Institutions and the shaping of different forms of entrepreneurship

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Abstract:

Entrepreneurship is often promoted as a universal solution for economic development issues. However, in practice different forms of entrepreneurship emerge in different countries. Some types, for example the Schumpertian ideal associated with innovation, do stimulate growth, but other types are much likely to do so. In this paper we argue that the national conditions for entrepreneurship, the Northian institutions, shape the form of enterprise. We employ international panel data to compare the effect of institutional factors on self employment, and patents. We find that the prevailing institutions are related to the form of entrepreneurship that emerges.

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Key words: institutions, entrepreneurship, panel data

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1. Introduction

Entrepreneurship is nowadays generally recognised to be an engine of economic development (Miniti and Levesque, 2008). Entrepreneurs are the micro economic agents who link national institutions to economic outcomes at the macro level (Wennekers and Thurik, 1999). Yet we are very aware that in some countries entrepreneurship flourishes and in others much less so (Acs, 2006; Audretsch and Thurik, 2000). As Verheul *et al* (2002) point out, entrepreneurship scholars appear to agree that the level of entrepreneurial activity varies across both countries and over time (Rees and Shah, 1986; Blanchflower, 2000). Nonetheless there is no reason to suppose that the extent of individual entrepreneurial potential should vary by country. Entrepreneurship is argued to be the set of practices involving the creation or discovery of opportunities and their enactment (Gartner, 1988). As a human endeavour, we might expect it to be spread fairly evenly across the globe. Indeed, in less developed countries it might even be anticipated that there are more opportunities (Smallbone and Welter, 2006). Yet, in terms of economic development outcomes, there are considerable international differences in entrepreneurship. It seems then, to explain these differences, we need seek an explanation at the national level, rather than at the level of the individual. If conditions *for* entrepreneurship vary, those conditions which foster enterprise, this might help explain why entrepreneurial processes produce different outcomes. It may also help explain the variety in entrepreneurship itself. Thus the objective of this paper is to explore these differing conditions for enterprise, the national "institutions" that appear to shape entrepreneurial outcomes.

We begin by examining the concept of entrepreneurship and how, as an individual practice, it might be influenced by national conditions. Thus we try to develop some insight into how national institutions may influence enterprise. Arguing that institutions condition the outcome of the enterprise, we empirically explore the impact of different institutional compounds on the two extreme forms of entrepreneurship: self-employment ant patent grants with the objective of establishing the relationship between institutional factors and enterprise. In these approaches, we hope to address the questions of, if and how, national institutions shape entrepreneurship.

2 . Entrepreneurship: some perspectives

Entrepreneurship is a multidimensional concept (Verheul et al, 2002). At a macro level, "entrepreneurship" can be conceptualised as the sum of individual decisions made by entrepreneurs about investing in ventures. Consequently, one perspective is to consider the entrepreneur as individuals and then to aggregate their activities (Davidsson, 1995). In his seminal book, McClelland (1961) argued that the extent of individual psychological traits determined the level of entrepreneurship in a country. McClelland's thesis about the "need for achievement" as a primary entrepreneurial trait has been expanded to include others such as; a risk taker, a good organizer and coordinator, with good intuition and leadership characteristics. In essence McClelland sees the aggregate of entrepreneurial traits as determining entrepreneurial outcomes and, in turn, economic growth.

However, this psychological and individualistic perspective has been criticised (Anderson and Starnawska, 2009) as much too narrow (Drakopoulou Dodd and Anderson, 2007). As Knight (1985) proposes, "we cannot assess the rationality of individual action without taking account of the institutional and cultural context in which everyday decisions are made." One challenge is that entrepreneurs act within society and that their entrepreneurial process is shaped by that society (Anderson, 2003; Anderson and Smith, 2007). A second and even stronger challenge is that although entrepreneurs are agents of change, we cannot discount structure in a more complete explanation. As Gagliardi (2008) argues, in all the actions we pursue as economic agents, we are affected by institutions. Thus structure and agents operate in a dynamic relationship (Jack and Anderson, 2002). Accordingly the structure, as represented by institutions, will influence and may help explain entrepreneurial differences. Valliant and Lafuente (2007) thus suggest that a theoretical framework based on a socio-cultural approach may be more appropriate for the study of entrepreneurship and SMEs than conventional economic and psychological approaches (Granovetter 1985, North 1990). The underlying assumption in this approach is that the decision to create a new enterprise, and therefore to become an entrepreneur, is conditioned by external or environmental factors. In other words, the socio-cultural factors of the institutional framework determine the levels of entrepreneurial activity in a specific time and place. Valliant and Lafuente (2007) argue that using an institutional approach helps explain radically different performance of economies over long periods of time. Zafirovski and Levine (1999) describe this socio-economic

approach as the sociological categories of economic action, so that economic variables are observations of complex social phenomenon.

