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ABSTRACT

Entrepreneurial Entry: Which Institutions Matter?*

In this paper we explore the relationship between the individual decision to become an entrepreneur and the institutional context. We pinpoint the critical roles of property rights and the size of the state sector for entrepreneurial activity and test the relationships empirically by combining country-level institutional indicators for 44 countries with working age population survey data taken from the Global Enterprise Monitor. A methodological contribution is the use of factor analysis to reduce the statistical problems with the array of highly collinear institutional indicators. We find that the key institutional features that enhance entrepreneurial activity are indeed the rule of law and limits to the state sector. However, these results are sensitive to the level of development.

JEL Classification: L26, P14, P51, P37

Keywords: entrepreneurship, property rights, access to finance

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1. Introduction

Existing research indicates that new firm entry[i] generates beneficial churning in the economy, fosters innovation, economic change and development; enhances employment creation; and ensures more equitable income distributions (Hirschman 1958; Baumol 1990; Acs 2006). However, these benefits are not an automatic consequence of entrepreneurial activity, but rather depend on the institutional environment. Where institutions are "weak", entrepreneurs are less likely to undertake new projects or may instead focus their energies on unproductive ones, with a resulting loss of efficiency (Glaeser *et al.*, 2003; Johnson *et al.*, 1997; Baumol 1990). While there can be deficiencies in the institutional framework anywhere, it is normally argued that this problem is especially serious in emerging economies; in particular, the literature has stressed the weak rule of law, and excessive state regulation (La Porta *et al*, 1999; Djankov *et al*, 2002). Moreover, in spite of the importance of the institutional environment for entrepreneurship entry, the subject poses a challenge for both theoretical and empirical research. The former arises because the conceptual framework linking individual choices to become entrepreneurs with the institutional environment remains underdeveloped. Moreover, institutions are difficult to measure and the available measures are often highly correlated with each other, leading to serious specification dilemmas (Acemoglu and Johnson, 2005). However, in recent years a rich array of new institutional measures has been developed that allow the problem to be addressed more analytically.

In our study, we compare the effects of institutions on individual entrepreneurial activity in the form of new business start-ups in 44 different countries. We include all start-ups regardless of the legal form. In contrast, most existing studies focus on small enterprises requiring legal registration or on incorporated firms as a proxy for entrepreneurial activity. We also use data on the whole universe of potential entrepreneurs, rather than just of the existing business owners. This unique opportunity is offered through the Global Enterprise Monitor survey (GEM). The impact of institutions can best be explored on the basis of cross-country variation (see Schaffer *et al.* (2006)), which is made possible by the GEM dataset. However, to date, most analyses using GEM data have focused on individual countries though Wennekers *et al.* (2005) and Van Stel *et al.* (2007) use country averages to explore institutional influences. The empirical novelty of this paper lies in merging individual and country-specific data as well as in the empirical methodology used. We start with a wide spectrum of institutional variables that allows for a comparative approach of all 44 countries contained in our analysis and by utilizing factor analysis prior to regression estimation models, we are able to obtain results that are more robust and address multicollinearity between the institutional measures, thereby avoiding the traps of *ad hoc* specifications based on an arbitrary exclusion of indicators. We also use institutional country-level variables as explanatory factors without being concerned with simultaneity bias, because the individual decision of a potential entrepreneur does not affect country-level institutions. Moreover, analysing across the whole universe of potential entrepreneurs enables us to overcome the limitation of selection bias prevalent in entrepreneurship studies.

It has been widely argued that institutions play an important role in determining the scale and quality of entrepreneurship. However, the literature has not yet been able to address explicitly the impact of institutions on the choice of whether an individual will enter the

market as an entrepreneur. Moreover, the relative significance of different institutions has been considered more rarely, and multicollinearity remains a problem. In this context, our paper provides the following key findings. We establish that two specific institutional dimensions – the rule of law, and a more limited state sector– are significantly associated with the entrepreneurial entry. Given that entrepreneurial entry decreases with the level of development (though the effect is non-linear: the negative marginal effect decreases with the level of income per capita) we also show that the impact of institutions is conditional on the stage of development: for the richest 10%-20% of countries little is explained by institutional variation.

This paper is structured as follows. In Section 2 we provide a brief theoretical overview of the institutional approach as applied to entrepreneurship and discuss the main empirical studies analysing entrepreneurship development and institutions. Our approach to quantifying the institutional environment is outlined in the third section and the Global Enterprise Monitor dataset as well as our estimation methods in the fourth. Section 5 presents our results and the paper concludes with Section 6.

2. Unbundling Institutions and Entrepreneurship: Theory and Empirics

This section begins by briefly discussing how institutions may influence entrepreneurship development. This is followed by an overview of the most relevant empirical literature which helps to motivate our own research.

2.1 Institutional theory

According to North, entrepreneurs are the main agents of change (1997a). Organizations set up by entrepreneurs adapt their activities and strategies moulding them to fit the opportunities and limitations provided through the formal and informal institutional framework. Though ideally, formal rules are designed to facilitate exchange reducing transaction costs, they are also likely to affect individuals or groups in different ways. Since private interests may differ and individuals, who often have their narrow interests at heart, affect formal rules and institutions, the latter are not necessarily shaped in the interest of social well-being (North 1994; Olson, 2000).

Correspondingly, formal and informal rules can be maintained even if they are inefficient (DiMaggio & Powell 1983; North 1990). There are several reasons for inefficient institutional outcomes. First of all, even when they clash with new formal rules, informal rules have a tenacious ability to survive because they have become part of habitual behaviour (i.e. culture). In this sense, informal institutions provide a sense of stability. Second, informal institutions may change more slowly due to the influence of path dependence. This occurs because institutional change is usually incremental and is seldom discontinuous (North 1990:10). Thirdly, lock-in can occur as a result of a symbiotic relationship between existing institutions and the organizations that have evolved as a result of the incentive structure provided by those institutions (*ibid.* 1990:7). Even when the formal rules change, organizations which benefited from the outdated informal rules and which would lose their 'comparative advantage' if they adopted new informal practices complementary to formal rule changes will continue to participate in detrimental informal rule practices in order to retain their position of power.

North and Thomas (1973), Williamson (1987), Barzel (1997), Rodrik (2000), Acemoglu and Johnson (2005) and others have argued that property rights systems form the backbone of the modern set of institutions that characterize the market economy. In essence strong legal property rights (rule of law) support the broader development of economic property rights that are defined as "individual ability, in expected terms, to consume the good (or the services of the asset) directly or to consume it indirectly through exchange" (Barzel, 1997, p.3). Accordingly, in recent institutional research, the focus shifts from the assignment of rights and certification to the institutional environmental conditions that make execution of these rights, especially exchange and other legal contracts based on the property rights, effective. One important issue relates to the accessibility of these rights to the population as a whole: property rights system may work well for the economic elite and remain deficient for the others (Sonin, 2003). This may in turn have critical implications for the extent and performance of the entrepreneurial sector (De Soto, 2001). Property rights have further implications for financial issues. One of the immediate benefits from the access to the formal property rights system is that it can create a basis for financial contracts and a virtuous circle of entrepreneurship, creation of assets and finance (*Ibid.*). Thus, property rights and finance form the two key, mutually reinforcing blocks of the effective market economy system supporting entrepreneurial entry.

