Entrepreneurship Policy and Globalization*

Robin Douhan, Pehr-Johan Norbäck and Lars Persson
Research Institute of Industrial Economics (IFN)

April 24, 2009

Abstract

PRELIMINARY VERSION!

Entrepreneurship has in recent years loomed large on policy makers' agendas. This paper proposes a model that explains this policy outcome as an endogenous response to market integration. The mechanism studied is how incumbent firms' incentives to lobby for protection against an independent entrepreneurs change when going from autarchy markets to internationally integrated markets. Changes in product market competition and competition between entrepreneurs are shown to lead to more pro-entrepreneurial policies in integrated markets. We find empirical support consistent with our model, in particular a strong negative correlation between openness and the level of barriers to entry into entrepreneurship.

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

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

*Financial support from the Tom Hedelius' and Jan Wallander's Research Foundation is gratefully acknowledged. This paper was written within the Gustaf Douglas Research Program on Entrepreneurship. We thank Kaj Tomson, Joacim Tag, Henrik Horn, and seminar participants at University of Nottingham, Uppsala University, and IFN (Research Insitute of Industrial Economics) for excellent comments and suggestions. E-mail: firstname.lastname@ifn.se

1. Introduction

The start-up of new firms plays an important role in an economy's innovation system.[1] However, for a long time, industrial policy has been synonymous with policies supporting large established firms. A case in point is Sweden where several financial market regulations, tax codes and labor market policies were designed to match the organization of large incumbent firms (Henrekson and Jakobsson, 2001).

Recently, the public debate and policies have shifted towards the small firm which is increasingly seen as a key actor in an innovation system.[2] This has been described by scholars as a "profound shift in government policies toward business [...] a new policy agenda designed to promote entrepreneurial activity is coming to the forefront" (Gilbert, Audretsch and McDougall, 2004). Several changes in industrial policies have been implemented with the motivation of being more adaptive for small entrepreneurial firms. Other policies have been specifically devised to facilitate the start-up of small innovative firms such as incubators, technology-transfer programs, start-up finance, *et cetera* (Minniti, 2008). In Sweden, the legislation against investment in Venture Capital funds by pension funds has been lifted with the explicit purpose of improving the financial possibilities for small R&D firms. New employment protection rules have been implemented to allow an employer to keep key personnel during downsizing – with the explicit aim of promoting small entrepreneurial firms.

Figure 1 shows data from the World Bank's Doing Business project, which surveys businesses in more than 100 countries. One part of this project extends the survey on barriers to entry for new firms, which was first introduced in Djankov *et al.* (2002). *Figure 1* shows how the mean values (weighted by the share of global GDP) of 73 countries have evolved over recent years. The first two displays show the capital requirement for starting a new business and the cost incurred in the process of a start-up in terms of the country's GDP per capita. The other two displays show the time needed and the number of procedures involved in starting a new business. The downward trend in these pictures is evident. On average, the cost of starting a new business declined by more than 6 percent per annum over the period 2003–08. The time and process

[1] See detailed descriptions in Baumol (2002, 2004). Moreover, many small innovative firms are supported by venture capital and Kortum and Lerner (2000) found, using a sample period of 1965-1992, that VC investments have a positive impact on patent count at industry level, and that this positive impact is larger than that of R&D expenditures. Hirukawa and Ueda (2008) find similar result when extending the sample period to 2001.

[2] *The Economist* (14th March 2009) published a special report on entrepreneurship: "Global Heroes".

required to start a new business declined by a yearly 9 and 2 percent, respectively, over the same period.

[FIGURE 1]

In this paper, we propose a model that could explain this change in industrial policy from anti-entrepreneurial to pro-entrepreneurial. The driving mechanism in the model proposed is the ongoing international integration of product and innovation markets. This is shown to decrease the domestic incumbent firms' value of protecting its domestic market from domestic entrepreneurial innovations. A policy maker who internalizes incumbents' and the entrepreneur's income will respond to this by changing industrial polices in favor of entrepreneurs.

The theoretical model has the following structure: There are two countries where a policy maker in each country decides on a policy that affects the return to entrepreneurial investments. The policy variable can be a fee (subsidy) or a tax on successful entrepreneurs' profit. Incumbent firms and the entrepreneur both have an incentive to influence the policy outcome. The policy is chosen to maximize lobbying contributions from the two groups. Given the entrepreneurial policy, the entrepreneur in each country decides how much to invest in innovative activity. If successful, the entrepreneur enters the product market. Finally, firms compete in oligopoly fashion on the product market, thereby generating profits.

Starting with autarchy, we show that an increase in the entrepreneur's effort, and thereby probability of making an innovation, has two effects which are not internalized by the entrepreneur. One is the negative business stealing effect on incumbent firms, the other is a positive effect on government income from the fees. An optimal policy will therefore balance the marginal cost and benefit of these two effects.

We then turn to how the globalization process, and in particular how the international integration of markets, affects the incentive to set entrepreneurial policy. This market integration process is partly due to policy changes. Important examples include: Large privatization and deregulation programs, and increased scope of international agreement on trade, investment and property right protection, such as WTO agreements and the EU single market program.[3] The

[3] World Investment Report (WIR) 2000 reports that over the period 1991-1999, approximately 97 per cent of a total of 1035 changes in the regulatory Foreign Direct Investment (FDI) regimes of countries were in the direction of liberalization and mostly involved the opening of industries previously closed to

integration is also due to technology advances reducing international transportation and transaction costs.[4] To highlight these features of the globalization process we study how the incentive to set an entrepreneurial policy changes when the two countries' markets are integrated, and patent protection is international.

We then show that market integration reduces the incentive for the policy maker to protect domestic incumbents from entreprenurial entry. There are three main reasons for this shift. First, in integrated markets, oligopoly rents are lower so there is less incumbent profit to protect. Second, in the presence of a foreign entrepreneur, there is always the risk of a foreign innovation, which dampens the effect of domestic policy on domestic agents. Third, entrepreneurial efforts expended by the domestic and the foreign entrepreneur are strategic substitutes. If the policy maker levies costly policies on the domestic entrepreneur, this will increase the effort of the foreign entrepreneur and the risk of a foreign innovation. The latter two effects implies that it becomes more difficult for the policy maker to protect domestic incumbents.

We also show that a government that considers the welfare of consumers will choose a more pro-entrepreneurial policy. The reason is that entrepreneurial innovations benefit consumers through lower prices or a higher quality of products. Moreover, such governments will be less affected by market integration since they already have less anti-entrepreneurial policies.

Our model predicts a negative relationship betweeen entry barriers to entreprenurs and international market integration. We test this prediction using data on entry barriers for entreprenurs from the World Bank's Doing Business survey. To measure international integration of markets we use several globalization indexes. As a first measure, we use the kof index provided by the

FDI. World Investment Report (WIR) 2008 reports that in 2007, only 98 policy changes that affect FDI were identified– the lowest number since 1992. The nature of the changes was similar to that observed over the past few years: 74 of 98 changes were in the direction of making the host-country environment more favorable to FDI.

The possibility to receive patent protection in foreign countries are today extensive. For instance, the Patent Cooperation Treaty (PCT) streamlines the process for U.S. inventors and businesses wishing to obtain patent protection in other countries. By filing one international patent application with the USPTO, U.S. applicants can concurrently seek protection in up to 115 countries. For an invention made in the United States, U.S. law prohibits filing abroad without a foreign filing license from the USPTO, unless six months have elapsed since filing a U.S. application.

[4] World Trade Report (WTR) 2008 evaluates the development of trade cost in the world economy and concludes "To sum up, empirical evidence shows an overall downward trend in trade costs in the last half century. This includes traditional trade costs (such as tariffs and non-tariff barriers) as well as transport and communication costs."

Swiss Federal Institute of Technology in Zurich. Our second measure is csgr index provided by University of Warwick. Both indices cover more than 120 countries over the period 1999–2004 and combines components of trade flows, FDI flows, information on international personal contacts and information flows, membership in international organizations. These components capture different parts of the market integration that we model. Using variation over time, we are able to control for country-specific effects.

The empirical results indicate a strong negative effect of international integration on barriers to entry for new firms, both between and within countries over time. Moreover, consistent with the theoretical framework, we find the effect to be stronger in countries with more rent-seeking governments, as measured by the level of corruption. To tackle concerns about endogeneity, we consider new members of the European Union. The commitment made when joining the union pertains to market integration, but not to policies towards entrants (as long as domestic and other EU entrants are treated in same fashion). However, we observe a sharp decline in the level of barriers to entry subsequent to the year of membership compared to similar countries outside and inside the EU, consistent with our theoretical predictions.

Our paper is related to the literature on lobbying for international protection. Starting from Grossman and Helpman (1994), a literature has explored a setting where the policy makers in two countries interact in a game where they may protect the own country's incumbent firms from foreign competition (Imai, Katayama and Krishna, 2008; Bombardini, 2008). We add to this literature by studying how an exogenously given international integration of markets affects the lobbying game between different interest groups within a country, i.e. entrepreneurs and incumbents.

Our paper is also related to the literature on R&D competition between countries. Starting from Brander and Spence (1983), a literature has explored a setting where the policy makers in two countries interact in a game where they may support the own country's oligopolistic incumbent firms (Eaton and Grossman, 1986; Leahy and Neary, 1997, 2008). We depart from this tradition by instead considering innovations by independent domestic entrepreneurs that exert externalities on domestic incumbents and compete with foreign entrepreneurs.[5]

The paper is also related to the literature on financial development and internationalization.