A more conventional economic conceptualisation of entrepreneurship is the Kirznerian approach; here, entrepreneurship is a process of detecting opportunities. Kirzner's (1973) entrepreneur is a person who places new profit opportunities in the market place. Profit, or entrepreneurial rent as Kirzner puts it, accrues until market conditions eliminate the surplus entrepreneurial rent in opportunities. But as Miniti and Levansque (2008) point out, Austrian economics views entrepreneurship as a universal characteristic of human action. Although useful for seeing the function of entrepreneurship, it tells us little about why entrepreneurship levels should vary so much. Remaining with economic conceptualisations, Schumpeter (1934), characterised "entrepreneurship", as the engine of an economy. For him, it was ongoing entrepreneurial innovations that injected new energy into an economy for its growing and flowering[1]. For Schumpeter then, the entrepreneur's role is to reallocate resources by breaking up the existed equilibriums through injecting entrepreneurial innovations. This Schumpeter vividly describes as the creative destruction process. Again we can see the function of the entrepreneur in this economic conceptualisation, but again we have no account of why it should vary so much.

However, other economists do provide some theoretical purchase. Baumol (1996) notes that although there are some variations in entrepreneurial supply across countries, the biggest difference lies in the contribution of entrepreneurship to productive or unproductive outcomes. Baumol, noting the utility of Schumpeter's thesis, argues that "entrepreneurs are always with us" (1996:3) but that they do not have an automatic bias towards innovation. Indeed, "at times the entrepreneur may even lead a parasitical existence that is actually damaging to the economy. How the entrepreneur acts at a given time and place depends heavily on the rules of the game- the reward structure in the economy- that happen to prevail." Thus Baumol guides us to explore these "rules of the game"; that is to say, the institutions for enterprise.

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[1] Entrepreneurial innovations, consist of five cases: (1) The introduction of a new good; (2) The introduction of a new method of production;(3) The opening of a new market;(4) The conquest of a new source of supply of raw materials or part-manufactured goods; (5) The carrying out of the new organization of any industry

Baumol argues then that if the appropriate conditions exist, they will produce wealth otherwise they will not produce wealth and their activities could be derailed into unproductive and even destructive forms. The gist of Baumol's thesis is that entrepreneurship can be expressed in a variety of forms, some of which could be quite bad from a public point of view. Society and the invisible hand (Smith, 1776) can provide resources and incentives to promote entrepreneurial activities, but if inappropriate conditions prevail, then "entrepreneurs" will utilise these resources for personal gain at the cost of economic growth.

Baumol (1990) thus argues that entrepreneurial individuals channel their efforts according to the quality of prevailing economic, political, and legal institutions. Accordingly, this institutional structure determines whether entrepreneurial efforts are channelled to productive or unproductive outcomes. Sobel (2008) claims that productive entrepreneurship is the fundamental source of economic growth and wealth creation. Where institutions provide secure property rights, a fair judicial system, contract enforcement and effective constitutional limits (Sobel, 2008), this reduces the profitability of unproductive entrepreneurship, so that individuals are more likely to engage in new wealth creation. Baumol believes that the magnitude of the benefit the economy derives from its entrepreneurship potential depends substantively on allocation of their talents between productive and unproductive activities. Thus, the decision to "entreprendre" in this approach is influenced by the rate of return or profit rate of alternative activities, which themselves are determined by the quality of political and legal institutions. Good institutions draw entrepreneurial efforts towards productive activities while maintaining higher rates of economic growth. Minniti and Levansque (2008) explain that the new institutional economics follow the demarcation between institutions and organizations first noted by North (1990). Like Baumol, Minniti and Levansque argue that, since entrepreneurs are present in all settings, it is the different institutional structures which generate the large variances in standards of living across societies.

