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The Effect of Business Regulations on Nascent and Young Business Entrepreneurship

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ABSTRACT. We examine the relationship, across 39 countries, between regulation and entrepreneurship using a new two-equation model. We find the minimum capital requirement required to start a business lowers entrepreneurship rates across countries, as do labour market regulations. However the administrative considerations of starting a business – such as the time, the cost, or the number of procedures required – are unrelated to the formation rate of either nascent or young businesses. Given the explicit link made by Djankov et al. [Djankov et al. 2002, ‘The Regulation of Entry’, *Quarterly Journal of Economics* 117(1), 1–37] between the speed and ease with which businesses may be established in a country and its economic performance – and the enthusiasm with which this link has been grasped by European Union policy makers – our findings imply this link needs reconsidering.

KEY WORDS: Global Entrepreneurship Monitor, nascent entrepreneurship, regulation, World Bank Doing Business, young businesses.

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1. Introduction

SME and Entrepreneurship policy makers seeking to increase rates of new firm formation and subsequent wealth creation are faced with choices. The central choice is to either follow a low regulation route or to follow a high “support” route. The low regulation route focuses policy upon two areas. The first is to enable the starting of a business to take place as quickly and cheaply as possible. The second is to minimise the number and severity of regulations upon that business whilst it is trading. The US is seen as the exemplar low regulation country.

The alternative policy is for government to provide “support” to new and small firms, funded by the taxpayer. It can be in the form of information, advice, training, or finance to new firms or existing small firms. EU countries have traditionally favoured “support” policies.

However, Djankov et al. (2002) claimed to show that countries where business regulation was most burdensome are more likely to be undemocratic, characterised by official corruption, have larger unofficial economies and lower levels of wealth. This finding was highly influential, triggering the introduction of legislation in countries to lower the “barriers” to new business creation. EU countries, where such barriers were high, responded. Between 1999 and 2006 France reduced the number of days taken to start a business from 53 to 8. Other examples are Spain where the number of days fell from 82 to 47 and Italy where they fell from 62 to 13.

This paper investigates the link between business regulation and new firm formation in 39 countries. It suggests that the association between the time and costs of starting a business and several

measures of entrepreneurship is by no means as clear as implied by Djankov et al. (2002). However it does find that labour market regulations depress measures of entrepreneurship. Our conclusion has to be that there is a need for a serious review of this policy area, with better data being a key requirement.

Our results are obtained by estimating a new two-equation model while 112 averaged country data points covering both developed and developing countries are used. The first equation explains the nascent entrepreneurship rate using policy regulations and various controls. The second equation explains the young business entrepreneurship rate using policy regulations, various controls and the nascent entrepreneurship rate. This enables us to discriminate between direct effects on the young business entrepreneurship rate and indirect effects through the nascent entrepreneurship rate because the nascent phase precedes the young business phase.

The paper begins by setting out some hypotheses on the relation between entrepreneurship and policy intervention. It then moves on to describe the data available and presents some simple tables. The modelling framework is then presented, followed by our key results. We conclude by reviewing the results, identifying the limitations of the study, but pointing to some provisional conclusions.

2. Entrepreneurship and policy options

Governments have a range of policies to enable Small and Medium-sized Enterprises (SMEs) to come into existence and to grow. The simple justification for such policies 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.¹ According to Lundström 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".

To deliver such policies governments are faced with clear choices, with these being set out in Table I, developed originally from Dennis (2004). The key choices are shown in the columns. The first is to focus attention upon lowering the entry "barriers" to new firm formation. Examples of such "barriers" include the length of time taken to start a business, the number and cost of any permits or licenses required, or the minimum capital requirements of a new firm.

A second policy option is to reduce the "burdens" on those individuals already operating SMEs. Such "burdens"² might include the difficulties over the hiring and firing of labour, obtaining access to credit, the severity of the tax regime or the difficulties of closing a business. These barriers are referred to in the Table as "barriers to expansion and growth".

A third policy option is to use public funds to provide finance directly and indirectly, or to provide information, training and advice soft support to both individuals considering starting a firm and to existing established SMEs.

As Dennis points out, governments in different countries make different choices – the US

TABLE I
Linking entrepreneurial groups with policy options

	Lowering barriers to start up	Lowering barriers to expansion and growth	Providing advice, support and finance from public funds
Nascent opportunity entrepreneurs	Strong impact	Weak impact	Strong impact
Nascent necessity entrepreneurs	Strong impact	Weak impact	Strong impact
Actual entrepreneurs (young businesses and established SMEs)	Weak impact	Strong impact	Strong impact

The table reports the hypothesised impact (strong or weak) of the policy option in the columns on the size of the entrepreneurial groups in the rows.

broadly favouring the first two policy options over the third whereas, until recently, EU countries have favoured the third. Our purpose in Table I is not to review the practicalities of these choices but to theorise about their implications for new and small firms.

The rows in Table I show that policy choices influence three groups of new and small firms. The first two are nascent entrepreneurs – defined as individuals taking active steps to start a business – with a distinction being made between necessity and opportunity entrepreneurs. The third group are the actual entrepreneurs defined as individuals actually running a business. This third group consists of newly established young businesses, as well as established SMEs or small firms.