[5] This is also a distinguishing feature from recent studies that have analyzed R&D competition in endogenous Schumpeterian growth models (Impullitti, 2007). In the same respect, we also differ from studies of the interaction between R&D policy and trade (Haaland and Kind, 2008).

Rajan and Zingales (2003) present empirical evidence that openness can explain the development of financial markets over long periods of time. They informally reason that when capital and product markets are closed, incumbent firms and financial intermediaries have an incentive to restrict the access to financial markets and thereby oppose entrepreneurial entry. Building on this argument, a couple of studies have recently explored investor protection as an endogenous outcome in models with lobbying from different interest groups, and how it depends on countries' political structure (Perotti and Volpin, 2007; Bebchuk and Neeman, 2007). We differ from these studies by focusing on the effects of the international market integration on the endogenously determined entrepreneurial entry barrier.

The entrepreneurship literature has typically regarded the shift towards more pro-entrepreneurial policies as a natural response to the increased importance of small-businesses and entrepreneurship (documented early by Loveman and Sengenberger, 1991; see also Baumol, 2002). One of the most frequently cited reasons for the increased importance of entrepreneurship is globalization (e.g. Gilbert *et al.*, 2004). However, the specific link between globalization and actual policy outcome has largely been neglected in the entrepreneurship literature.

The data on entry regulation shown in *Figure 1* has been extensively used in the literature (see Appendix *Table A.2*). Primarily, it has been used to study the effect 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). Most recently, 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. Although the close correlation between openness and entry barriers has been noted in earlier literature, there exist few, if any, theoretical explanations. In these studies, entry costs have been treated as an underlying institutional feature. However, in view of the strong decline in entry costs such an approach faces an obvious problem since underlying institutional features tend to be inert to change. To the best of our knowledge, this paper provides a first theory which can explain the variation in formal entry barriers over time.

The model is spelled out in Section 2. Section 2.2 studies how international market integration affects the incentive to set entrepreneurial policy. In Section 2.3 , we extend the base model. The extensions we consider are: (i) a total surplus maximizing government, (ii) *ex-post* oligopolistic

interaction, (iii) policy competition between governments, and (iv) entrepreneurial innovation for sale instead of entry. The empirical analysis is conducted in Section 3. Section 4 concludes the paper.

2. The Model

To highlight the effects of globalization, we begin by considering an industry in autarchy. Then, we examine the effect of globalization.

2.1. Benchmark: Autarchy

Consider a closed oligopolistic industry with n symmetric 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. In stage 2, the entrepreneur expends effort to increase the probability of making an innovation with a fixed size or quality $k > 0$. The revenues from a successful innovation depend on the profit from entering the product market and the size of the entry fee. 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 backward in the usual fashion.

2.1.1. Product market interaction (stage 4)

Firms are indexed j, and the set of index numbers for domestic incumbent firms is denoted $\mathcal{J}$. The entrepreneurial firm is assigned the index $j = E$. The product market profit of firm j is represented by $\pi_j(\mathbf{x} : k)$, where $k > 0$ represents the inherent quality of the innovation used by an entrepreneurial firm. 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. Fixed costs are abstracted from, so that exit is equivalent to inaction.

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

$$\pi_j(x_j^*, x_{-j}^* : k) \geq \pi_j(x_j, x_{-j}^* : k), \tag{2.1}$$

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

$$\pi_j(k) \equiv \pi_j(x_j^*(k), x_{-j}^*(k) : k). \tag{2.2}$$

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 $j \in \mathcal{J} \cup E$. Thus, there are two types of firms: one is the entrepreneurial firm which is making a profit $\pi_E(k) \geq 0$, and the other is an incumbent firm with a profit $\pi_I(k) \geq 0$. The argument $k > 0$ indicates entry by the entrepreneur. All firms are homogeneous in the case when no entry takes place, i.e. $j \in \mathcal{J}$ with profit $\pi_I(0) \geq 0$. The argument $k = 0$ indicates that the entrepreneur has not entered the market.

Both the entrepreneur's and the incumbent firms' profit are dependent on the quality of the innovation, k. The innovation enables the entrepreneur to enter the market and make profit, which reduces the incumbents' profit. 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.[6]

Definition ***The quality of the innovation.*** *When the quality of the innovation increases, the product market profit of the entrepreneur increases and the profit of the rivals decreases weakly, i.e.* $d\pi_E/dk > 0$, *and* $d\pi_N/dk \leq 0$.

To highlight the political economy mechanisms, we will conduct the main analysis under the assumption that entrepreneurial innovations are drastic, i.e. a successful entrepreneur will get a monopoly position. This assumption is relaxed in section 2.3.2. Formally,

Assumption A1 *The innovation k is drastic, i.e.* $\pi_I(k) = 0$.

From Assumption A1 we note that aggregate profits on the market are increased by entry due to monopoly, i.e. $\pi_E(k) > n\pi_I(0)$ where we also note that the aggregate loss by incumbents from entry is $n\pi_I(0)$.

[6] Note that we can consider of the innovation as a new cost-reducing production technology, but also some product improvement.

2.1.2. 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 her innovation, $\pi_E(k) - F > 0$.

2.1.3. Innovation activity (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 with a fixed amount τ, if the entrepreneur successfully innovates.

The entrepreneur solves the following problem,

$$\max_e \Pi_E = z(e)\left[\pi_E(k) - F - \tau\right] - y(e). \tag{2.3}$$

with the first-order condition :

$$z'_e(\pi_E(k) - F - \tau) - y'_e = 0 \tag{2.4}$$

which implicitly defines an optimal effort level $e(\pi_E(k), F, \tau)$. In particular, it can be verified that the optimal effort level is decreasing in the entry fee, $e'_\tau < 0$. 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. It will be useful to define a reduced-form expected profit for the entrepreneur as a function of the entry fee τ:

$$\Pi_E(\tau) = z(\tau)\left[\pi_E(k) - F - \tau\right] - y(\tau). \tag{2.5}$$

2.1.4. Entrepreneurial policy (stage 1)

We will assume a rent maximizing government (we examine the case of a total surplus maximizing government below). The objective function of the policy maker is the sum of the expected entry fee $\tau z(\tau)$ and lobbying contributions from entrepreneurs and incumbents, L_E and L_I:

$$V = L_E + L_I + \tau z(\tau), \tag{2.6}$$

We assume that incumbent firms can organize themselves as an interest group and make a joint lobbying contribution. In a perfect information setting, the government will then set a triplet $\{\tau, L_E, L_I\}$ maximizing (2.6). Note that the maximum lobbying contribution schemes for the entrepreneur and incumbents for a given τ are:

$$L_E(\tau) = \Pi_E(\tau), \tag{2.7}$$

$$L_I(\tau) = [1 - z(\tau)]\, n\pi_I(0), \tag{2.8}$$

where $\pi_I(k) = 0$ in (2.8). $L_I(\tau) = [1 - z(\tau)]\, n\pi_I(0)$ is thus the incumbents' willingness to pay for an entry fee τ when otherwise facing such a low entry fee (or such a high subsidy) that an entrepreneur will enter the market with certainty. $L_E(\tau) = \Pi(\tau)$ is the entrepreneur's maximum willingness to pay for entry fee τ when otherwise facing a prohibitively high entry fee.[7] The policy maker's maximization problem can thus be written as

$$\max_{\tau} V = \Pi(\tau) + [1 - z(\tau)]\, n\pi_I(0) + \tau z(\tau). \tag{2.9}$$

Taking into account the optimal effort by the entrepreneur in (2.4), the optimal entry fee τ^{Aut} is given from

$$\underbrace{z'_\tau \tau^{Aut}}_{\text{Exp. loss}} \quad \underbrace{-z'_\tau n\pi_I(0)}_{\text{Exp.gain}} = 0 \tag{2.10}$$

An increase in entry fees will reduce the entrepreneurial effort and hence, decrease the probability 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 when the probability of a successful innovation (and hence of entrepreneurial entry) declines, $-z'_\tau n\pi_I(0) > 0$. Both of these are externalities not internalized by the entrepreneur when setting its optimal effort level. From (2.10), we obtain the optimal policy in autarchy:

$$\tau^{Aut} = n\pi_I(0). \tag{2.11}$$

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

[7] The set of optimal lobbying contributions by the entrepreneur and the incumbent firms would hence correspond to a truthful Nash equilibrium in an asymmetric information setting (Bernheim and Whinston, 1986; Grossman and Helpman, 1994).

2.2. Why globalization reduces barriers to entrepreneurship

Let us now examine the impact of globalization on the optimal entry fees, τ. In what follows, we 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 2.3.3. 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 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 patent (and hence enter). This patent right is allocated by a 50-50 lottery. Another assumption that we impose is 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.

2.2.1. Integration of product markets

In the integrated product market, let the set of indices for foreign incumbents and the entrepreneur be denoted $\mathcal{J}^*$ and E^*, while $\mathcal{J}$ and E represent domestic incumbents and the entrepreneur, respectively. Product market competition may then entail firms indexed $j \in \mathcal{J} \cup \mathcal{J}^*$, $j \in \mathcal{J} \cup \mathcal{J}^* \cup E$ or $j \in \mathcal{J} \cup \mathcal{J}^* \cup E^*$. In either case, the Nash-equilibrium is given as

$$\pi_j^{Int}(x_j^*, x_{-j}^* : k) \geq \pi_j^{Int}(x_j, x_{-j}^* : k), \tag{2.12}$$

from which we define a reduced-form profit $\pi_j^{Int}(k) \equiv \pi_j^{Int}(x_j^*(k), x_{-j}^*(k) : k)$. We maintain Assumption A1 of a drastic innovation and assume that a successful entrepreneur (domestic or foreign) becomes a monopolist, and, hence $\pi_E^{Int}(k) > n\pi_I^{Int}(0) > n\pi_I^{Int}(k) = 0$.