A more recent distinction between types of entrepreneurship, nuancing Baumol's constructive and destructive is the distinction between opportunity and necessity entrepreneurship. Criticised by Smallbone and Welter (2006) as overly simplistic, the distinction, nonetheless highlights differences between the types of entrepreneurship likely to be found in less developed countries. The GEM studies (General Entrepreneurship Monitor) employs these categories to explain why the level of entrepreneurship in developing countries is sometimes higher than in developed countries. Necessity entrepreneurship is related to the absence of

employment options, whereas "opportunity entrepreneurship" denotes an active choice to start a new enterprise based on the opportunity and employing innovation. Reynolds and al (2001) argue that necessity entrepreneurship is related to poverty and does not create wealth. In contrast, opportunity entrepreneurship is associated with a long term economic growth. Acs (2006) takes this further and proposes that the distinction between opportunity and necessity entrepreneurship is an indicator of economic development.

It thus becomes clear that entrepreneurship is not the same across countries, it may be "good" or "bad" depending on the context where it is drawn from. Clearly, a driver of individual choice is "the institutions". These institutions are thought to provide the framework which guides activity, removes uncertainty and makes the actions of others predictable. In short, institutions serve to reduce the costs of action and facilitate the coordination of knowledge dispersed throughout society. Correspondingly, entrepreneurial value creation, as the result of entrepreneurial actions, is the outcome of complex interactions between individual characteristics and institutional environment. Accordingly, promoting entrepreneurship thus implies establishing "good" institutions. In effect it is the institutions that govern the performance of an economy (Coase, 1998). We turn now to examine the concept of "institutions".

3. Institutions

Tran et al (2009) explain how institutional economics emphasises the effects of institutions on economic growth through providing information, more secure property rights and stringent enforcement mechanisms to stimulate cooperation. Empirical investigations using cross-country-data have shown that better institutions are accompanied by higher economic performance. Economists have modelled institutions in two different ways: either as exogenously (North 1990) or as endogenously (Aoki 2001; Greif 1993, 1994). Aoki's comparative institutional analysis conceptualises institutions as a self -enforcing equilibrium in an evolutionary repeated game. Contrastingly, North (1990) defines institutions as the rules (formal and informal) of the game. North's approach therefore implies that enforcement relies (often implicitly) on the role of a third party. As we are not interested (at least in this work) either with the enforceability problem nor with the existence and the characteristics of equilibrium in such a game, we employ the North exogenous definition of institutions which also appears to be close to a common sense interpretation. Thus, for this paper, institutions are

considered as a set of rules, conventions and norms that set a standard of behaviour for the members of a society. As Gagliardi (2008:421) puts it, "institutions determine the structure for exchange that influences transaction and transformation costs, hence the feasibility and profitability of engaging in economic activity. It is through this mechanism that institutions are the underlying determinant of long-run economic performance." They continue, stated differently, institutions have the role of structuring human interaction in a stable, although not always efficient, way and this objective is accomplished by reducing the uncertainty that pervades all societies.

3.1. Institutional components
3.1.1. Formal institutions

Of the elements comprising the formal institutions, property right protection regimes, rules of law, political and economic freedoms and corruption are the most cited constituents. However, a substantial literature (see e.g. McMillan and Woodruff (1999, 2002), Djankov *et al*; 2004) argues that weak institutions, notably the quality of the commercial code, the strength of legal enforcement, administrative barriers, extra-legal payments and lack of market-supporting institutions, represent a significant barrier to entrepreneurship

3.1.2. Informal institutions

Informal institutions are the implicit codified attitudes embedded in a society and work to provide cues for shaping individual behaviour. As a result, these informal institutions state entrepreneurial opportunities by deciding what behaviour is to be tolerated and thus legitimised as entrepreneurship in a society (Etzioni, 1987). In this vein, Anderson and Smith (2007) found that the narratives and discourses of the meanings of entrepreneurship are ideological and clearly present a moral space. They conclude that legitimate entrepreneurship resonates with a socially approved moral dimension. Jack and Anderson (2002) suggest that entrepreneurship should be conceptualised as an embedded socio-economic process. Embedding enables and shapes how entrepreneurs recognise and realise opportunities in the environment. Thus, creating and operating enterprises should be congruent with socially-approved behaviour manifest and coded in informal institutions.

