

# **Size Matters: Entrepreneurial Entry and Government**

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## **Abstract**

We explore the country-specific institutional characteristics likely to influence an individual's decision to become an entrepreneur. We focus on the size of the government, on freedom from corruption, and on 'market freedom' defined as a cluster of variables related to protection of property rights and regulation. We test these relationships by combining country-level institutional indicators for 47 countries with working age population survey data taken from the Global Entrepreneurship Monitor. Our results indicate that entrepreneurial entry is inversely related to the size of the government, and more weakly to the extent of corruption. A cluster of institutional indicators representing 'market freedom' is only significant in some specifications. Freedom from corruption is significantly related to entrepreneurial entry, especially when the richest countries are removed from the sample but unlike the size of government, the results on corruption are not confirmed by country-level fixed effects models.

**Keywords:** entrepreneurship, government, market freedom, corruption

**JEL classification codes:** L26, P14, P51, P37

## 1. Introduction

Existing research indicates that entrepreneurship and new firm entry<sup>i</sup> fosters innovation and development; enhances employment creation; and ensures more equitable income distribution (Hirschman 1958; Baumol 1990; Acs 2006). However, these benefits 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 (Glaeser *et al.*, 2003; Johnson *et al.*, 1997; Baumol 1990; Hodler, 2009). While there can be deficiencies in the institutional framework anywhere, it is normally argued that problems are especially serious in less developed economies. The literature has concentrated on the weaknesses in the rule of law, high levels of state regulation, and corruption (La Porta *et al.*, 1999; Djankov *et al.*, 2002).

In this paper, we compare the effects of these factors on individual entrepreneurial activity in the form of new business start-ups in 47 different countries. Using the Global Entrepreneurship Monitor (GEM) dataset allows us to include all start-ups regardless of the legal form and to use information about the whole universe of potential entrepreneurs, rather than just of the existing business owners. In contrast, many existing studies focus on small enterprises requiring legal registration or on incorporated firms as a proxy for entrepreneurial activity. Previous studies using GEM have also analysed cross-country variation in entrepreneurship (see also Schaffer *et al.* 2005). In particular, Wennekers *et al.* (2005), Van Stel *et al.* (2007) and McMullen *et al.* (2008) use country averages to explore institutional influences on entrepreneurship. However, the literature has not considered explicitly the

impact of particular institutions namely the size of the government, corruption and market supporting institutions more generally - on the choice of whether an individual will enter the market as an entrepreneur. Our methodology is akin to the approach adopted by Koellinger (2008): we merge individual GEM survey data and country-level data from other sources. We base our study on a conceptual framework which analyses the potential role of the state and corruption, as well as the quality of market supporting institutions on entrepreneurial entry. Moreover, we address potential issues of multicollinearity between institutions by using factor analysis prior to estimating our regression models. This renders results that are more robust and avoids the *ad hoc* specifications based on an arbitrary exclusion of indicators. By using institutional country-level variables as explanatory factors for the individual decision of a potential entrepreneur, we are also able to overcome the limitation of simultaneity bias prevalent in entrepreneurship studies based solely on country-level aggregate data.

Analyzing the impact of the institutional environment for entrepreneurship 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. We build on Williamson's (2000) model of hierarchy of institutions to consider the effects of, in turn: corruption, property rights and the size of the government sector on entrepreneurship. Institutions are difficult to measure in practice and the available indicators are often highly correlated with each other, leading to serious specification dilemmas (Acemoglu and Johnson, 2005), but we employ factor analysis and use a large variety of indicators to ensure robustness for our findings.

Our work establishes that two institutional dimensions –comprised of a cluster of variables associated with market supporting institutional quality that we label *the market freedom* and *the size of the state sector* respectively– are associated with the entrepreneurial

entry. The negative impact of the size of state is more robust: our results are confirmed by country-level fixed effects models. The impact of these institutions on entrepreneurship is shown to be conditional on the stage of economic development: for the richest 10% of countries little is explained by institutional variation.

In the following section we analyze the effects of key institutions – corruption, property rights and the size of the state - on entrepreneurship. We also summarize the findings from the main existing studies so as to frame the current state of knowledge and identify our contribution. Our approach to quantifying indicators of the institutional environment is outlined in the third section and the Global Entrepreneurship Monitor dataset as well as our estimation methods in the fourth. Section 5 discusses our results and the paper concludes with Section 6.

## **2. Unbundling Institutions and Entrepreneurship: Theory and Empirics**

### *2.1 Institutional theory and entrepreneurship: an introduction*

Organizations set up by entrepreneurs - North's main agents of change (1997a) - adapt their activities and strategies to fit the opportunities and limitations provided through the institutional framework. Formal rules, designed to facilitate exchange by reducing transaction costs, are likely to affect individuals or groups in different ways. Since private interests may differ and individuals, who have their own 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).

Moreover both formal and informal rules can be maintained even if they are inefficient (DiMaggio & Powell 1983; North 1990). This is because, even when they clash

with new formal rules, informal norms have a tenacious ability to survive because they become habitual behaviour (i.e. culture). In this sense, informal institutions provide a sense of stability. Second, informal institutions may change more slowly due to 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).

One can model potential entrepreneurs as maximizing their expected return against the alternatives when making a decision to start new ventures (Casson, 1982; Parker, 2004). In contexts where institutions are functioning effectively, the risks primarily stem from the nature of the ventures themselves and the characteristics of the individuals' involved (Schumpeter, 1934; Kirzner, 1973). However, in a less developed economy, institutions may not provide sufficient underpinning to the functioning of the market economy and may influence both the potential returns from entrepreneurial activity and the variance around the expected income stream.

To organise our discussion of these institutional factors, we rely on the model of hierarchy of institutions as presented by Williamson (2000, p. 597). We start with the level of “embeddedness”: corruption, when widespread, may be seen as an informal norm and, therefore belongs there. Next we move to the level of “formal rules of the game”, and following Williamson, we take the rules related to property as located at the core of this level, which may also be labelled ‘constitutional’ (see also Olson, 2000). Finally, we move to the level of governance. Here we first consider “the depth” and quality of governance as represented by various dimensions of regulation, those related directly to entrepreneurial

entry in particular. Next we move to “the scope” of government activity, as proxied by the extent of state expenditure (and what follows, also by revenues).

## *2.2. Corruption*

In the literature, corruption has been found to reflect the multi-dimensional impact of poor institutions in developing countries (Tanzi 1998). The significance of corruption as an indicator of institutional quality arises from the fact that it becomes institutionally embedded; where widespread it is transformed into a social norm of behaviour, which becomes difficult to change and responds only slowly to formal institutional reform.

If we take corruption as a more fundamental (and less frequently changing) phenomenon than regulations, we can account for the inertia in informal institutions, as highlighted by North (1990). Corruption can become culturally embedded and in that sense becomes more than an equilibrium response to the current institutional setup. A good illustration of such a possibility comes from transition economies of Central and Eastern Europe. Estrin and Mickiewicz (2010) argue that change in informal institutions is socially embedded in generational change and therefore must be counted in decades rather than years.