We now take each of these groups in turn and theorise about the expected impact of the policies on each group, beginning with the two groups of nascent entrepreneurs. It would certainly be argued by Djankov et al. that the number of nascents would be increased if barriers to start up were lowered. However, it is less clear whether it is the necessity or the opportunity nascent entrepreneurs that will be most influenced by the lowering of entry barriers. On the one hand necessity entrepreneurs may be particularly strongly influenced by, for example, the costs of start up being lowered since these individuals are likely to have lower wealth than opportunity entrepreneurs. On the other hand, opportunity nascents are assumed to have a wider range of employment options than necessity nascents and so lowering entry costs may have a strong marginal effect.

It seems likely that nascent entrepreneurs will be less influenced by barriers to growth than by barriers to entry on the grounds that nascents are less likely to have business experience. They will be less likely therefore to have actually encountered such barriers. A possible distinction is that opportunity nascents may have higher growth expectations than necessity nascents and so may be more likely to be deterred if they think they are likely to be prevented from their business reaching optimal size. Finally we might expect, all else equal,³ for nascent rates to be higher in countries that provide advice, support and funds.

Turning now to young and established businesses we assume that they would be more strongly influenced by barriers to expansion and by the provision of advice and support, than by start-up barriers. A priori it is not clear whether the advice or the barriers would be more influential.

The hypothesised effects described above are summarised in Table I.

3. Data on entrepreneurship rates and regulations

Ideally, we would like to quantify all the relationships in Table I but, in practice, we are constrained by data limitations. In particular, cross-country data on the provision of advice and support are not available. Whilst Lundstrom and Stevenson (2005) provide a comprehensive description of such policies, this is restricted to only 13 countries and there is no data on aggregate policy expenditure. In terms of Table I therefore, the relationships in the final column cannot be estimated. We will now provide an overview of our data on entrepreneurship rates and on business regulations. The variables are set out in full in the next section of this paper.

Data on rates of entrepreneurship are derived from the Global Entrepreneurship Monitor (GEM). A distinction is made between the young business entrepreneurship rate, defined as the percent of the adult population that is the owner/manager of a business that is less than 42 months old, and the nascent entrepreneurship rate, defined as the percent of adult population that is actively involved in starting a new venture (Reynolds et al., 2002, 2005).

These rates are the dependent variables in our model (see also the next section) but, following Table I, we distinguish between the opportunity and necessity nascent entrepreneurship rates and the young business entrepreneurship rate. Our final entrepreneurship measure is the established business rate, defined as the percent of the adult population that is the owner/manager of a business that is older than 42 months. This is not a dependent variable in our model because we expect the impact of business regulations to be particularly important in the early stages of the business. However the established business

rate does play a role in our empirical exercises 'on the right hand side of the equations. Full details of the various GEM measures are shown in Table III.

Data on business regulations are taken from the World Bank Doing Business (WBDB) data base. According to the WBDB website "The Doing Business database provides objective measures of business regulations and their enforcement. The Doing Business indicators are comparable across 155 economies. They indicate the regulatory costs of business and can be used

to analyse specific regulations that enhance or constrain investment, productivity and growth. The indicators are placed in categories such as 'Starting a business', 'Hiring and firing of workers', 'Getting credit', etc. The precise definition of these indicators is provided in the next section.

As an illustration, Table II shows the number of days required to start a business for those countries participating in the GEM in 2005. This variable is taken from the WBDB category 'Starting a business', which is associated with the

TABLE II
Number of days required to start a business and entrepreneurship rates in 2005

	Number of days required to start a business	Young business entrepreneurship rate	Opportunity nascent entrepreneurship rate	Necessity nascent entrepreneurship rate
Australia	2	4.66	4.99	0.49
Canada	3	3.59	4.9	0.69
United States	5	5.23	7.16	1.06
Iceland	5	2.73	4.05	0.16
Denmark	5	2.44	1.5	0.08
Singapore	6	3.67	3.08	0.54
France	8	0.68	1.46	1.1
Jamaica	9	6.66	5.49	3.23
Netherlands	11	1.93	1.81	0.16
New Zealand	12	9.99	7.72	0.77
Norway	13	5.17	3.69	0.15
Italy	13	2.25	2.21	0.43
Finland	14	1.88	1.85	0.16
Sweden	16	2.54	1.33	0.17
United Kingdom	18	2.92	2	0.29
Latvia	18	2.77	2.91	0.6
Switzerland	20	3.71	2.28	0.16
Ireland	24	4.73	4.34	1.12
Germany	24	2.71	1.91	0.67
Chile	27	5.31	4.39	1.5
Austria	29	2.37	2.36	0.25
Japan	31	1.14	0.86	0.16
Argentina	32	3.93	4.43	1.4
Thailand	33	13.06	6.4	1.23
Belgium	34	1.17	1.7	0.11
South Africa	38	1.74	1.89	1.14
Greece	38	1.6	2.69	0.52
Hungary	38	0.82	0.37	0.11
Spain	47	3.36	2.08	0.3
China	48	9.4	3.67	1.16
Croatia	49	2.5	1.66	2.11
Mexico	58	1.36	2.78	0.6
Slovenia	60	1.44	2.29	0.22
Venezuela	116	7.48	11.16	6.83
Brazil	152	8.17	1.71	1
Average	30.17	3.86	3.29	0.88

Sources: WBDB and GEM.

policy option ‘lowering barriers to start up’ in Table I.⁴ While in this paper we use several variables to reflect regulation we focus on this particular indicator because it plays such an important role in the influential Djankov et al. study. Table II also includes data on the dependent variables of this study, i.e. young business and nascent entrepreneurship rates, classified by opportunity and necessity entrepreneurship.