3.2. Persistence versus Change of Institutions

In spite of their inertia, resistance to change (Hoffman, 1999), persistence (Parto, 2005) and durability (Hodgson, 2003), institutions are subject to change. The functionalist view of institutions proposes that institutions necessarily change in response to change in their environment[2]. These explanations are based on the assumption (mostly associated with the Chicago school) that economic agents can bargain to create adequate institutions. Institutions are thus seen as the result of some kind of Coasian bargain within society (see Acemoglu 2001 for a contrary view). Therefore, institutions should in general be both efficient and adapted to the existing social and economic environment.

However, since the 1970's, Olson (1972) challenged the idea of institutions resulting from an efficient Coasian bargain. Olson (1972) emphasised the problems associated with the collective action of large groups. Obviously, this Olsonian analysis contrasts with the Chicago view; inefficient institutions may survive for a long time because groups with an interest in institutional change might fail to get organised to solve their collective action problem. Furthermore, because institutional change implies transforming structural inequities, resistance by those with vested interests can be expected. Therefore, new rules and institutions often clash with their longer-established counterparts. Ruling out previous elites (associated with inefficient institutions) is not an easy task and frequently involves the need to balance the different interests of powerful actors. According to Bush (1987, 1989, 1994), the process of institutional adjustment can be broken down into two phases. Phase I involves ceremonial encapsulation, and Phase II involves regressive or progressive changes. In the entrepreneurship context, a progressive institutional change is related to an institutional adjustment where ceremonial behaviours that discouraged entrepreneurship are replaced by judgments that encourage entrepreneurship (Choy 2005; Bush 1987; 1989).

Turning from theory to real experiences; China presents an example of successful institutional change[3]. From a Maoist era where entrepreneurship was a taboo to the recent years where

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[2] This is rather like the social scientific equivalent of the Lamarckian view that organisms evolve in order to adapt to changes in their environment (as opposed to the Darwinian view that genetic mutations are random and that, when the environment changes, the mechanism of natural selection promotes the survival of the fittest). Interestingly Coase (1998) notes that Darwin arrived at his theory after reading Adam Smith on the division of labour.

[3] Chinese Communist Party leaders have publicly acknowledged the benefit that entrepreneurs bring to the economy, Anderson et al (2003) and changes instutions. A recent survey conducted among Chinese found that 70 percent of the respondents thought entrepreneurship was a good career choice (Gangemi 2007). Indeed, in 2005, China had 24 million small independent companies and the number was growing at 15-20% annually (Loyalka and Dammon 2006).

China earned a reputation as one of the world's most entrepreneur-friendly country, a clear change has been made. In the other extreme, most African countries failed drastically in their experiences of institutional change. The following (diagram 1) summarizes our theoretical argument:

4. Empirical Analysis

4.1. Data

We collected data from two sources (see Table 1) so our sample data describes the relevant characteristics of 36 countries (Table 2) over 12 years (from 1995 to 2006). Data in this format is well suited to analysis using panel data techniques. Such techniques can encompass a large range of methods depending on (i) the assumptions that can be made on the structure of the general model and (ii) on the nature of the considered variables. Thus depending on the dependent variable that we choose to capture entrepreneurship, as well as the assumptions we postulate on the basic structure of the model, we use the most appropriate panel data technique. We explain our assumptions and argument in the analysis.

4.2. Dependant variable

As discussed earlier, entrepreneurship has a multiple facets, and in reality a country has some level of both necessity and opportunity entrepreneurship. Nonetheless we expect a tendency to dominate so that one entrepreneurial form will characterise a country. Let us consider as a benchmark, and also for the sake of simplicity, the two extreme approaches: self-employment and patent grants (Wennekers and Thurik, 1999). We appreciate that self-employment may become opportunity entrepreneurship and that innovations may be created by the self-employed, who hitherto were engaged in job replacement. However, our aim is simply to verify if these two a priori extreme views are determined by the same conditions, or are they ruled differently. Thus-

- To analyse entrepreneurship as "owning a business" (Knightian sense), we use the self employment rate[4].
- To capture the innovative aspect of entrepreneurship we consider patent grants by country of origin (US patent office) 1995-2007. The choice of US patent grants is dictated by the fact that US has a "first to invent" system, all the other countries have a

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[4] OECD Factbook 2008: Economic, Environmental and Social Statistics -

"first to file" system. This option is guided by our research objective; to capture the extreme expressions of entrepreneurship.

