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Determinants of Entrepreneurs' Activities: New Evidence from Cross-Country Data

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This paper provides an empirical investigation of the main determinants of entrepreneurial activities across three groups of countries over the period 2004–2008, by specifically examining the importance of institutional setting and economic growth on entrepreneurial activities. The classification of countries is based on the Economic Freedom Index and the World Economic Forum (2011) which groups them on the basis of whether they are innovation-driven, efficiency-driven, or factor-driven countries. On the one hand, empirical results find a positive and significant role for economic freedom to accelerate entrepreneurial activities and growth in innovation and efficiency-driven countries characterized by strong institutional systems. On the other hand, the results suggest that in factor-driven countries characterized by relatively less economic freedom and weak institutions, there is a significant negative relationship between economic freedom and entrepreneurial activities.

Keywords: Economic freedom; growth; investment; unemployment; entrepreneurial activities.

JEL Classifications: M13, Q32, M13.

1. Introduction

The debate regarding the relationship between economic freedom and entrepreneurial activities (EA) has generated a vast theoretical and empirical literature in recent years. Traditional scholars relate EA to small businesses and they emphasize the role they play in accelerating economic growth. Somewhat more recently, scholars have been more concerned with exploring the differences across countries and the reasons behind these differences (Schmitz, 1989; Grossman and Helpman, 1994; Barro and Sala-i-Martin, 1995). Among other things, the interactions between the entrepreneurship, trade and recent innovative investments have led researchers to explore the role that entrepreneurship plays in stimulating and generating economic growth (Jovanovic, 1982; Audretsch, 1995; Cohen and Klepper, 1996).

While studies have tried to explain the role of EA as an engine of economic growth, only a handful of studies have been undertaken to analyse the differences across countries and over time. Some countries attract entrepreneurs while others prevent them from starting up any business. However, the relationship between entrepreneurship and

economic freedom in general and growth in particular has largely been missing in the empirical studies and related literature. This paper's contribution is based on assessing the impact of institutions in general and economic freedom in particular on EA for a panel of 49 countries spanning 2004–2008. The classification of countries is based on Economic Freedom Index and the World Economic Forum (2011) which groups them on the basis of whether they are innovation-driven, or efficiency-driven, or factor-driven countries.[1]

The aim of this paper is to provide insights regarding the impact of sound robust institutions in spurring EA. The remainder of the paper is structured as follows. Section 2 presents the link between EA, economic freedom and growth. Section 3 describes the empirical model and discusses the results. Section 4 concludes with the main findings and proposes a set of policy recommendations for countries targeting to boost EA.

2. Literature Review

The multiple impacts of entrepreneurship on growth, employment, standard of living, innovation and capital accumulation have attracted numerous researchers to explore these links. This section traces the role of the entrepreneurship and how it has evolved over time, giving rise to a variety of theories. It starts by defining entrepreneurship, followed by a brief overview of the theories.

2.1. *Defining entrepreneurship and its links to growth*

Entrepreneurship is studied in the relevant literature at both the micro-level, i.e., at the level of the individual firm or entrepreneur, and at the macro-level. In 1934, Schumpeter introduced entrepreneurship as an agent of growth, which through the process of innovation, brought about social change and economic development. Furthermore, he distinguished between five manifestations of entrepreneurship, "a new product, a new method of production, a new market, a new source of supply of intermediate goods, and a new organization". Schumpeter's definition therefore equated entrepreneurship with innovation in the small business sense; that is identifying market opportunities and using innovative approaches to exploit them.

