) controlling for gdp/capita and education.	Positive effect (more corruption) in countries with many procedures.
Fisman and Sarria-Allende (2004)	Number, average size and operating margin of firms per 3-digit sector.	Cost	Interaction of sector specific natural entry barrier and growth potential with country specific entry barrier due to regulation.	In industries with low natural entry barriers, the average size of firms depends positively, and number of firms negatively, on the entry cost imposed by regulation.
Chang, Kaltani and Loayza (2005)	Growth	Index of cost, procedures and time	Panel of 80 countries over 40 years (5-year avg). Study interaction of openness with (time-invariant) institutional variables.	Openness has a positive effect on growth only in countries with low entry barriers.
Barseghyan (2008)	Output per worker and TFP	Cost	Cross-country IV regressions (N=50-100), with instruments for entry costs. Also controlling for human capital, corruption and business regulation (other than entry costs).	Negative effect of entry costs on output per worker and TFP.
Freund and Bolaky (2008)	Income gdp/capita	Procedures	Cross-country regressions (N=100-126) studying interaction of openness with entry regulation.	Finds strong negative effect of entry regulation and its interaction with openness on gdp/capita.
Klapper, Laeven and Rajan (2006)	Firm creation, average size of entrants and growth of incumbents	Procedures and entry	Interaction of country specific (institutional) entry barriers with industry specific characteristics (natural entry barriers)	Higher institutional entry barriers lower entry rate in sectors with high natural entry barriers, leads to larger new entrants, and increase incumbents' value added per employee.

TABLE A.3
GLOBALIZATION INDICES AND THEIR SUBCOMPONENTS

	CSGR index		KOF index	
	Variable	Weight	Variable	Weight
Economic	Exports plus imports of goods and services as a proportion of GDP	0.418	Trade (percent of GDP)	0.19
	Inflows plus outflows of foreign direct investment as a proportion of GDP	0.092	Foreign Direct Investment, flows (percent of GDP)	0.20
	Inflows plus outflows of portfolio investments as a proportion of GDP	0.220	Foreign Direct Investment, stocks (percent of GDP)	0.23
	Employee compensation paid to non-resident workers and investment income from foreign assets owned by domestic residents plus employee compensation paid to resident workers working abroad and investment income from domestic assets owned by foreign residents, as a proportion of GDP.	0.270	Portfolio Investment (percent of GDP)	0.17
			Income Payments to Foreign Nationals (percent of GDP)	0.09
			Hidden Import Barriers	0.01
			Mean Tariff Rate	0.09
			Taxes on International Trade (percent of current revenue)	0.07
			Capital Account Restrictions	0.09
Social	Stock of foreign population as proportion of total population.	0.088	Telephone Traffic	0.09
	Inflows of foreign population as proportion of total population.	0.208	Transfers (percent of GDP)	0.01
	Worker remittances (receipts) as a proportion of GDP.	0.026	International Tourism	0.09
	Number of tourists (arrivals plus departures) as proportion of total population.	0.009	Foreign Population (percent of total population)	0.07
	International outgoing telephone traffic (minutes) per capita	0.003	International letters (per capita)	0.09
	Internet users as a percentage of population	0.203	Internet Users (per 1000 people)	0.12
	Number of films imported and exported.	0.041	Television (per 1000 people)	0.12
	Sum of value of books and newspapers imported and exported per capita (US dollars)	0.386	Trade in Newspapers (percent of GDP)	0.10
	Number of international letters delivered and sent per capita	0.036	Number of McDonald's Restaurants (per capita)	0.12
			Number of Ikea (per capita)	0.12
			Trade in books (percent of GDP)	0.08
Political	Number of foreign embassies in country	0.378	Embassies in Country	0.25
	Number of UN peacekeeping operations in which country participates	0.357	Membership in International Organizations	0.28
	Number of memberships of International organisations	0.266	Participation in U.N. Security Council Missions	0.22
			International Treaties	0.25

Note that the weight refers to weight in each sub-index. For further information about sources for the specific variables we refer to (csgr) http://www2.warwick.ac.uk/fac/soc/csgr/index/ and (kof) http://globalization.kof.ethz.ch/. I both cases variables are normalized across time and countries. The weights are obtained as the principal component of the variables in each subindex. The kof index obtains the overall globalization index as the principal component of the three sub-indices, whereas the overall csgr index is the average (with equal weights) of the three sub-indices. In our estimations we exclude the following parts of the kof index: hidden import barriers, mean tariff rate, taxes on international trade and capital account restrictions. The index we use is obtained as the principal component excluding this variables