4. Modelling and data considerations

4.1. Model

To examine the determinants of *nascent* entrepreneurship and *young business* entrepreneurship we will estimate a two-equation model explaining these entrepreneurship rates separately, while taking into account the interrelationship between the two variables. Our model takes the following form:

$$N=f(\mathbf{X}_1, \mathbf{G}) \quad (1)$$

$$Y=f(N, \mathbf{X}_1, \mathbf{X}_2, \mathbf{G}) \quad (2)$$

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

The set-up of the model parallels Grilo and Irigoyen (2006) where survey data from the 15 EU Member States and the US for the year 2000 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.⁵ While the Grilo and Irigoyen model refers to the micro (individual) level, the model employed in the current paper is defined at the macro (country) level. The first equation explains the nascent entrepreneurship rate using policy regulations and various controls. The second equation

explains the young business entrepreneurship rate using policy regulations, various controls and the nascent entrepreneurship rate. The idea is that nascent entrepreneurship is a necessary condition for becoming a business owner. In other words: there is a natural ordering in entrepreneurial engagement levels (Grilo and Thurik, 2005, 2006). Hence, the nascent entrepreneurship rate appears both as a dependent variable in Equation (1) and as an independent variable in Equation (2). In the latter equation the coefficient of the nascent rate may be interpreted as the ‘conversion’ effect from nascent to actual (young business) entrepreneurship. A higher coefficient suggests that a higher proportion of individuals who are in the process of starting a business actually succeed in setting up the business (i.e., they ‘convert’ from nascent entrepreneur into young business entrepreneur). We recognise that the conversion interpretation is imperfect as GEM currently does not follow individual nascent entrepreneurs over time (Sternberg and Wennekers, 2005). Nevertheless we consider it likely that a strong statistical association between nascent and actual young business entrepreneurship at the *macro* level implies a strong statistical association at the *micro* level (the latter implying conversion in the actual meaning of the word). For this reason we will use this interpretation throughout the paper.

Verheul et al. (2002) develop an eclectic framework for the determinants of entrepreneurship distinguishing between the demand side and the supply side of entrepreneurship and government intervention.⁶ 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 these opportunities (Verheul et al., 2002). Examples of demand side factors are technological development, globalisation and industrial structure, whilst 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 here include issues upon which this paper focuses: entry regulation, labour market regulation and the social security system.⁷

We use the incumbent business ownership rate as an indicator of the *demonstration effect*. It has a special place in the eclectic framework in the sense that it *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 attractively entrepreneurship is perceived, independent of existing opportunities or individual characteristics. Incumbent business ownership is operationalised as the established business rate, as measured by the GEM. The established business rate is defined as the number of owner/managers in businesses older than 42 months as a percentage of adult population.

In terms of our model, supply side factors influence the stock of potential (or nascent) entrepreneurs. These factors may also influence the stock of young business entrepreneurs. Hence X_1 appears both in Equation (1) and in Equation (2). However, demand side factors may influence the young business rate rather than the nascent rate because they influence the market room for new businesses. Hence they influence the number of actual new-firm start-ups, and so X_2 appears only in Equation (2).⁸ Government intervention factors influence both the nascent and the actual young business entrepreneurship rate. Furthermore, to test for the ‘conversion’ effect, the nascent rate is also included as an explanatory variable in the young business equation.

Although the distinction between the supply and demand-side of entrepreneurship can be made conceptually, it is less clear in a world of proxy variables. To address this we will also test for the impact of demand side variables on the nascent rate, even though vector X_2 is not in Equation (1).

Finally, as theorised in Table I, we distinguish between opportunity and necessity entrepreneurship. We assume opportunity nascents are more likely to ‘convert’ into an actual start-up, because of their higher skills. This would

imply that the ‘conversion’ coefficient in Equation (2) is higher for opportunity nascents than for necessity nascents.

4.2. Explanatory variables

The vectors X_1 , X_2 and G contain several variables. The supply and demand side variables of entrepreneurship are taken from the Global Competitiveness Report 2001–2002 (GCR) or the World Competitiveness Yearbook 2001 (WCY). Those capturing government intervention are taken from the WBDB data base.

4.3. Explanatory variables reflecting the supply and demand sides of entrepreneurship

The supply side of entrepreneurship (vector X_1) is captured by: ‘Ease of access to loans’, ‘Venture capital availability’, ‘Working hours per year’, ‘Secondary school enrolment’ and ‘Tertiary enrolment’. The demand side of the entrepreneurship (vector X_2) includes: ‘Economic growth rates’, ‘FDI and technology transfer’, ‘Company-university cooperation’ and ‘Industrial structure’ (share of services). The exact variable descriptions are provided in Table III.

4.4. Explanatory variables reflecting government intervention (vector G)

Five categories of variables derived from the WBDB methodology are included: These are: ‘Starting a business’, ‘Hiring and firing workers’, ‘Getting credit’, ‘Paying taxes’ and ‘Closing a business’. Detailed descriptions are provided in Table IV but, because of their significance for the paper, they are also briefly outlined below.

The category ‘Starting a business’ identifies the bureaucratic and legal hurdles an entrepreneur must overcome to incorporate and register a new firm. It examines the procedures, time, and cost involved in launching a commercial or industrial firm with up to 50 employees and start-up capital of 10 times the economy’s per-capita gross national income (www.doingbusiness.org).