2.2 Existing empirical findings on the determinants of entrepreneurial activity

While using a different methodology, a number of earlier studies provide both a basis and a motivation for the development of our research. The six main studies vary considerably in their measures of entrepreneurial activity, institutional variables, methods and results and the differences are summarized in Table 1.

Klapper *et al*. (2006) build on the Djankov *et al*. (2002) study by measuring the direct impact of entry costs. Specifically, they analyse the effect of entry regulation (in terms of entry costs) on the creation of new firms. Their study focuses on incorporated companies and measures the effects of entry costs in terms of complying with bureaucratic requirements for incorporation. The Amadeus data set is used to compare the entry of incorporated firms in 34 Western and East European countries and include institutional variables, such as entry cost, property rights protection and employment rights as well as measures related to the financial and fiscal aspects of the policy environment. Their results indicate the rate of new corporation creation in industries that tend to be high-entry is relatively lower in countries with higher entry costs.

Desai *et al.* (2003) draw on the same dataset, aggregating company level data to produce industry level indicators as the units of analysis to study the effects of institutional indicators on entry. These indicators include: a measure of start-up procedures (from Djankov *et al.* 2002), a corruption indicator (from Transparency International), an index of labour regulations (from Botero *et al,* 2004), an index measuring the independence of courts (from the World Bank), a formalism index of the court system (from Djankov *et al.* 2003) and a measure of property rights protection (from the World Economic Forum). The latter three dimensions are strongly correlated, as property rights protection is weak if the courts are not independent and efficient, so they are often merged into one property rights indicator. In order to address the issue of multicollinearity, Desai *et al* enter each institutional indicator into a separate regression. Their key result, which is not inconsistent with Klapper *et al*. (2006), i is that lower rates of entry pertain in the Central and East European (post-Soviet) countries.

Demirguc-Kunt *et al.* (2006) also focus on incorporated firms, but adopt a different methodology and use a different dataset. Instead of looking at industry averages, they combine country level institutional explanatory variables with firm-level data. Discrete response models are used to investigate which factors affect the likelihood for companies to be incorporated. Utilising company data from the World Business Environment Survey and country level institutional indicators, they find that developed financial systems, efficient bankruptcy procedures, lower regulation of corporate entry, relatively lower corporate taxes in comparison with personal income taxes, and English, German and Scandinavian legal origin increase the likelihood for firms to be incorporated.

Taking a different approach, and focusing on entrepreneurs rather than just incorporated firms, Wennekers *et al.* (2005) and Van Stel *et al.* (2007) utilise GEM to explore the relationship between entrepreneurship levels, economic development and institutional variables. Wennekers *et al*. (2005) aggregate the data from each country into a country level mean value employing nascent entrepreneurship rates by country as their unit of analysis and using 2002 GEM data from 36 countries. The explanatory variables to capture institutional variation include income per capita (purchasing power parity), variables measuring demographics (population growth and education), legal origin (former centralised command economy origins) and institutions (fiscal legislation, social security system and administrative requirements for starting a new business). Their results indicate that there is a positive effect of population growth on entrepreneurship development and confirm Desai *et al.* (2003) in that countries with formerly centrally planned economy origins significantly display lower levels of entrepreneurship development. In terms of institutions, they find a negative effect of social security but a positive effect of tax revenues as a percentage of GDP on nascent entrepreneurship. They point out that the latter result may be consistent either

with incentives for tax avoidance / evasion or with high-tax countries spending more on infrastructure providing a better environment for new firms. Their results also indicate that individuals undertaking entrepreneurial activity in higher income countries are more likely to be exploiting an opportunity rather than driven to entrepreneurship out of necessity.

Van Stel *et al.* (2007) analyse the effect of a particular set of institutions, business regulations, on nascent entrepreneurs and young businesses (defined as less than 42 months old). Nascent entrepreneurs are further categorised as those driven by opportunities or by necessity to start up a new business. They draw on a broader country range of GEM data (2002 - 2005 for 39 countries) and also base their analysis on aggregate mean values. Their measurement of business regulations is drawn from the World Bank's *Doing Business* indicators and uses five categories: (1) starting a business, (2) hiring and firing workers, (3) obtaining credit, (4) paying taxes and (5) closing a business. Their results indicate that minimum capital requirements and labour market rigidity have a negative effect while private bureau coverage[ii] (i.e. availability of credit information) has a positive effect on nascent entrepreneurship rates. They also show that countries with more nascent entrepreneurs tend to have more young businesses, supporting the notion that more nascent entrepreneurs translates into more actual entrepreneurship. GDP growth is found to have a positive effect on opportunity but no significant effect on necessity entrepreneurship.

Finally, Klapper *et al.* (2007) is based on the largest country sample (76 countries), utilising the World Bank Entrepreneurship Survey. The database focuses on registered businesses only, and, as the authors note, it is not a legal obligation to register some forms of businesses in some countries. Not surprisingly, in contrast to studies based on more encompassing GEM data, the authors find a positive association between registration rates and income per capita: more formalisation and better coverage of registration of businesses is

characteristic of wealthier countries. The strongest result on determinants of registration rates relates to the positive impact of finance. However, as the authors are aware, using country averages, one cannot rule out reverse causality, as a greater number of registered companies alleviate informational asymmetries between providers of finance and businesses, perhaps leading to standardisation of lending procedures, and therefore creating better conditions for the development of the financial sector.

Table 1 summarises these studies in terms of the data sets used, the dependent variables chosen, their main outcomes and their estimation model limitations. Multicollinearity and omitted variables pose an important limitation in all. Two run separate regressions for each institutional indicator in order to address the problem of multicollinearity. This is a reliable exploratory methodology, which may help in rejecting irrelevant factors but does not provide insights as to the comparative impact of each of the significant factors. It may also lead to spurious results; when a variable is used which is strongly correlated with an omitted variable, the resulting significance is questionable. Indeed Acemoglu (2005) criticises this approach, arguing that the correlation between different institutional variables makes the results on individual dimensions questionable due to the problem of correlation with the omitted dimensions.

Moreover, for the country level studies, simultaneity bias (reverse causality) is a serious issue. Only Demirguc-Kunt *et al.* (2006) avoid this problem by combining individual level outcomes with country level variables[iii]. This is the methodology we adopt, while focusing on the more general concept of entrepreneurial entry based on GEM.