However, this interpretation has been brought into question by the finding in Djankov *et al.* (2002) that corruption levels and the intensity of entry regulations are positively correlated. This could suggest that ‘low level’ institutional characteristics of governance, notably an inefficient, over-regulated environment, creates the conditions in which corrupt practices thrive, especially where officials are endowed with discretionary power. However, the critical assumption concerns which variables are seen as endogenous. Corruption may be viewed as endogenous when it is modelled as an equilibrium response to an overregulated environment (see also Hodler, 2009). We would argue however that the regulatory barriers

may be endogenous vis-a-vis corruption because politicians are corrupt and seek to realise rents. As Shleifer and Vishny noted, corruption '*...can also cause leaders of a country to maintain monopolies, to prevent entry, and to discourage innovation by outsiders if expanding the ranks of the elite can expose existing corruption practices*' (1993:616).

Even where corruption “greases the wheels of commerce”, it typically has a negative effect on economic development (Wei 2000; Aidt 2009). Corruption is detrimental for entrepreneurial entry in three ways: it may discourage potential entrepreneurs who are unwilling to engage in corrupt behaviour from ever starting a business.<sup>ii</sup> Similarly, it may encourage unproductive and destructive forms of entrepreneurship (Baumol 1990) and breed negative societal attitudes towards entrepreneurs. Finally, a corrupt environment may prevent businesses from growing because they wish to avoid expropriation by corrupt officials, especially those involved with tax administration (Barkhatova 2000; Aidis and Mickiewicz, 2006). A study by Djankov *et al.* (2005) in Russia indicates that perceptions of low corruption combined with a favourable attitude towards entrepreneurship by the general population and government officials increases both the probability that Russians become entrepreneurs as well as the length of time they spent as entrepreneurs. A corrupt environment distorts entrepreneurial opportunities and returns: it facilitates the development of entrepreneurs willing and able to engage in corrupt practices while acting as a barrier that hinders the entry or growth of businesses by entrepreneurs who are unwilling to engage in corrupt practices.

### 2.3. Property rights

Following Williamson (2000), we see property rights at the core of ‘high level’ (constitutional characteristics) of the formal institutional order. North and Thomas (1973),

Williamson (1985), 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. Within the theoretical framework introduced by Hodler (2009) which links institutional environment with entrepreneurial outcomes, strong property rights may be seen as corresponding to low levels of government arbitrariness, which in turn is related to limits imposed on opportunities for the government actions influenced by non-welfare enhancing political motives.

Strong formal property rights (which may also be seen as a component of the wider characteristics of the 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 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: a property rights system may work well for the economic elite and remain deficient for the others (Sonin, 2003).

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). Property rights that are well protected help promote entrepreneurship and innovation



(Parker 2007: 711). In addition, weaker property rights are likely to foster the development of predatory forms of entrepreneurial activities<sup>iii</sup> (Henrekson 2007:730). But if property rights, such as for intellectual property, are too strong, innovativeness may be reduced (ibid. 731).

#### *2.4. Business Regulations and the Size of the State*

Parker (2007) offers an overview of the way in which the various aspects of excessive business regulation impose costs on entrepreneurs and hamper entrepreneurial activity.

Djankov *et al.* (2002) also focus on the regulation of entry though they fail to find an unambiguous direct link between this and entrepreneurial entry. The difficulty arises because while governance structures may be important for entrepreneurship, the institutional spectrum becomes very wide at the lower level of governance. Thus, while at the top of institutional hierarchy, the institutional order focuses on protection of property rights, at the lower level of governance, the number of regulatory dimensions becomes very large. Hence, while the impact of individual regulatory measures is difficult to detect, their joint influence may still be significant. We return to the catalogue of regulatory measures and to the data reduction methods to deal with this problem in section 3.

One way to address the problem of multidimensionality of governance indicators is to identify some critical dimension that may cut across all indicators of government activity and may represent an important institutional aspect affecting entrepreneurship. We posit that the size of the state may provide us with such an opportunity.

Greater government spending may provide resources to maintain strong institutions, and thereby reduce barriers to entrepreneurial entry such as weak property rights as well as eliminating some of the incentives for corruption by ill-paid officials. But it can also create major new barriers to entrepreneurship development. For example, a greater level of state

expenditure implies weaker budget constraints on government spending. This is likely to create conditions under which political non-welfare-related motives begin to dominate in the government activity, hampering productive entrepreneurship (Hodler, 2009).

Moreover, a larger state sector may militate against entrepreneurship, both via the collection of taxes and through its expenditures (Parker 2004). 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 (and state sector employment) provide alternative sources of income and therefore by increasing the alternative wage may reduce the net expected return to entrepreneurship (Parker 2004). In addition, a strong welfare state can reduce the incentives for necessity entrepreneurs. Henrekson (2005) has shown this to be the case in Sweden, where the welfare state has had a negative effect on entrepreneurial behaviour both of opportunity and necessity entrepreneurs. Similarly Koellinger and Minniti (2009) provide empirical evidence based on data from 16 developed countries that generous unemployment benefits are negatively related to nascent entrepreneurship: opportunity and necessity entrepreneurs as well as innovative and imitative entrepreneurs were less likely to engage in entrepreneurial activities in those developed countries where unemployment benefits were high.

## 2.5 *Existing empirical findings on the determinants of entrepreneurial activity*

A number of earlier studies have investigated the impact of institutions on entrepreneurship. The seven main studies vary considerably in their measures of entrepreneurial activity, institutional variables, methods and results, and the differences are summarised in Table 1.

Klapper *et al.* (2006) build on the Djankov *et al.* (2002). Their study focuses on incorporated companies and measures the effects of entry costs in terms of complying with bureaucratic requirements for incorporation on the creation of new firms. The Amadeus data set is used to compare the entry of incorporated firms in 34 Western and East European countries and in addition to entry cost, institutional variables, such as property rights protection and employment rights as well as measures related to the financial and fiscal aspects of the policy environment are also included. 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). In order to address the issue of multicollinearity, Desai *et al.* enter each institutional indicator into a separate regression. Their key result, which is in line with Klapper *et al.* (2006), indicates that lower rates of entry pertain to 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 from the World Business Environment Survey. Discrete response models are used to investigate which factors affect the likelihood for companies to be incorporated. 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.

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) employ nascent entrepreneurship rates by country as their unit of analysis and use 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 measures of governance/regulation (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.

Van Stel *et al.* (2007) analyse the effect of a particular set of business regulations on nascent entrepreneurs and young businesses (defined as less than 42 months old). 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 both minimum capital requirements and labour market rigidity have a negative effect while private bureau coverage<sup>iv</sup> (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.

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.

Finally a recent study by McMullen *et al.* (2008) focuses on the institutional

determinants for opportunity driven and necessity driven entrepreneurial entry. The authors estimate models using the individual dimensions of the Wall Street Journal and Heritage Foundation indicators of economic freedom. These indicators are used in separate equations as well as jointly in a single equation (with the logarithm of GDP per capita used as a control variable). The results provide evidence that property rights are significant for opportunity driven entry but not for necessity driven entry. Notably for future research, McMullen *et al.* (2008) recommend the application of factor analysis to the Heritage Foundation indicators; a proposal that we adopt in this paper.

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 of these studies. Klapper *et al.* (2006) and Desai *et al.* (2003) 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 coefficients are estimated in an inconsistent way (Acemoglu, 2005).

Demirguc-Kunt *et al.* (2006) combine individual level outcomes with country level variables<sup>v</sup>. This is the methodology we adopt, while focusing on the whole universe of potential entrepreneurs rather than existing business owners or just registered entrants. We also use factor analysis to address the collinearity problems in measuring institutional quality and also consider explicitly the size of the state as well as levels of corruption.