Measures on the flexibility of labour regulations are taken from the WBDB category ‘Hiring and firing workers’. It examines the difficulty of hiring a new worker, rigidity of rules on expanding

TABLE III
Variable descriptions and sources

Variable	Description	Source
Nascent entrepreneurship rate	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)	GEM
Opportunity nascent rate	The number of nascent entrepreneurs (as defined above) with an opportunity based motive, i.e., they indicate they will start a business because they have perceived a business opportunity.	GEM
Necessity nascent rate	Opportunity nascents will start a business as one of several possible career options The number of nascent entrepreneurs (as defined above) with a necessity based motive, i.e., they indicate they will start a business because they see entrepreneurship as their last resort. Necessity nascents feel compelled to start their own business because all other work options are either nonexistent or unsatisfactory	GEM
Young business entrepreneurship rate.	The percent of adult population that is the owner/manager of a business that is less than 42 months old	GEM
Established business rate	The percent of adult population that is the owner/manager of a business that is older than 42 months	GEM
Intercept poor countries	Dummy variable that is 1 if the per capita income level in 2000 exceeds 15,000 US \$ in purchasing power parities, and 0 otherwise	WCY
Growth	Economic growth rates: gross domestic product, constant prices, annual percent changes	IMF
Ease of access to loans	How easy is it to obtain a loan in your country with only a good business plan and no collateral? (1 = impossible, 7 = easy)	GCR
Venture capital availability	Entrepreneurs with innovative but risky projects can generally find venture capital in your country (1 = not true, 7 = true)	GCR
Working hours	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)	WCY
Secondary school enrolment	Percentage of relevant age group receiving full-time education, 1997	WCY
Tertiary enrolment	Gross tertiary enrolment rate 1997	GCR
FDI and technology transfer	Foreign direct investment in your country (1 = brings little new technology, 7 = is an important source of new technology)	GCR
Company-university cooperation	Technology transfer between companies and universities (answers ranging from insufficient to sufficient)	WCY
Industrial structure	Employment share services	WCY

Note: GEM = Global Entrepreneurship Monitor, WCY = World Competitiveness Yearbook 2001, IMF = International Monetary Fund, World Economic Outlook Database, September 2005, GCR = Global Competitiveness Report 2001–2002.

TABLE IV
Variable descriptions and sources, WBDB indicators

Variable	Description
	<i>WBDB indicators, category Starting a Business</i>
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. A procedure is defined as any interaction of the company founder with external parties (government agencies, lawyers, auditors, notaries)
Time	The time it takes to obtain legal status to operate a firm, in calendar days. Time captures the median duration that incorporation lawyers indicate is necessary to complete all necessary procedures
Cost	The cost of obtaining legal status to operate a firm as a percentage of per capita income. It includes all identifiable official expenses (fees, costs of procedures and forms, photocopies, fiscal stamps, legal and notary charges, etc.)
Minimum capital	The paid-in minimum capital requirement reflects the amount that the entrepreneur needs to deposit in a bank before registration starts. This variable is measured as a percentage of per capita income
	<i>WBDB indicators, category Hiring and Firing Workers</i>
Difficulty of Hiring Index	Difficulty of hiring a new worker
Rigidity of Hours Index	Restrictions on expanding or contracting the number of working hours
Difficulty of Firing Index	Difficulty and expense of dismissing a redundant worker
Rigidity of Employment Index	This variable is computed as the average of the Difficulty of Hiring Index, the Rigidity of Hours Index and the Difficulty of Firing Index
Hiring cost	This indicator measures all social security payments (including retirement fund; sickness, maternity and health insurance; workplace injury; family allowance; and other obligatory contributions) and payroll taxes associated with hiring an employee. The cost is expressed as a percentage of the workers salary
Firing costs	Cost of a redundant worker, expressed in weeks of wages
	<i>WBDB indicators, category Getting Credit</i>
Legal Rights Index	This index measures the degree to which collateral and bankruptcy laws facilitate lending
Credit Information Index	This index measures rules affecting the scope, access and quality of credit information
Public registry coverage	A public credit registry is defined as a database managed by the public sector, usually by the central bank or the superintendent of banks. It collects information on the creditworthiness of borrowers (persons or businesses) in the financial system and makes it available to financial institutions. The coverage indicator reports the number of individuals and firms listed in the public credit registry with current information on repayment history, unpaid debts or credit outstanding. The number is expressed as a percentage of the adult population. If no public registry operates, the coverage value is 0
Private bureau coverage	A private credit bureau is defined as a private firm or non-profit organisation that maintains a database on the creditworthiness of borrowers (persons or businesses). The variable is defined analogously to the public registry coverage variable
	<i>WBDB indicators, category Paying Taxes</i>
Number of payments	The number of times the company pays taxes in a year is the number of different taxes multiplied by the frequency of payment for each tax. The frequency of payment includes advance payments as well as regular payments
Total tax payable	This indicator measures the total amount of taxes payable by the business in the second year of operation except for labour taxes. Labour taxes (such as payroll taxes and social security contributions) are included in the hiring cost indicator (see above). The total amount of taxes is the sum of all the different taxes payable after accounting for deductions and exemptions. The taxes withheld but not paid by the company are not included. Payable taxes are presented as a share of gross profit (defined as sales minus cost of goods sold and labour costs)