4.3. Independent variables

In the literature we presented the institutional context as both formal and the informal rules of the game, but here we deal only with formal institutions. The reason is straightforward, the availability of data. Since the five Hofstede cultural dimensions are cross sectional (Hofstede et al, 2004) and are not measured for the same year, it is methodologically infeasible to incorporate them into our panel data analysis. Given these constraints on data, we use several independent variables to reflect the institutional context. These were derived from several different sources that are publicly available. These data bases offer variables related to rules of law, economic freedoms, political stability, and corruption. Nonetheless we had to decide which variables were most relevant and useful. If we considered all the available variables this would lead to a technical problem because a) the degree of freedom will be very reduced and b) because most of these variables are correlated. We thus calculated the co-variances and selected those which are not correlated (correlation of less than 0.5). We are also cautiously assured that they vary across and within the considered sample. Finally, we integrated only five exogenous covariates. The variables definition, their sources and some descriptive statistics are indicated in table 1.2.

4.4. The Econometric model

Our aim is to estimate the relationship between entrepreneurship and the institutional context from different countries over different periods of time. This can be handled using methods developed in the context of panel data models (Greene 2003). One advantage is that panel data allows us to make many more observations. Moreover, the use of a panel data approach, rather than a pure cross section analysis or a time series analysis, is also justified by the possibility of controlling the individual and temporal heterogeneity of data. Furthermore a panel data approach allows the identification of effects that are not directly observable in a cross sectional, nor in a time series, approach.

4.4.1. Self-employment

The basic model for self-employment can be written as:

$$Y_{it} = \beta_0 + \beta_1 Bus_{it} + \beta_2 Trade_{it} + \beta_3 INV_{it} + \beta_4 CPI_{it} + \beta_5 GOV_{it} + \alpha_i + u_{it} \quad (1)$$

Where Y_{it} is the self employment rate in country i (i = 1, 2,…, N) at period t (t = 1, 2,…,T) ; α_i are countries specific and are the unobserved individual effects or unobserved heterogeneity. Accordingly, α_i are invariant over time, but are assumed to be different across countries; u_{it} are called the idiosyncratic errors or idiosyncratic disturbances and they change across time. This error term is assumed to be homoskedastic and uncorrelated.

4.4.2. Patent grants

As "patent grants" is a count variable, and each subject has the same length of observation time, the appropriate model is the negative binomial regression model in the context of panel data. The negative binomial model, as compared to other count models (i.e., Poisson), is assumed to be the appropriate model. In other words, we assume that the dependent variable is ill-dispersed (either under- or over- dispersed) and does not have an excessive number of zeros. The basic model for patent grants can be written as:

$$P(Y = y_{it}) = \frac{\lambda^{y_{it}} e^{-\lambda}}{y_{it}!}$$

where λ is the poisson parameter. $\log \lambda = \beta'X + \alpha_i + u_{it}$. Where X represents the vector of our exogenous variables. In the binomial case, an error term will be introduced in the mean :

$$\log \lambda = \beta'X + \varepsilon + \alpha_i + u_{it}$$

4.5. Empirical results

The basic model in equation (1) was estimated using alternative regression methods. For the self-employment rate, the well known fixed effect and the random effect models are used in the standard way. The Hausman test was then run to determine which model should be adopted. Since the p value of the Hausman test is, by far, less than 10%, either in the case of self-employment or patent grants (where the negative binomial regression in panel context is run), then the fixed effect model which focuses on the within country variation is econometrically more appropriate. However, fixed and random effects models give similar results for both patent grants and self employment rate regressions.

The regression results are presented in table (3).[5]

4.5.1. Self-employment

Our results show that business freedom, investment freedom and perceived corruption are the variables which significantly influence the self-employment rate. In contrast, trade freedom and freedom from government, do not significantly affect the self-employment rate.

- *Business freedom*

Business freedom has a negative impact on the self-employment rate; that is when the business freedom increases the self- employment rate decreases. Although this negative effect is not large (as the coefficient either in the fixed and the random case equals approximately to 0.3) it is somewhat surprising. Intuitively, we would have expected business freedom to be a "pull" factor. It may be that where there is a large degree of business freedom good job opportunities exist and thus people are not pushed into self employment. Alternatively, this result could be explained by the fact that less business freedom mirrors the existence of a centralised government where a tradition of bureaucracy is deeply rooted. This kind of economic model is generally characterised by inefficiency and may led to a misallocation of resources. As a consequence these economies are characterised by high level of unemployment which induces individuals to have few other option but to become self-employment. Baum et al (1993) also suggest that entrepreneurial individuals might encounter difficulties where business freedom is limited. Self employment may then become a means of achieving some independence in constrained circumstances..