The integration of markets implies that domestic incumbents will have to compete with foreign firms. For the individual incumbent firm, we assume that the exposure to more competition is not offset by the benefit of having access to larger markets. Thus, in the absent innovation state, we make the following assumption:

Assumption A2 Competition is stronger in integrated product markets, $\pi_I^{Int}(0) < \pi_0^{Aut}(0)$.

2.2.2. Integration of the market for innovations (stage 2)

To simplify the presentation, we assume that a patent for an innovation k is universal and allocated by 50-50 lottery in case of simultaneous innovations. 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 write the probability that the domestic entrepreneur successfully enters as

$$z_E^{win}(e, e^*) = z(e)\left[1 - z(e^*)\right] + 0.5z(e)z(e^*). \tag{2.13}$$

where $z(e)(1 - z(e^*))$ is the probability of entry if the domestic entrepreneur alone is successful and $0.5z(e)z(e^*)$ is the probability that the domestic entrepreneur wins the lottery in case of simultaneous innovations. The probability that the foreign entrepreneur enters the integrated market is symmetric and, in the integrated market, we can write the entrepreneurs' maximization problems as follows:

$$\max_{e} \Pi_E = z_E^{win}(e, e^*)\left[\pi_E^{Int}(k) - F - \tau\right] - y(e), \tag{2.14}$$

$$\max_{e^*} \Pi_E = z_{E^*}^{win}(e^*, e)\left[\pi_{E^*}^{Int}(k) - F - \bar{\tau}^*\right] - y(e^*). \tag{2.15}$$

Using (2.13), the Nash-equilibrium in efforts is given from:

$$z_e'(1 - 0.5z^*)\left[\pi_E^{Int}(k) - F - \tau\right] - y_e' = 0, \tag{2.16}$$

$$z_{e^*}'(1 - 0.5z^*)\left[\pi_E^{Int}(k) - F - \bar{\tau}^*\right] - y_{e^*}' = 0. \tag{2.17}$$

From (2.16) and (2.17), the optimal entrepreneurial efforts can be derived as functions of the domestic entry fee, $e(\tau)$ and $e^*(\tau)$. Note that (2.16) and (2.17) imply that entrepreneurial efforts e and e^* are strategic substitutes: more effort expended by the foreign entrepreneur, e^*, reduces the effort of the domestic entrepreneur, e. It 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 $e_\tau^{*\prime} > 0$. Noting that $z(\tau) = z(e(\tau))$ and $z^*(\tau) = z(e^*(\tau))$, 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, $z_\tau'^* = z_{e^*}' e_\tau^{*\prime} < 0$ and $z_\tau' = z_e' e_\tau' < 0$.*

Once more, it will be useful to define a reduced-form expected profit for the entrepreneur as function of the entry fee τ. From (2.13), (2.16) and (2.17), we have:

$$\Pi_E^{Int}(\tau) = z_E^{win}(\tau)\left[\pi_E^{Int}(k) - F - \tau\right] - y(\tau). \tag{2.18}$$

2.2.3. Entrepreneurial Policy (Stage 1)

In the integrated world, the policy maker once more maximizes the sum of lobbying contributions from the entrepreneur and the incumbents, respectively, and the entry fee. It follows that the policy maker's problem in (2.9) now becomes:

$$\max_{\tau} V = \Pi_E^{Int}(\tau) + \left[1 - z^{entry}(\tau)\right] n\pi_I^{Int}(0) + \tau z_E^{win}(\tau).$$

where z_E^{win} is the probability that the domestic entrepreneur enters the market from (2.13), and $z^{entry}(\tau) = 1 - [1 - z(\tau)]\,[1 - z^*(\tau)]$ is the probability that either the domestic or the foreign entrepreneur is successful. Using the entrepreneur's optimality condition (2.16), the policy maker's first-order condition now becomes:

$$\underbrace{z'_\tau(1 - 0.5z^*)\tau}_{\text{Expected loss (fees)}} \quad \underbrace{-z'_\tau(1 - z^*)n\pi_I^{Int}(0)}_{\text{Expected gain (incumbents)}} \quad \underbrace{-z^{*\prime}_\tau(1 - z))n\pi_0^{Int}(0)}_{\text{Expected loss (incumbents)}} = 0. \tag{2.19}$$

To infer the effect of globalization on entrepreneurial policy, it is instructive to compare the optimal entry fee τ^{Int} in (2.19) to the corresponding fee under autarchy τ^{Aut} in (2.10). From (2.19), we note that when valuing the negative effect from the policy on the probability of a domestic innovation, $z'_\tau < 0$, the policy maker trades off the expected loss of entry fees $z'_\tau(1 - 0.5z^*)\tau^{Int} < 0$ against the expected gain by incumbents $-z'_\tau(1 - z^*)n\pi_I^{Int}(0) > 0$. In comparison with (2.10), we note that these terms are discounted with probabilities $(1 - 0.5z^*)$ and $(1 - z^*)$. The term $(1 - 0.5z^*)$ represents the risk that even if the domestic entrepreneur is successful, the foreign entrepreneur may still win the patent lottery. This reduces the expected loss of entry fees. The term $(1 - z^*)$ represents the risk of dissipation of incumbent profits due to the success of the foreign entrepreneur. Since international competition drives down the incumbent profits absent innovation ($\pi_I^{Int}(0) < \pi_I^{Aut}(0)$), and since the gains by incumbents are more heavily discounted by the risk of foreign innovations than the loss of entry fees ($1 - 0.5z^* < 1 - z^*$), the policy maker will tend to choose lower entry fees in the integrated economy. Inspecting (2.19), we also note that the expected loss by incumbents generated by a more aggressive foreign entrepreneur

provides additional incentives for the policy maker to reduce its entry fees in the globalized economy, as shown by the term $z_\tau^{*\prime}(1-z))n\pi_0^{Int}(0) < 0$ in (2.19).

To proceed, from (2.19) and (2.10), we can formally show that:

$$\tau^{Aut} - \tau^{Int} = n\left[\pi_I^{Aut}(0) - \pi_I^{Int}(0)\lambda^{Int}\right] > 0, \tag{2.20}$$

where:

$$\lambda^{Int} = \frac{z_\tau'(1-z^*)+z_\tau^{*\prime}(1-z)}{z_\tau'(1-0.5z^*)} < 1 = \lambda^{Aut}, \tag{2.21}$$

since $z_\tau' < 0$ and $z_\tau^{*\prime} > 0$ from Lemma 1. Henceforth, we will refer to λ as the effectiveness of government policy.

Thus, from (2.20), globalization will reduce the entry barriers for entrepreneurs due to two distinct mechanisms. The increased product market competition from foreign incumbent firms will reduce incumbents' profits absent innovation, which limits the losses for incumbents under entrepreneurial entry. This is shown by the term $\pi_I^{Aut}(0) - \pi_I^{Int}(0) > 0$.

But foreign competition over entrepreneurial rents created by entry will work towards an additional reduction in entry barriers, as shown by the term $\lambda^{Int} < 1$. Intuitively, the government lacks a policy instrument for controlling the foreign entrepreneur. This drives a wedge between how an increase in the entry fee reduces expected revenues collected from the fees, captured by the term $z_\tau'(1-0.5z^*)$, and how an increase in the entry fee saves on incumbents' profits, as captured by the term $z_\tau'(1-z^*) + z_\tau^{*\prime}(1-z)$. Competition between the domestic and the foreign entrepreneur makes it relatively more costly for the government to erect entry fees as compared to the autarchy case (where these two effects were identical, i.e. $\lambda^{Aut} = z_\tau'/z_\tau' = 1$ in (2.10)).

We have the following proposition:

Proposition 1 *The optimal entrepreneurial policy in terms of entry fees is lower in the globalized economy than in the autarchy,* $\tau^{Aut} - \tau^{Int} > 0$.

2.3. Extensions

First, we alter the specification of the policy maker's objective function, shifting the focus from a rent maximizing government to a total surplus maximizing government. Then, we relax Assumption A1 of drastic innovations and consider the case where incumbent firms remain on the market even after entrepreneurial entry. Then we consider a parametric case of policy compe-

tition between governments in a bilateral setting. Finally, we study the case of entrepreneurial innovation for sale.

2.3.1. A total surplus maximizing government

The government's objective has hitherto been the sum of maximal lobbying contributions and entry fees. Let us here instead study what would happen if the government were to maximize the total surplus, i.e. the sum of producer and consumer surplus. Let $CS(0)$ denote the consumer surplus in the pre-innovation state and $CS(k)$ the consumer surplus with entrepreneurial firm entry. Assume that the new innovation increases the consumer surplus so that $CS(k)-CS(0) > 0$.