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INSERT TABLE 1 ABOUT HERE  
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### 3. Quantifying Institutional Indicators

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 for cross-country institutional quality and as indicated above a number of different variables have been used. We adopt the variables used by McMullen *et al.* (2008) which originate from the Heritage Foundation / Wall Street Journal set of institutional indicators. Though other indicators exist, the Heritage Foundation/Wall Street Journal's indicators are unique in providing the broadest coverage and containing the largest number of countries and years.<sup>vi</sup> Other studies conducting comparable empirical analysis have successfully utilised the Heritage Foundation/Wall Street Journal's indicators (Doucouliagos and Ulubasoglu 2006; Heckelman 2000; Han and Sturm 2000). 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)<sup>vii</sup>, security of property rights, business regulations (which include entry barriers), and freedom from 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 (see Beach and Kane (2007) for a more detailed discussion).

“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 for related institutional features. We apply factor analysis to tackle the problem, utilising the entire dataset (1995-2008 including 164 countries and nine indicators) available on the Heritage Foundation’s website.<sup>viii</sup> By ordering the extracted factors according to the magnitude of their eigenvalues we produced the following screeplot.

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FIGURE 1 ABOUT HERE

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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.<sup>ix</sup> We next apply oblique rotation (via oblimin method), producing the following factor loadings illustrated by Figure 2 below.<sup>x</sup>

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FIGURE 2 ABOUT HERE  
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While Heritage Foundation and Wall Street Journal aggregate their indicators into one average measure of ‘economic freedom’, our results demonstrate that the set of indicators has more than one dimension and enforcing a one-dimensional scale on it may not be a valid technique. We need to look more closely into what are the dimensions suggested by factor analysis.

Figure 2 reveals that the property rights indicator has the highest loadings on the first factor, which itself explains most of the institutional variance. "Freedom from corruption", ranks as the second highest loadings on the first factor. Most of other institutional indicators measuring various dimensions of regulation are clustered around these. Thus, most but not all of the Heritage-Wall Street Journal indicators are located here. We therefore label the first factor as *market freedom*, to relate it but also distinguish from the label of ‘economic freedom’ used by Heritage-Wall Street Journal.

In Figure 2 we also see that the dimensions “fiscal freedom” and the size of the government expenses in GDP should both be considered separately from the other institutional factors. They form the second factor that we label (*limited*) *size of state sector*. While the impact of taxes and the impact of government expenses (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.<sup>xi</sup> Linking our results to the discussion in Section 2, we note that out of the four institutional dimensions identified using Williamson's (2000) framework, for our data the first three (freedom from corruption, property rights, measures of regulation) are difficult to disentangle empirically, while the fourth (government size) stands apart.

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FIGURE 3 ABOUT HERE  
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In Figure 3, we show the country - specific factor scores, finding the Scandinavian countries, Belgium, Netherlands and Germany to be located in the upper left corner, with market freedom and an extensive state sector. In contrast, Hong Kong and Singapore are two economies which combine market freedom with a small state sector. The Anglo-Saxon economies are located in between, characterised by conditions of market freedom and a mid-sized state. 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 market freedom is weak. The weak negative correlation between the two factors is driven by the fact that there are no countries in the lower left corner of the graph. To explain this, we may notice that the factor we labelled 'market freedom' (low corruption, low degree of arbitrariness in the executive branch of the government, more limited and more functional regulations) may also be taken as a measure of institutional quality. This suggests that, paradoxically, a large state sector cannot be built where

institutional quality is low, perhaps because the latter affects the state's capacity to collect taxes.

Another way of interpreting the relationship between the two factors is through the Acemoglu and Verdier (2000) model, which stipulates that while state intervention may have a positive overall impact, some corruption may be unavoidable to achieve an efficient outcome in the feasible range. 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 also: Mickiewicz 2009). Acemoglu and Verdier's (2000) 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 institutional outcomes may also be explained using political theories (assuming some entrenched special interests) and by institutional inertia (as represented by legal origin). As noted above, inefficient economic institutions may persist and both political factors and institutional continuity can contribute to this outcome. This theoretical perspective is consistent with the ordering of both factors that results from our factor analysis.

Given the importance of corruption in our analysis, we next explore if the relationship in Figure 3 holds when factor scores are replaced by the two individual source indicators taken from the Heritage-Wall Street Journal dataset. Accordingly, we plot in Figure the relationship between the variable 'freedom from corruption' and 'government size'. The results are consistent with Figure 3 but stronger; a weak negative correlation in Figure 3

(correlation coefficient: 0.07) becomes somewhat stronger in Figure 4 (coefficient at 0.22).

Institutional theory proves useful in interpreting the results. At the bottom, we have countries with weak institutions and small government size (such as Mexico, Thailand and South Africa). In contrast, lower levels of corruption are also related to larger government size in countries such as Sweden and Denmark. Again, this interpretation runs against Acemoglu and Verdier's (2000) model, and is consistent with our interpretation of corruption. It also allows for reverse causality: it may be corruption that makes large government impossible, as argued above. Thus though the redistributive aims of many Latin American governments may be comparable to those held by Scandinavian politicians, Latin American governments may be constrained by their institutional capacity to implement those policies.

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FIGURE 4 ABOUT HERE  
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We have shown that the correlations between the factors and between the single measures of corruption and government size are limited, enabling us to identify their separate impacts on entrepreneurship. Moreover, the ordering of countries along the diagonal in Figure 4 is partially driven by the level of development. Hence, it is important to control for this in our empirical work.

## 4. Data and Estimation Methodology

### 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. Entrepreneurial activity in this paper is new, nascent start-up activity, 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 businesses they are starting, which must not have paid any wages or salaries for more than three months (Reynolds *et al.*, 2005; 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 1998-2005 surveys. Our survey database includes 47 individual country samples. Additional data details are reported in Table 2.

### 4.2. Control variables

Apart from the institutional variables discussed above, we control for the level of economic development as well as 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).

Similar to McMullen *et al.* (2008), we found that the curvilinear relationship represented by natural logarithm of GDP per capita (p.c.) fits the data best. We also verified that using both GDP p.c. and GDP p.c. squared does not alter our main results; we do not report these equations because overall they perform worse than when the natural logarithm of GDP p.c. is used.<sup>xii</sup>

In addition, the link between the overall (cyclical) economic performance in a country and the incentives to entrepreneurial entry are often discussed. 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 has been shown by Van Stel *et al.* (2007) to have a positive effect on the rate of opportunity entrepreneurship. Some ambiguity in these results is resolved by Koellinger and Thurik (2009), who demonstrate that time gaps should be taken into account. Following them, we include GDP growth as a control variable but lag it one year.

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 found that polynomial representation has the best fit for the data and we report the set of results based on this.

It would be ideal to control for individual differences in access to finance, because Evans and Jovanovic (1989) show that capital constraints lead to 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)). However, our data set does not offer a reasonable proxy, though we capture an aspect of the individual's financial position by using a dummy variable which indicates if a potential entrepreneur had been providing funds for business financing in the past.

We also control for individual personal and 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; 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) establish the significance of education for nascent entrepreneurs and Parker (2004) shows that 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, and we include a variable indicating if the individual is in employment.

