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**PUBLIC POLICY FOR ENTREPRENEURSHIP
AND INNOVATION: IMPACT IN MANAGED
AND ENTREPRENEURIAL ECONOMIES**

Karen Murdock

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Departament d'Economia de l'Empresa

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Public Policy for Entrepreneurship and Innovation: Impact in Managed and Entrepreneurial Economies

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Working Paper (b)

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Introduction

Many of the most advanced economies of the world have undergone significant transformation in the last few decades. Globalization and technological changes, especially developments in information technologies, have helped to stimulate this transformation. These have contributed to changing institutional frameworks in many respects within the economies including adjustments to economic policies. The results of these transformations take many different forms and are manifested in different areas of an economy. At the heart of these changes however, has been the increasingly important role of entrepreneurship in the economy. The transformed ('new') economy stimulates and supports activities in innovation and entrepreneurship and is labelled the entrepreneurial economy. The 'old' economy on the other hand restricts such activities and is referred to as the managed economy (Audretsch & Thurik, 2001).

The fundamental differences between the transformed and old economy are reflected in fourteen trade-offs which are separated into four groups. These trade-offs contain the elemental conditions which separate the two kinds of economies. Table 1 outlines these trade-offs. The first group concentrates on the underlying forces behind the two economies. It comprises three trade-offs: localization versus globalization; change versus continuity and jobs and high wages versus jobs or high wages. Localization versus globalization as a fundamental element that distinguishes the two economies, deals with the difference in meaning of geographic space. In the managed economy product and the production process are standardized and utilize the traditional inputs of land, labour and capital and where regional specific characteristics have no real bearing on what transpires in the economic process. Globalization and advances in technology however has had the effects of erasing the comparative advantage that high waged countries have gained from routine economic activities, based on these traditional production factors. Such routine activities can now be transferred with relative ease to low cost areas of the world thanks to advances in information technology. This has created the need for a new way to remain competitive.

The entrepreneurial economy can be seen as the new way. It is the consequence of a system in which knowledge has emerged as the most important factor of production. Tacit knowledge is believed to be the main source of competitive advantage for

knowledge-based firms. Since its development takes place in localized networks and clusters and it is not ‘costlessly’ transferred across geographic space, it is not affected in the same ways by globalization. Local conditions which facilitate knowledge creation and returns from externalities such as its spill-over are therefore crucial in this new economy. The developments of local spaces, (towns, cities or regions), to create ‘innovation milieu’ in which knowledge creation and its spill-over flourish are therefore more important in this kind of economy. This departure in the meaning of geographic space sets the stage for all the other fundamentals that helps to differentiate the managed and the entrepreneurial economy as can be perceived from the subsequent trade-offs.

Table 1: Trade- offs between managed and entrepreneurial economies

Group	Trade-offs	Managed Economy	Entrepreneurial Economy
Underlying forces	1.	Globalization	Localization
	2.	Continuity	Change
	3.	Jobs or wages	Jobs and wages
	4.	Stability	Turbulence
Underlying Environment	5.	Specialization	Diversity
	6.	Homogeneity	Heterogeneity
Firm Function	7.	Control	Motivation
	8.	Firm transaction	Market exchange
	9.	Competition and Co-operation as substitutes	Competition and Co-operation as complements
	10.	Scale	Flexibility
Public Policy	11.	Regulation	Stimulation
	12.	Targeting output	Targeting input
	13.	National Policy	Local Policy
	14.	Low-risk Capital	Risk Capital

Source: Self elaboration

This paper focuses on the group of trade-offs that concerns public policy². The differences in the goal, target and focus of public policies as well as the system of finance in the managed and the entrepreneurial economy are investigated. The increasing interest of public policy to stimulate entrepreneurship and innovation as a way to achieve economic success helped in the decision to analyze the group of trade-offs.

² The effort required to analyze the entire set of trade-offs is beyond the scope of this paper.

There is a pervasive belief that entrepreneurship and innovation activities stimulate economic growth and that entrepreneurship and innovation activities can be influenced with the right set of public policies. This belief has resulted in a plethora of public policy programs especially in the last decades (Stevenson & Lundström, 2001, Lundström & Stevenson, 2005; Veciana et al., 2004,). This is coupled with the notion that many governments hold strongly that knowledge based industries are vital to economic growth and that they can improve the future of their countries through public policy targeted at these areas (Eliassaon and Eliasson, 1996). This study analyses trade-offs in public policy and concentrates on public policy for entrepreneurship and innovation which have been created as ways to increase the actual levels of entrepreneurship and innovation. These are not the same policies that existed to support small and medium size enterprises (SMEs) and which dates back decades. Through the new policy programs, countries hope to increase the levels of entrepreneurship and innovation that they experience, which will help them maintain comparative advantage and grow their economies.