Note that the consumer surplus absent innovation $CS(0)$ is determined by the degree of competition on the oligopolistic market. Given the increase in competition following integration, it is natural to assume that $CS^{Int}(0) > CS^{Aut}(0)$. Moreover, following the assumption of a drastic innovation, we have that $CS(k) = CS^{Aut}(k) = CS^{Int}(k)$. Thus, the increase in consumer surplus from entrepreneurial entry is always greater in autarchy than in the integrated market:

$$CS(k) - CS^{Aut}(0) > CS(k) - CS^{Int}(0) > 0. \tag{2.22}$$

In the autarchy case, the total surplus maximizing government solves:

$$\max_{\tau} W = \Pi_E^{Aut}(\tau) + [1 - z(\tau)]\, n\pi_I^{Aut}(0) + [1 - z(\tau)]\, CS^{Aut}(0) + z(\tau)CS(k).$$

From the associated first-order condition, it is easily shown that a total surplus maximizing government always chooses an entry fee $\tilde{\tau}^{Aut}$ lower than that of a rent maximizing government τ^{Aut}, i.e.

$$\tilde{\tau}^{Aut} - \tau^{Aut} = -\left[CS(k) - CS^{Aut}(0)\right] < 0 \tag{2.23}$$

Likewise, in the integrated market, the total surplus maximizing government solves

$$\max_{\tilde{\tau}^{Int}} W = \Pi_E^{Int}(\tau) + \left[1 - z^{win}(\tau)\right] n\pi_I^{Int}(0) + \left[1 - z_E^{entry}\right] CS^{Int}(0) + z_E^{entry} CS(k)$$

from which we can show that the associated optimal entry fee chosen by a total surplus maximizing government $\tilde{\tau}^{Int}$ is once more smaller than that of the rent-maximizing government τ^{Int}, i.e.:

$$\tilde{\tau}^{Int} - \tau^{Int} = -\lambda^{Int}\left[CS(k) - CS^{Int}(0)\right] < 0 \tag{2.24}$$

We can also note that market integration, or "globalization", always reduces the entry fees more when the government maximizes rents as compared to when the government maximizes the total surplus. Using (2.20) and (2.22)–(2.24), it is straightforward to show that:

$$\underbrace{\left[\tau^{Aut}-\tau^{Int}\right]}_{(+)}-\underbrace{\left[\tilde{\tau}^{Aut}-\tilde{\tau}^{Int}\right]}_{(+)}=\left[CS(k)-CS^{Aut}(0)\right]-\lambda^{Int}\left[CS(k)-CS^{Int}(0)\right]>0 \quad (2.25)$$

We summarize the results in the following proposition:

Proposition 2 *Integration with the rest of the world leads to a larger reduction in entry fees for a rent maximizing government as compared to a government which maximizes the total surplus,* $\tau^{Aut}-\tau^{Int}>\tilde{\tau}^{Aut}-\tilde{\tau}^{Int}>0$.

2.3.2. Post-Innovation Oligopoly

A key prediction in Proposition 1 is that globalization reduces the entry fees for entrepreneurs. How would this result change if we relaxed the assumption of a drastic innovation and allowed incumbent firms to make a positive profit in the post-entry market, i.e. $\pi_I(k)>0$? The decrease in incumbent profits from entrepreneurial innovation and entry is then $n\left[\pi_I^{Aut}(0)-\pi_I^{Aut}(k)\right]$ and $n\left[\pi_I^{Int}(0)-\pi_I^{Int}(k)\right]$ under autarchy and integration, respectively. Substituting $n\left[\pi_I^{Aut}(0)-\pi_I^{Aut}(k)\right]$ for $n\pi_I^{Aut}(0)$ and $n\left[\pi_I^{Int}(0)-\pi_I^{Int}(k)\right]$ for $n\pi_I^{Int}(0)$ in (2.20), it follows that the change in entry fees going from autarchy to an integrated market would be:

$$\tau^{Aut}-\tau^{Int} = n\{\underbrace{\left[\pi_I^{Aut}(0)-\pi_I^{Aut}(k)\right]}_{(+)}-\underbrace{\left[\pi_I^{Int}(0)-\pi_I^{Int}(k)\right]}_{(+)}\lambda^{Int}\} \quad (2.26)$$

$$\lambda^{Int} = \frac{z'_\tau(1-z^*)+z^{*\prime}_\tau(1-z)}{z'_\tau(1-0.5z^*)}<1 \quad (2.27)$$

Once more, (2.26) reveals that government policy affecting the entry cost of domestic entrepreneurs is less effective in the presence of foreign entrepreneurs, i.e. $\lambda^{Int}<1=\lambda^{Aut}=1$. Thus, without an instrument for controlling the foreign entrepreneur, the government will tend to set a lower fee under globalization also when the post entry market is oligopolistic.

How does the loss of incumbents from entry differ between autarchy and the integrated market cases? Consider a Cournot model where the size of the domestic (foreign) market is given by s (s^*) and this market is served by n (n^*) incumbent firms. Let prices in each market be linear in demand, with an intercept A. Moreover, assume constant marginal costs equal to c for

incumbent firms, and $c-k$ for the successful entrepreneur who enters the product market. It is then straightforward to show that:

$$\begin{aligned} \left[\pi^{Aut}(0)-\pi^{Aut}(k)\right] &= (n+1)^{-2}(2A-2c-k)\,sk \\ \left[\pi^{Int}(0)-\pi^{Int}(k)\right] &= (n^*+n+1)^{-2}(2A-2c-k)\,(s^*+s)\,k. \end{aligned} \tag{2.28}$$

The following proposition follows directly from (2.28) when imposing symmetry ($s=s^*$ and $n=n^*$):

Proposition 3 *For a Cournot model with linear price, constant marginal costs and symmetric countries, the loss of incumbents due to an innovation is larger in autarchy than in integrated markets, or* $\frac{\left[\pi^{Aut}(0)-\pi^{Aut}(k)\right]}{\left[\pi^{Int}(0)-\pi^{Int}(k)\right]}>1$.

Proof. In the appendix ■

It follows that in with symmetric countries, $\tau^{Aut}-\tau^{Int}>0$, so that the entry fee is lowered when markets are integrated. However, Proposition 3, does not necessarily hold in more general cases. This is readily seen from (2.28), where the loss of incumbents in integrated markets may be larger than the loss in autarchy if the foreign market is larger than the domestic market and the number of firms is smaller. In such cases, the integrated market generates more profit for incumbent firms and an innovation is consequently more harmful. More generally, the beneficial effects on profit due to larger markets and the losses from increased competition will depend on the size of the domestic and foreign markets, how competitive each market is (i.e. the number of oligopolistic firms) and the extent to which the two trade.

2.3.3. Policy competition

In the main analysis, we have taken the entrepreneurial policies of foreign governments as given, focusing on the choice of a domestic government. How would the results change if we were also to model foreign entrepreneurial policies?

In this section, we add a foreign government choosing an entry fee τ^* simultaneously with the domestic government. Policy competition makes the model considerably more difficult to solve and we use a parametric representation. We assume the probability of success to be a function $z(e)=1-\exp(-\gamma e^{\eta})$, with the effort cost $y(e)=\theta e^{\eta}$. Given this parametric form, we can show the following useful relation:

Lemma 2 *The ratio between the response of the domestic and the foreign entrepreneur to a change in domestic policy is*

$$\frac{z_\tau^{*\prime}}{z_\tau^\prime} = -\frac{2-z}{1-z^*}.$$

Proof. In the appendix ■

Substitute this into (2.21) to obtain

$$\lambda^{Int} = \left(\frac{1-z^*}{1-0.5z^*}\right)\left(\frac{1}{2-z}\right). \tag{2.29}$$

It is easily verified that $\frac{\partial \lambda^{Int}}{\partial \tau^*} > 0$ and since we have that $\tau^{Int} = n\pi_I^{Int}(0)\lambda^{Int}$, we have the following result.

Proposition 4 *Domestic and foreign policies are strategic complements, i.e.* $\frac{\partial \tau^{Int}}{\partial \tau^*} > 0$

To gain some intuition for the equilibrium, we plot the reaction functions for specific parameter values in *Figure 2*. The entrepreneurial profit of entry was set to $\pi_E^{Int}(k) = 10$, incumbents' profits to $\pi_I^{Int}(0) = 8$ and the fixed cost of entry to $F = 0$.

We first note that the reaction functions (domestic drawn with solid lines and foreign with dashed lines) are increasing and convex. As the entry fee of the other country increases towards 10, i.e. the level where no profit can be made from entrepreneurship, the probability of foreign entry z^* drops towards 0. In this situation, the reaction function increases rapidly to the corresponding autarchy situation with a domestic fee equal to 8 (if the incumbents' profits are constant when we go from autarchy to integrated markets). For all foreign fees $\tau^* < 8$, we know from (2.29) that $\lambda^{Int} < 1$, implying that the effectiveness of domestic policy is always lower than in the autarchy case $\lambda^{Aut} = 1$. In the policy interaction, there is a stable equilibrium at the point indicated "Eq", which is below the autarchy fee.

[FIGURE 2]

2.3.4. 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.[8] The venture capital industry provides some evidence of the relation between innovation for sale and innovation for entry. *Figure 3* 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 3]

However, it can be shown that our identified mechanism still be 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 for the case of drastic innovations consider the following sale model: If a sale take place, the entrepreneur sell 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.

The N incumbents simultaneously post bids, which are accepted or rejected by the entrepreneur. Each incumbent announces a bid, b_i, where $\mathbf{b} = (b_1, ..., b_i, ...b_n) \in R^n$ is the vector of these bids. Following the announcement of $\mathbf{b}$, the innovation are sold to the incumbent with the highest bid ($b_i = S_E^*$). If more than one has the highest bid, each such incumbent obtains the innovation with equal probability.