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

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 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:

$\mathbf{ent}_{ijt} = f(\text{Market freedom}_{jt}, \text{Size of State Sector}_{jt}, \text{GDP/capita}_{jt}, \text{GDP growth rate}_{jt}, \text{Availability of Finance}_{jt}, \text{Individual Level Controls}_{jit}),$



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 also report marginal effects instead of coefficients. We allow for the possibility that the observations are *not* independent for each country-year sample in our dataset. This is reflected in the estimated variance-covariance matrix and reported coefficients and we also cluster standard errors on country-years. Given the sample size, all our standard errors would be artificially suppressed and many country level variables would become significant without this correction. As an alternative strategy, we also applied specifications including a full set of country and year fixed effects. Unsurprisingly, these models were not reliable and the overall Wald statistics could not be produced. This is because the sample is highly unbalanced and the institutional indicators do not vary greatly over time, which makes it difficult and inappropriate to estimate a fixed effects model. Moreover, institutional indicators are assessed with a measurement error, and there are probably lags between the actual phenomena and perceptions. For instance, it is likely that perceptions of corruption follow actual corruption with lags, and the length of these may vary. In order to alleviate this problem, all the country level variables are loaded with a one year lag.

Our estimation strategy is as follows: first we estimate the model including the two factors obtained by data reduction methods: *market freedom* and *size of state sector* (Table 3, model (1)). To explore the relationship between the level of development and the institutional variables, we then estimate the same model excluding 10% of the sample corresponding to the richest countries (Table 3, model (2)).<sup>xiii</sup>

To consider more carefully the individual institutions behind our “factors”, we re-estimate the two models described above replacing the factors with each of the ten underlying

‘economic freedom’ indicators. We limit our presentation of these results to the combinations which were most significant: these proved to be ‘the size of the government’ indicator (retaining reverse ordering, as is presented in the original data) and ‘freedom from corruption’ (Table 3, models (3) and (4))<sup>xiv</sup>.

To check robustness of our indicators, we report two models where the two factors are replaced with alternative indicators (Table 3, models (5) and (6)). First, the *market freedom* is replaced with an indicator for the "effective constraints on the executive branch of the government" obtained from the Polity IV dataset (Marshall and Jaggers 2007).<sup>xv</sup> Acemoglu and Johnson (2005), argue that the effective constraints on the discretionary power of the executive branch of the government serves as a good overall proxy for the protection of property rights. We also replace the *size of state sector* factor with a variable, the "ratio of government expenses to GDP", as reported in the World Bank "World Development Indicators".

Finally, as a further robustness check, we run a fixed effects model with robust standard errors on country level averages, which are available for a longer time span (that is for 1999-2009) from GEM. Our dependent variable is now the proportion of respondents involved in a start-up activity (‘nascent entrepreneurs’); alternatively, we also use a different functional form with better distributional characteristics, transforming this measure into logarithms. On the right hand side, we include freedom of corruption, size of the government, and control for the logarithm of GDP per capita (purchasing power parity) and GDP rate of growth, which we continue to lag one period to alleviate simultaneity bias.

## 5. Results and discussion

### 5.1. Specifications and empirical results

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INSERT TABLE 3 ABOUT HERE  
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Table 3 presents the six estimation models<sup>xvi</sup>. We observe in the first two models that the two institutional factors have the expected signs but different levels of significance. In particular, the *market freedom* is insignificant when the total country sample is used, though when the richest countries are removed, it becomes weakly significant. The *size of state sector* factor is positive and highly significant in both specifications. These are our central results and the remaining regressions explore their robustness and implications.

To ensure our results are not an artefact of the use of factor analysis, we entered all the institutional variables separately instead. Due to limitations of space, we focus on the most significant indicators. Reassuringly, these prove to be, first, "freedom from corruption" and the "the government size" (i.e. individual Heritage indicator, not to be confused with the factor used previously, *size of state sector*), coded in reverse order by the Heritage Foundation i.e. with lower values representing more government spending. These regressions are reported in models 3 and 4. These confirm our previous results; both the size of the government and freedom from corruption variables are found to be significant, with the latter increasing in significance from model 3 to model 4 where the richest 10% of the countries have been removed.

In models 5 and 6 we use alternative indicators of institutions, drawn instead from Polity IV, with "constraints on executive" as an alternative measure of the *market freedom*. As previously, the results suggest that the link between market freedom and entrepreneurship

is weak; the variable is marginally significant for the whole sample (model 5) but marginally insignificant when the richest countries are excluded (model 6). On the other hand, the estimated coefficients on government expenses remain highly significant in both models.<sup>xvii</sup>

Finally, the results of our robustness check using fixed effects model is reported in Table 4. We find that both freedom of corruption and government size retain their signs, but only the latter is significant. If corruption is a slowly evolving embedded informal norm, the within variation captured by fixed effects will be largely driven by measurement errors, so it is unsurprising that the corresponding coefficient becomes insignificant. Nevertheless, the identification problem remains: there may be other dimensions of long term institutional embeddedness apart from corruption that we do not include. Therefore, this strong robustness check confirms our results on government size, but leads to some caution in relation to our previous results on corruption.

Our results with respect to the control variables largely conform with those in the literature. As shown previously (e.g. Wennekers *et al.*, 2005) the relationship between the level of economic development and entrepreneurship is negative and non-linear; a logarithmic function performs best with our data. We also confirm that access to finance is important for entrepreneurial activity (Klapper *et al.*, 2006); formal finance is less important in poor countries, but becomes increasingly significant at the higher stages of economic development (Deminguer-Kunt *et al.*, 2008). At lower levels of development, the impact of credit to private sector on entrepreneurship is negative, perhaps because it is crowding out informal finance, though it becomes positive at higher levels of GDP per capita (Wennekers *et al.*, 2005). Credit provision becomes insignificant once we eliminate the richest countries.

Men and current owners are significantly more likely to start new businesses (Minniti *et al.*, 2005a), as are people who provided finance as business angels in the past (Mickiewicz, 2005). We also confirm the relevance of business networks: individuals who know other entrepreneurs are significantly more likely to start a new business. This result is not surprising given that a number of studies have identified the importance of entrepreneurial networks for opportunity recognition (Hills *et al.* 1997; Singh *et al.* 1999) and entrepreneurial alertness (Ardichvili *et al.* 2003). However networks developed in weak institutional environments may not complement markets (creating synergies) but substitute for them, creating transaction costs. As a result, much networking activity may not be productivity-enhancing (Aidis *et al.* 2008: 670). Human capital as measured by post-secondary and higher education has a significantly positive impact on entrepreneurial entry (Davidsson and Honig, 2003). Finally we confirm a significant, quadratic effect for age in our regression models, implying that in the relevant range older people are less likely to become entrepreneurs (Levesque and Minniti, 2006).

## 5.2 Discussion

Our analysis provides insights into the effect of variations in institutional quality on entrepreneurial entry. We identify a significant and robust negative relationship between the size of the state sector and entrepreneurship. Moreover, freedom from corruption has a positive and significant impact on entrepreneurial entry, albeit this result is slightly less robust. However, contrary to some previous findings (Van Stel, 2007; McMullen *et al.*, 2008), potential entrepreneurs are only marginally influenced by *market freedom*, especially if they do not reside in the sample's richest countries.

