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From nascent to actual entrepreneurship: the effect of entry barriers

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From nascent to actual entrepreneurship: the effect of entry barriers

Abstract:

This exploratory study focuses on the conversion from nascent to actual entrepreneurship and the role of entry barriers in this process. Using data for a sample of countries participating in the Global Entrepreneurship Monitor between 2002 and 2004, we estimate a two-equation model explaining the nascent entrepreneurship rate and the young business entrepreneurship rate, while taking into account the interrelationship between the two variables (i.e. the conversion). Furthermore various determinants of entrepreneurship reflecting the demand and supply side of entrepreneurship as well as government intervention are incorporated in the model. We find evidence for a strong conversion effect from nascent to actual entrepreneurship. We also find positive effects on entrepreneurial activity rates of labour flexibility and tertiary enrollment and a negative effect of social security expenditure. Concerning the effect of entry regulations we find mixed results. Using one set of entry regulation measures we find no effects whereas using data from a second source we find a weak negative effect of more burdensome entry regulations on the rate of entrepreneurship.

Keywords: nascent entrepreneurship, young businesses, entry regulations

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1. INTRODUCTION

The role that entrepreneurship plays in the economy has changed dramatically over the last half century. According to Audretsch (2003, p. 5), "Entrepreneurship has become the engine of economic and social development throughout the world." The increased importance of entrepreneurship is also recognized by policy makers. It is deeply embedded in the current European policy approach that the creativity and independence of entrepreneurs contribute to higher levels of economic activity. Indeed, according to the European Commission (2003, p. 9), "The challenge for the European Union is to identify the key factors for building a climate in which entrepreneurial initiative and business activities can thrive. Policy measures should seek to boost the Union's levels of entrepreneurship, adopting the most appropriate approach for producing more entrepreneurs and for getting more firms to grow."

Given this challenge an important question is how many people that have plans to become an entrepreneur (nascent entrepreneurs) convert their plans into an actual business startup. We label the proportion of nascent entrepreneurs that actually start a business the 'conversion rate' between nascent entrepreneurship and actual entrepreneurship. A related question is which factors influence this conversion rate. The present paper investigates these questions and pays attention to the role of entry regulations. We build a two-equation model explaining the nascent entrepreneurship rate and the young business entrepreneurship rate. The model is estimated using country data for all 44 countries that participated in the Global Entrepreneurship Monitor program (GEM) for at least one year during the period 2002-2004. Data on entry regulations are taken from Djankov *et al.* (2002) and the Global Competitiveness Report (GCR). Furthermore, data for several control variables are taken from various sources.

We find evidence for a strong conversion effect from nascent to actual entrepreneurship. We also find positive effects on entrepreneurial activity rates of labour flexibility and tertiary enrollment and a negative effect of social security expenditure. Concerning the effect of entry regulations we find mixed results. Using one set of entry regulation measures we find no effects whereas using data from a second source we find a weak negative effect of more burdensome entry regulations on the rate of entrepreneurship.

The organisation of this paper is as follows. In Section 2 we position the role of entry regulations in a broader SME policy context. In Sections 3 and 4 we present data on conversion rates and entry regulations for the 44 GEM countries. In Section 5 we present our model and describe the variables. There are different effects influencing the nominator (young business rate) and the denominator (nascent rate) of the conversion rate. Therefore we estimate a two-equation model explaining the young business rate and the nascent rate separately, rather than using the conversion rate as dependent variable in a single equation model. Section 6 presents the estimation results while the final section is used for discussion.

2. THE ROLE OF ENTRY REGULATIONS IN PUBLIC POLICY TOWARDS ENTREPRENEURSHIP AND SMEs [1]

It is now recognised that governments spend considerable sums of taxpayers' money in seeking to enable Small and Medium-sized Enterprises (SMEs) to come into existence and to grow. The simple justification for such expenditure is that SMEs are major sources of job creation, innovation and competitiveness in a modern economy and that it is governments' task to promote these characteristics in order to enhance the welfare of its citizens.[2] According to Lundstrom and Stevenson (2002) "The general goal of SME Policy is to strengthen the existing base of small enterprises by ensuring they can compete in the marketplace and they are not prejudiced because of their small size, relative to large firms".

Governments throughout the world have many different policies to support or directly assist SMEs. They provide finance directly and indirectly; they provide guidance and advice to SMEs on a wide range of topics. They also try to influence the start-up of new firms, through measures such as grants, tax relief and educational programmes. Examples of these policies are provided by Storey (2003).

Besides providing direct assistance to entrepreneurs and SMEs, governments may also focus on lowering the 'burdens' or impediments to entrepreneurial activity. Examples of such burdens are the number of procedures a new business has to comply with in order to operate legally or the extent of bureaucratic red tape. In practice governments make different choices about the extent to which policies focus upon providing direct assistance and on lowering the 'burdens' or impediments. Dennis (2004) makes an interesting distinction shown in Figure 1. This shows a matrix which makes a distinction between the provision of assistance and the lowering of impediments.[3]

[1] This section is based on Storey (2005).

[2] Storey (2003) argues that this justification is in fact too simple because government intervention can have undesirable side-effects such as increased bureaucracy through maintaining (unproductive) policy programs. He argues that the correct justification of government intervention is the existence of market failures such as imperfect information on the private benefits of starting a business or imperfect information on the private benefits of obtaining external advice.

[3] The term 'impediments' is used as it is the one used by Dennis (2004). However the term clearly has negative connotations, implying perhaps that individuals are prevented from starting a business without good reason. Governments in countries that have high 'impediments', however, justify these policies on the grounds that this provides protection for the consumer. For example all countries impose 'impediments' preventing the unqualified establishing a business as a doctor or surgeon, whereas only some countries have similar restrictions on those wishing to start a business as an electrician or a driving instructor. The justification for 'impediments' to entry into the medical profession is presumably based on potential damage to the consumer's life. However errors or incompetence on the part of the electrician or the driving instructor can also clearly endanger human life, yet the extent to which these individuals are 'impeded' from starting a business varies considerably from one country to another, depending upon the extent to which emphasis is placed on the desire to protect the consumer.

Figure 1: A Typology of Public Policy toward Small Business

Low Direct assistance	**LIMITING** **[Developing Countries]**	**COMPETING** **[USA]**
High Direct assistance	**COMPENSATING** **[EU]**	**NURTURING** **[US Minority]**
	High Impediments	Low Impediments

Source: Dennis (2004).