An incumbent's valuation of obtaining the restructured assets is

$$w_{II} = R_A(k) - R_{NA}(k). \tag{2.30}$$

The first term shows the profit for an incumbent if it obtains the innovation. The second term shows the profit of the same incumbent if does not obtain the innovation and faces a rival who did. Since the incumbents are ex-ante symmetric, their valuations are symmetric. Lemma 2.3.4 follows straight forward:

[8] Granstrand and Sjölander (1990) present evidence from Sweden, and Hallm, Berndt and Levin (1990) present evidence from the US that firms acquire 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.

Lemma 3 *The equilibrium sale price is* $S_E^* = w_{II}$*.(ii) In the case of a drastic innovation* $S_E^* = w_{II} = \pi_E^{Aut}(k)$ *for the autarchy case and* $S_E^* = w_{II} = \pi_E^{Int}(k)$ *for the integration case.*

Thus from Lemma 2.3.4 it follows that the reward will be the same for the entrepreneur in case of sale as for entry when the innovation is drastic and since the remaining parts of the analysis are valid, it follows that our results carries over to the case of sale.[9] Consequently, since innovations by definition are unique assets and bidding competition then seems natural our identified result also seems relevant for the case of entrepreneurs selling their innovation.

2.3.5. Innovation by incumbents

What would happen if we also allowed incumbents to undertake R&D? We expect our identified mechanism to still be in effect. In particular, the negative externality of entrepreneurial efforts is still present and should be affected in a similar way by the globalization process. However, the magnitude of the effects will be different and also the level and type of R&D by incumbents will be affected. This analysis is left to future research, however.

3. 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 2, this effect may also be stronger in countries where governments are to a larger extent rent extracting. Moreover, by Proposition 4 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 openness.

3.1. Econometric Model

To examine Proposition 1, we study how the international openness of a country affects the cost of entry for domestic entrepreneurs. For country i, in time t, we have:

$$Entry\_cost_{i,t} = \alpha_0 + \underset{(-)}{\alpha_1} Globalization_{i,t} + \mathbf{X}'_{i,t}\boldsymbol{\beta} + \gamma_i + \gamma_t + \varepsilon_{i,t} \tag{3.1}$$

where $Entry\_cost_{i,t}$ is the entry cost, $Globalization_{i,t}$ is proxied by measures of globalization, $\mathbf{X}_{i,t}$ is a vector of controls, γ_i is a country-specific effect, γ_t a time-specific effect and u_{ij} is the

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

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

To examine Proposition 2, we will augment (3.1) 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

$$\begin{aligned} Entry\_cost_{i,t} &= \alpha_0 + \underset{(-)}{\alpha_1} Globalization_{i,t} + \underset{(+)}{\alpha_2} Corr_{i,t} + \underset{(-)}{\alpha_3} Corr_{i,t} \times Globalization_{i,t} \\ &\quad + \mathbf{X}'_{i,t}\boldsymbol{\beta} + \gamma_i + \gamma_t + \varepsilon_{i,t} \end{aligned} \tag{3.2}$$

As shown by Proposition 2, 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 $\alpha_3 < 0$.

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 A2* 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). Compared to (3.1) and (3.2), previous studies have used entry costs as an explanatory variable. While our approach is novel, this generates a concern for endogeneity and reverse causality.[10] We try 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.

[10] 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).

3.1.1. Measuring entry barriers for entrepreneurs: explained variable

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.[11] 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 2008. 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.

3.1.2. Measuring international product and innovation market integration: explanatory variable

We use two indices to measure international market integration. As a first measure, we use the *kof index* provided by the Swiss Federal Institute of Technology in Zurich. Our second measure is *csgr index* provided by University of Warwick.[12] 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. The close correlation between the two globalization indices and the entry costs is shown in *Figure 4*.

[FIGURE 4]

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. Political

[11] 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.

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

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.[13] The indices are described in detail in appendix *Table A3*.

The globalization that we have theoretically depicted contains both integration of product and innovation markets. How these relate to our empirical measures of economic, social as well as political aspects is not straightforward. 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 results for each sub index separately.

3.1.3. Other explanatory variables

The cross-country effect of openness $Open_{i,t}$ on entry barriers $Entry\_cost_{i,t}$ in (3.1) 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 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 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

[13] 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.

collected from legal documents.[14]

When examining Proposition 2 by estimating (3.2), 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.

3.2. Results

We first run different specifications of the model in eq 3.1. As shown in the first column of *Table 1*, 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 however 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 (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 1]

Table 2 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.

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

Theoretically, the relation between entry barriers and integration was determined by two circumstances. One factor was the incumbent firms' *status quo* profit, i.e. profit absent an innovation, which from (2.26) had an ambiguous effect. Empirically, it is likely that economic integration, entailing a reduction in the barriers that a company meets when selling on a foreign market, will have the strongest effect on incumbents' *status quo* profits. However, social as well as political integration are also affect the *de facto* barriers that a company faces when expanding its business abroad.

The other factor influencing the relation between entry barriers and integration was the effectiveness of government policy (λ). From (2.26) this had a negative effect on barriers to entry. Arguably, effectiveness of government policy is 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 entry of foreign innovative firms. To some extent, a higher degree of social integration, in a similar manner paves the way for foreign entrants. Conversely, it is plausible that entry on foreign markets is facilitated for innovators originating from countries which are highly politically and socially integrated.

In this interpretation, the weak results for economic integration presented in *Table 2* are consistent with the theoretical predictions of an ambiguous effect from incumbent's *status quo* profit. The stronger results for a negative effect on entry fees from political and social integration are consistent with an interpretation where these dimensions closer reflect the effectiveness of government policy, captured by λ.

[TABLE 2]

Rent seeking governments Proposition 2 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 2, we employ interaction effects between openness and corruption. These are reported in *Table 3*. To alleviate concerns of endogeneity, we construct dummy variables for corruption levels above the mean. The interaction effects in columns (ii) come out as highly significant with both corruption indices. Consistent with Proposition 2, countries that score higher on the corruption index are those with the largest negative effect on 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.

[TABLE 3]

Policy complements Proposition 4 shows that the entrepreneurial policies set by governments in different countries are strategic complements. If the neighboring countries set pro-entrepreneurial policies, this will induce the domestic policy maker to also reduce the barriers to entry. 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 4*. 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 are 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 4]

3.3. 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.[15] Moreover,

[15] 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 that stipulate 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 between EU countries.[16] 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 changed benefit from protection for incuments vis-á-vis entrepreneurial firms.

Using countries that were members of the EU throughout the period 2000–2008, we can use a difference-in-difference design to isolate the effect of entry into EU on entry barriers. *Figure 5* 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 5]

[TABLE 5]

The decrease in cost of entry also clearly emerges from the regression results shown in *Table 5* 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 2004–2008 than in 2000–2003.

3.4. 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 6* 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 subject to aid programs have been forced to comply with some institutional improvement program. One concern is that this creates a spurious relation between

[16] 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, wheras 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.

entry costs and openness for some countries. As a robustness check, we exclude sub-Saharan countries from our sample in column (iii).

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 6]

4. Conclusion

In recent years, industrial policy worldwide has shifted towards the small and entrepreneurial firms. The previous literature has largely taken this shift for granted as a response to an increased importance of the small firm in the innovation system. Our analysis explains the shift in entrepreneurial policy as an endogenous response to the international integration of product and innovation markets.

In more open economies, it becomes more difficult to protect profits of incumbent firms from an independent innovator. At the same time, a successful innovator will have access to a larger market to sell the innovation. Incumbents' willingness to lobby will decline whereas entrepreneurs will be more prone to lobby for reduced barriers. In an interest group setting, where the policy maker sets policies according to the lobbying contributions of market agents (or put high weight at producer surplus), this will shift the optimal policy towards a more pro-entrepreneurial policy.

Empirical data indicates a strong negative correlation between openness and the degree of barriers to entry into entrepreneurship. This evidence is consistent with our theory and indicates that globalization has been a driving force in the deregulation of entry into entrepreneurship.

What other factors could explain the recent trend towards pro-entrepreneurial policies? The existing entrepreneurship literature has typically explained the shift towards more pro-entrepreneurial policies as a consequence of increased advantage of small scale activities and

technological development favoring small scale production. (Achs and Audretsch, 2005; Loveman and Sengenberger, 1991; see also Baumol, 2002). However, these explanation would not be opposed to our explanation, but rather interact with our political economy explanation. Exploring this interaction in detailed is left to future research.

Both in theory and in the empirics we have treated market integration as several different changes in different characteristics of the markets. In practise international market integration takes place through several distinct measures: reduced trade costs, reduced greenfield costs, increased international protection of property rights, increased international patent protection, changes of consumer information sets, etc. To distinguish the effect of different changes and their interaction seems as an interesting task for 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 becomes integrated they will benefit from lower consumer prices of two reasons. First, if no innovation takes place product competition will be tougher 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 are affected by the integration and by changes in policy. Moreover, total producer surplus might increase or decrease because competition is increased both in the product market and in the innovation market, at the same time as more efficient technology will be used and duplication cost will be reduced. A more detailed study of this is left to future research.

5. References

Acs, Zoltan J., and David B. Audretsch, "Entrepreneurship, Innovation and Technological Change," *Foundations and Trends in Entrepreneurship*, 1 (2005), 149–195.