Defining entrepreneurship as a small firm might be somewhat misleading as large firms might exhibit entrepreneurial and innovative traits. To that end, an alternative classification emerged based on Wennekers and Thurik (1999) who differentiated between three types of entrepreneurs. The first type are the "Schumpeterian entrepreneurs" who mainly operate in small, independent firms; second are the "Intrapreneurs" who are the innovators and the creative leaders gaining their advantage from

[1] Economic freedom index is an indicator provided by Freedom House, organization, Heritage Foundation and the Fraser Institute to monitor worldwide Economic freedom. They have provided for each country a specific rating. A scale from 0 to 100 to evaluate the 10 Economic Freedom factors consist of four main categories; those categories are rule of law, limited government, regulatory efficiency and open markets.

creative destruction; and third are the managerial business owners who focus on the coordination of production and distribution across economic activities.

Later, endogenous growth models highlighted the importance of knowledge as a determinant of economic growth, while the new class of endogenous growth models pioneered by Romer (1990) identified some attributes of entrepreneurship by modeling the process of innovation and deriving the motives for innovation from the micro-economic level.

In parallel with the endogenous growth literature, Porter (1990) provided a modern rendition of Rostow's (1960) stages of growth model by identifying three stages of development: (1) a factor-driven stage, (2) an efficiency-driven stage, and (3) an innovation-driven stage. The factor-driven stage is characterized by high rates of agricultural self-employment. Countries in this stage compete through low-cost efficiencies in the production of commodities or low value-added products. Almost all countries have experienced this stage. To reach the second stage, the efficiency-driven stage, countries must increase their production efficiency and educate the workforce to be able to adapt in the subsequent technological development phase. In the efficiency-stage, countries are characterized by efficient productive practices in large markets that allow firms to exploit economies of scale. In the final stage, countries are characterized by sound economic policies and qualified labor which allow them to deepen the EA and increase entry density through creating more competitive advantages.

In the last two decades, the knowledge and information revolution has renewed theoretical thinking linking entrepreneurship to growth with new theories emerging from the field of industrial evolution or evolutionary economics (Baumol, 1990, 1993; Jovanovic, 1982; Audretsch, 1995). The evolutionary economics literature views entrepreneurs as agents of change who bring new ideas to markets and accelerate growth through a process of competitive firm selection. Wennekers and Thurik (1999) showed that the general innovative role of entrepreneurs included not only newness (implementing inventions), but also new entry (start-ups and entry into new markets).

2.2. *Growth and entrepreneurship: Empirical literature*

Empirical studies on entrepreneurship and its relationship to economic growth are relatively recent. Most empirical studies focus primarily on a single aspect of entrepreneurship as it is difficult from an operational point of view to fully encompass the totality of EA on growth. Acs *et al.* (1994) report that a majority of Organization for Economic Cooperation and Development (OECD) countries witnessed an increase in the self employment rates during the 1970s and 1980s. Since the 1990s, the rate of business ownership has been rising as a reliable measure. For instance, the entrepreneur is often defined as one who starts his/her own, new and small business at his/her own risk.

Later, in a cross-sectional study of 23 OECD member countries covering the period 1984–1994, Wennekers and Thurik (1999) provided empirical evidence for the role of entrepreneurship (measured by business ownership rates) to be associated with higher rates of employment growth at the country level. Moreover, Carree and Thurik (1999), followed by Audretsch *et al.* (2002) concluded that in OECD countries, there is evidence that higher rates of entrepreneurship accelerate growth rates and lower unemployment.

Audretsch and Fritsch (2002) provide new results from studying 74 (West) German countries during the period 1986 till 1998 and present three key findings. First, they confirm that the start-up rates in the 1980s are not found to be related to employment change. However, in the 1990s, those regions with higher start-up rates experienced higher employment growth. They also find that regions with high start-up rates in the 1980s had high employment growth in the 1990s. There is further evidence of an increase in self-employment in many OECD countries. For example in the United Kingdom, the number of self employed as a portion of the total labor force increased from 7.8% in 1972 to 10.5% in 2000, and in the United States this fraction increased from 8% to 10% in the same period (Van Stel, 2003).