The study analyses economies of European Union (EU) member countries. These economies are separated into managed or entrepreneurial economies as in Murdock (2009a), which also analysed the trade-offs in public policy. A two-equation model which applies OLS regressions is used to examine the relationship among policy programs representing the four trade-off areas and entrepreneurship and innovation activities in each grouping of economy. The analysis shows that the impact of the variables used to proxy the four areas of public policy on entrepreneurship and innovations are by no means clear-cut and equal across the two grouping of economies. Not all effects are positive in the entrepreneurial economies and negative in the managed economies. For example, higher education R&D which represents the targeting of inputs shows negative impact in the entrepreneurial economies against expectation. The results suggest that recommendations regarding public policies include consideration for whether the economic setting can be considered managed or entrepreneurial. They also point to the need for further reform in public policy in both types of economies.

The paper begins with the development of a conceptual framework which acts as the boundary and guides the analysis. It is followed by the research model and the hypothesised relationships which are assessed. The methodology for the analysis

including the modelling framework and description of the data is then presented. Key results and their discussion are next. The paper ends with some concluding remarks within the limitations of the study and possible implications.

Conceptual Framework

Theory and presumptions

There is empirical evidence of the existence of a relationship between a country's institutions and its level of entrepreneurship. Based on the three pillars of institutions articulated by Scott (1995), Kostova (1997) divided a country's institutional profile into normative, cognitive and regulatory dimensions and pointed out that they all have implication for a country's entrepreneurship activities (Kostova, 1997). Busenitz, Gomez & Spencer (2000) subsequently showed that countries are rated differently on each of the three dimensions. In addition they showed that each dimension relates to different aspects of what constitutes entrepreneurship across countries. Along similar lines of research, Spencer and Gomez (2004) showed that the regulatory dimension was a significant negative predictor of self-employment but not a good predictor of the prevalence of small firms. It was however a significant positive predictor of advanced entrepreneurship, which they measured as the number of new firms listed on a country's stock exchange.

The Institutional Theory proposed by Douglass North, forms the theoretical foundation on which this analysis is based. It views institutions as constraints that are imposed to reduce the uncertainties involved in human interactions. It suggests two basic types of institutions, formal and informal. Formal institutions including the rules of laws, government procedures and policies, define the set of economic opportunities that are available in an economy. They also determine the attractiveness or incentives for pursuing each of those opportunities. Informal institutions on the other hand include the ideas, beliefs, values and attitudes of a group of people. They are socially sanctioned norms which are internally enforced. It is the former group of institutions, as the location of public policies, which is our concern in this research (North, 1990).

According to North, the economic success that countries in the developed world, such as the USA and Western Europe, have experienced is a result of their institutional

settings. Property rights laws, political rules and even labour laws that determine the rights that one has over one's labour have all had a significant role in the economic development of places. In similar lights the lack of economic progress that other parts of the world have experienced has been attributed to their institutional structure. In this latter instance, the failure to develop strong formal institutions has obstructed the kinds of interactions that would have contributed to economic success (North, 1990). Although institutions are generally stable, they evolve over time and in this way help to create opportunities for new and different economic activities which may be labelled entrepreneurship and or innovation. A pervasive trend among world governments is that institutions in the form of public policy can be used to simulate entrepreneurship (with innovation as a more recent addition) and in this way they can increase economic growth and improve the competitiveness of their countries.

Globalization and advances in information technology have caused significant changes in the economies of especially the developed world. These changing conditions have created avenues for entrepreneurship and innovation in several ways. For example, technological changes facilitated the PC revolution. This has helped the creation of new generic technologies with industrial possibilities such as biotechnologies in its modern form and nanotechnologies which did not exist just a few decades ago (Eliasson, et al., 2004). Technological changes have also reduced the need for scale economies opening up opportunities for new small firms. Consumer demand for more personalized goods and services have also created avenues for entrepreneurship. Increasing disposable incomes have also created demands for high quality products which have served to drive innovation in both product and processes. The ways that economic activities are organized have also undergone significant changes. Cheaper communication and transportation cost have resulted in greater interaction among people from different parts of the world.

These developments no doubt signal progress and development in many instances. There are however 'flip-side effects'. One such effect is that many developed economies have seen their comparative advantage eroded by high quality competition from Central and Eastern Europe as well as Asia (Audretsch & Thurik, 2001). The responses to these developments have included changes in their institutional structure through which they hope to hold on to their comparative advantage. Not all economies

have undergone these changes which have created the polarity in economies. One aspect of this divergence is the creation of public policies to stimulate the entrepreneurial and innovation processes. Since many countries now strongly believe that their ability to remain competitive in world markets is tied to entrepreneurship and innovation.