Table IV
continued

Variable	Description
	<i>WBDB indicators, category Closing a Business</i>
Time	Time to go through insolvency in calendar years. This variable captures the average time taken to go through insolvency, as estimated by bankruptcy lawyers. Information is collected on the sequence of the bankruptcy procedures and on whether any procedures can be carried out simultaneously. Delays due to legal derailment tactics that parties to the bankruptcy may use – in particular, the extension of response periods or appeals – are considered
Cost	Cost of the bankruptcy proceedings, as a percentage of the estate value of the bankrupt business. ^a The cost of the bankruptcy proceedings is calculated on the basis of survey responses by practicing insolvency lawyers. Costs include court costs as well as fees of insolvency practitioners, independent assessors, lawyers, accountants and the like. Bribes are excluded
Recovery rate	The recovery rate, which calculates how many cents on the dollar claimants (creditors, tax authorities, and employees) recover from an insolvent firm. This variable more or less combines the former two variables as the cost of bankruptcy proceedings is deducted from the initial available money, and the recovery rate is then calculated as the present value of what is left. ^b

Source: World Bank, www.doingbusiness.org

^aThe data are computed for a standardised case, where a limited liability company has downtown real estate as its major asset. The company runs a hotel with 201 employees.

^bThe third factor influencing the recovery rate is whether or not the firm survives as a going concern. In case the business is liquidated there is an additional loss of value impacting the recovery rate negatively (see World Bank, 2005, p. 69).

or contracting working hours, the non-salary costs of hiring a worker, and the difficulties and costs involved in dismissing a redundant worker (www.doingbusiness.org). For all these variables higher values imply more rigid regulations. Hence the expected influence on entrepreneurship rates is negative. For more details on these measures we refer to Botero et al. (2004).

We also use measures from the WBDB category ‘Getting Credit’. This quantifies two sets of issues – credit information registries and the effectiveness of collateral and bankruptcy laws in facilitating lending. Table IV again provides full descriptions. Higher values imply that lending is easier, so the expected influence on entrepreneurship rates is positive.

The WBDB category ‘Paying Taxes’ reviews the taxes that a medium-size ‘standardised’ company must pay or withhold in a given year. The indicators included in the present study are the frequency and scale of tax payments. Higher taxes are assumed to make running a business less attractive, so the expected sign of these variables is negative.

Finally the WBDB category ‘Closing a business’ identifies weaknesses in existing bankruptcy law and the main procedural and

administrative bottlenecks in the bankruptcy process. The indicators include the time and cost associated with going bankrupt, as well as the recovery rate which measures the amount of money claimants recover from an insolvent firm. When the recovery rate is higher, banks may be expected to be more willing to lend, hence this may have a positive impact on entrepreneurship. Also, when insolvency is efficiently organised, more entrepreneurs having to close their business may be encouraged to start a second time.⁹

5. Empirical analysis

5.1. Methodology and sample

We estimate Equations (1) and (2) using data for 47 countries over the period 2000–2005. Unfortunately the data are not complete. First, data for the established business rate are only available for the years 2002–2005. But, as the demonstration effect has been found to be empirically relevant in earlier studies (Wennekers et al., 2005), it is important to include this variable in the model. Second, several countries participated in GEM only once or twice. Third, there are missing values for some independent

variables for the countries of Croatia, Uganda, Jamaica and Latvia. All in all, this provides 124 observations. Finally, several test regressions revealed that some observations 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 have an unbalanced panel of 112 observations distributed over 39 countries. Using this sample, all regressions pass the Jarque-Bera test on normality of the residuals.¹⁰ The distribution of these observations over the countries is shown in the Appendix A.

The data set comprises variables that vary over time, as well as time-invariant variables. The GEM variables (the nascent, young business and established business entrepreneurship rates) and growth of GDP vary over time, whereas the GCR and WCY variables are time-invariant. Those from WBDB are available for the period 2003–2005. We set the values for 2002 equal to those of 2003.¹¹

In our estimation models we depart from a baseline model which includes the economic growth rate and the established business rate. These variables are important as they capture the business cycle effect and the demonstration effect, respectively.

In Equation (1) we also include a ‘poor country’ dummy. It is often observed that entrepreneurship rates are higher in poor countries because it is more often necessity driven, or more associated with the rural sector. We include a dummy to correct for this. We choose a per capita income level of 15,000 USDs in purchasing power parities (year 2000) as the cut-off point. The Appendix A shows the countries defined as poor. In Equation (2) the inclusion of this dummy is not required because the nascent entrepreneurship rate (both opportunity and necessity driven) is included as an additional explanatory variable.

To summarise, our baseline model includes a dummy for poor countries, growth of GDP and the established business rate as explanatory variables for the opportunity and necessity nascent rates (Equation 1). The opportunity and necessity nascent rates, growth of GDP and the established business rate are used as explanatory variables for the young business entrepreneurship rate (Equation 2).

When estimating Equations (1) and (2), we cannot include all explanatory variables from Tables III and IV simultaneously because of multicollinearity. To obtain an overall picture we computed (auxiliary) regressions, each time adding one variable to the baseline model. The regressions were estimated using OLS. As our data base contains very heterogeneous countries we computed standard errors which are robust to heteroskedasticity. Results of these auxiliary regressions are presented in a working paper version of the present article (van Stel et al., 2006).