Barseghyan, Levon, "Entry Costs and Cross-country Differences in Productivity and Output," *Journal of Economic Development*, 13 (2008), 145–167.

Baumol, William J., "Entrepreneurship, Innovation and Growth: The David-Goliath Symbiosis," *Journal of Entrepreneurial Finance and Business Venture*, 7 (2002), 1–10.

Baumol, William J., "Entrepreneurial Enterprises, Large Established Firms and Other Components of the Free-Market Growth Machine," *Small Business Economics*, 23 (2004), 9–21.

Bebchuk, Lucian A., and Zvika Neeman, "Investor Protection and Interest Group Politics," NBER Working Paper No. w13702, 2007.

Bernheim, Douglas B., and Michael D. Whinston, "Menu Auctions, Resource Allocation and Economic Influence," *Quarterly Journal of Economics*, 101 (1986), 1–32.

Bloningen, Bruce A., and Christopher T. Taylor, "R&D Intensity and Acquisitions in High-Technology Industries: Evidence from the US Electronic and Electrical Equipment Industries," *Journal of Industrial Economics*, 48 (2000), 47–70.

Bombardini, Matilde, "Firm Heterogeneity and Lobby Participation," *Journal of International Economics*, 75 (2008), 329–348.

Brander Barbara J., and James A. Brander, "International R&D Rivalry and Industrial Strategy", *Review of Economic Studies*, 50 (1983), 707–722.

Ciccone, Antonio, and Elias Papaioannou, "Red Tape and Delayed Entry," *Journal of the European Economic Association*, 5 (2007), 444–458.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, "The Regulation of Entry," *Quarterly Journal of Economics*, 117 (2002), 1–37.

Dreher, Axel, "Does Globalization Affect Growth? Evidence from a new Index of Globalization," *Applied Economics*, 38 (2006), 1091–1110.

Eaton, Jonathan, and Gene M. Grossman, "Optimal Trade and Industrial Policy under Oligopoly," *Quarterly Journal of Economics*, 101 (1986), 383–406.

Fisman, Raymond, and Virginia Sarria-Allende, "Regulation of Entry and the Distortion of Industrial Organization," NBER Working Paper No. w10929, 2004.

Freund, Caroline, and Bineswaree Bolaky, "Trade, Regulations, and Income," *Journal of Development Economics*, 87 (2008), 309–321.

Gilbert, Brett A, David B. Audretsch, and Patricia P. McDougall, "The Emergence of Entrepreneurship Policy," *Small Business Economics*, 22 (2004), 313–323.

Granstrand, Ove, and Sören Sjölander, "The Acquisition of Technology and Small Firms by Large Firms," *Journal of Economic Behavior and Organization*, 13 (1990), 367–386.

Grossman, Gene M., and Elhanan Helpman, "Protection for Sale", *American Economic Review*, 84 (1994), 833–850.

Haaland Jan I., and Hans Jarle Kind, "R&D Policies, Trade and Process Innovation," *Journal of International Economics*, 74 (2008), 170–187.

Hall, Bronwyn H., Ernst Berndt, and Richard C. Levin, "The Impact of Corporate Restructuring on Industrial Research and Development," *Brookings Papers on Economic Activity: Microeconomics* (1990), 85–124.

Helpman, Elhanan, Marc Melitz, and Yona Rubinstein, "Estimating Trade Flows: Trading Partners and Trading Volumes," *Quarterly Journal of Economics*, 123 (2008), 441–487.

Henrekson, Magnus, and Ulf Jakobsson, "Where Schumpeter was Nearly Right - The Swedish Model and Capitalism, Socialism and Democracy," *Journal of Evolutionary Economics*, 11 (2001), 331–358.

Hirukawa, Masayuki, and Masako Ueda, "Venture Capital and Industrial Innovation," CEPR

Discussion Paper No. 7089, 2008.

Imai, Susumu, Haijime Katayama, and Kala Krishna, "Is Protection Really for Sale? A Survey and Directions for Future Research," NBER Working Papers No. w13899, 2008.

Impullitti, Giammario, "International Schumpeterian Competition and Optimal R&D Subsidies", European University Institute Working Paper No. 55, 2007.

Joyce, Joseph P., "Promises Made, Promises Broken: A Model of IMF Program Implementation," *Economics & Politics*, 18 (2006), 339–365.

Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi, "Governance Matters IV: Aggregate and Individual Governance Indicators, 1996-2006," The World Bank Policy Research Working Paper No. 4280, 2007.

Klapper, Leora, Luc Laeven, and Raghuram Rajan, "Entry Regulation as a Barrier to Entrepreneurship," *Journal of Financial Economics*, 82 (2006), 591–629.

Kortum, Samuel, and Josh Lerner, "Assessing the Contribution of Venture Capital to Innovation," *RAND Journal of Economics*, 31 (2000), 674-692.

Leahy, Dermot, and Peter J. Neary, "Public Policy Towards R&D in Oligopolistic Industries," *American Economic Review*, 87 (1997), 642–662.

Leahy, Dermot, and Peter J. Neary, "Multilateral Subsidy Game", *Economic Theory*, forthcoming, 2008.

Lerner, Josh, and Robert P. Merges, "The Control of Strategic Alliances: an Empirical Analysis of the Biotechnology Industry," *Journal of Industrial Economics*, 46 (1998), 125–156.

Loveman, Gary, and Werner Sengenberger, "The Reemergence of Small-scale Production: an

International Comparison," *Small Business Economics*, 31 (2001), 1–37.

Minniti, Maria, "The Role of Government Policy on Entrepreneurial Activity: Productive, Unproductive or Destructive?" *Entrepreneurship Theory and Practice*, 32 (2008), 779–790.

Perotti, Enrico C., and Paolo F. Volpin, "Politics, Investor Protection and Competition," ECGI Finance Working Paper No. 162, 2007.

Rajan, Raghuram G., and Luigi Zingales, "The Great Reversals: the Politics of Financial Development in the Twentieth Century," *Journal of Financial Economics*, 69 (2003), 5–50.

Svensson, Jakob, "Eight Questions about Corruption," *Journal of Economic Perspectives*, 19 (2005), 19–42.

World Investment Report, UNTAC, 2000, 2008.

World Trade Report, WTO, 2008

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

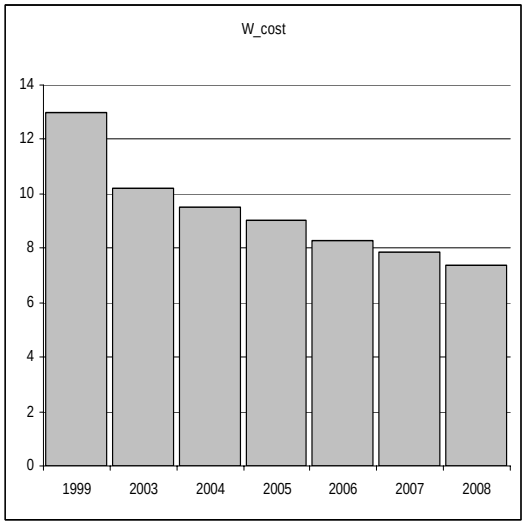
	(i)	(ii)
EU member	-0.77 (0.18)***	-0.33 (0.17)**
Institutions	-0.05 (0.06)	-0.07 (0.05)
Year Dummies	No	Yes
Obs	797	797
R2	0.21	0.18

Regressions include country specific effects. Identification on countries that switches from being a outside of EU to becoming a member in 2004. Robust standard errors are reported in parentheses.

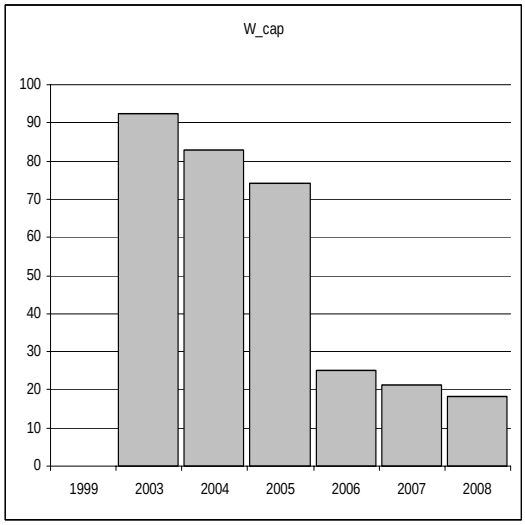
TABLE VI
ROBUSTNESS CHECKS

	(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

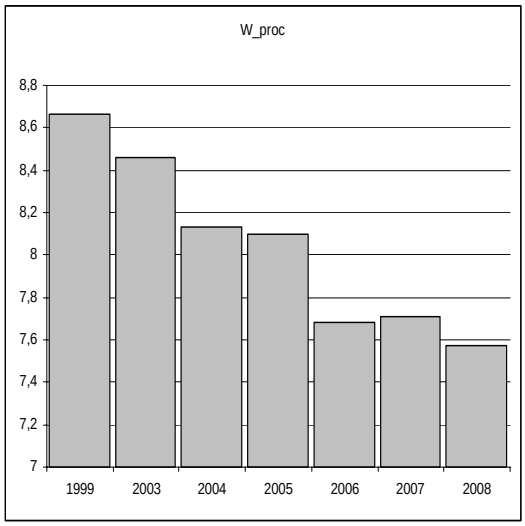
Regressions include country specific effects. Robust standard errors reported in parentheses. *** indicates p-value<0.01, ** p-value<0.05 and * p-value<0.1. The following observations have been dropped: column (i) the top 20-percentile in income/capita; (ii) the bottom 20-percentile; (iii) sub-Sahara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