Entrepreneurs are defined as those who initiate activities; however they are individuals or groups of people who aim at initiating economic enterprise in the formal sector under a legal form of business. Entrepreneurship can therefore manifest itself in a number of ways, one of which is innovation. Salgado-Banda (2005) measured innovative entrepreneurship using quality adjusted patent data. He concluded that a positive influence on growth could be asserted for the 22 OECD countries over the period of 1975–1998.

Another set of studies have commonly used business start-up rates as a proxy for measuring entrepreneurship (Klapper and Quesada Delgado, 2007; Naude, 2008). Acs and Armington (2004) used regional data for the United States during 1989 through 1996 to link entrepreneurship to growth using new firm birth rate as a proxy for EA. Results show that higher levels of EA were significantly and positively linked to higher economic growth rates. Their findings suggest that new firms may have a stronger effect in creating new jobs than what was found in previous studies. Creating jobs can be directly linked to economic growth and supporting EA is a powerful force driving innovation, productivity, job creation and economic growth. The effect of EA on economic growth thus depends upon the level of per capita income and economic growth.

In summary, the evidence to date generally points to a significant and positive relationship between new firm formation, economic growth, and employment creation.

2.3. *Determinants of entrepreneurial activities*

There are several potential determinants of entrepreneurship that span a wide range of theories; this wide spectrum of approaches point to the overlapping roles of an

entrepreneur. There has been relatively little work on how institutional factors influence EA. Entrepreneurship determinants at the macro level are explained by demand side determinants (named push factors), representing technological developments, the industrial structure of the economy, government regulation, and the stage of development (Wennekers and Thurik, 1999). The supply side determinants (named pull factors), represent demographic characteristics such as population, the income levels, educational attainment, unemployment level, cultural norms, access to finance, and the degree of taxation.

The literature differentiates between the levels of analysis; for instance, at the micro level, the focal point is on the decision-making process by individuals to become self employed (Reynolds *et al.*, 1999; Blanchflower and Oswald, 1998). A number of other studies have also considered the cyclical aspects of self-employment and especially how movements of self-employment are linked with movements in unemployment. Blanchflower and Oswald (1998) found a strong negative relationship between regional unemployment and self-employment for the period 1983–1989 in the UK. A study by Blanchflower (2000) using a panel data of 23 countries for the period of 1966–1996 found that the level of education has a negative effect on the probability of an individual being self-employed. They reasoned that this was because highly educated people may not be willing to be risk-takers. This result is supported by Van der Sluis *et al.* (2005) using a meta-analysis during the period 1980 till 2003. In contrast, Reynolds *et al.* (1999) have outlined why education is vital for entrepreneurship. First, education provides individuals with the necessary skills and qualifications. Second, education creates awareness for career alternatives. Third, education provides knowledge that can be used by individuals to develop opportunities.

Similarly, the impact of unemployment on EA is ambiguous. Storey (1991) attributes this ambiguity to the methodology employed in the studies. He found a positive relation between unemployment and the decision to start a new business in time series studies and a negative relation in cross-sectional or pooled cross-sectional studies during the period 1975 till 1988. Evan and Leighton (1990) provided empirical evidence for the United States and found a relationship between the increased possibility of starting a new business and workers who lost their jobs.

Adding to the previous determinants, income and wealth have been found to have significant impact on EA. For instance, Ilmakunnas *et al.* (1999) used cross-country panel data on 20 OECD countries for 1978, 1983, 1988, and 1993 to test the relation between income disparity and self-employment and provide evidence for a positive relationship.

The foregoing overview suggests several immediate determinants of entrepreneurship. In addition to the previously mentioned determinants, institutions are often perceived as a major determinant of economic growth. North (1990) provided evidence of the explicit relation between economic growth and the entrepreneur in the context of the institutional framework. Accordingly, Baumol (1993) emphasized the institution's role in encouraging productive entrepreneurship, which can be identified

as a primary source of economic growth and is responsible for the creation of additional output.