It shows that policy makers have four options. Most EU countries have, by world standards, comparatively high impediments to starting a business, as illustrated by Djankov *et al.* (2002). On the other hand they also have considerable sums of public money devoted to encouraging smaller enterprises, which can be considered as compensating for the impediments. For this reason, this box is labelled 'compensating'. A very different approach is adopted in the USA. Here the direct assistance is low, but so are the barriers to starting a business. Competition is therefore seen as the focus of US policy and this box is labelled 'competing'. The US however, does have some exceptions to this - its programmes to promote the interests of technology-based firms, and in the promotion of minorities. Here again the barriers are low but there is a high level of direct assistance provided. This is shown in the box labelled 'nurturing'. Finally there are many countries where the barriers to starting a business are high, but where public assistance is low. This box is labelled as 'limiting' and contains often large numbers of less developed countries in Africa, South America and some former communist countries.

The above illustrates policy makers do indeed have a wide choice on how, if at all, they wish to promote new and smaller enterprises. The current paper focuses on the impediments dimension in Figure 1, and on entry regulations in particular. The impact of entry regulations on the economic landscape of countries has been the subject of a number of studies, providing mixed evidence. In their pioneering study Djankov *et al.* (2002) present data on the regulation of entry of start-up firms in 85 countries. They concluded that regulation is not in the public interest. They found that countries where regulations are most burdensome are less likely to be democratic, more characterised by corruption, have larger unofficial economies and lower levels of wealth. The case for lighter business regulation seemed clear. However, Capelleras *et al.* (2005), in a comparison between a lightly regulated economy (Great Britain) and a more heavily regulated economy (Spain) find no significant differences between these countries in terms of the average age of a firm, the initial startup size of new firms, and patterns of employment growth. Based on these results Capelleras *et al.* (2005) therefore question whether the move towards reducing regulations, at least amongst high income democratic countries, will lead to more dynamic, growth-orientated smaller enterprises.

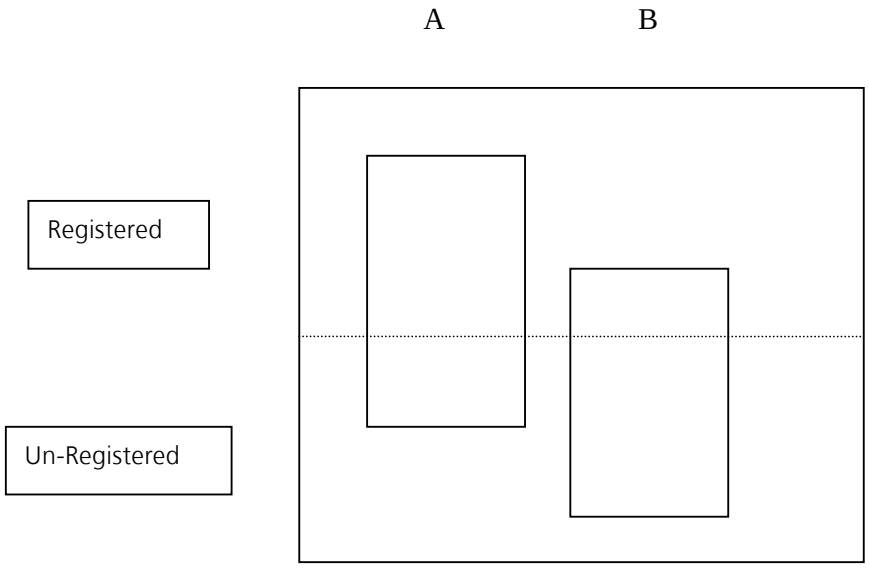
The Capelleras et al. argument is that seeking to link official new firm formation rates across countries to bureaucratic burdens could lead to seriously misleading conclusions. Djankov et al argue that bureaucratic burdens lower the rate of new business formation, lower the growth

of establish SMEs and so impede economic performance. This interpretation encourages policy makers, particularly in highly regulated Europe to seek to lower these 'burdens' in order to induce an improvement in economic performance.

Capelleras et al. take issue with this. They argue that, apart from the problems of mono-causal explanations, the use of official birth rates is misleading. This is illustrated in Figure 2 below. Here there are two hypothetical countries A and B. Each has a different proportion of its enterprises in the registered compared with the unregistered economy. In country A, a low regulation [LR] economy, because the costs of regulation are low most firms choose to register. In country B which is a high regulation economy [HR] a much lower proportion of firms register. However, Figure 2 shows that the total number of enterprises [registered and unregistered] is the same. In practice, of course, we do not know about the relative sizes of these two components, but what is clear is comparing only the registered firms in the economy is unsurprisingly correlated with the scale of regulation.

The contribution of Capelleras et al is to compare, in so far as is possible, both registered and unregistered businesses in England and Spain. They show that, contrary to regulation theory, the start-up sizes and subsequent growth of new enterprises, as well as the factors explaining that growth do not differ, even though England [UK] is the fifth least regulated economy in the world whereas Spain is the fifty-fifth least regulated.'

Figure 2



The current paper adds to this debate by investigating the relation between entry regulations and the 'conversion rate' from nascent entrepreneurship to actual entrepreneurship. The next sections present data on the conversion rate and on entry regulations in the 44 countries participating in GEM between 2000 and 2004.

3. DATA ON CONVERSION RATES BETWEEN NASCENT AND ACTUAL ENTREPRENEURSHIP

In this section we present data on the conversion rates for the 44 countries in our data set. The conversion rate is computed as the ratio Young business entrepreneurship rate / Nascent entrepreneurship rate. These variables are taken from the Global Entrepreneurship Monitor data base and are defined as follows:

- Young business entrepreneurship rate. This is the percent of adult population that is the owner/manager of a business that is less than 42 months old.
- Nascent entrepreneurship rate. This is the number of people that are actively involved in starting a new venture, as a percentage of adult population. An individual may be considered a nascent entrepreneur if the following three conditions are met: if he or she has taken action to create a new business in the past year, if he or she expects to share ownership of the new firm, and if the firm has not yet paid salaries or wages for more than three months (Reynolds *et al.*, 2002, p. 38).