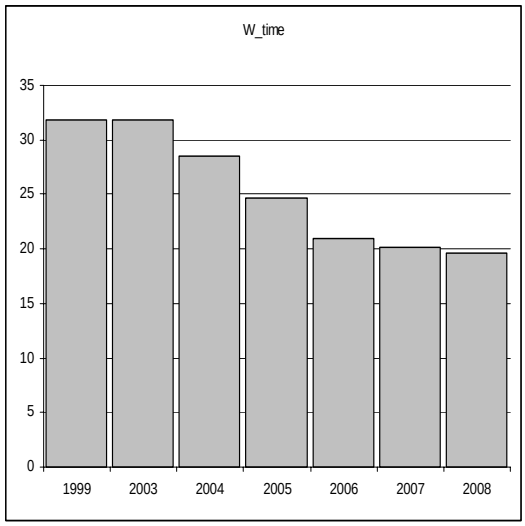
Display A: Cost of starting a new business



Display B: Capital Requirement



Display C: Number of procedures



Display D: Time (days) required

FIGURE I
Doing Business Indicators of Starting a Business (1999-2008), 73 ountries, weighted by share GDP

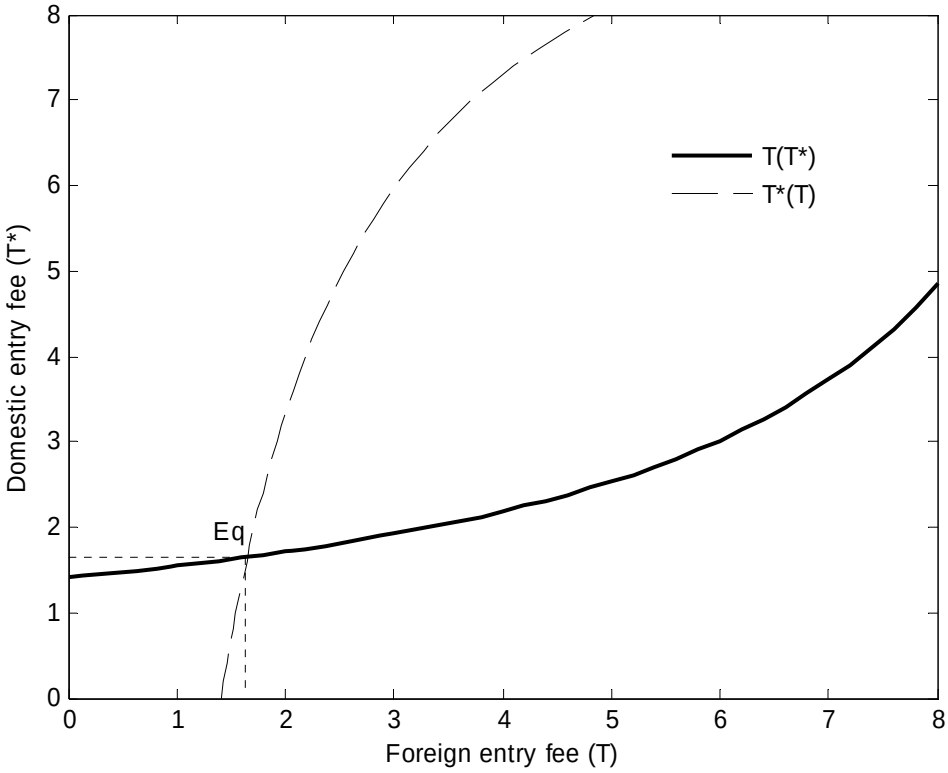


FIGURE II
Reaction Functions for Parametric Model

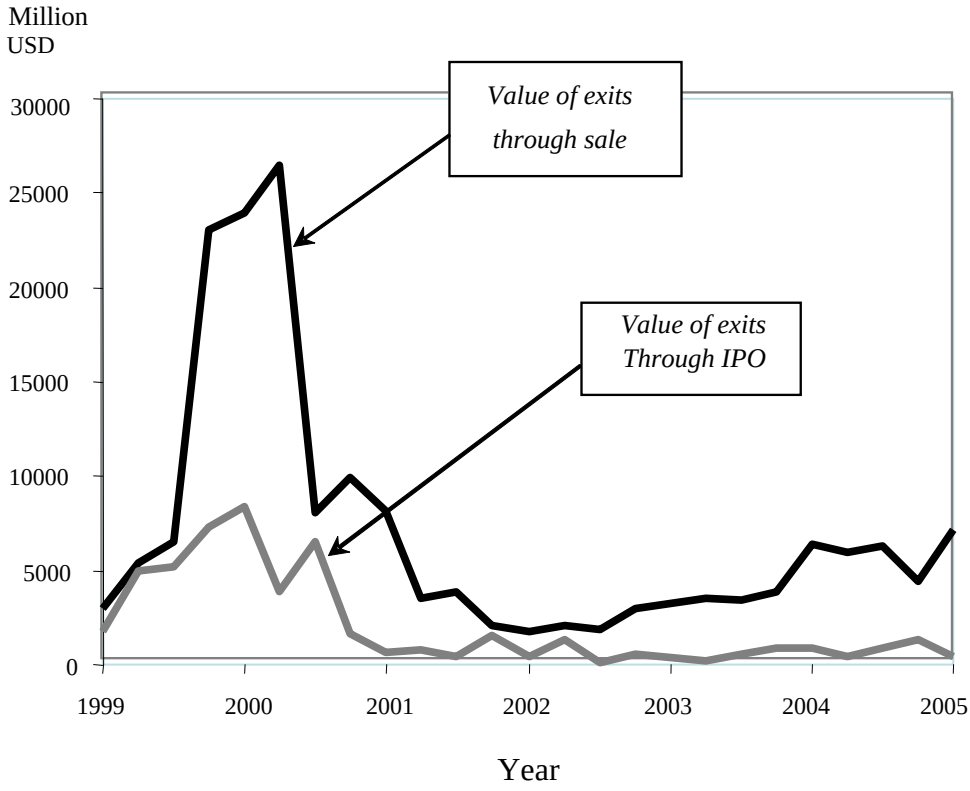


FIGURE III
The Value of Exits Through M&A and IPO in the US.
Source: Thomson Venture Economics/National Venture Capital Association

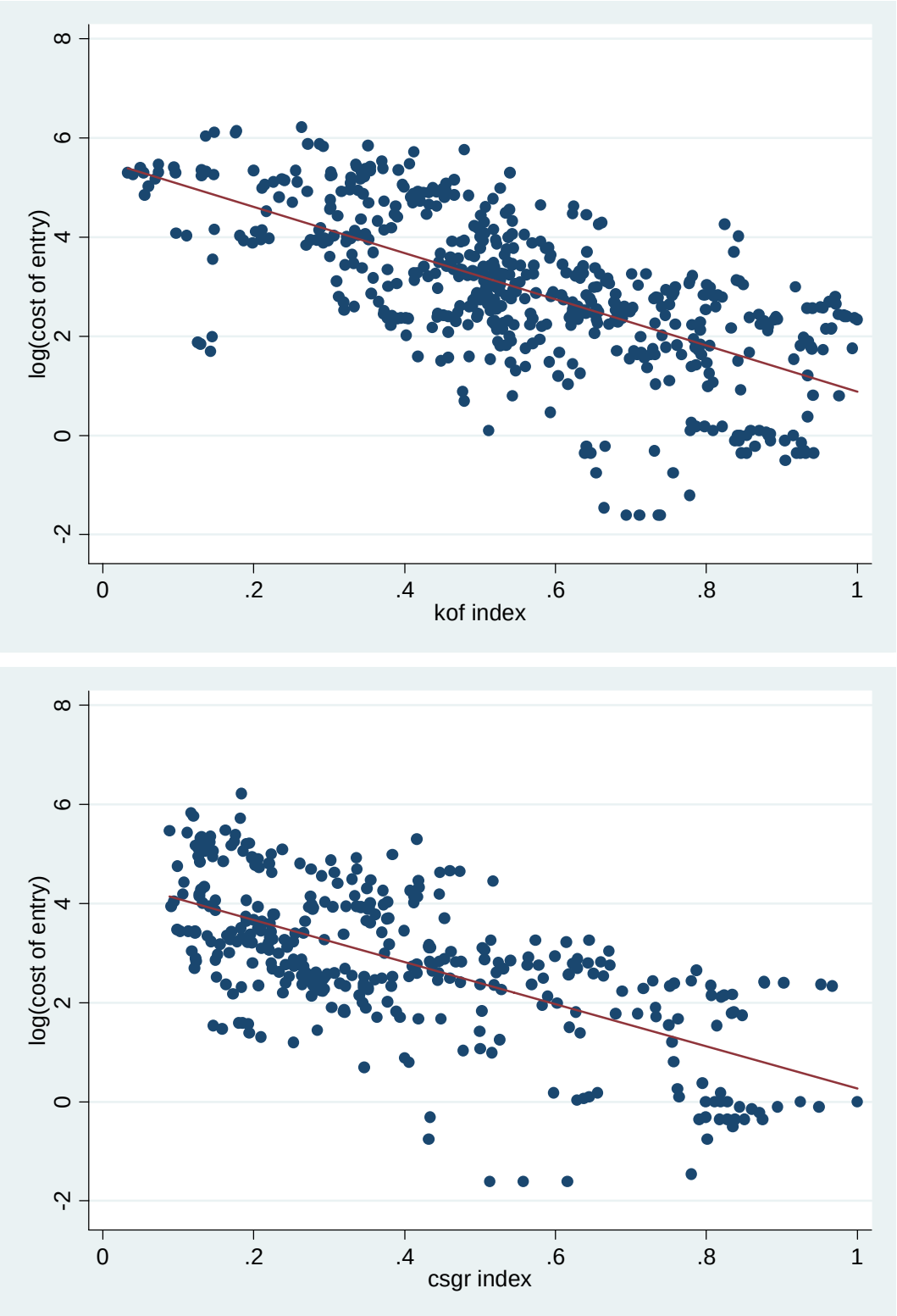


FIGURE IV
Correlations between Openness Indices and Entry Costs.