This has contributed to a proliferation of new public policy that they hope will create the environment to stimulate and nurture entrepreneurship and innovation.

The transformations in terms of public policy can be seen in the form of four trade-offs for policy (Audretsch & Thurik, 2001). These concern the goals, location and target of public policy as well as the system of finance and are: (a) Regulation versus stimulation: Antitrust (competition policy), regulation and public ownership are the general characteristics of public policies that existed in managed economies, especially in the post war periods. They aimed to regulate or constrain the activities of the existing large powerful corporations. In the entrepreneurial economy which is characterized by a large number of firms, many of which are small and new, the general goal of public policies is to create a stimulating environment that supports economic activities that will lead to economic success. (b) National policy versus local policy: In the managed economy the locus of public policy is at the national or federal level where national institutions are responsible for shaping public policies for localized recipients. In the entrepreneurial economy public policies tend to be developed locally. These public policies are influenced by the local conditions incorporating special needs and result in more effective public policies.

(c) Targeting outputs versus targeting inputs: Public policies are targeted at outputs in the managed economy. This means that emphasis is placed on targeting a set of industries or even firms through which it was believed that the country could gain comparative advantages. These could be promoted through specific government programs to ensure that they could compete with similar entities in other countries or even dominate world markets. In the entrepreneurial economy, targeting inputs into the economic process becomes important. With uncertainty about what to produce, how to produce it and who should produce it, it is difficult to target outcomes, industries or firms. Public policies are therefore targeted at creating inputs, specifically the creation and commercialization of new knowledge which has become the most important input in the economic process. (d) Low Risk Capital versus Risk capital: Traditional means of

financing where existing companies are provided with liquidity for investments dominate in the managed economy. In the entrepreneurial economy however, where ideas for new products and services resulting from innovative activity are shrouded in uncertainty, a different system of financing becomes necessary. Venture capital combining liquidity with other resources such as management competence and experience and personal networks is needed to accommodate these embedded uncertainties and risks (Audretsch and Thurik, 2001).

The literature

The literature on public policy for entrepreneurship and innovation can be divided into several different streams. There is the extensive work of Stevenson & Lundström, 2001; Lundström & Stevenson 2005³ and Veciana, 2004 that have concentrated on what may be referred to as traditional entrepreneurship policies. These are public policies that are geared mostly at creating a protected environment for small and medium sized enterprises and to which objectives for entrepreneurship were subsequently added. Similar but less extensive coverage of public policies for entrepreneurship have appeared in various publications of the OECD and the European Commission (OECD, 1998, EC, 2003). A general theme among these works is that of outlining the types of public policies for SMEs and entrepreneurship that exist in different countries, including the motivations behind them. Storey has also made significant contributions in this area of the literature including analysis of the effectiveness of some SME support programs and has also provided structure for the evaluation of the effectiveness of such policy programs (Storey, 1998; Storey, 2002).

Another line of research focuses on individual areas that are addressed by public policy to stimulate entrepreneurship and/or innovation, such as education and regulations. They generally analyse how each area affects entrepreneurship, measured in different ways. Djankov et al., 2002 for example, have investigated the impact of regulations on entrepreneurship in terms of the entry rate of firms into the formal economy. They found that more restrictive regulations prevent firms from entering the formal economy. Van Stel et al. (2006) have shown that labour regulations together as well as other

³ This work is limited to 11 countries and does not assess any impact of the public policies identified.

aspects of regulations such as minimum capital requirement to start a business do lower the entrepreneurship rates in the countries they sampled. Capelleras et al (2008) have also looked at the effect of regulations on entrepreneurship. Altogether they seem to suggest that higher levels of regulation are potentially detrimental to entrepreneurship. The hypothesis in this regard is therefore that H1: Regulations will have positive effect on entrepreneurship and innovation in entrepreneurial and negative effect in managed economies.

Education has shown mixed effect. For example, while higher education may increase the quality of self-employment, it has the effect of also reducing the quantity of self-employment (Burke et al., 2000; Reynolds et al., 1994). Kirchoff et al., 2002 have identified university expenditure on R&D as having significant impact on new firm formation, especially 'technological oriented firms' in the regions surrounding universities and research institutions. The above would suggest that the investments that are made in creating knowledge (both directly and indirectly) provide opportunities for innovation and subsequently entrepreneurship. This therefore leads to the following general hypotheses H2: The targeting of inputs will have positive effect on entrepreneurship and innovation in entrepreneurial economies and negative effect in managed economies.