INSERT TABLE 1 ABOUT HERE

2.3. Key lessons from the literature: property rights and the size of the state sector

In this section we summarize briefly the lessons from the empirical and theoretical literature that we have discussed so far. One can model potential entrepreneurs as maximizing their expected return when making a decision to start new ventures (Casson, 1982). In contexts where institutions are functioning effectively, risks primarily stem from the nature of the ventures themselves and the characterstics of the individuals' involved (Schumpeter, 1934; Kirzner, 1973). However, in a developing economy context, institutions may not provide sufficient underpinning to the functioning of the market economy and thus will influence both the potential returns from entrepreneurial activity and the variance around that possible income stream. We focus on two specific aspects of the inter-relationship between entrepreneurial activity and institutions, which have been found to be among the most important (Johnson *et al*., 2002; Dermirgus-Kunt *et al*., 2006; Klapper *et al.*, 2006). The first is the system of property rights, which ensure that entrepreneurs can recoup the rewards to which they are contracted. Weaknesses in property rights increase the riskiness of entrepreneurial activity. The second concerns the welfare and tax system, which determines both the opportunity cost and the net financial return to entrepreneurial activity.

De Soto (2001), argues that the lack of well-defined and efficient system of registering, protecting and trading of property rights may be the key obstacle that prevents the entrepreneurs from utilising and combining the potentially productive assets and turning them into real capital: *'Principal problem is not the lack of entrepreneurship (…). What the poor lack is easy access to property mechanisms that could legally fix the economic potential of their assets so they could be used to produce, secure or guarantee greater value in the expanded market'* (De Soto 2001: 46). Rodrik (2000) , also pinpoints the essential role of

property rights, in his analysis of the five key market supporting institutions: '*It stands to reason that an entrepreneur would not have the incentive to accumulate and innovate unless s/he has adequate control over the return to the assets that are thereby produced or improved*' (Rodrik 2000:6).

Recent theories of entrepreneurship emphasise that "the institution of private property ... has an important psychological dimension that enhances our feelings of ... internal control and personal agency, and it thereby promotes entrepreneurial alertness" (Harper 2003, p. 74). For entrepreneurship, it is also important that the property rights not only guarantee the status quo but also include the 'find and keep' component, which is essential for the aspects of entrepreneurship related to discovery, innovation and creation of new resources (Harper 2003). Unlike Acemoglu and Johnson (2005), we regard property rights as difficult to separate from contracts rights, especially, when we include the rights of use and transferability; the crucial ones for entrepreneurial activity. The relationship between property rights and entrepreneurship has been considered previously in the literature, but the results have been ambiguous. The property rights indicator was not found to be significant by Klapper *et al.* (2006), Desai *et al*. (2003) or Demirguc-Kunt *et al*. (2006), possibly because of their focus on incorporated companies. However, Johnson *et al*. (2002) show that the insecurity of property rights may be a key factor deterring investment in small manufacturing firms in five transition countries in Eastern Europe.

Secondly, we consider the impact of the state sector on entrepreneurship. In general, a larger state sector will militate against entrepreneurial activity, both via state revenues and expenditures. Taxes and welfare provision may affect entrepreneurial entry via their direct impact on expected returns to entrepreneurial activity and its opportunity cost. High and increasing marginal level of taxes may weaken incentives for opportunity-driven entrepreneurship by reducing potential gains, while high levels of welfare support provide alternative sources of income and therefore by increasing the alternative wage may reduce the net expected return to entrepreneurship. Taken together, this implies that a larger state sector will drive out entrepreneurial activity.

3. Institutional Indicators and Factor Analysis

In this section, we describe the measures employed in our empirical work to quantify the institutional environment and the methodologies used to tackle multicollinearity. Our approach is to apply a data reduction technique – factor analysis – and we report the findings from this methodology. In the next section, we consider the remaining data used in our study.

There is no single universally accepted set of indicators of cross-country institutional quality, but we have identified the Heritage Foundation / Wall Street Journal set of institutional indicators as a reliable source which offers a broad number of and provides the largest number of countries and years. The Heritage Foundation offers fifty independent indicators grouped into ten broad institutional categories related to: trade policy, fiscal burden (including marginal tax rates), size of the government sector (government spending) in the economy, monetary policy (control of inflation), constraints on foreign investment, direct state involvement in banking and finance and regulatory restrictions that go beyond

prudential supervision, regulation of labour (employment and wages)[iv] , security of property rights, business regulations (which include entry barriers), corruption. These ten categories are intended to outline the institutional factors that taken together determine the degree to which economic actors are free to respond to changing world market conditions (Beach and Kane (2007)).

"Property rights" in the Heritage Foundation index comprises seven areas: (1) Freedom from government influence over judicial system; (2) Commercial code defining contracts; (3) Sanctioning of foreign arbitration of contract disputes; (4) Government expropriation of property; (5) Corruption within the judiciary; (6) Delays in receiving judicial decisions and/or enforcement, and (7) Legally granted and protected private property. Thus, consistent with De Soto (2001) and Barzel (1997), the indicator of property rights protection includes both low risk of expropriation and security of contracts, and remains closely related to the slightly more general concept of the "rule of law."

We have noted that multicollinearity is a serious issue in institutional analysis, because of the abundance of closely related indicators. Theory can guide us on the relative importance of different institutional dimensions but is of limited assistance when considering the choice of alternative measures of related institutional features. We apply factor analysis to tackle the problem, utilizing the entire dataset (1995-2008 including 164 countries and nine indicators) available on the Heritage Foundation's website.[v] By ordering the extracted factors according to the magnitude of their eigenvalues we produced the following screeplot.

FIGURE 1 ABOUT HERE

There is a distinct break after the second factor, as the eigenvalue drops from 1.30 to 0.27. Accordingly, following the standard practice (see Russell, 2002; Pett et al., 2003; Costello and Osborne, 2005) we retain the first two factors.[vi] Given we have no reasons to expect that the correlation between the factors is zero, we next apply oblique rotation (via oblimin method), producing the following factor loadings illustrated by Figure 2 below.[vii]

FIGURE 2 ABOUT HERE

Figure 2 reveals the pivotal role of the property rights dimension among the Heritage Foundation indicators. The property rights indicator has the highest loadings on the first factor, which itself explains most of the institutional variance. It links closely with freedom from corruption that has the second highest loadings on the first factor, as well as with business freedom (the third highest loading), which is related to freedom of entry and exit. Most of other institutional indicators are clustered around these. We therefore label the first factor as “rule of law”.

However, Figure 2 shows that ”fiscal freedom” and the size of the government spending in GDP dimensions should be best considered separately from the other institutional factors. They cluster together forming the second factor that we label “limited state sector”. While the impact of taxes and the impact of government spending (including welfare) on entrepreneurship can be separated conceptually, they are obviously connected empirically via

the size of the state budget, and in practice their independent effects prove difficult to identify. The factor scores for countries in our sample are reported in Figure 3 below.