One may consider different operationalisations of the conversion rate dependent on the assumed lags. For instance, if one assumes that it takes some time before a nascent entrepreneur is able to convert his plans into an actual business startup, then the ratio young businesses(t) / nascent entrepreneurs(t-1) (the 'lagged' conversion rate) may be more relevant than the ratio young businesses(t) / nascent entrepreneurs(t) (the 'current' conversion rate). However, in reality we do not know the length of this lag and the lag is also dependent on the time during which the nascent entrepreneur is already 'nascent'. In other words, for how long is the nascent entrepreneur already 'involved in starting a new venture'? As we do not have information on this we computed the average of the 'current' conversion rate and the 'lagged' conversion rate for the 44 GEM participating countries in the period 2000-2004. We also average over the period 2000-2004 or, for countries with missing values, over the years they participated. In this way the conversion rates presented are less vulnerable to outlier years. Table 1 presents the conversion rates in ascending order. It also reports the number of observations on which the statistic is based. In case a country participated for the whole period 2000-2004, this number is nine (five times the current conversion rate and four times the lagged conversion rate).[4]

[4] The exact computation of the rates presented in Table 1 is as follows. First, the averages over the years are computed for both the current and the lagged conversion rate. Second, the simple average over these two yearly averaged conversion rates is computed.

Table 1: Average conversion rates young businesses / nascent entrepreneurs, 2000-2004

Mexico	0.35	(3)	Finland	0.74	(6)
Poland	0.37	(4)	Singapore	0.75	(9)
Slovenia	0.38	(5)	Russia	0.77	(3)
Peru *	0.41	(1)	Jordan *	0.80	(1)
Croatia	0.44	(5)	Portugal	0.81	(2)
South Africa	0.45	(7)	Switzerland	0.82	(3)
France	0.47	(9)	Spain	0.82	(9)
Venezuela *	0.51	(1)	Iceland	0.83	(5)
Germany	0.56	(9)	Greece	0.85	(3)
Belgium	0.57	(9)	Hong Kong	0.87	(5)
Argentina	0.57	(9)	Australia	0.89	(9)
United States	0.58	(9)	Denmark	0.89	(9)
Hungary	0.58	(4)	United Kingdom	0.89	(9)
Japan	0.59	(6)	India	0.90	(5)
Italy	0.60	(7)	Netherlands	0.98	(7)
Chile	0.64	(3)	Brazil	1.03	(9)
Canada	0.64	(9)	Uganda	1.18	(3)
Ecuador *	0.66	(1)	Sweden	1.20	(7)
Ireland	0.69	(7)	Korea	1.23	(5)
New Zealand	0.70	(7)	China	1.43	(3)
Norway	0.72	(9)	Israel #	2.05	(6)
Thailand *	0.72	(1)	Taiwan *	2.41	(1)

Average of 'current' conversion rate (average 2000-2004) and 'lagged' conversion rate (average 2001-2004). In case of missing observations the average conversion rates are computed over the available years. The number of observations on which the statistic is based is given in parentheses. For the *-marked countries the ('current') conversion rates shown are actually computed for just one year. # The relatively high conversion rate for Israel is mainly due to a very low nascent rate in 2001.

Many phenomena may account for the observed differences in Table 1. For instance, high entry barriers may cause more nascents not to start businesses compared to countries with low barriers (the 'startup' effect). However, if there are many nascent entrepreneurs then less nascents will actually succeed in getting a business up and running because of strong competition (the 'survival' effect). This may explain the relatively low conversion rate in the United States. Furthermore there may also be barriers to 'become' nascent (Van Gelderen *et al.*, 2005).

Since the nominator and the denominator can be assumed to be influenced by the same phenomena (in different ways), performing a regression analysis using the conversion rate as dependent variable in a single equation may be a tricky exercise. Also a limitation of the conversion rate is that it is not constructed from micro data following individual nascent entrepreneurs over time. Instead the conversion rate is constructed from aggregate numbers of nascent and young business entrepreneurs. Nevertheless Table 1 is useful as an illustration as it is likely that countries that have a higher ratio young business entrepreneurs over nascent entrepreneurs will also have higher conversion rates (in the implied meaning of the word). For all these limitations we will not estimate a single regression model using the conversion rate as dependent variable. Instead, in Section 5 we set up a two-equation model to disentangle the different types of effects involved.

As in this paper we are primarily interested in the effect of entry regulations on entrepreneurship rates, we move on in Section 4 presenting our data on entry regulations.

4. DATA ON ENTRY REGULATIONS

We use data on entry regulations from two sources: the data presented in the pioneering article by Djankov *et al.* (2002) and data from the Global Competitiveness Report (edition 2001-2002). The data cover the number of days required to start a business, the number of permits or procedures required to start legally and the general burden involved in starting up. Both sources present data on these indicators but the data are obtained in very different ways. Djankov *et al.* (2002) have gone through considerable effort to obtain reliable data, as is clear from the following quote: "We collect data on entry regulation using all available written information on start-up procedures from government publications, reports of development agencies such as the World Bank and USAID, and government web pages on the Internet. We then contact the relevant government agencies to check the accuracy of the data. Finally, for each country we commission at least one independent report on entry regulation from a local law firm, and work with that firm and government officials to eliminate disagreements among them" (p. 6). The data of the Global Competitiveness Report (GCR) are taken from the so-called Executive Opinion Survey, which is a survey among firms within countries. The goal of the survey is to capture a broad array of intangible factors that cannot be found in official statistics but that nonetheless may influence the growth potential of countries. For details, see Cornelius and McArthur (2002).

Although related the data from these two sources are not the same. This is illustrated in Table 2 for the number of days required to start a business. Although correlations are significant their values are only 0.6. For instance we can see that for some countries like Denmark or the US, there are large differences between these two sources. We do not know the exact sources of these differences. We do know that Djankov *et al.* focus on bigger firms as their 'standardized' firm is a domestically owned limited liability company which has between 5 and 50 employees one month after startup. The GCR is less explicit about the type of business for which they measure entry regulations. As most of the entrepreneurs captured by the GEM variables are in very small businesses, it might be the case that the Djankov variables are less appropriate to investigate, compared to the GCR measures. But at this point we know too little about the exact sources of the differences. Therefore we use both sets of measures in our empirical analysis. The exact definitions of the entry regulation variables as reported by Djankov *et al.* and the GCR are given below.