Future researchers may wish to distinguish more carefully between institutions and to extend our framework to alternative forms of entrepreneurship, such as potential entrepreneurs, existing entrepreneurs or high growth entrepreneurs. Whereas existing entrepreneurs and high growth entrepreneurs may be more significantly influenced by the quality of property rights, our analysis indicates that this may play less of a role for nascent entrepreneurs, especially in more developed economies. Similarly, while current entrepreneurs may have learned to function in their existing institutional environment, even where corruption is prevalent, our results indicate that entrepreneurial entry is greater where there is less corruption. In addition, the results suggest that the perceptions of corruption play a significant role in reducing entrepreneurial aspirations, a view consistent with other studies (Djankov *et al.* 2005; Aidis and Mickiewicz, 2006; Aidis and Adachi 2007; Aidis *et al.* 2008).

Our main result concerning the impact of the size of the state sector 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 this discourages movements from employment towards entrepreneurship. Thus, some of the key

policy discussions with respect to the state sector and entrepreneurship should be about its design as well as its size.

Our analysis is subject to a number of limitations. Firstly, though the GEM data provides excellent uniform data for cross-country comparisons, there is potential sample selection bias because, given the cost of conducting a GEM country survey, few participating countries have very weak institutions. Thus our results more accurately pertain to middle and high income countries. Moreover, from the perspective of institutional change, the data are only available for relatively few years, we may not have sufficient inter-temporal variation to be confident that causality runs from institutional quality to entrepreneurship rather than vice versa. These issues must be addressed further in the future as additional years of data become available.

## **6. Conclusions**

When the size of the government is considered from a theoretical perspective, one could argue that a larger government may be associated with better conditions for entrepreneurship. More extensive government spending may create a basis for stronger institutions, funding law and order enforcement systems that protect contracts and supporting infrastructure that may enhance entrepreneurship. Conversely, lower government spending might weaken the business environment. However, we do not observe this positive relationship over the empirical range of current economies. In contrast, we find a robust negative relationship between the size of the government and entrepreneurial entry. Consistent with earlier findings (Parker, 2004; Henrekson, 2005; Koellinger and Minniti, 2009), we argue that an extensive welfare state supported by high level of taxation reduce the incentives for nascent entrepreneurs. This in turn, has wider implications for economic

development.

Our findings also have implications for policy-makers. We have found that that individual choice to become an entrepreneur is heavily dependent on two aspects of the business environment: on the size of the state sector and – based on somewhat weaker results – on freedom from corruption. Policymakers might benefit from focusing their attention on the elements of the institutional environment that are most critical at a given level of economic development in their efforts to enhance entrepreneurial activity. Reducing corruption is important but we have argued that corruption is not just a rational choice response of economic actors but also an embedded informal institution. Hence, its eradication cannot be achieved solely through better monitoring and by institutional design to improve bureaucratic procedures. In addition, one needs to target deeper issues of social attitudes and values, and to influence those through the educational system and media awareness. Moreover, at every level of economic development, increasing the size of the state sector reduces the incentives to be entrepreneurial. This trade-off needs to be taken into consideration when making policy choices: policies to increase the fiscal role of the state are in direct conflict with aspirations to create a more entrepreneurial society. In a global perspective, it is South-East Asia, characterised by limited fiscalism and dynamic entrepreneurial sectors that offers clear lessons for policy-makers.



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

	Klapper <i>et al.</i> (2006)	Desai <i>et al.</i> (2003)	Demirguc-Kunt <i>et al.</i> (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:	<ul style="list-style-type: none"> <li>• Entry costs (incorporation procedures)</li> <li>• Property right protection</li> <li>• Employment rights</li> <li>• Financial system development</li> <li>• Tax disadvantage</li> <li>• Legal origin</li> </ul>	<ul style="list-style-type: none"> <li>• Entry costs (incorporation procedures)</li> <li>• Corruption</li> <li>• Labour regulations</li> <li>• Independence of banks</li> <li>• Court system</li> <li>• Property right protection</li> <li>• Legal origin</li> </ul>	<ul style="list-style-type: none"> <li>• Entry cost (incorporation procedures)</li> <li>• Financial system development</li> <li>• Tax disadvantage</li> <li>• Legal origin</li> <li>• Bankruptcy procedures</li> <li>• Legal protection in solving disputes</li> <li>• Share of unofficial economy</li> <li>• Protection of shareholders rights</li> </ul>
Outcomes:	<ul style="list-style-type: none"> <li>• New corporation creation in industries that tend to be high entry are relatively lower in countries with higher entry costs;</li> <li>• Entry costs have a greater effect in richer countries than in poorer countries</li> <li>• Entry costs tend to be lower in countries with English or Scandinavian legal origins.</li> </ul>	<ul style="list-style-type: none"> <li>• Communist legal origin has negative effect.</li> </ul>	<ul style="list-style-type: none"> <li>• Communist legal origin has negative effect</li> <li>• Financial sector development and bankruptcy procedures has positive effect</li> <li>• Tax disadvantage makes incorporation less likely</li> <li>• Entry costs have significant negative effect</li> </ul>
Handling of multicollinearity in institutional indicators:	<ul style="list-style-type: none"> <li>• Entering each institutional indicator into a separate regression</li> </ul>	<ul style="list-style-type: none"> <li>• Entering each institutional indicator into a separate regression.</li> </ul>	<ul style="list-style-type: none"> <li>• Factor analysis; using extracted factors in place of original variables.</li> </ul>

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

	Wennekers <i>et al.</i> (2005)	Van Stel <i>et al.</i> (2007)	Klapper <i>et al.</i> (2007)	McMullen <i>et al.</i> (2008)
Data set used	Global Entrepreneurship Monitor	Global Entrepreneurship Monitor	WB Entrepreneurship Survey	Global Entrepreneurship Monitor
Dependent variable	Country level rates of nascent entrepreneurship	Country level rates of nascent entrepreneurship & young business Rate	Country level rates of creation of incorporated firms	Country level rates of nascent Entrepreneurship split between opportunity and necessity
Institutional variables included:	<ul style="list-style-type: none"> <li>• Entry costs (administrative requirements for starting a new business)</li> <li>• Fiscal legislation</li> <li>• Social security</li> <li>• Former communist country economic origin</li> </ul>	Variables in 5 categories: <ul style="list-style-type: none"> <li>• Starting a business</li> <li>• Hiring and firing workers</li> <li>• Getting credit</li> <li>• Paying taxes</li> <li>• Closing a business</li> </ul>	<ul style="list-style-type: none"> <li>• Entry costs (incorporation procedures)</li> <li>• Employment rights</li> <li>• Financial system development</li> <li>• Quality of state governance</li> </ul>	Ten individual dimensions of the Wall Street Journal / Heritage Foundation “Economic Freedom” set of institutional indicators
Outcomes:	<ul style="list-style-type: none"> <li>• Higher social security expenditure has a negative effect;</li> <li>• Higher government tax revenues have a positive effect;</li> <li>• Communist legal origin has a negative effect.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimum capital requirements have a negative effect;</li> <li>• Labour market rigidity has a negative effect;</li> <li>• Countries with more nascent entrepreneurs also have more young businesses;</li> <li>• GDP growth rates have a positive effect on opportunity entrepreneurship;</li> <li>• Private bureau coverage has a positive effect.</li> </ul>	<ul style="list-style-type: none"> <li>• Financial system matters for per capita entry rate, but significance is not robust (sensitive to estimation method)</li> <li>• 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)</li> </ul>	The most significant result is that protection of property rights is associated positively with opportunity motivated entry
Handling of multicollinearity in institutional indicators:	<ul style="list-style-type: none"> <li>• General to specific: excluding insignificant variables.</li> </ul>	<ul style="list-style-type: none"> <li>• General to specific: excluding insignificant variables.</li> </ul>	<ul style="list-style-type: none"> <li>• Applying different estimation methods (GEE, GLS) and different definition of dependent variable to check for robustness</li> </ul>	Applying equations with single indicators entered separately