There is yet another stream of research, one that shares the most similarity with this study. Here the focus is on combinations of public policy programs for entrepreneurship and innovation and trying to establish relationship between these public policies and rates of entrepreneurship in different countries. The most extensive one that comes to mind is that of Hoffmann (2007), which considered a wide selection of public policies and how they may affect entrepreneurship. This research found that venture capital was an important impact on entrepreneurship activities. The important function of capitalists, who provides money and share the risk involved in commercializing new ideas in the innovative entrepreneurial process, dates back to Schumpeter. Since then many others including Eliasson and Eliasson (1996) have highlighted the importance of capitalists to bankroll the ventures of especially knowledge-based entrepreneurs. The availability of financing for new firms has been an issue from the very beginning of government intervention. Venture capital and other non traditional forms of financing are especially needed when the new ventures are based on new uncertain knowledge.

Such as is the case in the newer industries such as biotechnology, nanotechnology, and even in the information and telecommunication sectors. The hypothesis is therefore that H3: The venture capital activities will have positive effect on entrepreneurship and innovation in the entrepreneurial economies and will have negative effect in the managed economies.

The location of public policy development has come to prominence in the past two decades. A key concern in these discussions has to do with the level of government that is most appropriate for public policy development and implementation (Uyarra, 2008). The emergence of the entrepreneurial (knowledge) economy and subsequent discussions about the nucleus of this economic orientation is often accompanied by accounts of the region as the appropriate level for the making of public policy. The region as an appropriate unit for policy development and implementation has also been discussed in the literature by authors including Cooke and Morgan, (1998), Malmberg and Maskell, (1997) and Storper, (1995). The location of public policy development has not, as far as we are aware, been singled out as one of the important determinants of neither entrepreneurship nor innovation. In keeping with the expectations of the trade-offs between the managed and the entrepreneurial economies, the hypothesis in this area is the following: H4: Regionally developed public policies will have positive effects on entrepreneurship and innovation in entrepreneurial economies and have negative impact in managed economies.

There is also the line of research looks at the relationship between entrepreneurship and economic development. This line of research is worth mentioning even though it has different objectives from this study. However, it is this link between entrepreneurship and economic development that have spurred the renewed interest in entrepreneurship and resulted in the shifting orientation in public policy for entrepreneurship and innovation. Positive relationships between entrepreneurship and economic growth have been shown by authors such as Carree, et al. (2002) and Carree & Thurik (2003). Entrepreneurship activities are seen as related to economic growth, measured as employment at the country level, in the GEM reports compiled by Reynolds and his colleagues.

The separation of countries into managed and entrepreneurial economies based on the trade-offs, as is done in this paper is new and so research which specifically addresses the managed and entrepreneurial economies is still to come. There is some works that have looked at the transformation taking place in different countries under the theme of the knowledge economy. While not referring specifically to these two groupings of economies, they provide useful insights into tangible indicators that signal technological transformation/innovation adaptation, which helps to separate many of the world's most developed economies. The Knowledge Economy Index (KEI) project undertaken by the UNU-MERIT⁴ in an effort to develop and improve indicators for the knowledge economy provides valuable indicators that signal innovation and technology changes which drive the entrepreneurial economy. The work by the Joint Research Unit of the European Commission (Saisana & Munda, 2008) as well as 'The 2007 State New Economy Index' (Atkinson & Correa, 2007) provides strong evidence of the types of factors that are tangible evidence of a separation among economies or states and provides useful insights in the grouping of the countries.

Methodology

Public policy programmes/initiatives dealing specifically with these four trade-offs and which are aimed at facilitating innovation and entrepreneurship, are operationalized into dependent variables in a statistical analysis. To analyze their effect on entrepreneurship and innovation a two equation model similar to the one used by van Stel et al. (2006) is applied. It assesses entrepreneurship and innovation rates separately but also take into consideration the interrelations between the two concepts. The innovation variable is used as both dependent and independent at different specifications. It is specified as a dependent variable in equation 2 after it appeared as part of the set of independent variables in equation 1. In equation 1, innovation is seen as one of the factors influencing the proliferation of entrepreneurship in a way similar to the 'conversion effect' described by van Stel et al. (2006). A country that demonstrates high levels of innovation activities is expected to have a high coefficient on this variable which is

⁴ A joint research and training centre of United Nations University ([UNU](#)) and [Maastricht University](#), The Netherlands.

expected to be a contributing factor for higher levels of entrepreneurship by providing more opportunities for persons to enter the entrepreneurial process.

19 EU member countries are analyzed in this paper. They were selected to represent the make up of the Union and include a mix of population size and length of membership as well as a wide spectrum of GDP. These countries are separated into managed and entrepreneurial economies in part on indicators of innovation and technological transformation using cluster analysis. The groups are managed economies comprising Czech Republic, Greece, Hungary, Italy, Latvia, Poland, Portugal, Slovenia and Spain. The entrepreneurial economies are Austria, Belgium, Denmark, Finland, France, Germany, Ireland, the Netherlands, Sweden and the United Kingdom.