Table 2: Number of days required to start a business according to Djankov *et al.* (2002) and The Global Competitiveness Report 2001-2002 (GCR)

	Djankov *et al.*	GCR	Rank Djankov *et al.*	Rank GCR
Australia	2	30	1	14
Canada	2	22	1	9
Denmark	3	30	3	14
New Zealand	3	10	3	3
United States	4	30	5	14
United Kingdom	4	7	5	1
Sweden	13	25	7	12
Hong Kong	15	8.5	8	2
Ireland	16	15	9	7
Switzerland	16	24	9	11
Norway	18	10	11	3
Singapore	22	21	12	8
Finland	24	22.5	13	10
Japan	26	30	14	14
South Africa	26	45	14	26
Korea	27	30	16	14
Chile	28	60	17	29
Netherlands	31	10	18	3
Israel	32	10	19	3
Belgium	33	90	20	38
Thailand	35	30	21	14
Greece	36	60	22	29
Taiwan	37	30	23	14
Hungary	39	45	24	26
Germany	42	30	25	14
Slovenia	47	60	26	29
Argentina	48	45	27	26
France	53	30	28	14
Russia	57	26	29	13
Poland	58	30	30	14
Italy	62	105	31	41
Brazil	63	60	32	29
Jordan	64	30	33	14
Mexico	67	90	34	38
Ecuador	72	60	35	29
Portugal	76	60	36	29
India	77	90	37	38
Spain	82	60	38	29
Peru	83	60	39	29
China	92	30	40	14
Venezuela	104	60	41	29
CORRELATION	0.587 ***		0.637 ***	
Croatia	38	Missing		
Iceland	Missing	5		
Uganda	29	Missing		

*** Significant at 1% level.

Definitions used in Djankov et al. and Global Competitiveness Report

- Number of days (see Table 2).

Djankov *et al.*: "The time it takes to obtain legal status to operate a firm, in business days. A week has five business days and a month has twenty-two. Source: Authors' own calculations." (p. 16).

GCR: "Considering license and permit requirements, what is the typical number of days required to start a new firm in your country? (median response listed for each country)".

- Number of procedures / permits.

Djankov *et al.* (procedures): The number of different procedures that a start-up has to comply with in order to obtain a legal status, i.e. to start operating as a legal entity. Source: Authors' own calculations." (p. 16).

GCR (permits): "Approximately how many permits would you need to start a new firm? (median response listed for each country)".

Administrative burden in general.

Djankov *et al.*, variable cost + time: "The cost of obtaining legal status to operate a firm as a share of per capita GDP in 1999. It includes all identifiable official expenses (fees, costs of procedures and forms, photocopies, fiscal stamps, legal and notary charges, etc.) as well as the monetized value of the entrepreneur's time. The time of the entrepreneur is valued as the product of time and per capita GDP in 1999 expressed in per business day terms. The company is assumed to have a start-up capital of ten times the GDP per capita level in 1999. Source: Author's own calculations." (p. 16).[5]

GCR, variable Administrative burden for startups. "Starting a new business in your country is generally (1=extremely difficult and time consuming, 7=easy)". Note that this is actually an inverse measure of burdens as a higher value implies less burdens. Hence we will call this variable Inverse Burden.

As in Table 2, the correlation between the number of procedures according to Djankov *et al.* and the number of permits required to start a firm according to GCR, is significant at 1% level but its value is only 0.575. This also holds for the administrative burden in general related to startup (correlation -0.576, significant at 1% level).

5. MODEL AND OPERATIONALISATION

Model

We are interested in the determinants of the conversion rate between nascent entrepreneurship and young business entrepreneurship. However, it is likely that some determinants influence the nominator of the conversion rate (young business rate) while others influence the denominator (nascent rate). Therefore we will estimate a two-equation model with

[5] Djankov *et al.* also measure a variable called 'cost'. This is the same variable as 'cost + time' but excluding the monetized value of the entrepreneur's time. We will include this variable as well in our analyses.

separate equations explaining nascents and young businesses. Our model takes the following form:

(1) $N = f(\mathbf{X_1}, \mathbf{G})$

(2) $Y = f(N, \mathbf{X_1}, \mathbf{X_2}, \mathbf{G})$

where
N = nascent entrepreneurship rate
Y = young business entrepreneurship rate
X_1 = vector of explanatory variables reflecting the supply side of entrepreneurship
X_2 = vector of explanatory variables reflecting the demand side of entrepreneurship
G = vector of explanatory variables reflecting government intervention

The setup of the model is inspired by Grilo and Irigoyen (2005) where survey data from the 15 EU Member States and the US are used in the framework of a two-equation model to establish the effect of demographic and other variables on latent and actual entrepreneurship. Latent entrepreneurship is measured by the probability of a declared preference for self-employment over employment.[6] The operationalisation of the model is inspired by Verheul *et al.* (2002) who develop an eclectic framework for the determinants of entrepreneurship distinguishing between the demand side and the supply side of entrepreneurship and government intervention. The demand and supply side factors create aggregate conditions that influence the so-called risk-reward profile of individuals which forms the basis for the entrepreneurial decision made at the individual level. The demand side creates entrepreneurial opportunities through the market demand for goods and services, whereas the supply side provides potential entrepreneurs that can act upon the opportunities (Verheul *et al.*, 2002). Examples of demand side factors are technological development, globalisation and industrial structure while examples of supply side factors are education, age structure of population and availability of capital. Finally government intervention may also influence the demand and/or supply of entrepreneurs. Examples are entry regulation, labour market regulation and the social security system.[7] Note that the SME policies described in Section 2 are only part of the total set of possible government intervention instruments.[8]

In terms of our model, it may be argued that supply side factors influence the stock of potential (or nascent) entrepreneurs. These factors may also influence the stock of actual entrepreneurs. Hence $\mathbf{X_1}$ appears both in Equation (1) and in Equation (2). However, concerning demand side factors one may argue that they influence the young business rate rather than the nascent rate because the demand side factors determine if there is room in the

[6] Blanchflower, Oswald and Stutzer (2001) use a similar approach though their model has more of a reduced form flavour.

[7] Supply side factors of entrepreneurship often interact with government intervention factors. For instance, education obviously influences the skills of people required to become an entrepreneur (supply side factor). However, education itself can be influenced by government intervention through spending more money on the education system.

[8] The eclectic framework is also used in Grilo and Thurik (2004) where a multinomial logit approach is taken using survey data from the 15 EU member states, Norway, Iceland, Liechtenstein and the US to establish the effect of demographic and other variables on various entrepreneurial engagement levels.

market for new businesses, hence they impact the actual *realisations* of new-firm startups. Hence $\mathbf{X_2}$ appears in Equation (2) only.[9] Government intervention factors may influence both the nascent and the actual entrepreneurship rate. Finally, to test the conversion effect, the nascent rate is also included as an explanatory variable in the young business equation.[10]

Model operationalisation

In our empirical exercises the vectors $\mathbf{X_1}$, $\mathbf{X_2}$ and $\mathbf{G}$ from the above-described model contain the following variables. Most variables are taken from the Global Competitiveness Report 2001-2002 (GCR) or the World Competitiveness Yearbook 2001 (WCY). Some variables are based on so-called Executive Opinion Surveys. In these cases the question asked to the 'experts' (executives in top- and middle management of firms) are mentioned.