We then build a complete multivariate model. For each dependent variable we combine all significant variables from the auxiliary regressions into one model specification which also includes the baseline variables. Next, we remove the non-significant variables, to end up with a model including only those explanatory variables which have a significant impact (next to the baseline variables). In this process we also take into consideration some restrictions that arise from multicollinearity. For instance, as the Rigidity of Employment Index is an average of three sub-indices (see Table IV), we cannot include the sub-indices and the overall index simultaneously. For the opportunity nascent rate and the young business rate, this led us to include only the combined indicator.

The final results of the procedure described above are shown in Table V. In reading this table it is important to realise that empty cells imply a non-significant influence. For instance, the number of procedures has no significant impact on the young business rate. In addition, for each explanatory variable from Table III or IV not included in Table V, it holds that the variable has no impact on any of the entrepreneurship rates. For instance, the time it takes to obtain legal status to operate a firm (see Table IV) has been tested to have no significant impact on the various entrepreneurship rates. Again, the different steps leading to Table V are shown in van Stel et al. (2006).

5.2. Interpretation of results

Table V contains several important results. First, the impact of entry regulations on the three entrepreneurship rate measures is limited.

TABLE V
Estimation results

	Equation (1)			Equation (2)
	Opportunity nascent rate	Opportunity nascent rate	Necessity nascent rate	Young business rate
Intercept	1.91 (1.2)	7.32* (1.7)	-.27 (0.3)	.18 (0.7)
Intercept poor countries	1.84*** (4.4)	1.48*** (3.1)	.90*** (4.9)	
Growth	.12** (2.4)	.13** (2.4)	-.015 (0.5)	.037 (1.1)
Established business rate	.31*** (4.8)	.29*** (4.6)	.11*** (4.4)	.26*** (7.9)
Opportunity nascent rate				.33*** (5.2)
Necessity nascent rate				.75*** (5.2)
Procedures			.043** (2.0)	
Minimum capital	-.0041** (2.6)	-.0059*** (2.7)	-.0009** (2.5)	
Rigidity of Hours Index			-.012*** (5.7)	
Rigidity of Employment Index	-.020*** (2.7)	-.015** (2.0)		-.012*** (3.1)
Firing costs			.0086*** (3.7)	
Private bureau coverage	.011*** (2.7)	.010*** (2.7)		.0036 (1.6)
Recovery rate			-.010*** (3.1)	
Tertiary enrolment (GCR) ^b	.028*** (2.6)	-.15 (1.4)		
Employment share services ^a (WCY)	-.032* (1.7)	-.11* (1.8)	.014* (1.7)	
Interaction variable: Tertiary enrolment × Employment share services		.0025* (1.7)		
R^2	.576	.611	.724	.856
N	109	109	110	112

Note: Absolute heteroskedasticity-consistent t -values are between brackets.

^aEcuador and Jordan missing in WCY.

^bTaiwan missing in GCR.

***Significant at 1% level, **Significant at 5% level, *Significant at 10% level.

Of the four entry regulation variables (WBDB category ‘Starting a Business’), only the minimum capital requirement is an obstacle for entrepreneurship. One interpretation of this is that the creative entrepreneur either overcomes or avoids bureaucratic burdens such as the number of procedures or the amount of time that is required to start up, even if these are relatively heavy. However the minimum capital requirement may be a more serious barrier

because even skilful entrepreneurs may not be able to overcome this without access to assets. This might explain the negative sign. Note however that the impact of this variable on actual entrepreneurship (the young business rate) emerges only in an indirect way, viz. through the effect of nascent entrepreneurs.

Second, in contrast to the entry regulation measures and our initial theorising, we find strong negative effects on nascent rates of the

labour market regulation measures ‘rigidity of employment’ and ‘rigidity of hours’. Where labour market regulations are more rigid, entrepreneurship rates are lower. Formulated differently, in countries where the flexibility of employers to hire and fire employees is higher, the various rates of entrepreneurship also tend to be higher. Two explanations for this are offered. On the side of employees, the safety of their paid job is less which may make them more likely to decide to start their own business (push effect). On the side of the entrepreneurs, they have more flexibility in running their business which makes business ownership more attractive (pull effect). Both effects imply higher entrepreneurship rates. In support of our theorising, however, the rigidity of employment index acts as an obstacle for the young business entrepreneurship rate both in a direct manner (the variable is significant at 1% level in Equation 2) and in an indirect manner through the (opportunity) nascent rate.

Third, we find empirical support for the ‘conversion’ effect: the coefficients on the nascent rate variables in Table V (Equation 2) are highly significant.¹² Countries with more nascent entrepreneurs also have more entrepreneurs in actual young businesses. Perhaps somewhat surprisingly, nascent entrepreneurs with a necessity based motive are more likely to set-up a business than those who are opportunity based. This may be because of the lack of alternative employment options induces more necessity nascent to actually start businesses because they (are forced to) put more effort in the start-up process. Note however that this does not imply that necessity nascent are more ‘successful’ in terms of economic performance. Research by van Stel et al. (2005) shows that in developing countries where the number and share of necessity based entrepreneurs is high compared with developed countries (see Acs et al., 2005, pp. 18–21) higher levels of entrepreneurship contribute negatively to economic growth. This may reflect the low human capital of entrepreneurs in these countries,¹³ necessity start-ups have lower survival and growth.