FIGURE 3 ABOUT HERE

We find that the Scandinavian countries, Belgium, Netherlands and Germany are located in the upper left corner with a strong rule of law and an extensive state sector. In contrast, Hong Kong and Singapore are the two economies which combine the rule of law with a small state sector. The Anglo-Saxon economies are between these cases, with high quality institutions and a middle size range of state sector. In contrast, Latin American countries (with the notable exception of Chile), Russia, China and India are all countries where the size of government spending and taxation remains relatively low, but rule of law is weak. The weak negative correlation between the two factors is probably driven by the fact that there are no countries in the lower left corner of the graph. Thus, paradoxically, a large state sector cannot be built where basic institutional quality is low, because the latter affects the state's capacity to collect taxes.

Another way of interpreting the weak negative correlation between the two factors is to note that factor 1, which we have denoted 'rule of law", actually represents both property rights and corruption. Once we focus on corruption, our results can be stated in the terms of the theoretical model by Acemoglu and Verdier (2000), who argue that while state intervention may have a positive overall impact, some corruption may be unavoidable to achieve an efficient outcome in the feasible range. On our graph, this would imply a positive

correlation between the two factors, at least over some section of the distribution: a larger state sector would be associated with greater corruption leading to an ordering of observations along the diagonal. However, this is not what we observe. Rather, the findings in Figure 3 are more consistent with Hellman *et al.* (2003): in the countries with a large state sector, corruption may be lower, perhaps because special interests become directly embedded within the state sector (see Mickiewicz (2009)).

Acemoglu and Verdier's perspective is motivated by the efficiency theory of institutions, which assumes that institutional outcomes have some traits of efficient feasible solutions. In contrast, Botero *et al*. (2004) argue that the institutional outcome may also be explained by political theories (assuming some entrenched special interests) and by institutional inertia (as represented by legal origin). We noted above that inefficient economic institutions may persist and both political factors and institutional continuity can contribute to the explanation.

4. Data and Estimation Methodology

In this section we consider the remaining data used in our empirical work and describe our estimation techniques.

4.1 Individual Level Data

Our individual level data are drawn from GEM and are generated through surveys creating stratified samples of at least 2,000 individuals per country. The sample is drawn from the whole working age population in each participating country and therefore captures both entrepreneurs and non-entrepreneurs. While data on business ownership and individual business financing is included, entrepreneurial activity is primarily viewed as new, nascent

start-up activity. Nascent entrepreneurs are defined as those individuals between the ages of 18 – 64 years who have 'taken some action' toward creating a new business in the past year, and expect to own a share of those business they are starting, which must not have paid any wages or salaries for more than three months (Minniti *et al.*, 2005b). In contrast, established entrepreneurs are defined as individuals who own or manage a company and have paid wages or salaries for more than 42 months (ibid.).

We utilise all available GEM data from the 1998-2004 surveys. Our survey database includes the 44 individual country samples, as reported on Figure 3. Additional data details are reported in Table 2.

4.2. Control variables

Apart from the institutional variables discussed above, we control for a number of indicators of economic development as well as various personal characteristics of entrepreneurs that might affect entrepreneurial entry. Commencing with cross- country characteristics, a number of studies have documented the existence of a relationship between entrepreneurial activity and economic development (Wennekers et al. 2005; Carree et al. 2002; Acs et al. 1994), for which we control by including a measure of per capita GDP (purchasing power parity).

In addition, the link between the overall (cyclical) economic performance in a country and incentives to entrepreneurial entry are often discussed. The problem is that two conflicting effects may occur, and it is difficult to decide *a priori* which has the stronger impact. On the one hand, entrepreneurship may be 'recession-push', as the opportunity cost of entrepreneurial entry is lower when existing firms are not expanding, which reduces new job openings. On the other hand, there may be also 'prosperity-pull' effect; that is, a growing

economy leads to larger expected gains from entrepreneurial activity (Parker, 2004). The rate of economic growth measured by GDP growth has been shown by Van Stel *et al.* (2007) to have a positive effect on the rate of opportunity entrepreneurship. Though in our models we focus on new firm entry more generally, we include GDP growth as a control variable.

The scale of entrepreneurial activity is also influenced by the supply of finance. An efficient system of property rights may be a necessary but is not a sufficient condition for a well-developed financial system. One can find countries which have implemented a relatively efficient system of property rights, while their financial system remains underdeveloped, for example some of the countries that switched from a command to market economy. In these cases, entrepreneurs may be unable to carry through their projects, either because the cost of finance is too high or because they face binding financial constraints (Gros and Steinherr, 2004; Mickiewicz, 2005). The findings on this issue in the empirical literature are mixed. Grilo and Irigoyen (2006) report a negative effect of the perception of lack of finance on the probability of being self-employed, while Grilo and Thurik (2005) are unable to identify any effect. The ambiguity may result from the fact that entrepreneurs often substitute financial resources from the informal sector for those from the formal sector (Korosteleva and Mickiewicz, 2008).

We also control for individual differences in access to finance. Evans and Jovanovic (1989) show that, due to capital constraints, there is a positive relationship between the probability of becoming self-employed and the assets of the entrepreneur. Similarly, Evans and Leighton (1989) show that the exploitation of entrepreneurial opportunities is more common when people have greater financial capital (see also: Hurst and Lusardi (2004)). We capture some aspects of the individual-specific financial constraints by using a dummy

variable, which indicates if a potential entrepreneur had been providing funds for business financing in the past.

It is also important to control for individual factor supply characteristics, including gender, age and human capital. Most research indicates that men have a higher probability of becoming entrepreneurs than women (Minniti *et al.* 2005a; Verheul *et al.* 2006); in an analysis based on GEM data, men were found to be about twice as likely to be involved in entrepreneurial activities than women (Reynolds *et al.* 2002). The relationship between entrepreneurship and age is typically found to be inverse-U -shaped, with the maximum found at a relatively young age (Levesque and Minniti, 2006).

Findings on human capital are an important area of research in terms of its relationship to entrepreneurship; though the results for developed economies measured in terms of education are mixed. Robinson and Sexton (1994) and Cooper and Dunkelberg (1987) find that the decision to become self-employed is influenced by education while the results of Delmar and Davidsson (2000) and Davidsson and Honig (2003) show an education effect for nascent entrepreneurs. More recent evidence compiled by Parker (2004) suggests that on average, entrepreneurs tend to be more educated than non- entrepreneurs.