**Table 2. Summary Statistics**

<b>Variable</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>Std. Dev.</b>
Start-up activity (%)	0	100	3.4	18.1
Owner/man. of existing businesses (%)	0	100	5.3	22.4
Business angel in past 3 y (%)	0	100	2.7	16.4
Knows entrepreneurs (%)	0	100	36.1	48.0
Currently in employment (%)	0	100	51.1	50.0
Education: secondary or more (%)	0	100	65.3	47.6
Education: postsecondary or more (%)	0	100	22.0	41.4
Education: higher (%)	0	100	10.6	30.8
Female	0	100	52.8	49.9
Age	1	104	43	17
<i>Market freedom</i> (factor 1)	-1.10	2.25	1.23	0.73
<i>Size of state sector</i> (factor 2)	-3.28	1.76	-0.89	1.17
Government size (reverse sign) (Heritage)	0	94	48	25
Freedom from corruption (Heritage)	19	100	71	20
Constraint on executive (Polity IV)	3	7	6.7	0.9
Government expenses / GDP (%)	11	47	32	9
Annual GDP growth rate (%)	-11	11	3	2
Credit to priv. sector / GDP (%)	7	231	106	45
GDP per capita, purchasing power parity (2005 USD, thousands)	1	47	26	10

Notes:

1/ All country level variables are lagged one year.

2/ Heritage Foundation / Wall Street Journal indicator of government size is coded so that larger value represents lower level of government expenditure; the variable is kept in this form.

Table 3. Estimation Results

	(1)	(2)	(3)	(4)	(5)	(6)
	All	w/t highest	All	w/t highest	All	w/t highest
<b>Variables:</b>	Sample	10% GDPpc	Sample	10% GDPpc	Sample	10% GDPpc
Owner/man. of exist. busin.	-.37* (.18)	-.39* (.18)	-.37* (.18)	-.39* (.18)	-.27 (.20)	-.24 (.20)
Business angel in past 3 y	3.89***(.34)	3.62***(.39)	3.85***(.32)	3.60***(.37)	3.55***(.34)	3.42***(.39)
Knows entrepreneurs	3.69***(.25)	3.30***(.24)	3.68***(.24)	3.29***(.23)	3.58***(.24)	3.33***(.25)
In employment	.80***(.24)	.87***(.22)	.77***(.20)	.82***(.20)	.47* (.20)	.51* (.23)
Education: second. or more	.45* (.19)	.39* (.19)	.45* (.18)	.41* (.18)	.48** (.17)	.38* (.17)
Education: postsec. or more	.58***(.14)	.42** (.14)	.52***(.14)	.35* (.14)	.36* (.15)	.30† (.16)
Education: higher	.95** (.29)	1.06** (.35)	1.03*** (.28)	1.16*** (.35)	1.48*** (.31)	1.74*** (.32)
Female	-1.39*** (.10)	-1.28*** (.10)	-1.39*** (.10)	-1.29*** (.09)	-1.53*** (.12)	-1.40*** (.12)
Age	.04 (.04)	.04 (.05)	.05 (.04)	.04 (.05)	.14*** (.04)	.15*** (.04)
Age squared (x1000)	-1.09* (.50)	-1.00† (.60)	-1.11* (.49)	-1.05† (.59)	-2.27*** (.46)	-2.33*** (.54)
Log GDP pc (ppp)	-.63* (.26)	-.88** (.27)	-.69** (.22)	-.90*** (.22)	-.63** (.24)	-.76* (.30)
Annual GDP growth rate	-.05 (.04)	-.06 (.04)	-.09* (.04)	-.09* (.04)	-.07* (.03)	-.07* (.03)
Credit to priv. sector / GDP	-.02† (.01)	-.00 (.01)	-.04* (.02)	-.02 (.02)	-.04* (.02)	-.03 (.02)
Credit / GDP sq. (x1000)	.11 (.01)	.01 (.01)	.15* (.01)	.03 (.01)	.22** (.01)	.17† (.01)
<i>Market freedom</i> (factor 1)	.32 (.28)	.49† (.27)				
<i>Size of state sector</i> (factor 2) <sup>1</sup>	.81*** (.15)	.75*** (.15)				
Freedom from corruption			.02* (.01)	.03** (.01)		
Government size (reverse)			.04*** (.01)	.04*** (.01)		
Constraints on executive					.26† (.16)	.29 (.19)
Government expenses / GDP					-.10*** (.02)	-.09*** (.02)
Number of observations	350397	317282	350397	317282	268825	241770
Wald Chi squared	3725***	3351***	3195***	2906***	2557***	2455***
Pseudo R squared	0.1099	0.1134	0.1107	0.1141	0.1150	0.1152

Notes to Table 3:

\*\*\* Denotes significance at 99.9%

\*\* Denotes significance at 99.0%

\* Denotes significance at 95.0%

† Denotes significance at 90.0%

Robust standard errors in parentheses.

Government size: the larger values represent lower government expenses and lower taxation.

Country level variables lagged one year to alleviate potential endogeneity.

<sup>1</sup> The larger values represent lower government expenses and lower taxation.

Table 4. Estimation Results:  
country fixed effects (within) panel estimator

	(1)	(2)
<b>Dependent variable</b>	Country level startup rate	Natural logarithm of country level startup rate
Log GDP pc (ppp)	5.91***(1.16)	5.69***(0.92)
Annual GDP growth rate	0.06*(0.03)	0.03 (0.02)
Freedom from corruption	-0.02 (0.02)	0.01 (0.02)
Government size (reverse)	0.03*(0.01)	0.03*(0.01)
Constant	-58.03*** (11.06)	-60.77*** (8.65)
Number of observations	369	369
F statistics (4, 73)	8.39***	14.48***
Within R squared	0.09	0.13
Between R squared	0.07	0.21
Overall R squared	0.03	0.07

Notes:

Significance levels denoted as in Table 3.

GDP growth and GDP level lagged one year to alleviate simultaneity.

Figure 1.