Fourth, the determinants of opportunity and necessity entrepreneurship are different. GDP

growth rates have a significantly positive effect on opportunity rates but no effect on necessity rates. This is in line with our expectations: higher growth rates reflect a higher demand for goods and services, creating more opportunities to start new businesses. The necessity nascent rate is not affected as these individuals are not influenced by demand. Furthermore, whereas opportunity entrepreneurship is influenced by higher education levels (tertiary enrolment), necessity entrepreneurship is not. This emphasises that opportunity based entrepreneurs have higher human capital levels compared with necessity based entrepreneurs. The positive effect of tertiary enrolment on the opportunity nascent rate (first column of Table V) suggests that individuals with higher education levels are more likely to start businesses compared with others.¹⁴ The second column of Table V shows the effects of tertiary enrolment and the share of services interact. So higher tertiary enrolment rates only leads to more entrepreneurs if the share of services in the economy is sufficiently high, and vice versa.¹⁵

Fifth, when considering the effect of the business regulations categories ‘Getting Credit’, ‘Paying taxes’ and ‘Closing a business’, the variable ‘Private bureau coverage’, is significantly positive suggesting that if better information about creditworthiness of potential borrowers is available, credit rationing by lenders to small businesses will occur less often (Armour and Cumming, 2005). The influence of tax systems seems to be marginal while for bankruptcy regulation we only find a counter-intuitive result for the necessity entrepreneurship rate (a negative sign on recovery rate). This is discussed below.

Finally, the necessity entrepreneurship equation in Table V has several counter-intuitive findings. First it shows the number of procedures with which a start-up has to comply, and the firing costs of a redundant worker are positively associated with necessity rates. Second, the negative sign for the recovery rate in case of bankruptcy is also contrary to our expectations. Our explanation for this is that, in countries where business regulations are particularly burdensome, business owners are more reluctant to register their firms and so

are more likely to operate in the informal economy (World Bank, 2005, p. 3). Countries with more regulations are also poor countries (World Bank, 2005, p. 3) where the share and number of necessity entrepreneurs is relatively high (Acs et al., 2005). In short, these counter-intuitive findings imply that many necessity based entrepreneurs in developing countries escape regulatory regimes by setting up their business in the informal sector.¹⁶

6. Conclusions

This paper has examined the relationship, across 39 countries, between regulation and entrepreneurship using a new two-equation model. It generates three key results. *First*, it finds no significant impact on nascent or young business formations of administrative considerations such as the time, the cost, or the number of procedures needed to start a business. The only exception is that the minimum capital requirement required to start a business does seem to lower entrepreneurship rates across countries. Given the explicit link made by Djankov et al. (2002) between the speed and ease with which businesses may be established in a country and its economic performance – and the enthusiasm with which this link has been grasped by European Union policy makers – our findings imply this link needs reconsidering. Our results are more compatible with a Baumol (1990) inspired view that, whilst circumstances may influence the nature of entrepreneurship in society, it remains ever-present. We therefore do not subscribe to the view that “heavily regulated” countries (in terms of entry regulations) need only to reduce such “burdens” in order to become more enterprising and by implication more wealthy. What seems more likely is that entry regulation influences the distribution of business activity between the formal and the informal economy, rather than influencing the total volume of activity.

Second, we find substantial differences between the determinants of opportunity entrepreneurship and those of necessity entrepreneurship. Whilst opportunity entrepreneurship is influenced by higher education, necessity entrepreneurship is not. Our findings

are compatible with the view that many necessity entrepreneurs in developing countries avoid business regulations by starting and operating a business in the informal sector. This result stresses the importance of measuring numbers of formal and informal entrepreneurs separately (Verheul et al., 2006).¹⁷

Thirdly, we find it is labour market, rather than entry, regulations which exert a stronger influence upon both the nascent and the young business rate. This is surprising since we would have expected nascent entrepreneurs – those considering starting a business – to have been more influenced by immediate priorities, rather than factors that only come into play once the business is established.

We remain conscious of two limitations of our work. First, the WBDB indicators are generally defined for relatively large new firms. They relate to a ‘standardised’ firm, defined as a domestically owned limited liability company with between 5 and 50 employees one month after start-up. As the bulk of the entrepreneurs captured by GEM operate in very much smaller businesses, we implicitly assume that country differences in regulations are stable across size-classes. In other words, the countries where the WBDB regulation indicators are high for larger new firms are the same countries where it is difficult to begin a smaller new firm.

Our second limitation is that we would have liked in this paper to have examined the factors influencing the rate at which individuals “convert” from being a nascent to a young business owner. The extent to which this transition, or conversion, rate was influenced by entry barriers would have been a stronger test than the one used here, but unfortunately the available data preclude it. Ideally we would like a panel data set in which individuals are tracked through these phases, whereas the GEM data are discrete snapshots.

Notwithstanding these limitations, we feel the current paper has re-opened an important debate on a key policy area. If administrative entry barriers play only a very modest role in explaining variations in enterprise creation rates, then the current “fashion” for countries to compete by lowering these barriers needs to be reviewed.

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Appendix A: Estimation sample

Table A.1 lists the distribution of observations in our estimation sample over the countries. A country can have 4 observations maximum (for the years 2002–2005). It is also indicated whether the country is ranked as a poor country. In total we have 112 observations 26 of which are of poor countries.