Explanatory variables reflecting the supply side of entrepreneurship ($\mathbf{X_1}$):
- Ease of access to loans (GCR). "How easy is it to obtain a loan in your country with only a good business plan and no collateral? (1=impossible, 7=easy)".
- Venture capital availability (GCR). "Entrepreneurs with innovative but risky projects can generally find venture capital in your country (1=not true, 7=true)".
- Tertiary enrollment (GCR). Gross tertiary enrollment rate 1997. Source: World Bank *World Development Indicators* 2001.
- Secondary school enrollment (WCY). Percentage of relevant age group receiving full-time education, 1997.
- Working hours (WCY). Average number of working hours per year. Hypothesis: In countries where working long hours is more common, there may be a bigger supply of potential entrepreneurs (as entrepreneurs –in general– also work long hours).

Explanatory variables reflecting the demand side of entrepreneurship ($\mathbf{X_2}$):
- Economic growth rates. Source: International Monetary Fund, World Economic Outlook Database, September 2004 (gross domestic product, constant prices, annual percent changes).
- FDI and technology transfer (GCR). "Foreign direct investment in your country (1=brings little new technology, 7=is an important source of new technology)".
- University/industry research collaboration (GCR). "In its R&D activity, business collaboration with local universities is (1=minimal or non-existent, 7=intensive and ongoing)".
- Company-university cooperation (WCY). Technology transfer between companies and universities (answers ranging from insufficient to sufficient).
- Industrial structure: Employment share services (WCY).

[9] Note that some of the determinants of the young business rate may impact this rate not only through more startups but also through the *survival* effect. For instance, it may be hypothesised that countries with a higher average education level of the population not only produce more startups but also produce more startups *that survive*. This effect is also captured in the model as the young business rate measures all owner/managers of firms younger than 3.5 years.

[10] For a similar model using survey micro data, see Grilo and Irigoyen (2005). In their model the probability of actually being self-employed depends in part on the revealed preference for self-employment. In a follow-up study Grilo and Thurik (2005) make a comparison between the old 15 member states of the EU and the ten new ones. Also they compare the 2001 results of Grilo and Irigoyen with new 2004 results.

Explanatory variables reflecting government intervention (**G**).

ENTRY REGULATION MEASURES (see Section 4):

- Procedures, Time, Cost, Cost+Time (Djankov *et al.*, 2002)
- Permits, Days, (Inverse) Burden (GCR)

OTHER GOVERNMENT INTERVENTION MEASURES

- Bureaucratic red tape (GCR). "How much time does your company's senior management spend working with government agencies/regulations? (1=less than 10% of its time, 2=10-20%, 3=21-30%, …, 8=71-80%)".
- Employer's flexibility of hiring and firing (GCR). "Hiring and firing of workers is (1=impeded by regulations, 7=flexibly determined by employers)".
- Social security expenditure (2000). This variable measures the employer's compulsory social security contribution as a percentage of GDP per capita.

Besides these explanatory variables for the nascent and young business entrepreneurship rates that can be classified in demand and supply side of entrepreneurship and government intervention, we use one more explanatory variable, the established business rate. Like the nascent and young business entrepreneurship rates this variable is taken from Global Entrepreneurship Monitor. The established business rate measures the number of owner/managers in businesses older than 42 months as a percentage of adult population. It is used as an indicator of the *demonstration effect*. It has a special place in the Verheul *et al.* (2002) framework in the sense that the demonstration effect *directly* influences the risk-reward profile of individuals (instead of through the aggregate conditions created by the demand and supply side factors). The more common entrepreneurship is in an economy (i.e. the more businesses there are), the more attractive entrepreneurship is perceived by people, independent of existing opportunities and individual characteristics. If many people are involved in self-employment, other people may be signaled and persuaded to start their own firm as well without taking into account the aggregate conditions to successfully launch a business (Verheul *et al.*, 2002).

6. EMPIRICAL ANALYSIS

Methodology and sample

Our goal is to estimate Equation (1) and (2) separately, using the explanatory variables described above. As mentioned we have data for 44 countries over the period 2000-2004. However, there are several missing data. First, data for the established business rate are available for the years 2002-2004 only. As the demonstration effect has been found to be empirically relevant in earlier studies (see e.g. Wennekers *et al.*, 2005), we do not want to leave this variable out. This reduces the potential sample to 132 observation (three years times 44 countries). Second, several countries participated in GEM only once or twice. The number of non-missing observations for the GEM variables (the nascent, young business and established business entrepreneurship rates) for the years 2002-2004 is 98. Third, there are missing values for the entry regulation variables for Croatia, Iceland and Uganda (see Table 2), leaving us with 90 possible observations. Finally, several test regression revealed that Brazil (for which we have 3 observations), Ecuador (1), Korea (1), Peru (1) and Venezuela (1) do not fit in our models in the sense that they have extreme residual values for which we have no sound explanation. After removing these observations we end up with an

unbalanced panel of 83 observations, and using this sample all regressions pass the Jarque-Bera test on normality of the residuals. The distribution of these observations over the countries is given in Appendix 1.

Although the distinction between variables reflecting the supply and demand side of entrepreneurship can be made theoretically, the distinction is less clear in reality. Therefore, we also test for the possible impact of the variables that we classified as demand side variables on the nascent rate even though vector $\mathbf{X_2}$ is not in Equation (1).

In our data set we have variables that vary over time as well as time-invariant variables. Of the variables described above the GEM variables (the nascent, young business and established business entrepreneurship rates) and growth of GDP vary over time while the others are time-invariant. In our estimation models we always include the time-varying explanatory variables (i.e. economic growth and established business rate), not only because they vary over time but also because they are important conceptually (they capture the business cycle effect and the demonstration effect, respectively). However we cannot include all explanatory variables described above in a single equation estimation because of (assumed) multicollinearity. Therefore, to get a first glance of the impact of the various variables, we compute separate regressions each time including the economic growth rate and established business rate as control variables. In Equation (1) we also include a 'poor country' dummy. It is often observed that entrepreneurship rates are higher in poor countries because entrepreneurship is of a different nature compared to rich countries (i.e. more often necessity driven instead of opportunity driven or associated with the rural sectoral composition). We include a dummy to correct for this. We choose a per capita income level of 15,000 US $ in purchasing power parities (year 2000) as the cut-off point (source Word Competitiveness Yearbook). Appendix 1 shows which countries are labelled as poor in this way.[11] In Equation (2) the inclusion of this dummy is not required because the nascent entrepreneurship rate is included as an additional explanatory variable.