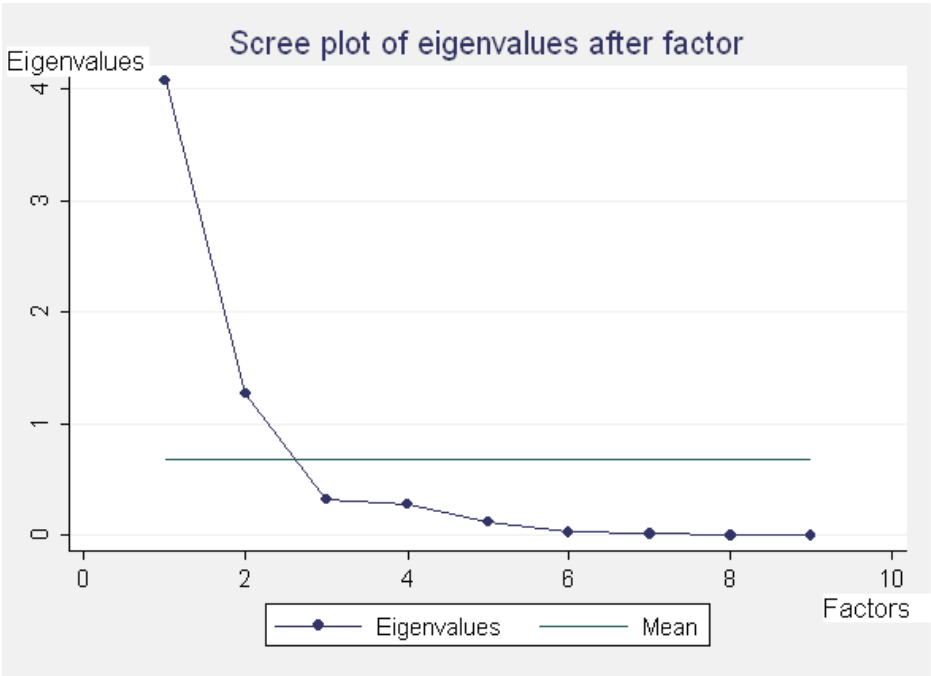
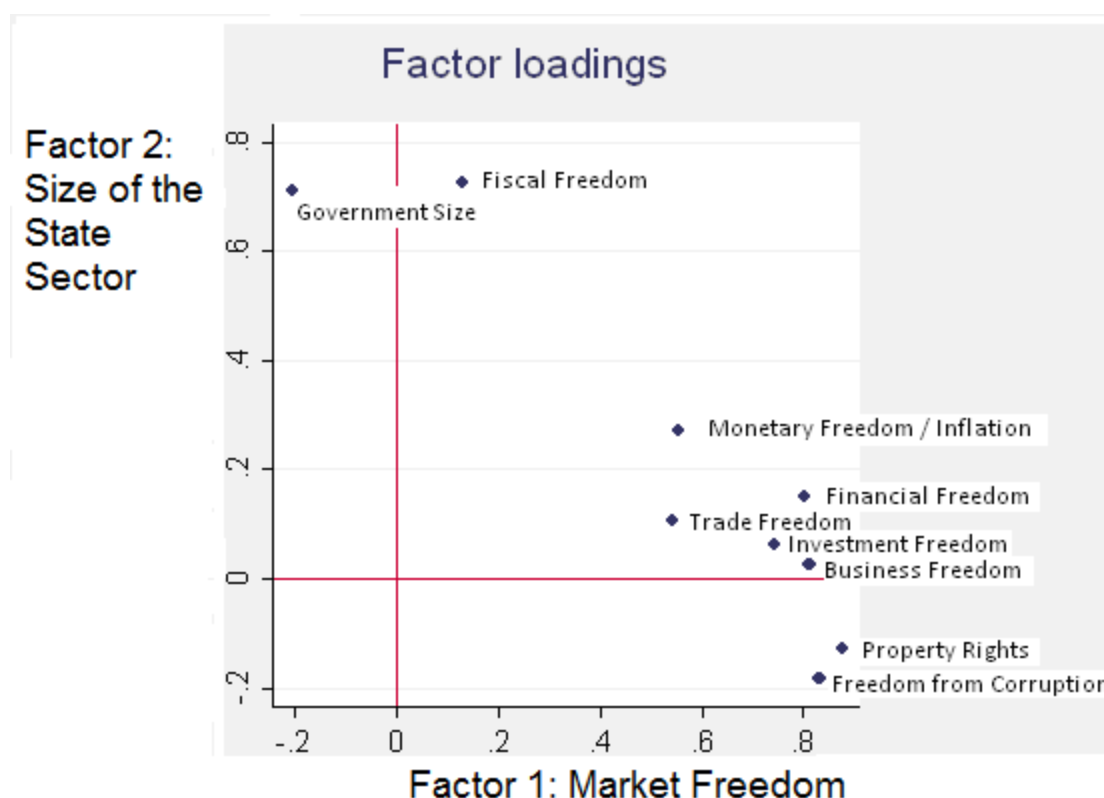


Figure 2.



Explanation of indicators:

**Fiscal freedom** is a measure of the tax burden imposed by government. It includes both the direct tax burden in terms of the top tax rates on individual and corporate incomes and the overall amount of tax revenue as a percentage of GDP.

**Government size** (also referred to as government spending) considers the level of government expenditures as a percentage of GDP including consumption and transfers.

**Monetary freedom** combines a measure of price stability with an assessment of price controls using weighted average inflation rate for the past three years.

**Financial freedom** is a measure of banking security as well as a measure of independence from government control.

**Trade freedom** is a composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services.

**Investment freedom** measures restrictions in the following five areas: national treatment of foreign investment; sectoral investment restrictions; expropriation of investment without fair compensation; foreign exchange compensation; foreign exchange controls and capital controls.

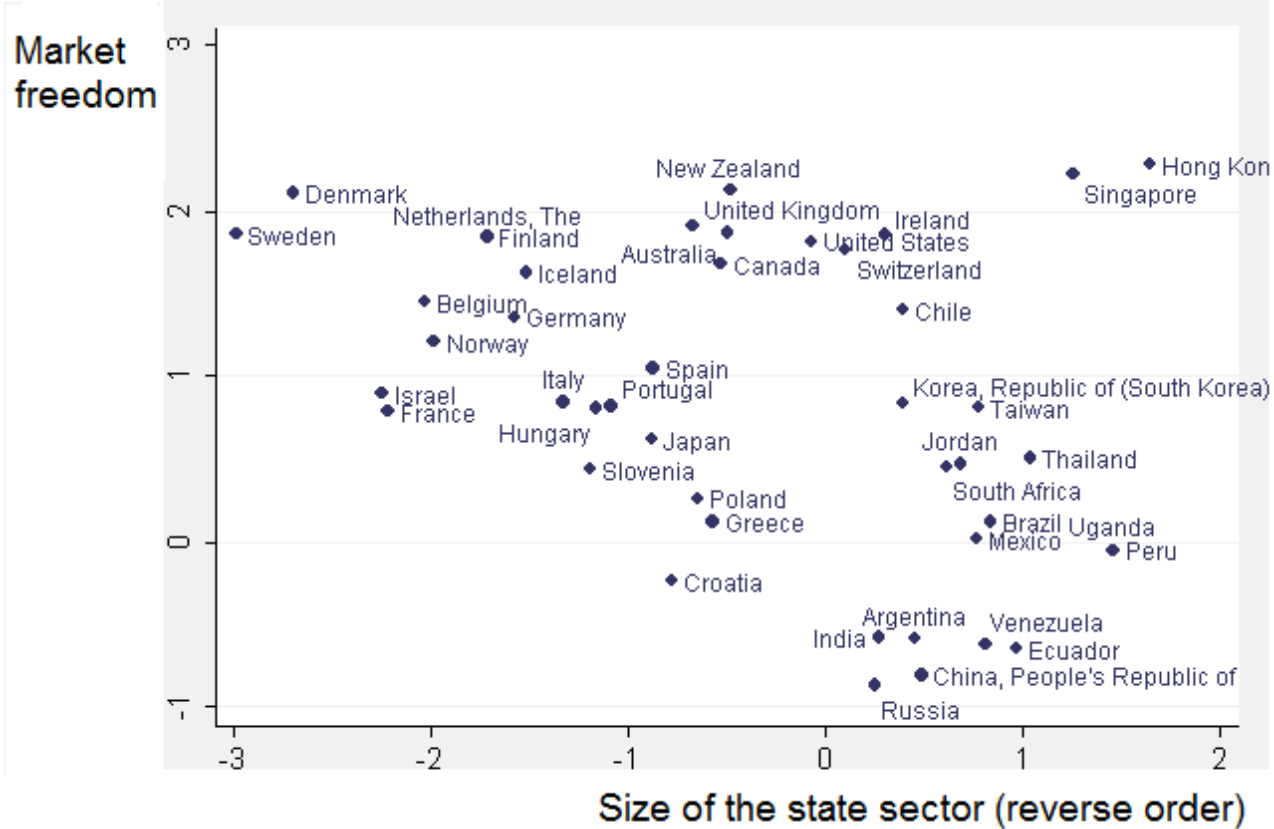
**Business freedom** is a quantitative measure of the ability to start, operate, and close a business and represents the overall burden of regulation as well as the efficiency of government in the regulatory process.