Bjørnskov and Foss (2008) test the relation between entrepreneurship and economic freedom across 29 developed, developing, and transition countries during 2001 using Global Entrepreneurship Monitor data. In addition to finding that the relation between the size of government and EA is negatively correlated, the study also concluded that institutional features, such as size of the government, the degree of administrative complexity, the tax system, the intellectual property rights regime, the level of trust, corruption, and availability of finance capital can affect the level of entrepreneurship in a country.

Bureaucracy costs and regulations could also affect EA, and in a study of OECD countries for the period 2003 and 2004, Fonseca *et al.* (2001) found that fewer individuals become entrepreneurs when the start-up costs are higher. Related empirical studies find that well defined rules and regulations, well-protected rights, sound government, less corruption and an efficient judicial system promote entrepreneurship (Merck *et al.*, 2000; Johnson *et al.*, 2000, 2002; Boettke and Coyne, 2003; Acs and Virgill, 2010).

This paper attempts to examine the main determinants of EA, especially the effect of economic freedom on EA. This paper focuses on the main institutional and macroeconomic determinants affecting entrepreneurship using a dynamic panel model for a relatively short time dimension.

3. Empirical Model and Results

3.1. *Data and methodology*

The data used in this paper are drawn from three different sources and are summarized in Table 1. First, the dependent variable is from the World Bank Group Entrepreneurship Survey (WBGES).[2] The WBGES covers 112 countries during the period between 2004 and 2009 and it provides cross-country data on new business registration and entry density. It is a useful measure to capture the quality of the institutional and regulatory environment facing entrepreneurs in the formal sector.

Following Klapper and Love (2011), the paper employs the entry density indicator as a proxy for EA. It is calculated as the number of newly registered limited-liability firms in the corresponding year as a percentage of the country's working age population (ages 15–64), normalized by 1000. Table 1 summarizes the variables used in the estimation of the model, with their respective descriptive statistics.

Second, the independent variables are from Heritage Foundation and World Bank indicators which cover the data on macroeconomic and institutional determinants that may affect EA across countries. A country's overall economic freedom score is a

[2] Over the last decade, the World Bank has compiled different databases for the study of EA around the world from it WBGES. The data is available at: http://econ.worldbank.org/research/entrepreneurship.

Table 1. Variables with description and source.

Description of the variables used in the regression models			
Variables		Description	Source/database
Dependent			
EA	Entrepreneur activity	New businesses registered are the number of new limited liability corporations registered in the calendar year.	World Bank
Macroeconomic measures			
GDPC	GDP per capita (constant LCU)	GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Data are in constant local currency.	World development Indicator
UNEMPL	Total (percent of total labor force)	Unemployment refers to the share of the labor force that is without work but available for and seeking employment.	
FDI	Foreign direct investment, net outflows (percent of GDP)	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net outflows of investment from the reporting economy to the rest of the world and is divided by GDP.	
EFI	Overall economic freedom index	Economic freedom is the fundamental right of every human to control his or her own labor and property. In an economically free society, individuals are free to work, produce, consume, and invest in any way they please, with that freedom both protected by the state and unconstrained by the state. In economically free societies, governments allow labor, capital and goods to move freely, and refrain from coercion or constraint of liberty beyond the extent necessary to protect and maintain liberty itself.	Heritage Foundation

simple average of its scores on the 10 individual freedom indices from the Heritage Foundation. The economic freedom index (EFI) is individually scored on a scale of 0–100. The 10 indices are grouped into four broad categories: Rule of law (property rights, freedom from corruption); Government size (fiscal freedom, government spending); Regulatory efficiency (business freedom, labor freedom, monetary freedom) and Market openness (trade freedom, investment freedom, financial freedom). In this paper, the stage of economic development is proxied using GDP per capita.