Wennekers *et al.* (2005) found a significant and positive relationship between the number of incumbent business owners and entrepreneurial start-ups. Role models may for example help by providing information, which alleviates both uncertainty and the cost of starting the business (Minniti, 2005). We therefore also control for whether the potential nascent entrepreneur knows any other entrepreneurs. Another factor that may affect start-up rates in different economic settings is whether the entrepreneur is employed while starting their business.

Definitions of all the variables and descriptive statistics for all variables, including nascent entrepreneurship are presented in Table 2.

INSERT TABLE 2 ABOUT HERE

4.3 Framework for analysis

If ***i*** denotes individuals, ***j*** denotes countries and ***t*** denotes time, we estimate an equation of the form :

$\mathbf{ent}_{ijt}$ = f(Strength of Property Rights$_{jt}$, , Level of Welfare Provision and Taxation$_{jt}$, GDP/capita$_{jt}$, GDP growth rate$_{jt}$, Availability of Finance$_{jt,}$ Individual Level Controls$_{jit}$),

where **ent** is a dummy variable denoting whether or not an individual in a particular country at a particular date is engaged in nascent start up activity. We use Probit as our estimator, reporting robust standard errors. We allow for the possibility that the observations are ***not*** independent for each country-year sample in our dataset and this is reflected in the estimated variance-covariance matrix and reported coefficients[viii].

5. Discussion of Results

INSERT TABLE 3 ABOUT HERE

We commence in Table 3 by reporting a variety of regressions which contain the two factors derived in section 3 as measures of the strength of property rights and the level of welfare provision and taxation. Four models are reported. The first is the simplest case while model 2 attempts to control for non-linearities in the specification of the size of the formal financial sector. In the latter two models, we consider possible non-linearities with respect to the level of development by restricting the sample to countries with GDP per capita up to the 90^{th} and 80^{th} percentile respectively. The experiments to exclude higher GDP per capita countries are motivated by the fact that entrepreneurial entry decreases with the level of development. However, the effect is non-linear: the negative marginal effect decreases with the level of per capita income.[ix] One should note, that as we include institutional indicators in all specifications, the effect of development captures some additional influences, like propensity to risk taking, which may be associated with the overall level of wealth. In turn, institutional variables come with the expected signs, albeit with variance in their levels of significance. In particular, the impact of the rule of law becomes less significant at higher levels of development. To see this, one may notice that in Models 1 and 2, the impact of the first factor (rule of law) remains insignificant. However, the impact of rule of law becomes significant in model 3 using the same specification but removing the top 10% of observations corresponding to the richest countries in our sample. This conclusion is not sensitive to a particular choice of a cut-off point. When we eliminate the top 20% of observations in terms of GDP per capita in model 4, it is unaffected.

The results are more straightforward for the size of the government. Factor 2 (limited state sector) remains the most significant macro-level variable, being positive and highly significant in every specification.

We now turn to the results on the impact of the scale of the private sector finance. When entered in the linear form in model 1, the size of the credit supply to private sector is insignificant. However, as noted above, at low levels of development, formal finance may be initially crowding out informal finance. Allowing for nonlinearity in model 2, we see that the initial impact of the credit to private sector is negative and than becomes positive, producing a U-shaped relationship with both terms significant at the 99% level. Interestingly, in direct contrast to the results on property rights, the significance is driven primarily by countries at higher level of development. This can be seen from the fact, that credit provision becomes insignificant once we eliminate the richest countries in Models 3 and 4.

To summarise, we have shown that the rule of law is an important determinant of the entrepreneurial entry, but its importance is lower for countries at the highest level of development. In contrast, access to formal finance is less important at the initial stages of development but grows in importance with GDP per capita.

The results with respect to the control variables largely conform with our expectations. We confirm that men and current owners are significantly more likely to start new businesses, as are people who provided finance as business angels in the past. We also confirm the relevance of business networks: individuals who know other entrepreneurs are significantly more likely to start a new business. Human capital as measured by post-secondary and higher education has a significantly positive impact on entrepreneurial entry. Finally we confirm significant quadratic effect for age in our regression models, implying that in the relevant range older people are less likely to become entrepreneurs.

6. Conclusions

We have found that the strong protection of property rights plays a pivotal role in the institutional environment conducive to entrepreneurial activity, especially at lower levels of development. Most of the other institutional indicators, including freedom from corruption, lack of entry barriers and absence of other regulatory barriers cluster around property rights forming our Factor 1 ('Rule of Law'). This is consistent with De Soto: *'Marx would probably be shocked to find how in developing countries much of the teeming mass does not consist of oppressed legal proletarians but of oppressed extralegal small entrepreneurs'* (De Soto 2001: 229). However, the variation in "the rule of law"has less impact in developed countries and, as documented by Figure 3, these are the countries where the rule of law is already high.

We also identify a strong and robust negative effect from the size of the state sector on entrepreneurial activity and this holds throughout the full range of income per capita in our sample. However, we recognise that this result abstracts from some important issues; the characteristics of the state sector as well as its size are important. Baumol *et al.* (2007) argue against welfare provision based on employment status as it discourages a movement from employment towards entrepreneurship. Thus, some of the key policy discussions are not only about the size of government spending but also about its design.

The relationship between the level of development and entrepreneurship is negative and non-linear; a logarithmic function performs best with our data. Access to finance is also found to matter for the entrepreneurial activity. However, when the level of development is taken into account we obtain the opposite results to those on property rights: formal finance

is less important in poor countries, but becomes increasingly significant at the higher stages of development.

Our results contain interesting implications for policy makers as well as directions for further research. We have found that that the promotion of individual choices to become entrepreneurs is heavily dependent on two key aspects of the business environment: the rule of law and the size of the state sector. Moreover, priorities with respect to the provision of finance may be conditional on the level of development (Acs and Szerb (2009)). These results suggest that policymakers might benefit from focusing their attention on the elements of the institutional environment that are most critical at a given level of development in their efforts to enhance entrepreneurial activity.

However, our most consistent result concerns the negative impact of the state sector (comprising in our second factor the level of taxation and the extent of welfare provision) on entrepreneurial activity. It would seem that at every level of development, higher rates of taxation reduces the incentives to be entrepreneurial rather than follow other forms of work while higher welfare provision raises the opportunity cost of entrepreneurial activity. Policies to increase the fiscal role of the state in the economy are therefore in direct conflict with aspirations to create a more entrepreneurial society.

Future research might wish to pay greater attention in developing both theory and empirical work to non-linearities, especially concerning effects from various measures of the level of development. Further effort to find better institutional measures should result in sharper policy prescription, but our results suggest that all the dimensions of protection of property rights matter, and these include a well-functioning judicial system protecting security of contracts and transactions between individuals and firms, an effective system of registering property and low risk of expropriation by government action. Property rights should be seen as important in entrepreneurship-oriented development strategies. Our results also suggest why their significance has been largely overlooked: most research on entrepreneurship is concerned with developed countries, where we have found that impact of institutional variation in the rule of law is lower.