The model

Equation

1. $K = f(N, G)$

2. $N = f(G)$

K= Entrepreneurship activity

N = Level of Innovation

G = vector of explanatory variables reflecting institutional effects in the form of public policy.

In the empirical application of the model, K, the level of entrepreneurial activity in a country is operationalized as the entry rate of new firms (ERNF) as measured by Eurostat and EIM, Netherlands. The Eurostat database on business demographics is an effort to create a harmonized database in this area. However it is in its infancy and is incomplete. The data from EIM is therefore used to supplement it. The entry rate of new firms is more likely to capture formally registered enterprises. They are also more likely to be the more innovative ventures or high-growth potential enterprises which Acs & Varga (2005) have suggested are most important for economic development. N represents the level of innovation in a country and appears as both a dependent and explanatory variable. The amount of innovation activity can influence the availability of entrepreneurial opportunities in a country thus affecting total entrepreneurship levels. In

the empirical application the number of patent applications for each country is the proxy used for this variable.

Table2a: Variable description and sources

Variable	Description	Source
Employment Rigidity	A composite index made up of a simple average of the difficulty of hiring, difficulty of firing and rigidity of hours indices. Higher values indicate more rigid regulations.	WBDB
Cost of firing	The cost of advance notice requirements, severance payments and penalties due when terminating a redundant worker, expressed in weeks of salary.	WBDB
Business regulation	A composite index of 7 components to identify the extent that regulations and bureaucratic procedures and regulatory constraints limit competition and the functioning of the market. Higher score indicates a more market driven economy.	EFWR
Foreign ownership restriction	Foreign ownership of companies in your country is (1= rare, limited to minority stakes and often prohibited in key sectors, 7 = prevalent and encouraged).	GCR
Local/Regional public policy	Percentage of total government expenditure assigned to local or state government.	Eurostat

Source: Self elaboration

Note: WBDB = World Bank Doing Business

EFWR = Economic Freedom of the World Report

GCR= Global Competitiveness Report

Explanatory Variables

Several variables make up the vector G in the empirical application of the model. The regulations areas covered are labour regulations including the cost of firing, general business regulations and a measure of the openness of the economies. Higher values of these variables, with the exception of business regulation, are indicative of a rigid regulatory regime. Higher values of business regulations here however signify a free market economy where competition flourishes. There are variables representing the 'location' of public policies, the targeting of input and the existence of a vibrant risk financing system are described in Tables 2a and 2b. Taken from reliable sources, they are selected to, as closely as possible, proxy the four trade-offs in public policy that distinguished the managed and the entrepreneurial economies.

Table2b: Variable description and sources

Variable	Description	Source
Government Appropriations for R&D	Government budget appropriations or outlays on R&D (GBAORD) refer to budget provisions, not to actual expenditure expressed as a percentage of GDP.	Eurostat
Scholarships and grants	Financial aid from all levels of government expenditures (excluding loans), extended to students at all tertiary level in all educational programs.	OECD
Higher education R&D expenditure(HERD)	R&D expenditures include all expenditures for R&D performed within Higher Education sector on the national territory during a given period, regardless of the source of funds shown as a percentage of GDP.	Eurostat
University/industry collaboration	The collaboration between business and local universities in their R&D activity. (1= minimal or nonexistent, 7 = intensive and ongoing)	GCR
Venture capital (Seed & Start-up and Expansion and Replacement)	Private equity raised for investment in companies broken down into two investment stages: Early stage (seed + start-up) and expansion and replacement capital as a percentage of GDP (gross domestic product at market prices). It does not include management buyouts, management buyins and venture purchase of quoted shares.	Eurostat
Capitalization of stock market	Market capitalization of listed companies as a percentage of GDP.	World Bank Development Indicators
Venture capital availability	Entrepreneurs with innovative but risky projects can generally find venture capital in your country (1= not true, 7 = true).	GCR

Source: Self elaboration

Control Variables

There is a myriad of factors that influences and affects the level of entrepreneurship and innovation activities in a country. It is impossible to include them all or to control for all of their potential impact. Two factors which remain diverse among the countries in each group and which may have serious implication for entrepreneurship and innovation are economic and population growth rates.

These are therefore included as control variables in the analysis. Population growth rate⁵ is the average annual percent change in the population, resulting from a surplus (or deficit) of births over deaths and the balance of migrants entering and leaving a country.

⁵ The rate may be positive or negative and is taken from the US Census Bureau international database.

Economic growth comes from Eurostat and is calculated using data at previous year's prices. This calculation of the annual growth rate of GDP volume allows comparisons of economic development both over time and between economies of different sizes irrespective of any changes in prices.