Several steps are employed in the selection of the sample used in the empirical analysis. As a first step, countries are grouped according to their level of economic freedom forming three groups representing 49 countries during the period 2004–2008. The first group consists of 15 countries that are characterized as being innovation-driven with scores in the EFI above 70%. The second group consists of 19 countries that are efficiency-driven with an EFI score ranging between 55% and 70%. Finally, the third group is a set of 15 factor-driven countries with a score less than 60% implying that they were less free in terms of economic freedom during the same period. The list of all countries is reported in Table 2.

For dynamic panels with a relatively short time dimension, the preferred method is the fixed effects model (FEM), given by Eq. (1). The FEM allows for heterogeneity among subjects by allowing each entity to have its own intercept value. The term "fixed effects" is due to the fact that, although the intercept may differ across subjects, each entity's intercept does not vary over time, i.e., it is time-invariant.

$$\mathrm{LnEA}_{i,t} = \alpha_0 + \alpha_1 \mathrm{LnEFI}_{i,t} + \alpha_2 \mathrm{LnGDPC}_{i,t} + \alpha_3 \mathrm{LnFDI}_{i,t} + \alpha_4 \mathrm{lnUnemp}_{i,t} + \varepsilon_{i,t}. \quad (1)$$

The subscripts denote the country i and the time period t. EA represents the entry density which proxies EA, EFI represents the rank of economic freedom index,[3] GDPC is the gross domestic product per capita (constant LCU), FDI is the foreign direct investment (FDI), UNEMP is the total unemployment (percent of total labor force) and ε_t is an error term. The dynamic model using the panel generalized method of moments (GMM) — to take care of cross-section heteroscedasticity and contemporaneous correlation — is captured in Eq. (2)

$$\begin{aligned}\mathrm{LnEA}_{i,t} = {} & \alpha_0 + \alpha_1 \mathrm{EA}_{i,t-1} + \alpha_2 \mathrm{LnEFI}_{i,t} + \alpha_3 \mathrm{LnGDPC}_{i,t} \\ & + \alpha_4 \mathrm{LnFDI}_{i,t} + \alpha_5 \mathrm{lnUnemp}_{i,t} + \varepsilon_{i,t}. \end{aligned} \quad (2)$$

3.2. *Empirical results*

Our analysis starts with panel unit root tests followed by the traditional procedures for estimating cross-sectional dependence on the unit root test results. In order to assess the stationarity of the variables employed, this paper uses four different unit root tests

[3] http://www.heritage.org/index/.

Table 2. List of sample countries.

Factor-driven stage countries				Efficiency-driven stage countries				Innovation-driven stage countries			
Country	EFI	Entry Density	GDPC	Country	EFI	Entry Density	GDPC	Country	EFI	Entry Density	GDPC
Algeria	55.72	0.53	4,786	Albania	60.08	0.52	4,108	Belgium	71	3.70	25,100
Azerbaijan	54.18	0.95	5,574	Brazil	60.0	1.91	8,622	Canada	77	6.54	26,102
Belarus	45.92	0.23	2,510	Bulgaria	62.4	4.63	6,798	Cyprus	72	16.55	11,503
Cambodia	57.92	0.13	886	Costa Rica	65.32	11.02	6,582	Denmark	76	4.89	32,320
Egypt	55.48	0.14	1,859	France	61.86	2.78	23,366	Finland	73	2.46	28,790
Guatemala	59.7	0.65	1,892	Hungary	64.72	3.51	5,947	Germany	70	1.12	25,620
India	53.18	0.05	1,042	Israel	63.9	5.29	27,591	Hong Kong	90	10.39	31,515
Indonesia	52.66	0.14	2,187	Italy	63.3	1.81	19,903	Iceland	75	13.01	37,958
Morocco	54.48	0.53	2,827	Jordan	65.02	0.37	3,797	Ireland	82	5.82	30,130
Moldova	57.82	1.40	591	Kazakhstan	56.9	2.33	7,165	Japan	70	1.31	38,563
Pakistan	55.78	0.03	982	Latvia	67.36	4.62	6,056	Singapore	88	5.20	36,972
Sri Lanka	59.82	0.30	2,013	Malaysia	62.22	2.64	8,460	Spain	70	4.82	32,799
Suriname	52.8	0.24	2,600	Malta	66.32	9.12	11,172	Sweden	70	3.29	52,730
Tunisia	58.34	0.73	3,023	Mexico	65.62	0.56	9,507	Switzerland	79	2.57	68,555
Uzbekistan	47.4	0.44	966	Panama	64.9	3.70	6,472	United Kingdom	79	9.77	43,146
				Portugal	63.62	3.54	23,716				
				Romania	56.64	5.80	9,497				
				Slovenia	60.1	2.59	27,015				
				Turkey	55.54	0.87	10,380				