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Table 1. Summary of existing research on institutions and entrepreneurship development

	Klapper *et al*. (2006)	Desai *et al*. (2003)	Demirguc-Kunt *et al*. (2006)
Data set used	Amadeus	Amadeus	World Bank Enterprise Survey
Dependent variable	Industry level rates of creation of incorporated firms	Industry level rates of creation of incorporated firms	Individual level indicator variable related to incorporated form
Institutional variables included:	• Entry costs (incorporation procedures) • Property right protection • Employment rights • Financial system development • Tax disadvantage • Legal origin	• Entry costs (incorporation procedures) • Corruption • Labour regulations • Independence of banks • Court system • Property right protection • Legal origin	• Entry cost (incorporation procedures) • Financial system development • Tax disadvantage • Legal origin • Bankruptcy procedures • Legal protection in solving disputes • Share of unofficial economy • Protection of shareholders rights
Outcomes:	• New corporation creation in industries that tend to be high entry are relatively lower in countries with higher entry costs; • Entry costs have a greater effect in richer countries than in poorer countries • Entry costs tend to be lower in countries with English or Scandinavian legal origins.	• Communist legal origin has negative effect.	• Communist legal origin has negative effect • Financial sector development and bankruptcy procedures has positive effect • Tax disadvantage makes incorporation less likely • Entry costs have significant negative effect
Handling of multicollinearity in institutional indicators:	• Entering each institutional indicator into a separate regression	• Entering each institutional indicator into a separate regression.	• Factor analysis; using extracted factors instead of original variables.

Table 1. Summary of existing research on institutions and entrepreneurship development (continued)

	Wennekers *et al*. (2005)	Van Stel *et al*. (2007)	Klapper *et al.* (2007)
Data set used	Global Entrepreneurship Monitor	Global Entrepreneurship Monitor	WB Entrepreneurship Survey
Dependent variable	Country level rates of nascent entrepreneurship	Country level rates of nascent entrepreneurship an young business rate	Country level rates of creation of incorporated firms
Institutional variables included:	• Entry costs (administrative requirements for starting a new business) • Fiscal legislation • Social security • Former communist country economic origin	Variables in 5 categories: • Starting a business • Hiring and firing workers • Getting credit • Paying taxes • Closing a business	• Entry costs (incorporation procedures) • Employment rights • Financial system development • Quality of state governance
Outcomes:	• Higher social security expenditure has a negative effect; • Higher government tax revenues have a positive effect; • Communist legal origin has a negative effect.	• Minimum capital requirements have negative effect; • Labour market rigidity has a negative effect; • Countries with more nascent entrepreneurs al have more young businesses; • GDP growth rates have a positive effect on opportunity entrepreneurship; • Private bureau coverage has a positiv effect.	• Financial system matters for per capita entry rate, but significance is not robust (sensitive to estimation method) • Entry procedures matter for entry rates per capita, but significance is not robust (sensitive to estimation method, also less significant as compared with the result on finance)
Handling of multicollinearity in institutional indicators:	• General to specific: excluding insignificant variables.	• General to specific: excluding insignificant variables.	• Applying different estimation methods (GEE, GLS) and different definition of dependent variable to check for robustness

Table 2. Summary Statistics

Variable	Obs	Mean	Std. Dev	. Min	Max
Entrepreneurial entry (start-up)	503466	0.03	0.18	0.00	1.00
Male	503466	0.47	0.50	0.00	1.00
Owner/man. of exist. Business	503466	0.05	0.22	0.00	1.00
Business angel in past 3 years	501983	0.03	0.16	0.00	1.00
Knows entrepreneurs in past 2 years	408828	0.35	0.48	0.00	1.00
In employment at time of survey	484814	0.49	0.50	0.00	1.00
Education: secondary or more	460982	0.67	0.47	0.00	1.00
Education: postsec. or more	460982	0.32	0.47	0.00	1.00
Education: higher	460982	0.08	0.26	0.00	1.00
Age	471037	42.97	16.99	1.00	104.00
Annual GDP growth rate	503466	2.95	2.45	-10.89	10.06
Log GDP pc (ppp)	503466	10.04	0.65	6.69	10.75
Rule of law (factor 1 score)	503466	1.26	0.75	-0.87	2.28
Limited size of the government (factor 2 score)	503466	-0.88	1.17	-3.28	1.71
Credit to priv. sector / GDP	500583	108.80	44.85	6.88	231.08

Table 3. Estimation results using factor scores

	(1) Benchmark			(2) Non-linear credit			(3) without highest 10% of GDP pc			(4) without highest 20% of GDP pc		
	Robust Coef.		Std. Err.	Robust Coef.		Std. Err.	Robust Coef.		Std. Err.	Robust Coef.		Std. Err.
Male	0.22	***	0.02	0.22	***	0.02	0.21	***	0.02	0.21	***	0.02
Owner/man. of exist. busin.	-0.05	†	0.03	-0.06	†	0.03	-0.07	*	0.03	-0.07	†	0.04
Business angel in past 3 y	0.42	***	0.03	0.42	***	0.03	0.41	***	0.03	0.41	***	0.03
Knows entrepreneurs	0.52	***	0.02	0.52	***	0.02	0.50	***	0.02	0.49	***	0.02
In employment	0.14	***	0.03	0.13	***	0.03	0.15	***	0.03	0.16	***	0.04
Education: second. or more	0.05		0.04	0.04		0.04	0.03		0.04	0.03		0.04
Education: postsec. or more	0.11	***	0.02	0.11	***	0.02	0.09	***	0.02	0.07	**	0.03
Education: higher	0.09	*	0.04	0.07	†	0.04	0.11	**	0.04	0.12	***	0.04
Age	0.01		0.01	0.01		0.01	0.01		0.01	0.01		0.01
Age squared	-0.00	†	0.00	-0.00	†	0.00	-0.00	†	0.00	-0.00	†	0.00
Annual GDP growth rate	-0.01		0.01	-0.00		0.01	0.00		0.01	0.00		0.01
Log GDP pc (ppp)	-0.11	*	0.04	-0.09	†	0.05	-0.12	*	0.05	-0.11	†	0.06
Rule of law	0.03		0.05	0.05		0.05	0.08	†	0.05	0.10	*	0.05
Limited state sector	0.15	***	0.03	0.12	***	0.02	0.14	***	0.03	0.17	***	0.03
Credit to priv. sector / GDP	0.00		0.00	-0.01	**	0.00	0.00		0.00	0.00		0.00
Credit to priv. sector squared				0.00	**	0.00	0.00		0.00	0.00		0.00
Constant	-1.07	**	0.37	-1.08	**	0.39	-0.89	*	0.44	-1.07	*	0.47
Number of observations	360697			360697			325786			290741		
Wald Chi squared	3576.70	***		3737.84	***		3159.63	***		2696.69	***	
Log pseudolikelihood	-52557			-52409			-45203			-40505.6		
Pseudo R squared	0.1104			0.1129			0.1156			0.1179		

Key: *** significant at 0.001; ** significant at 0.01; * significant at 0.05; † significant at 0.1

Figure 1.