The data covers the period 2001-2005 creating a balanced panel of 95 observations which contain both time variant and time invariant data. OLS regressions with robust standard error are used for the analyses⁶. A series of first level regressions are performed where each independent variable is added to the control variables as equations 1 and 2. Those variables that appear significant at this first stage are included in the final regressions. In the full regressions, the independent variables are tested for multicollinearity and where it was identified between two variables the one with the strongest level of significance is kept and the other removed from the regression. The regressions passed Skewness-kurtosis test for normality. The final results obtained by the above procedure are presented in Table 3.

Results and Discussions

Population and Economic Growth

Population growth shows significant positive impact on ERNF in entrepreneurial economies. As was pointed out earlier this effect could be either on the demand side or on the supply side (Verheul et al., 2002). On the demand side, increasing populations create greater needs and the meeting of these can create opportunities for entrepreneurship. On the supply side, the increasing population creates more people that need employment, some of whom may have to enter self employment to realize any gainful employment.

In managed economies the effect on ERNF is negatively significant. Population increase is either natural or through immigration. In the case of natural population, improving economic conditions may allow families to have more children. The increases in demands are met by existing companies as an anticompetitive environment may deter new entrants. In the case where population increase is the result of immigration, these immigrants may be going to work for existing companies rather than striving to establish their own firms.

⁶ In each regression the analysis is performed by groups.

The latter scenario exists for example in Spain. It has experienced significant immigration; however the majority of immigrants work for existing firms.

Economic growth on the other hand only shows negative impact on patents in entrepreneurial economies and may be an expression of a reality in which the countries that have the highest economic growth have lower levels of patent applications. These economies are growing either from old technology or they are benefiting from innovations that have taken place in other places. It has been suggested that this is happening in several Eastern European countries such as Hungary where new technology developed elsewhere is introduced into the manufacturing process.

Table 3: Final Regression

Equation 1 DV= ERNF	Entrepreneurial Economies	Managed Economies	Equation 2 DV= Patent	Entrepreneurial Economies	Managed Economies
Intercept	1.3** (2.8)	.59 (.46)	Intercept	5.8*** (4.4)	10.9*** (4.7)
Population Growth	.33** (5.5)	-.46** (-2.2)	Population Growth		
Economic Growth	.007 (.44)	-.02 (-1.1)	Economic Growth	-.08** (-3.1)	.03 (.52)
Employment Rigidity	-.06** (-2.3)	-.16** (-2.2)	Employment Rigidity	.26*** (7.1)	-.68** (-3.0)
Business Regulations	.52** (2.5)	.73** (3.2)	Business Regulations	.09 (.29)	2.9** (3.4)
Foreign ownership restriction			Foreign ownership restriction	-1.9** (-2.5)	-6.7*** (-7.0)
Regional government expenditure			Regional government expenditure	.26** (3.3)	.63** (4.5)
Higher Education R&D	.45*** (4.8)	.21 (1.1)	Higher Education R&D	-2.8** (-2.1)	-2.7*** (-5.3)
University/industry Research collaboration			University/industry Research collaboration	.92** (3.2)	1.5** (2.5)
R ²	.793***	.461**		.865***	.826***

Note: robust t-values in brackets. ***Significance at 1% level **Significance at 5% level

Source: Self elaboration

Entrepreneurial economies

Entrepreneurial economies, by classification represent a collective of public policies that support the entrepreneurial and innovation processes. As the propositions indicated, it is expected therefore that the variables used to proxy public policy in these economies will have positive relationship with entrepreneurship and innovation.

Regulations

Regulation variables generally show significant impact on ERNF in these economies. Business regulations show significant positive effects on ERNF. As pointed out earlier, higher scores on this variable signal a free market economy where the market guides activities and determines prices resulting in a more competitive economy. It is therefore not surprising that it would have a positive influence on ERNF. The impact of employment rigidity is negative on ERNF but positive on patents. These results further support the importance of employment regulations in the creation of an infrastructure that supports and fosters entrepreneurship and innovation.

It acts as a deterrent to the entry rate of new firms suggesting the labour regulations of these countries prevent many potential new firms from forming. This has already been suggested, for example that the labour regulations in many Western European countries, compared with the USA, are very restrictive and are not conducive to stimulating entrepreneurship. The most interesting result however is that it does not appear to deter the proliferation of patents. That patent activities are not affected by the labour regulatory regime, may be due to the role that universities play in this area. It could be argued that postgraduate researchers in universities are important contributors in this area and are probably less constrained by the labour regulations of a country. Another surprising result is the negative impact of foreign ownership restrictions on innovation in these kinds of economies. While it was expected that this would be the relations in managed economies, it is surprising to see this kind of effect here.