Given these baseline specifications, we include, in separate regressions, the explanatory variables described in Section 5. The regressions are estimated using OLS. As our data base contains very different countries we compute standard errors which are robust to heteroskedasticity. Below we present the results for the entry regulation variables (our main interest) and the other explanatory variables.

Results for entry regulation variables

Results for Equations (1) and (2) focusing on the entry regulation variables are presented in Tables 3 and 4, respectively.

[11] Using this method some former communist countries are labeled as poor. In Wennekers *et al.* (2005) a separate dummy is used for these countries to capture the negative attitude toward entrepreneurship in these countries. We chose not to include a separate dummy for these countries as we do not want to manipulate results by using different types of dummies for specific groups of countries.

Table 3: Estimation results for NASCENT entrepreneurship rate (83 observations)

	I	II	III	IV	V	VI	VII	VIII
Intercept	2.01 *** (3.5)	3.45 *** (4.3)	2.91 *** (4.6)	2.39 *** (4.2)	2.75 *** (4.5)	2.02 ** (2.5)	2.03 *** (2.8)	.56 (0.3)
Intercept poor countries	2.62 *** (3.4)	3.53 *** (4.2)	3.52 *** (4.5)	3.27 *** (4.0)	3.70 *** (4.6)	2.63 *** (3.4)	2.63 *** (3.4)	2.82 *** (3.5)
Growth	.014 (0.1)	-.023 (0.2)	.008 (0.1)	0.0 (0.0)	-.007 (0.1)	.014 (0.1)	.014 (0.1)	.0002 (0.0)
Established businesses	.29 *** (3.0)	.28 *** (3.5)	.31 *** (3.4)	.31 *** (3.6)	.32 *** (3.8)	.29 *** (3.0)	.29 *** (3.0)	.29 *** (3.1)
DJANKOV:								
Procedures		-.18 *** (2.7)						
Time			-.04 *** (3.5)					
Cost				-3.97 ** (2.3)				
Cost+time					-4.0 *** (3.0)			
GCR:								
Permits						-.004 (0.0)		
Days							-.0005 (0.1)	
(Inverse) Burden								.29 (0.6)
R-squared	.369	.430	.452	.418	.451	.369	.369	.373

Note: Absolute heteroskedasticity-consistent t-values are between brackets. *** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level.

Table 4: Estimation results for YOUNG BUSINESS entrepreneurship rate (83 observations)

	I	II	III	IV	V	VI	VII	VIII
Intercept	-.17 (0.8)	.20 (0.7)	-.052 (0.2)	-.038 (0.2)	-.030 (0.1)	.064 (0.2)	.184 (0.8)	-1.56 ** (2.2)
Nascent rate	.45 *** (9.6)	.44 *** (9.6)	.44 *** (9.3)	.44 *** (10.6)	.44 *** (10.1)	.45 *** (9.8)	.46 *** (10.2)	.45 *** (10.1)
Growth	.076 (1.4)	.074 (1.2)	.079 (1.3)	.078 (1.5)	.078 (1.4)	.074 (1.4)	.067 (1.3)	.068 (1.1)
Established businesses	.21 *** (4.7)	.21 *** (5.1)	.22 *** (4.7)	.22 *** (5.8)	.22 *** (5.3)	.21 *** (4.8)	.21 *** (4.9)	.21 *** (5.1)
DJANKOV:								
Procedures		-.045 * (1.8)						
Time			-.004 (0.8)					
Cost				-1.12 (1.6)				
Cost+time					-.64 (1.4)			
GCR:								
Permits						-.057 (1.4)		
Days							-.0098 *** (2.9)	
(Inverse) Burden								.27 ** (2.0)
R-squared	.832	.841	.834	.841	.837	.835	.846	.842

Note: Absolute heteroskedasticity-consistent t-values are between brackets. *** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level.

Tables 3 and 4 show that there is strong statistical support for the demonstration effect. The rate of established business entrepreneurship has a positive and significant impact on both nascent and young business entrepreneurship. We do not find an effect for economic growth rates, although there seems to be some weak support for an effect on the young business rate.[12] The weak effect may be due to the fact that the between or cross-country component in our panel is stronger than the within component. See Appendix 1. We also find support for the conversion effect. The nascent rate variable in Table 4 is highly significant. Countries with more nascent entrepreneurs also have more entrepreneurs in actual young businesses.

[12] Note that the stronger effect on young businesses compared to the effect on nascents is in line with our model consisting of Equations (1) and (2) as the economic growth rate is part of vector $\mathbf{X_2}$.

Moving on to the entry regulation measures we find mixed results. In Table 3 all Djankov measures are negatively and significantly related to the nascent entrepreneurship rate. This suggests that if regulations are more impeding less people will consider starting a business. In Table 4 the number of procedures is the only significant Djankov measure. However, note that the Djankov measures also influence the young business rate indirectly, through their effect on the nascent rate (Table 3). For the GCR measures it is the other way around: they are not significant in Table 3, but they do seem to have some impact on the young business rate (Table 4). At this stage it is very difficult for us to interpret these different findings for the different sets of measures. However, from Tables 3 and 4 we can at least observe a common pattern. In all 14 cases the regulation measures have a sign consistent with an impeding effect on entrepreneurship (note that the positive sign for the inverse burden measure is due to its inverse definition), and in half of the cases these effects are also significant. So, although we do not yet fully understand the meaning of these findings, it seems to be the case that there is some constraining effect from heavier regulations, even when corrected for demonstration, business cycle and conversion effects. Further research is needed to corroborate these results.

Results for other explanatory variables

Table 5 presents the results of adding, in separate regressions, the other explanatory variables identified in Section 5. We find significant effects of three variables.

First, there is a strong effect on nascent entrepreneurship of tertiary enrollment. Apparently, university students are more inclined to start businesses compared to others. This result is in line with Reynolds *et al.* (1999) who conclude that the larger a country's investment in education at the tertiary level, the higher is the rate of new firm formation (NFF). Note that, although the variable has t-value zero in Equation (2), tertiary enrollment indirectly influences NFF or the young business rate through the effect of the nascent rate which is very strong (see Table 4).