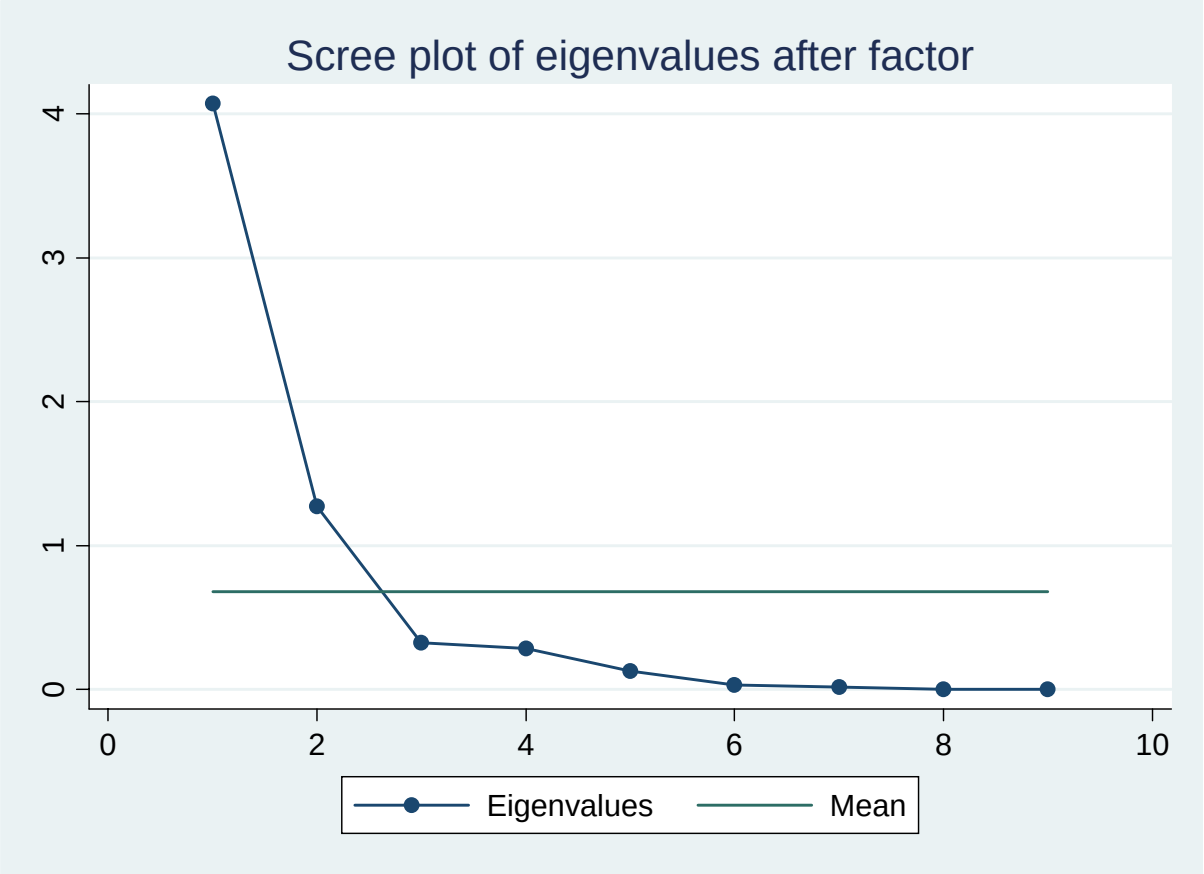

Scree plot of eigenvalues after factor
0
1
2
3
4
0
2
4
6
8
10
Eigenvalues
Mean

Figure 2.