Regional Public Policy

Regional government expenditure shows no meaningful or significant impact on entrepreneurship in these economies. Recall that one characterization of entrepreneurial economies is that public policies are developed and created in regions or at local

political levels. It was therefore expected that this variable would have had a positive significant impact on entrepreneurship especially in these entrepreneurial economies. This was however not confirmed. It does show significant positive impact on the measure of innovation. This is interpreted to be an indicator that any effect on actual entrepreneurship will be through the 'conversion effect'. However since patent does not show any significant impact on ERNF we speculate that this will depend on how entrepreneurship is measured and that it maybe more likely to show up if technology entrepreneurship is used. This is not an automatic process and much depends on the efforts that are put into transferring research results into commercial products and services that benefit the society. Its positive contribution in stimulating patent activities further supports the significance of the regional innovative systems to the country's economy.

Targeting Input

Entrepreneurial economies differentiate themselves to a large extent by the importance of knowledge as an input in the economic process. Especially since the Barcelona Declaration of the European Commission promoting innovation through research and development has been at the forefront of policy development for EU members. R&D expenditure was also one of the most significant variables in separating the countries and is highest among entrepreneurial economies. These variables are therefore expected to have positive effects here. In terms of the conversion effect that was suggested, patent does not show any significant impact on ERNF, leading us to speculate that the impact may be strongest when 'advanced entrepreneurship' is considered, such as fast growing technology companies.

Higher education research and development expenditure is the only variable that showed significant positive impact on ERNF. This is a probable indication of the strength of the role of spin-outs from universities and other higher education institutions in influencing the number of new firms that are entering the economy. The negative impact on patents is cause for concern. It is expected that the more that universities and other higher education research institutions spend on research and development activities, the greater would be their discovery of patentable ideas. This link however cannot be substantiated based on the present analysis. University/industry research collaboration shows a significant enabling effect on patent. This kind of collaboration

can serve to focus research activities which may contribute to the discovery of ideas with better potential for commercialization. This kind of protection becomes important to industry as it aims to commercialize these ideas. More patents are expected to contribute to greater opportunities for the creation of fast growing companies.

The negative relations and the overall weak performance in this area of policy is a worrying sign but not necessarily a new finding. It suggests that there still exist institutions which hinder the important transformation from research results to actual useful products and services that benefits society. It further supports what has been established in the literature that efforts at targeting inputs, such as increasing R&D spending, does not correspond to increasing entrepreneurship. The countries that have the highest expenditures in areas such as R&D do not demonstrate correspondingly high rates of entrepreneurship (Acs et al., 2005; Henrekson & Roine, 2007).

System of Finance

Existing views and evidence of the effect of financing on entrepreneurship is mixed (Capelleras et al., 2005; Hoffman, 2007). Popular opinion holds that the availability of risk finance in the form of venture capital or less formal sources such as business angels is crucial to the development of entrepreneurship and indeed for the development of the entrepreneurial economy. Indeed the ready availability of a system of risk finance helps to define the entrepreneurial economy. However the literature has not provided any strong empirical support for the significant impact of venture capital on entrepreneurship and neither can this study, especially in more traditional measurements such as ERNF. Financing also does not show any significant impact on patenting; probably supporting the notion that most of the financing at this early stage of the knowledge creation process comes from government or other public sources.

Managed economies

The managed economies are expected to exist at the other end of the spectrum from entrepreneurial economies in terms of the four trade-offs concerning public policy. They have public policies that deter rather more than they stimulate both innovation and entrepreneurship. As the hypotheses indicated, these are expected to have negative impacts.

Regulation

Business regulations and employment rigidity demonstrate similar effects on ERNF here as in entrepreneurial economies. This strengthens the notion that these variables are so crucial to the entrepreneurial process that their impacts transcend the economic structure. It also suggests that business regulations and employment rigidity are not that different between these two grouping of economies. In the case of innovation the effects are slightly different. The effect of business regulations is positive and significant here though it was not significant in entrepreneurial economies. Employment rigidity shows negative impact on patents. Foreign ownership restrictions also show significant negative impact on patents as in entrepreneurial economies. Foreign companies may not be the best contributors to the innovation process (in the area of patent development). It has been suggested that rather they help to introduce existing technologies to countries that are not at the cutting edge of innovation such as many of those making up the managed economies.

Regional Public Policy

Regional government expenditure only shows strong positive impact on patent which is similar to that shown for entrepreneurial economies. This further supports the belief that efforts at increasing the innovation capacity are better served or more effective when a regional or local approach is taken. In addition, any effect on the level of entrepreneurship, even in managed economies, may have to come in the form of 'conversion effects' as we have tried to demonstrate in this study.