including LLC's test, IPS-W-statistic, Augmented Dickey Fuller (ADF)-Fisher Chi-square test, and Phillips and Perron (PP)-Fisher Chi-square tests. The results of these tests are reported in Table 3 indicating that they are stationary at levels especially for the LLC's test at the 1 percent level.

Table 3. Panel unit root test.

Innovation-driven countries	Variables				
	ED	EFI	GDPC	UNEMP	FDI
Method LLC-*t**					
Level	2.577	−1.269	−3.79*	10.01	18.37
First difference	−14.08***	−5.6***	−3.70***	−6.98***	−2.4**
IPS-W-Stat					
Level	4.11	1.51	1.39	6.95	8.42
ADF–Fisher Chi-square					
Level	15.02	30.38	0.003	1.23	0.51
First difference	44.77	56.822*	267.12***	25.65	12.78
PP–Fisher Chi-square					
Level	15.61	1.29	0.001	0.9	0.04
First difference	105.33***	64.84*	44.77	35.09	7.36
Efficiency-driven countries	LOGED	LOGGDPG	LOGCPI	LOGUNEMP	LOGICTGEXP
Method LLC-*t**					
Level	11.08	−1.68*	1.29	7.52	1.73
First difference	−2.34**	−13.23***	−12.18***	−18.93***	−8.25***
IPS-W-Stat					
Level	4.86	8.35	1.33	4.95	1.38
ADF–Fisher Chi-square					
Level	2.39	26.96	13.54	2.28	13.27
First difference	13.514	133.3***	56.73*	70.745***	87.31***
PP–Fisher Chi-square					
Level	2.39	26.96	14.77	0.179	13.27
First difference	8.31	133.3***	92.95***	76.25***	87.31***
Factor-driven countries	LOGED	LOGGDPG	LOGGDPD	LOGUNEMP	LOGICTGEXP
Method-LLC-*t**					
Level	9.87	10.47	3.29	NA	5.3
First difference	5.87***	−3.98***	−23.59***	NA	−3.76***
IPS-W-Stat					
Level	6.44	3.13	4.38	NA	2.69
ADF–Fisher Chi-square					
Level	0.88	5.48	2.69	NA	2.16
First difference	19.93*	−3.01*	78.48**	NA	42.13
PP–Fisher Chi-square					
Level	0.59	5.48	2.19	NA	0.061
First difference	23.93*	−3.01*	84.59**	NA	42.14

Notes: Numbers in () are standardized errors, *, ** and *** indicate 10%, 5% and 1% level of significant, respectively.

The results reveal a positive significant relationship between EA and EFI in the innovation/efficiency-driven stage countries (Table 4). Furthermore, the results also suggest a positive and highly significant relationship between EA and FDI as well as economic growth in the innovation and efficiency-driven countries. The coefficient of EFI in the efficiency-driven countries is 6.37, higher than the coefficient for innovation-driven countries which is 1.04, in turn underlining the importance of a free economic system to attract more entrepreneurs. Another possible explanation for disparities in results lies in the stage of development as innovation-driven countries are at the steady state. These results are also in line with the literature concerning the importance of economic freedom and institutional measures (Wennekers and Thurik, 1999; Wennekers *et al.*, 2002; Bjørnskov and Foss, 2008).