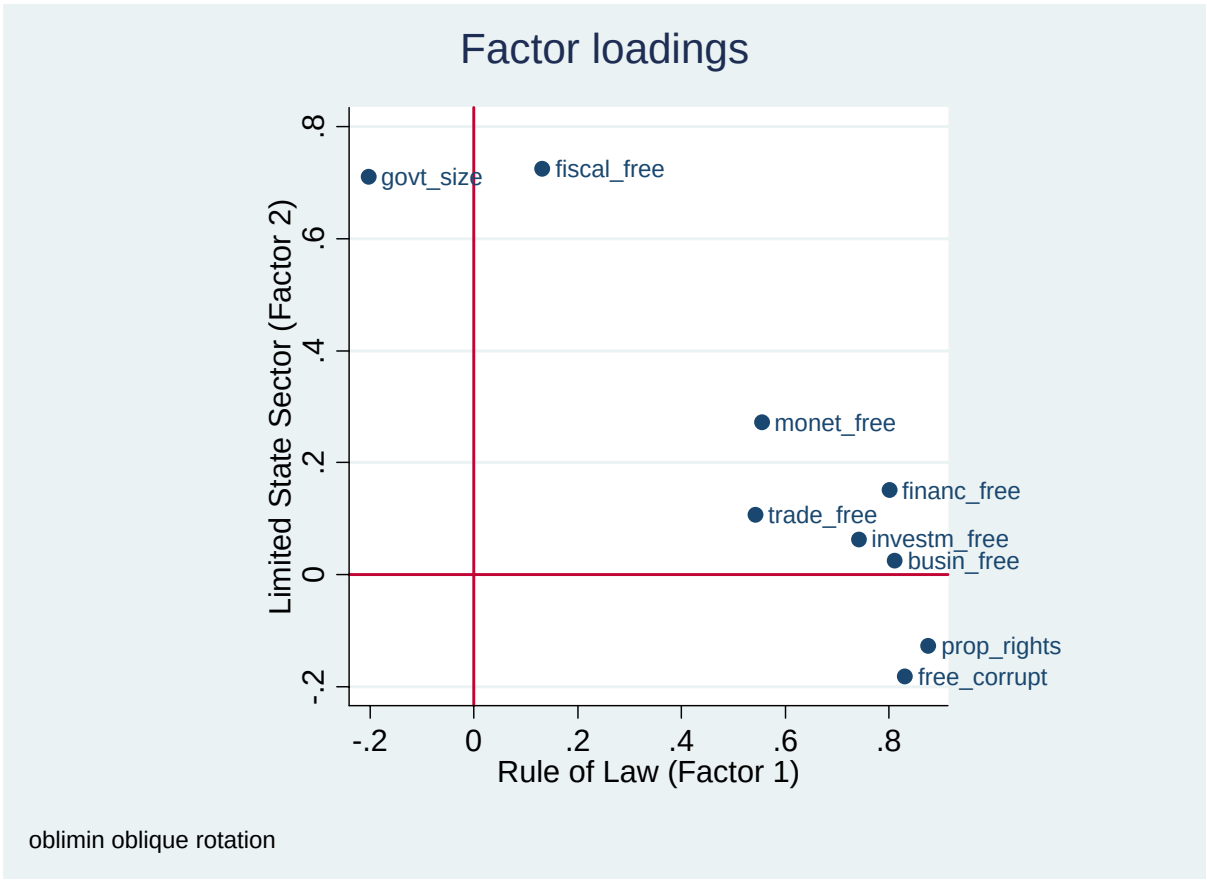
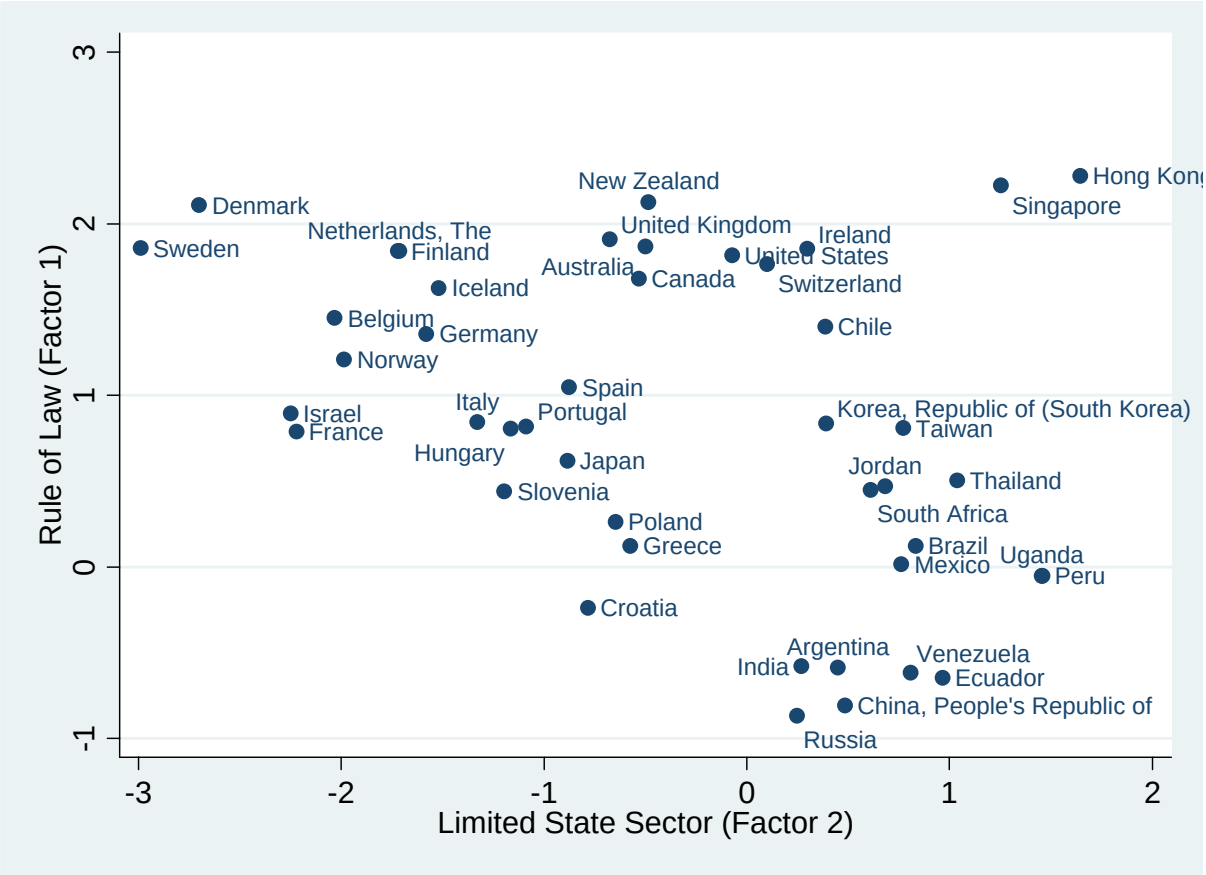

Factor loadings
govt_size
fiscal_free
monet_free
financ_free
trade_free
investm_free
busin_free
prop_rights
free_corrupt
Limited State Sector (Factor 2)
-.2
0
.2
.4
.6
.8
Rule of Law (Factor 1)
-.2
0
.2
.4
.6
.8
oblimin oblique rotation

Figure 3. Factor scores for GEM sample countries.



Note:
The datapoints relate to year 2004 or latest available.

[i] Entrepreneurship is a multidimentional concept (see Acs and Szerb, 2009) and our results may not apply to measures other than entry.We motivate our focus by the work of Lumpkin and Dess (1996) who state 'the essential act of entrepreneurship is new entry' (1996: 136). See also Acs (2006).

[ii] This variable measures the existence and extensiveness of private firms or non-governmental organizations that maintain databases on the creditworthiness of borrowers (Van Stel *et al*. 2007:178).

[iii] However, their study is limited due to a narrow focus on incorporation.

[iv] This indicator is available since 2005.

[v] As accessed in February 2008. Since labour freedom is available from 2005 only, it was not included. However, we verified it did not affect the results significantly. When we run factor analysis for a shorter period but with freedom of labour included, , the first two factors still explain most of the variance, and loadings of labour freedom are not high on either of them. Empirically, labour freedom is negatively correlated with the size of the government spending and therefore its impact is difficult to separate where the size of the government is taken into account (see Aidis *et al*., 2007).

[vi] However, retaining two factors come at cost of high uniqueness value for the trade freedom indicator (at 0.71), i.e. this variable is not well explained by the extracted factors. Generally however, sampling adequacy is high: overall Kaiser-Meyer-Olkin measure is 0.85.

[vii] As argued by Costello and Osborne (2005), orthogonal rotation is not utilising all available information. Moreover, if factors are truly uncorrelated, the results of oblique rotation are very similar to the results of orthogonal rotation. In our case the correlation between the two factors after oblique rotation is -0.14. We use oblimin method following recommendation by Fabrigar *et al*. (1999) and Russell (2002). We also applied promax. We verified that the results based on the two are almost indistinguishable for our data.

[viii] It has important effects for the significance levels we report: without this correction, practically any country level variable would be significant, given the sample size.

[ix] It is likely that there is a U-shaped relationship between the level of develepment and the entrepreneurial entry as postulated by Acs *et al*. (1994), Carree *et al*. (2002) and Wennekers *et al*. (2005). Unfortunately, for our data, when we attempt to enter a linear and quadratic GDP per capita term in our specifications, the overall Wald statistics for the probit regression becomes problematic. For this reason, we stick to the logarithmic transformation..