Targeting Input

The variables that represented the targeting of input show no significant (direct) impact on ERNF in managed economies. Any impact on entrepreneurship will have to be by 'conversion' through patents. The identified effects on patents are similar to those observed earlier in the entrepreneurial economies. University/industry research collaboration has positive impact on patent applications. This collaboration can provide resources to engage in research work that may lead to the discovery of ideas that can be patented. The relationship between higher education R&D expenditure and patent applications is also negative, as is the case in entrepreneurial economies.

System of Finance

The system of finance variables do not generate any significant impact on measures of entrepreneurship nor innovation in managed economies. It was expected that these variables would not be the determining factors for entrepreneurship and innovation in managed economies, since based on its classification these kinds of financing are less readily available in these kinds of economies. Venture capital is expected to be less available in managed economies than it is in entrepreneurial economies. As such entrepreneurs and innovators will have to find other sources of financing their ventures and their research. Government financing programs either nationally but increasingly at the EU level are crucial for early stage funding of research in both groupings of economies. The development of stock markets and their capitalization is also generally less in managed economies and therefore does not offer an attractive exit route for venture capitalists.

Concluding Remarks and Implications

These results show that the relationships among the variables are not as clear-cut as predicted. In the case of entrepreneurship, there are negative relationships in entrepreneurial economies where positives were expected such as in the case of employment rigidity. Other expected relationships were also absent as in the case of regional government expenditure. On the other hand also positive relations are seen in the managed economies when only negative ones were expected as in the case of business regulations and the targeting of input (Higher education R&D). For innovation, the relationships are also mixed. In the entrepreneurial economy foreign ownership restriction representing regulation shows a negative impact on innovation as is the case of higher education R&D. At the same time there are some positive impacts in the managed economy where negative impacts were predicted. Regional government expenditure, university/industry research collaboration are examples. The most drastic result however is the lack of significant impact of any measure of risk finance in either grouping of economies.

These results nevertheless demonstrate that the entrepreneurial economies have an institutional profile, in terms of these limited public policy trade-offs, that is more

supportive of entrepreneurship and of innovation. These are based on the positive relations that were proposed and that were observed. It is not a perfect setting, however as there are still deterrents to the entrepreneurial and innovative processes as can be assumed from the negative impacts that are depicted. The most striking finding in this regard is the negative relations between higher education research and development spending on patent applications and the lack of significant effect of university/industry research collaboration on ERNF. This however maybe a reflection of the nature of the data, and suggests a reassessment with other sources or kinds of data. The presence of several negative relations, where positive or no relations were presumed to be, signifies the need of continued efforts to improve the institutional environment. Institutions in the form of public policies that will not just create opportunities for entrepreneurship and innovation but will also facilitate the conversion of these opportunities into growing and prosperous economic units.

The institutional profile to support entrepreneurship and innovation in the managed economies appears to be weaker than that of entrepreneurial economies. It is not a total washout however with some enabling policies for entrepreneurship and even stronger signs in terms of innovation. The identification of positive relationships, where negative ones were expected, attests to this. This maybe attributed to the fact that there are several countries that fall in the group of managed economies that have made significant progress in public policy reform. There are however countries such as Greece, that fall extremely low in the majority of the trade-offs (Murdock, 2009a). Greater efforts must therefore be made to improve the institutional structure of these countries if they are expected to achieve economic growth and experience the kind of economic prosperity that entrepreneurial economies countries like Denmark, the UK and Finland have experienced.

Implications for policy

The results show that there are policies that are damaging to the aim of increasing innovation and entrepreneurship activities in the EU. Detering public policy exists in both economies although they appear to be stronger in managed economies. Labour regulation stands out as important in both types of economies. Wage setting institutions and other labour related legislations discourage the hiring of workers which will hinder both the start and growth especially in managed economies. These legislations may

push firms to move to other places, where there are more agreeable legislations. That the effect on innovation is different in the two economies suggests that policy objective should not be the same in the two economies.

There has been much emphasis placed on increasing R&D spending. However it appears that while there are remarkable efforts being placed on research, the development aspect of the duo is often less emphasized. Increasing spending on R&D is not contributing to increases in patents nor entry rates of new firms which are ways to realize real benefits from the investments in the process. Greater efforts must now be placed on commercializing the result from research, preferable through paving the way for the creation of high-growth potential new firms with complimentary legislations.

There have been remarkable efforts to create financial systems that favour small young and innovative firms. However the lack of any strong impact of these efforts should be considered as indications that there still needs to be greater efforts in this area in both types of economies. Strong government presence in the financing of high-growth potential firms is not the most efficient way to address enterprise financing. An environment of taxes and financial legislations that will make the accumulation of individual wealth an attractive gesture is needed. This will help to create a more active environment of start-ups.

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