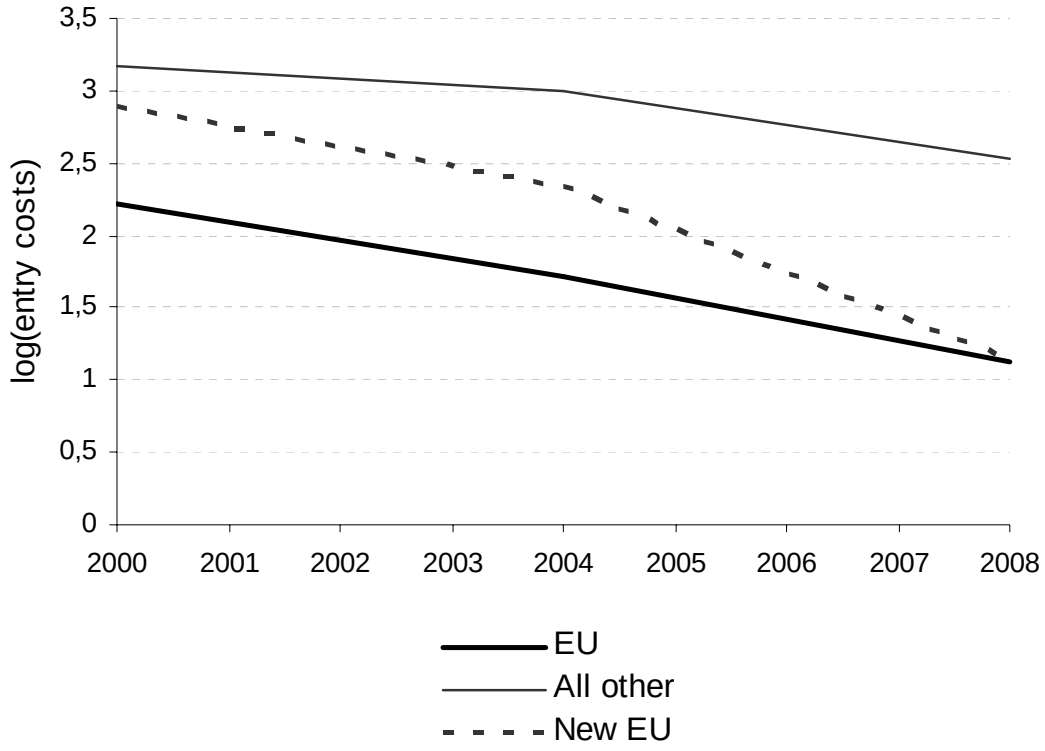


FIGURE V
Effect of EU-Membership on Entry Barriers.

Appendix

Proof of proposition 3

Use the following notation: domestic (foreign) market size, s (s^*); number of domestic (foreign firms) n (n^*); quantity sold on domestic (foreign) market q (q^*); price on domestic (foreign) market P (P^*). Prices are linear in demand and given by $P = A - q/s$ and $P^* = A - q^*/s^*$.

Consider the profit of a domestic incumbent in four cases: autarchy pre-innovation ($\pi^{Aut}(0)$), autarchy post-innovation ($\pi^{Aut}(k)$), integrated markets pre-innovation ($\pi^{Int}(0)$) and integrated markets post-innovation ($\pi^{Int}(k)$).

It is standard to derive the following profits (where profit in the case of integrated markets is the sum of profits made on the domestic and foreign market):

$$\begin{aligned}
\pi^{Aut}(0) &= s\left(n+1\right)^{-2}\left(A-c\right)^{2} \\
\pi^{Aut}(k) &= s\left(n+1\right)^{-2}\left(A-c-k\right)^{2} \\
\pi^{Int}(0) &= \left(s+s^*\right)\left(n+n^*+1\right)^{-2}\left(A-c\right)^{2} \\
\pi^{Int}(k) &= \left(s+s^*\right)\left(n+n^*+1\right)^{-2}\left(A-c-k\right)^{2}.
\end{aligned}$$

We hence have that:

$$\begin{aligned}
\left[\pi^{Aut}(0)-\pi^{Aut}(k)\right] &= \left(n+1\right)^{-2}\left(2A-2c-k\right)sk \\
\left[\pi^{Int}(0)-\pi^{Int}(k)\right] &= \left(n^*+n+1\right)^{-2}\left(2A-2c-k\right)\left(s^*+s\right)k.
\end{aligned}$$

The loss in autarchy relative to the loss in integrated markets:

$$\frac{\left[\pi^{Aut}(0)-\pi^{Aut}(k)\right]}{\left[\pi^{Int}(0)-\pi^{Int}(k)\right]} = \frac{\left(n^*+n+1\right)^{2}s}{\left(n+1\right)^{2}\left(s^*+s\right)}.$$

Imposing symmetry ($s = s^*$ and $n = n^*$) we have

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

Proof of Lemma 2

The entrepreneur's payoffs are (abstracting from cost of entry):

$$\begin{aligned}\Pi &= (\pi-\tau)z(1-0.5z^*)-\delta e^{\alpha}\\ \Pi^* &= (\pi-\tau^*)z^*(1-0.5z)-\delta e^{*\alpha}\end{aligned}$$

With probabilities given by:

$$\begin{aligned}p &= 1-\exp(-\gamma e^{\alpha})\\ p^* &= 1-\exp(-\gamma e^{*\alpha})\end{aligned}$$

FOCs can be written in probability form as

$$\begin{aligned}Dom &: (1-z)(2-z^*)=\frac{\delta}{2\gamma(\pi-\tau)}\\ For &: (1-z^*)(2-z)=\frac{\delta}{2(\pi-\tau^*)\gamma}\end{aligned}$$

Take logs and differentiate with respect to z,z^* and τ

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

Where

$$\begin{aligned}z' &= \frac{dz}{de}\\ z^{*\prime} &= \frac{dz^*}{de^*}\end{aligned}$$

In matrix form

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

With

$$\begin{aligned}D &= z'z^{*\prime}\left[\frac{1}{(1-z)(1-z^*)}-\frac{1}{(z-p)(z-p^*)}\right]\\ &= z'z^{*\prime}\left(2-z\right)^{-1}\left(z-1\right)^{-1}\left(z^*-2\right)^{-1}\left(z^*-1\right)^{-1}\left(z+z^*-3\right)>0\end{aligned}$$

And

$$D_1=\begin{bmatrix}\frac{1}{\pi-\tau} & -\frac{z^{*'}}{2-z^*}\\ 0 & -\frac{z^{*\prime}}{1-z^*}\end{bmatrix}=-\frac{z^{*\prime}}{1-z^*}\frac{1}{\pi-\tau}$$

$$D_2 = \left[\begin{array}{cc} -\frac{z'}{1-z} & \frac{1}{\pi-\tau} \\ -\frac{z'}{2-z} & 0 \end{array} \right] = \frac{1}{\pi-\tau}\frac{z'}{2-z}$$

$$\frac{de}{d\tau} = \frac{D_1}{D} = \frac{-\frac{z^{*\prime}}{1-z^*}\frac{1}{\pi-\tau}}{\frac{z'z^{*\prime}(3-z-z^*)}{(2-z^*)(2-z)(1-z^*)(1-z)}} = -\frac{\frac{1}{\pi-\tau}}{\frac{z'(3-z-z^*)}{(2-z^*)(2-z)(1-z)}} = -\frac{(2-z^*)(2-z)(1-z)}{(\pi-\tau)z'(3-z-z^*)} < 0$$

$$\frac{de^*}{d\tau} = \frac{\frac{1}{\pi-\tau}\frac{z'}{2-z}}{\frac{z'z^{*\prime}(3-z-z^*)}{(2-z^*)(2-z)(1-z^*)(1-z)}} = \frac{\frac{1}{\pi-\tau}}{\frac{z^{*\prime}(3-z-z^*)}{(2-z^*)(1-z^*)(1-z)}} = \frac{(2-z^*)(1-z^*)(1-z)}{(\pi-\tau)z^{*\prime}(3-z-z^*)} > 0$$

We then have

$$\begin{aligned} \frac{\frac{de}{d\tau}}{\frac{de^*}{d\tau}} &= -\frac{z^{*\prime}}{z'}\frac{(2-z)}{(1-z^*)} \\ \frac{\frac{dz}{d\tau}}{\frac{dz^*}{d\tau}} &= -\frac{(2-z)}{(1-z^*)} \end{aligned}$$

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