TABLE A.1
Estimation sample

Country	N	Poor country?	Country	N	Poor country?
Argentina	4	Y	Japan	3	
Australia	4		Jordan	1	Y
Belgium	4		Mexico	2	Y
Brazil	1	Y	Netherlands	4	
Canada	4		New Zealand	3	
Chile	3	Y	Norway	4	
China	2	Y	Poland	2	Y
Denmark	4		Portugal	1	
Ecuador	1	Y	Russia	1	Y
Finland	3		Singapore	4	
France	4		Slovenia	4	
Germany	4		South Africa	4	Y
Greece	1		Spain	4	
Hong Kong	3		Sweden	3	
Hungary	3	Y	Switzerland	3	
Iceland	4		Taiwan	1	
India	1	Y	Thailand	1	Y
Ireland	4		United States	4	
Israel	2		United Kingdom	4	
Italy	3				

Notes

¹ 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.

² The term “burdens” is placed in inverted commas since, although it is common parlance it is pejorative, implying that there are clear costs and no benefits. On the face of it, speeding and simplifying the procedures for business creation seems to be a highly beneficial policy. If businesses are more easily created these firms constitute a competitive threat to existing businesses, compelling them to compete or to go out of business. A second advantage is that, in some instances, the business licensing procedure is the focus of corruption, with those paying bureaucrats obtaining their licenses more quickly. The elimination of such corruption has considerable and wide-ranging social and economic benefits.

However, as with most legislative change, there are some important contrary arguments. First, the prime function of the business registration process is to enable some protection of consumers from fraudulent or incompetent business owners. Nobody would suggest that untrained doctors or surgeons should be allowed to practice, and registration provides the basis for the minimum check of the qualifications and track record of such individuals.

The wide acceptance of the need for doctors to register is presumably because their incompetence could kill people. But the same might also be said for an individual wishing to establish a business as a driving instructor. Similar arguments might then be applied to electricians who could electrocute themselves or other people if they made errors. Like doctors, both driving instructors and electricians could kill those in their charge, so raising the question of whether the same business licensing/regulations are appropriate for all three types of business. If not, then this raises the supplementary question of the nature of differences, and on what basis should such differences exist.

Extending the argument, we might also all wish to be protected from the financially unscrupulous. We might view it to be the role of government to ensure that rogues are identified and prohibited from trading. Again, registration is a minimum condition for identifying such individuals. In short, whilst we might all agree that excessive business licensing is undesirable, we might not all agree on the balance between the interests of those in the business community and consumers or others in society.

³ In practice holding all else equal is difficult since, as we noted earlier EU countries with relatively high tax regimes favour the provision of advice more than the low tax regime of the United States.

⁴ It is important to note that the WBDB indicators for ‘Starting a business’ focus on relatively large start-ups as their ‘standardised’ firm is a domestically owned limited liability company which has between 5 and 50 employees one month after start-up. This is far from ideal as many of the entrepreneurs captured by GEM operate in smaller businesses. However, a major advantage of the WBDB data base is that the measures are readily available, and that they are comparable across countries. Our implicit assumption has to be that country differences in regulations are stable across different types of firms (in terms of size, legal form or activity).

⁵ Blanchflower et al. (2001) use a similar approach while their model should be interpreted as a reduced form. Grilo and Thurik (2005) use 2004 survey data of the 15 ‘old’ Member States of the EU applying the original Grilo and Irigoyen (2006) model.

⁶ An update of the eclectic framework can be found in Audretsch et al. (2007).

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 Note that some of the determinants of the young business rate may impact this rate not only through more start-ups 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 start-ups but also produce more start-ups 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.

⁹ Armour and Cumming (2005) investigate a different aspect of bankruptcy law in relation to entrepreneurship levels, viz., the time to discharge from personal bankruptcy.

¹⁰ 12 Observations were removed in the outlier analysis.

¹¹ Also, some variables are available for 2004 and 2005 only. In those cases the values for both 2002 and 2003 were set equal to those of 2004.

¹² Again we recognise that the conversion interpretation is to some extent questionable as we do not follow individual nascent entrepreneurs over time.

¹³ See also van Stel and Storey (2004) who provide (indirect) empirical evidence that (UK) regions where more start-ups are subsidised have lower economic performance. The interpretation of the authors is that the subsidy programs cause many individuals with low human capital levels to start businesses. As these low skilled business owners do not grow their businesses and often leave the market after a while, the net effect on regional economic performance may well be negative.

¹⁴ 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.

¹⁵ It is straightforward to compute that the turning point for the effect of higher education lies at a share of services level of 61%, i.e., only when the share of services in an economy is higher than 61%, will an increase in the tertiary enrolment rate contribute to higher opportunity entrepreneurship rates.

¹⁶ Verheul et al. (2006) show that women may be more involved in informal entrepreneurship than men. Based on an analysis using GEM data they consider it likely that for developing countries a substantial number of entrepreneurs measured in GEM's entrepreneurship rates are owner-managers of unregistered businesses. Based on their analysis the authors also argue that the distinction between the formal and informal economy should be an important topic for the GEM research agenda: how many 'informal' entrepreneurs are included in the entrepreneurship measures of GEM's Adult Population Survey, and how does this affect empirical analyses that make use of the GEM data base?

This issue is important in particular for studies focusing on GEM countries with large informal sectors.

¹⁷ The call for measuring formal and informal entrepreneurship separately is also supported by observations made by Capelleras et al. (2005). 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 may well choose to establish more businesses which are below the official registration threshold, whereas in a lightly regulated economy, 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 set-up 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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