Table 4. Cross-sectional results macro determinants of entrepreneurial activity.

	Fixed effect estimation			System GMM one step		
	Innovation driven stage	Efficiency driven stage	Factor driven stage	Innovation driven stage	Efficiency driven stage	Factor driven stage
EA_{t-1}				0.4095*	0.3221*	0.1757*
				(0.179)	(0.132)	(0.08)
EFI	1.04***	6.37***	−0.063***	4.8499**	0.185*	−7.727**
	−0.004	−0.0002	−0.0023	(1.566)	(1.239)	(2.2)
GDPC	1.22***	10.32***	0.18***	0.454*	0.715*	0.0333
	−0.006	−0.0003	−0.0003	0.141	(0.1542)	(0.03)
FDI	0.027***	0.58***	−0.018***	0.2511**	0.481**	−1.009***
	−0.0002	−0.00001	−0.000007	0.075	(0.1036)	(0.285)
UNEMP	−0.44***	−2.5422***	−0.021***	0.209	−0.0481*	0.667
	−0.002	−0.00009	−0.00031	0.1846	(0.103)	(0.33)
C**	−14.53***	−117.1	0.4	−21.184**	−16.54**	−30.74**
	−0.05	−0.004	−0.0067	(6.916)	(6.143)	(9.107)
H-statistic	53.16***	22.13	13.4	—	—	—
Serial-correlation test				1.6*	0.08*	0.5
Sargan test				68.6**	12.49**	43.64*
Number of instruments				58	14	33
Number of countries	15	19	15	15	19	15
Number of observation	75	95	75	59	75	45

Notes: The first three columns present the result of fixed effects estimation for the three groups of countries while the last three columns present the result of one step system — GMM. The dependent variable is the entry density.

The *H* test is the Hausman one permitting to validate or not fixed effects results. The alternative hypothesis leads to the adoption of fixed effects results. For Sargan test, the null hypothesis indicates that the used instruments are not correlated with the residuals.

Standard errors are reported in parentheses. ***, *, and * indicate significance levels at 1%, 5% and 1%, respectively.

On the other hand, we find a significant negative relationship between EA and EFI in factor-driven countries. This result highlights the importance of economic freedom and sound institutions for this group of countries to affect EA positively, which could in turn explain their weak performance. These countries face many challenges that are rooted in the economic freedom sub indices. Acs *et al.* (2008) suggest that factor-driven stage countries should work towards the efficiency-driven stage by achieving stable institutional and macro-economic environment and by increasing entrepreneurial capacity and enabling individuals and businesses to absorb knowledge spillovers.

Another important result is the highly positive and significant relationship between EA and economic growth in the three groups of countries. But the estimated coefficient is 0.18 in the factor-driven countries recording the lowest coefficient compared to the innovation-driven countries with a coefficient of 1.22 which in turn is less than the efficiency-driven countries with a coefficient of 10.32. This higher coefficient shows that the efficiency-driven countries with a higher startup rate demonstrate higher growth rates. This important role for EA illustrates how it serves as an agent to stimulate the economy and create opportunities. These results support the conclusions of the previous studies as well (Audretsch and Fritsch, 2002; Acs, 1992).

One of the central goals of public policy among all modern economies is to accelerate growth, attract more investments and increase employment. Results suggest positive relation between FDI and EA in innovation and efficiency-driven countries. The estimated coefficient is 0.027 in the innovation-driven countries which is less than the coefficient of 0.58 for the efficiency-driven countries (see Table 4). This higher coefficient shows the ability of efficiency-driven countries to attract more investment and the reason behind this may be related to the fact that innovation-driven countries require huge investment to start businesses depending on research and development, while efficiency-driven countries require less investment. Similar results were found by Klepper and Sleeper (2000) and Agarwal *et al.* (2004).