- *Perceived corruption.*

Our findings implies that when the perceived corruption index increases, (which means that when business men and analysts perceive that the business becomes cleaner and more free from corruption), the self-employment rate decreases. Again this seems counter intuitive, but one possible explanation is that the self-employed have developed the ability to deal with corruption on a daily basis. Moreover, the self-employed may not have the power to avoid

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[5] For the self-employment case, we also estimated the model using the feasible least square regression which gives estimators free from autocorrelation and heteroskedasticiy. The obtained results and the interpretations are almost similar than those obtained in the random / fixed effect models. These results are not reported here (but available upon request) because this procedure (feasible least square) does not exist for the negative binomial regression in a panel data context.

corruption and consequently may passively resign themselves to deal with it. Hofstede et al (2004) also note that countries with perceived high levels of corruption (and are relatively poor) have higher levels of self employment. They suggest that this is because, in these circumstances, people are drawn into self employment because they find themselves uncomfortable in existing structures and organisations. They also note that it may also be difficult to find a decent job.

- *Investment freedom*

When investment freedom, which is related to foreign investment policy, increases, the self-employment rate increases too. This result seems to be consistent with the literature about the developmental role of foreign direct investment that postulates that foreign investment exhibits spillover effects and promotes skills to locals. Another possible explanation for our result is that when foreign investment prevails, it probably creates and/or increases local demand for specific goods and services. By responding to this demand, locals create their own enterprises, so that a myriad of small enterprises could develop.

4.5.2. Innovative entrepreneurship (patent grants)

As with the self-employment results, business freedom, and perceived corruption are the variables which significantly influence patent grants. However, the sign of this relation is different from the self-employment case. In contrast, trade freedom, freedom from government and investment freedom do not significantly affect patent grants.

- *Business freedom*

Business freedom affects positively patent grants. In general, businesses seek to maximize their freedom to operate. Furthermore, because innovation is a risky activity, an entrepreneur will seek an environment where starting, running and closing the business are processes without great administrative and legislative difficulties.

- *Perceived corruption*

The perceived corruption index is positively related to patented innovation; that is when the perceived corruption increases (i.e. the economy is seen as very clean) patented innovation increases too. This is as expected. Corruption is often associated with a high degree of

uncertainty which discourages investors especially when we consider that innovation is expensive, uncertain and a risky affair. Moreover, because in a corrupt environment bribes may be paid to government officials, innovative entrepreneurs will avoid corrupted economies mainly because they are worried about the protection of their innovation. Indeed, there is a high correlation between rules of law and corruption. So corrupted systems do not have rules of law that are able to guarantee that innovation will be properly protected.

5. Conclusions

Our empirical results regarding the self-employment rate are at first view, counter intuitive. However, on deeper examination they begin to make more sense and reflect other thoughtful work (Hofstede et al, 2004). The factors in institutions do not always seem to work in a straightforward way towards self employment. Nonetheless, our results about patent grants are more intuitive. Here we see that factors in institutions that we would assume to be positive, do indeed encourage innovation. Our work shows that these extreme manifestations of entrepreneurship appear to be determined by almost the same institutional factors; but these factors seem to be acting in opposite directions- what encourages self-employment, discourages innovation and vice-versa.

Indeed, perceived corruption and business freedom have a negative effect on self-employment and positive effect on patent grants. Of course corruption is more than nasty behaviour; the phenomenon that has attracted the interest of researchers in different fields of social sciences. An important literature has developed on this topic, with a dominant view implying that corruption harms economic activity (Gyimah-Brempong 2001; Ali and Isse 2003; Brunetti et al. 1998). However, several rationales have been developed to show that by "greasing the wheels of bureaucracy, corruption could be beneficial to the economy". In this vein, Mauro (1995) found indecisive results relating to the effect of corruption on GDP. Brown and al (2007) found that an increase in GDP per capita might result in an actual short-term increase in corruption, but over the long term this trend reverses. Our findings seem to add to this literature, by suggesting that corruption promotes self-employment (as necessity entrepreneurship) but discourages innovation (as opportunity entrepreneurship). This also implies that this necessity entrepreneurship seems to induce some level of necessity corruption.