Second, there is a positive effect of the variable Employer's flexibility of hiring and firing. There are two effects involved here. On the side of employees, the safety of their paid job is smaller which may make them decide to start their own business (push effect). On the side of the entrepreneurs, they have more flexibility in running their business which makes the self-employment occupation more attractive (pull effect). Both effects point in the direction of more entrepreneurship.

Third, we find a negative effect of social security expenditure. When social security entitlements are lower, incentives for unemployed or ill people to start their own business are higher because the opportunity costs of entrepreneurship are lower. This finding supports recent research by Brouwer *et al.* (2005) and Wennekers *et al.* (2005) who also find negative effects of social security expenditure on various entrepreneurship measures.

Table 5: Effect of other explanatory variables on nascent rate and young business rate

	Nascent rate (Equation 1)		Young business rate (Equation 2)	
	Coefficient (t-value)	N	Coefficient (t-value)	N
Supply side of entrepreneurship (X_1)				
Ease of access to loans (GCR)	.34 (0.8)	83	.11 (0.8)	83
Venture capital availability (GCR)	.31 (0.9)	83	.13 (1.1)	83
Working hours (WCY)	.0033 (1.6)	82	.0002 (0.3)	82
Secondary school enrollment (WCY)	-.043 (1.5)	82	-.0016 (0.2)	82
Tertiary enrollment (GCR)	**.064 *** (4.1)**	82	.00 (0.0)	82
Demand side of entrepreneurship (X_2)				
FDI and technology transfer (GCR)	.34 (0.8)	83	.23 (1.6)	83
University/industry research collaboration (GCR)	-.25 (0.5)	83	.18 (1.1)	83
Company-university cooperation (WCY)	.26 (1.4)	82	.07 (0.9)	82
Employment share services (WCY)	.056 * (1.8)	82	.004 (0.3)	82
Government intervention (G)				
Bureaucratic red tape (GCR)	-.83 (0.9)	83	.18 (0.8)	83
Employer's flexibility of hiring and firing (GCR)	.29 (1.4)	83	**.21 *** (3.0)**	83
Social security expenditure (WCY)	**-.055 ** (2.5)**	82	**-.020 *** (2.8)**	82

Note: Absolute heteroskedasticity-consistent t-values are between brackets. The results are from separate regressions that contain the same control variables as in Tables 3 and 4 (i.e. a constant, a dummy for poor countries, growth of gdp and the established business rate for the nascents equation and a constant, the nascent rate, growth of gdp and the established business rate for the young business equation). Coefficients of these additional explanatory variables are not reported. *** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level.

Results for combined models

We have also performed some exercises using combined models, i.e., models where explanatory variables from Tables 3, 4 and 5 are combined in single estimations of Equations (1) and (2). We combine the most influential variables from Tables 3, 4 and 5 in single equations (next to the baseline variables). These are the variables time (Djankov *et al.*), tertiary enrollment and social security expenditure for Equation (1) (explaining nascent rates) and the number of days required to start a business according to GCR, the employer's

flexibility of hiring and firing and social security expenditures for Equation (2) (explaining young business rates). Results are in Table 6.

Table 6: Combined models

	Nascent rate (Equation 1)	Young business rate (Equation 2)
Intercept	.059 (0.1)	-.23 (0.4)
Intercept poor countries	4.3 *** (5.1)	
Growth	.019 (0.2)	.057 (1.3)
Established business rate	.21 ** (2.0)	.23 *** (4.8)
Nascent rate		.43 *** (9.1)
Time (Djankov *et al.*)	.0011 (0.1)	
Days (GCR)		-.0060 (1.6)
Tertiary enrollment (GCR)	.067 *** (4.3)	
Social security expenditure (WCY)	-.062 ** (2.3)	-.010 (1.3)
Employer's flexibility of hiring and firing (GCR)		.13 (1.6)
R^2	.529	.850
N	81	82

Note: Absolute heteroskedasticity-consistent t-values are between brackets. *** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level. Compared to the 83 observation sample from Tables 3 and 4, data are missing for tertiary enrollment (Taiwan) and for social security expenditure (Jordan).

We see that the effect of the entry regulation measures (in this case the number of days required to start a business) get weaker once the relevant explanatory variables identified in Table 5 are included as well. The effect of the Djankov *et al.* measure in Equation (1) fades away totally[13] while the effect of the GCR measure in Equation (2) is also much weaker compared to Table 4. Note however that this effect is still almost significant (p-value 0.11). The results from Table 6 imply that we have to be very careful in drawing conclusions about the impact of entry regulations on entrepreneurship levels.

The weaker results in Table 6 are possibly due to multicollinearity. Table 7 presents the correlation matrix for the explanatory variables from Table 6 (baseline variables excluded). From Table 7 we see that the entry regulation measures (1. and 2.) are strongly and significantly correlated with the other explanatory variables. This holds for the Djankov *et al.* measure in particular. These strong interdependencies may cause standard errors for the

[13] Results for Equation (1) are similar to those in Table 6 if the employment share in services (which is significant at 10% level in Table 5) is included as well. This variable has t-value -0.5 in a combined regression.

entry regulation measures to increase, thereby erroneously suggesting that there is no impact. However, more research is needed to find out what is going on here exactly.

Table 7 Correlations between explanatory variables in Table 6, excluding baseline variables (N=81-83).

	1.	2.	3.	4.	5.
1. Time (Djankov *et al.*)	1				
2. Days (GCR)	.533 ***	1			
3. Tertiary enrollment (GCR)	-.545 ***	-.200 *	1		
4. Social security expenditure (WCY)	.428 ***	.379 ***	.110	1	
5. Employer's flexibility of hiring and firing (GCR)	-.273 **	-.272 **	-.066	-.377 ***	1

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level. Compared to the 83 observation sample from Tables 3 and 4, data are missing for tertiary enrollment (Taiwan) and for social security expenditure (Jordan).

Abstracting from the statistical problems described above we may remark that the findings in Table 6 *may* have plausibility in the following sense. In Table 6 there is no impact of the Djankov *et al.* measure but an (almost) significant effect of the GCR measure concerning the time involved in meeting the regulatory requirements. We know that the Djankov *et al.* measures relate to bigger firms (see Section 4) while most of the entrepreneurs identified by the GEM project are in small firms. Hence the Djankov *et al.* measure may be less relevant than the GCR measure. This would be consistent with the stronger result for the GCR measure. Again, more research is needed to confirm this conjecture.