On the other hand, in factor-driven countries, we find a negative relationship between FDI and EA. Such results provide additional explanations for the weak performance of a group that is characterized by an economic system that is not only relatively less-free but also suffers from inadequate institutions to attract investments, which appear to be very sensitive to prevailing regulations and laws.

Finally, we find a negative relationship between unemployment and EA across the three groups. The estimated coefficient in the efficiency-driven countries is 2.54, 0.44 in the innovation-driven and 0.021 in the factor-driven countries. The empirical results support what has been termed as a "Schumpeter effect" as he argues that EA reduce unemployment which is in contradiction with some of the other literature (for instance, see Storey, 1991; Foti and Vivarelli, 1994).

We also report the dynamic estimation results using system-GMM in Table 4 which are broadly consistent with the results reported earlier.[4] The dynamic lagged dependent variable emerges as being significant for all the groups of countries. Further, the estimation results reported also show that there is a positive relationship between EA and EFI in innovation-driven countries, but this relation is absent for the other groups of countries. More importantly, the results are consistent in showing that growth and FDI have a positive and statistically significant relationship with EA in both efficiency-driven and innovation-driven countries. The relation between the unemployment and EA is significant only in the efficiency-driven countries.

4. Conclusion

EA have multiple impacts and determinants, which have been documented extensively in a number of theoretical and empirical studies in the literature. However, the importance of institutions in explaining EA has not been paid attention to, which has been the main contribution of this paper. The paper reports a set of cross-country tests of the determinants of the EA using data from 49 countries for three groups of countries, classified into factor-driven, efficiency-driven, and innovation-driven countries.

The study shows that economic freedom is one of the main determinants of EA and plays a significant role in spurring EA in innovation and efficiency-driven stage countries. The empirical results of the paper emphasize the important role of free and sound economic system to attract and encourage EA, as evidenced by the negative relationship between EA and economic freedom in factor-driven countries characterized by weak institutions. Further, the positive relationship between FDI and EA in innovation and efficiency-driven countries, as well as the negative relationship between the two variables in factor-driven countries, stresses the importance of sound institutions in factor-driven countries in attracting more investments that would spur EA.

However, in factor-driven economies, small and new firms are not at the fore-front of the innovation process and hence their impact on economic growth is smaller compared to entrepreneurs in the innovation-driven economies. Moreover, the role of EA is lower in factor-driven countries in comparison with innovation-driven countries. In such countries, a sound regulatory system should help them overcome their institutional inadequacies and allow entrepreneurs to be able to execute business processes efficiently. This could in turn attract more investments that could be channelled into research and development activities which in turn could generate positive spillovers for factor-driven economies.

[4]The consistency of the GMM estimator depends on the assumption that the error term ε does not exhibit serial correlation and that the instruments used are valid. Following Arellano and Bond (1991), we used Sargan test of restrictions for over-identification, to test the overall validity of the instruments. Analyzing the sample analogs of the moment conditions used in the estimation procedure proved that Sargan test is robust to heteroskedasticity or autocorrelation. The second test examined the no serial correlation assumption of the error terms.

The results also show the positive and significant relation between EA and economic growth across all the three groups of countries. Finally, the empirical results also suggest that there is a clear negative relationship between an increase in EA and the decrease in unemployment rates across the three groups of countries.

Some broad policy implications arise from the study showing the mediating role economic freedom has attracting more EA to foster economic growth. The positive effect of economic freedom suggests that it may be good for governments to enhance the quality of institutions and the competence of entrepreneurs to accelerate growth.

The study is not without its limitations. Notably, the study depends on the WBGES data that covers only a short period of time (2004–2008). Future research could extend the analysis by considering different or longer periods. Further, the results are based on the overall economic freedom index that is constructed based on ten sub-indices. Additional analysis for each index might provide new results of the role of a specific policy.

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