It is well recognized that economic freedom compounds are associated with growth. However, our results show that self-employment is negatively correlated with both business freedom and perceived corruption. This implies that self-employment is negatively correlated with growth. Consequently, our results support the suggested opposition between self-employment as not creating long term growth and innovative entrepreneurship as generating long term prosperity.

Since Adam Smith (1776), economic theory emphasises the necessity of protecting the freedom of individuals because this results in greater prosperity for the whole of society. Consequently, some authors argue that countries with high levels of economic freedom will be more entrepreneurial. Nonetheless, our findings suggest that liberalisation policies could be very appropriate when the considered economy has the required innovation infrastructure to assure the passage from necessity to opportunity entrepreneurship; otherwise liberalisation's outcome will be unemployment rather than prosperity.

As any study, this paper has several limitations: while the empirical results are interesting, caution should be exerted when generalizing the findings. Indeed, despite the fact that the panel data context gives a large degree of freedom, the countries considered on the sample employed are, by far, developed countries. Of course this situation was not a choice but it was dictated by data availability. Nonetheless, we believe that our study makes a sound empirical contribution in that it gets "off the theoretical veranda" of economic theorising and uses data.

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Diagram 1, Conceptual framework
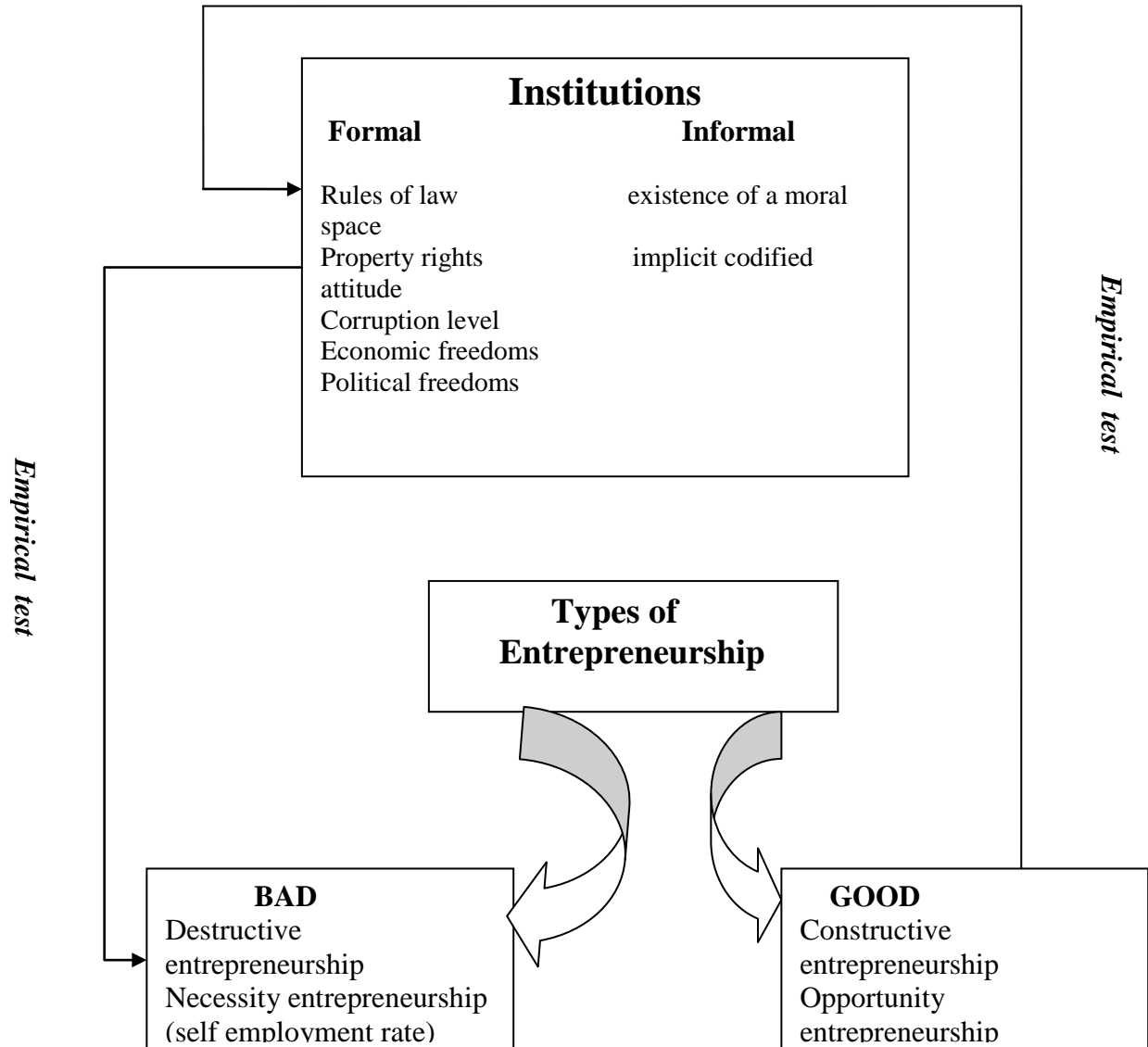
The country list:

Australia ,Austria, Belgium ,Canada, Czech Republic, Denmark ,Finnland , France,Germany, Greece Hungary, Iceland , Ireland , Italy , Japan , Luxembourg , Mexico ,Netherlands ,New Zealand ,Norway, Poland ,Portugal , Slovak Republic, Spain , Sweden, Switzerland, Turkey, United Kingdom, United States, Brazil, Chile, China, Estonia, Israel, Russian Federation, Slovenia

Table 1: Definition of variables and descriptive statistics (N = 432)

Variable and its and acronym	Variable definition	Source	Descriptive statistics			
			Min	Max	Mean	SD
Business freedom Bus	Ten elements equally weighted are used to calculate the "business freedom score", these elements are related to procedures to start, run and close a business. The score ranges from 0 to 100, where 100 represent the maximum degree of business freedom	Heritage foundation	30	97,96	95,77	15,96

Trade freedom Trade	This score is based on tow elements: The trade-weighted average tariff rate and Non-tariff barriers. It ranges between 0 and 100, where 100 represents the maximum degree of trade freedom.	Heritage foundation	40	100	73,65	8,98
Investment freedom INV	This factor scrutinizes each country's policies toward foreign investment, as well as its policies toward capital flows internally, in order to determine its overall investment climate. The country's investment freedom ranges between 0 and 100, where 100 represents the maximum degree of investment freedom	Heritage foundation	30	90	67,58	13,88

Corruption perception index CPI	The CPI Score relates to perceptions of the degree of corruption as seen by business people, risk analysts and the general public and ranges between 10 (highly clean) and 0 (highly corrupt).	Transparency International	2,1	10	6,733	2,18
Freedom from Government Gov	Scoring of the freedom from government factor is based on two components (i) Government expenditure as a percentage of GDP (ii) Revenues generated by state-owned enterprises and property as a percentage of total government revenue. The country's freedom from government ranges between 0 and 100, where 100 represents the maximum degree of freedom from government.	Heritage foundation	3,9	95,09	52,91	18,10

Table 2: Correlation matrix

	Business	Trade	Inv	Cpi
Bus	1			
Trade	0,3571	1		
Inv	0,2987	0,4683	1	
Cpi	0,4959	0,3409	0,4647	1
Gov	-0,0525	-0,0859	-0,2137	-0,3133

Table 3

Self-employment Results   **Patent Grants Results**

variables	Fixed effect	Random effect
Bus	-0.032 ***	-0.033** *
Trade	-0.01	-0.012
Inv	0.04 ***	0.039***
Cpi	-0.29 *	0.486**
Gov	-0.0039	0.0018
Cte	20,1***	21.68***
observation	380	380
R-squared	0,13	0.2359
R-squared within	0,12	0.1177
R-squared between	0,15	0.2670
Hausman test, Prob>Chi2		45,17***

variables	Fixed effect	Random effect
Bus	0.003**	0.00325 **
Trade	0.002	0.001
Inv	-0.0008	-.0009496
Cpi	0.081**	.09322 ***
Gov	-0.0017	-0.00174
Cte	1.544687	1.542439 ***
observation	386	386
Log loklihood	-2020.8723 ***	-2382.815 ***
Hausman test, Prob>Chi2		116.27***

Likelihood-ratio test vs. pooled: chibar 2(01) = 1262.26 , Prob>=chibar2 = 0.000

(*) (**), (***) indicate parameter significance at the (13), (5), (1) per cent level respectively