7. DISCUSSION

In this paper we investigate the impact of entry regulations on entrepreneurship rates. We build a two-equation model explaining the nascent entrepreneurship rate and the young business entrepreneurship rate at the country level. Our conceptual model is inspired by Grilo and Irigoyen (2005) who propose a two equation model explaining latent and actual entrepreneurship and Verheul *et al.* (2002) who develop an eclectic framework for the determinants of entrepreneurship distinguishing between the demand side and the supply side of entrepreneurship and government intervention. In our empirical application we include various indicators of the supply side and demand side of entrepreneurship as well as of government intervention. The model is estimated using data for a sample of countries participating in the Global Entrepreneurship Monitor between 2002 and 2004. Entrepreneurship measures are taken from GEM while data on entry regulations are taken from the pioneering article of Djankov *et al.* (2002) as well as from the Global Competitiveness Report. We find evidence for a strong conversion effect from nascent to actual entrepreneurship as well as preliminary indications that more burdensome entry regulations may negatively impact entrepreneurship rates. However, once a full model is estimated results for the entry regulation variables become weaker, and in the case of the Djankov measures the effect disappears. More research is required to be able to draw definite conclusions about the impact of entry barriers on entrepreneurship levels. Our results are in line with the finding of Grilo and Irigoyen (2005) that having a preference for self-employment increases the prob-

ability of actually being self-employed.[14] Moreover, they find support for negative effects of the perceived lack of financial support and that of administrative complexities, which can both be interpreted as entry impediments.[15] We also find positive effects on entrepreneurial activity rates of labour flexibility and tertiary enrollment and a negative effect for social security expenditure. These findings are highly relevant for policy makers.

However, our research has several limitations which still have to be resolved in future research. First, we need to know more about the exact measurement of the various entry regulation indicators and the sources for the differences between different measures. Second, more effort should be put in the construction and estimation of the model. In particular, we may think of setting the conversion rate coefficient in the young business equation dependent on the entry regulation measures instead of assuming a direct impact of these measures on nascent or young business entrepreneurship rates. Concerning estimation methods, we may think of allowing for interdependencies between the residuals of the nascent and the young business equation, and apply SUR estimation. Third, more insight is needed in to what extent combined models are affected by multicollinearity. Perhaps factor analysis may offer a way out of this problem. Fourth, more insight is needed in what way the outlier countries excluded from our model sample are different from the included countries (listed in Appendix 1). Fifth, while the current paper focuses on impediments, we would also like to incorporate data on the level of direct assistance to SMEs by governments to gain insight in the relative importance of the different public policy measures identified by Dennis (2004): direct assistance versus impediments (see Figure 1). Sixth, we may think of including more and different variables in the model. In particular we may include variables from the World Bank data base 'Doing Business in 2005'.

For all the reasons above the findings in this paper should be regarded as exploratory. Nevertheless we feel that the current paper may be the starting point of a promising line of re-

[14] This is not a surprising finding but it implies that, given that the preference for self-employment does not change over time, being self-employed is, at least partially, the expression of a genuine wish rather than an accident or a constrained choice (Grilo and Irigoyen, 2005).

[15] More precisely, Grilo and Irigoyen (2005) find that concerning administrative and financial obstacles, both perceptions play a significant negative role in self-employment status, over and above its indirect effect through preferences. They conclude that these results, combined with the ones obtained for latent entrepreneurship, indicate that administrative complexities hinder both the willingness to become self-employed and its materialisation in actual status having therefore both a direct and an indirect effect (through preferences) on actual entrepreneurship; while lack of financial support has only a direct effect on the fact of being self-employed but no significant impact on preferences. Using an entirely different model explaining various entrepreneurial engagement levels Grilo and Thurik (2004) conclude that, relative to never having considered setting up a business, the odds of thinking about it or having thought and given up are not significantly affected by the perception of administrative complexities. However, the odds of other more active entrepreneurial positions such as being in the process of starting a business or actually having started one (whether active for less or longer than three years) are significantly negatively affected by a perception of administrative complexity. However, they establish that the perception of lack of financial support has no discriminative effect across the various levels of entrepreneurial engagement.

search gaining insight in the impact of public policy measures on the extent and nature of entrepreneurship in different countries.[16]

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[16] Part of this line of research may be based on the observations made by Capelleras et al. (2005) described in Section 2. They argue that regulation does not affect entrepreneurship but merely influences the nature or form of that entrepreneurship. In other words it influences the distribution of entrepreneurship between registered and unregistered businesses. Unfortunately, the GEM data does not tell us what types of firm are included in actual entrepreneurship. In other words how many of the actual businesses are registered, and hence appear in official statistics and how many are unregistered? Amongst the unregistered there are two categories, the first are those which are legal, but merely are too small to appear in official figures, and the second are those which are illegal. We also do not know from the GEM data how many are in these two categories because GEM follows individuals without considering the number of businesses they have. So, an individual in a heavily regulated economy [HR] may well choose to establish more businesses which are below the official registration threshold, whereas in a lightly regulated economy [LR], an individual may choose to establish a single business but one that is registered. GEM data may be useful to investigate these types of questions. However, for this the setup of the GEM survey would have to be modified. In particular, we would need to know how many businesses each entrepreneur has and also whether these businesses are registered or unregistered.

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Appendix 1: Estimation sample

Table A1 lists the distribution of observations in our estimation sample over the countries. A country can have 3 observations maximum (for the years 2002-2004). It is also indicated whether the country is ranked as a poor country. In total we have 83 observations 19 of which are of poor countries.

Table A1 Estimation sample

Country	N	Poor country?	Country	N	Poor country?
Argentina	3	Y	Jordan	1	Y
Australia	3		Mexico	1	Y
Belgium	3		Netherlands	3	
Canada	3		New Zealand	3	
Chile	2	Y	Norway	3	
China	2	Y	Poland	2	Y
Denmark	3		Portugal	1	
Finland	2		Russia	1	Y
France	3		Singapore	3	
Germany	3		Slovenia	3	
Greece	2		South Africa	3	Y
Hong Kong	3		Spain	3	
Hungary	2	Y	Sweden	2	
India	1	Y	Switzerland	2	
Ireland	3		Taiwan	1	
Israel	2		Thailand	1	Y
Italy	2		United States	3	
Japan	2		United Kingdom	3	