**Property rights** indicator provides an assessment of the ability of individuals to accumulate private property, secured by clear laws that are fully enforced by the state.

**Freedom from corruption** is derived primarily from Transparency International's Corruption Perceptions Index (CPI). It measures the perceived level of public-sector corruption in 180 countries and territories around the world. The CPI is a 'survey of surveys', based on 13 different expert and business surveys.

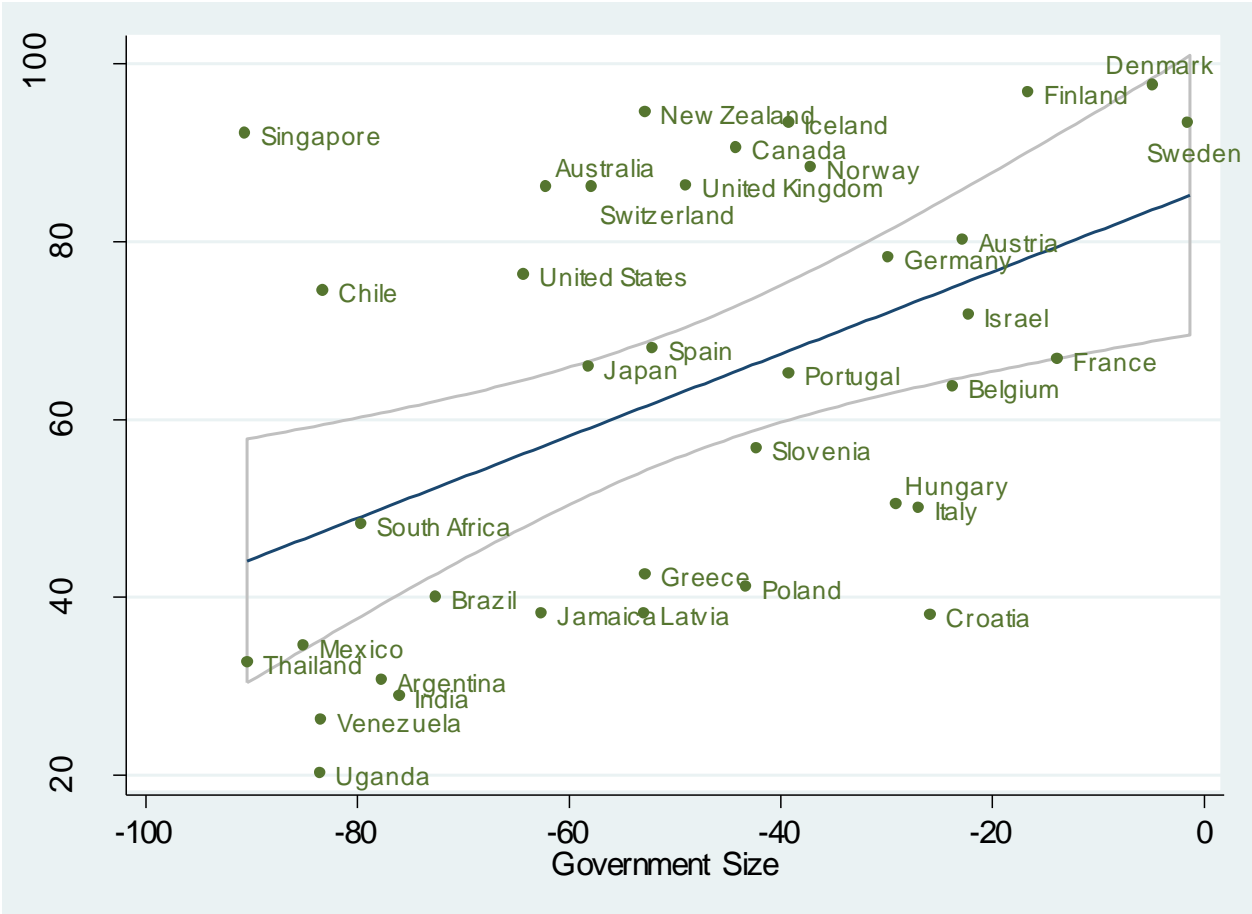
source: [http:// www.heritage.org](http://www.heritage.org), <http://www.transparency.org>

Figure 3. Factor scores for GEM sample countries.



Note:  
The data points relate to year 2004 or latest available.

Figure 4. Corruption and Government Size



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<sup>i</sup> Entrepreneurship is a multidimensional 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).

<sup>ii</sup> For example, the highly corrupt environment in Russia may explain the low levels of entrepreneurship there (see also Aidis and Adachi, 2008; Aidis, et al. 2008).

<sup>iii</sup> An example of predatory entrepreneurship in this case would be ‘private’ security companies which provide business protection at a price and profit from maintaining weak local property rights (e.g. Sicily). It is a form of destructive entrepreneurship and has a negative overall effect on economic growth.

<sup>iv</sup> 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).

<sup>v</sup> Koellinger (2008) applies similar methodology to GEM data focusing on innovativeness.

<sup>vi</sup> World Bank ‘Governance’ indicators would be an attractive alternative. Unfortunately, it is only in the most recent period where those are reported annually. For the period we cover some years are missing.

<sup>vii</sup> This indicator is available since 2005.

<sup>viii</sup> 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).

<sup>ix</sup> 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.

<sup>x</sup> 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.

<sup>xi</sup> However, while the size of the government measure as reported by Heritage is simply based on the volume of government expenses, the tax measure includes the impact of marginal tax rates in addition to tax revenues.



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<sup>xii</sup> These results can be obtained from the authors upon request. Estimation with GDP per capita squared does not produce a credible Wald statistics for the probit model. At the same time, the main results are not affected.

<sup>xiii</sup> In a previous version, reported as working paper XYZ we also used 20% threshold. The results were not affected.

<sup>xiv</sup> Additional results can be obtained from the authors upon request.

<sup>xv</sup> The Polity IV Project captures global trends in governance and currently includes 163 countries. The polity conceptual scale examines concomitant dimensions of democratic and autocratic authority in governing institutions. It is based on six component that measure three key qualities: executive recruitment, constraints to executive authority and political competition (see also <http://www.systemicpeace.org/polity/polity4.htm>)

<sup>xvi</sup> It is likely that there is a U-shaped relationship between the level of development and entrepreneurial entry as postulated by Acs *et al.* (1994), Carree *et al.* (2002) and Wennekers *et al.* (2005). Unfortunately, with regards to 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 cannot be produced. For this reason, we stick to the logarithmic transformation.

<sup>xvii</sup> Given the high significance of the size of the government we also explored what happens if a quadratic term is added. It is insignificant.