The Demography of Enterprises and Employment in the European Union Countries

What are the drivers of business demography and employment in European countries?

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THE DEMOGRAPHY OF ENTERPRISES AND EMPLOYMENT IN THE EUROPEAN UNION COUNTRIES
What are the drivers of business demography and employment in European countries?

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Abstract:

The aim of this contribution is to establish a typology of European entrepreneurship countries with respect to variables related to entrepreneurial activity and economic development. Using a combined use of multidimensional data analyses allows to extend the concept of “entrepreneurial regimes” proposed by Audretsch and Fritsch (2002) and leads to distinguish five entrepreneurial regimes. Moreover, in order to better characterize classes, a wide set of illustrative variables representative of national economic development, labour market functioning, formal and informal institutional environment as well as variables specific to the entrepreneurial population are considered. Finally, discriminant analyzes show that the five explanatory themes that are considered (Innovation, Employment, Formal Institutions, Entrepreneurship and Governance) differentiate the classes and significantly explain the diversity of entrepreneurial regimes. These findings have important implications for the implementation of public policy in order to promote entrepreneurial activity and reduce unemployment.
Résumé :

L'objectif de cette contribution est d'établir une typologie de l’entrepreneuriat dans les pays européens en ce qui concerne les variables liées à l'activité entrepreneuriale et au développement économique. L'utilisation d'analyses combinées de données multidimensionnelles (ACP et CHA) permet d'étendre le concept de «régimes entrepreneuriaux» proposés par Audretsch et Fritsch (2002) et conduit à distinguer cinq régimes entrepreneuriaux. De plus, afin de mieux caractériser les classes, on considère un large éventail de variables illustratives représentatives du développement économique national, du fonctionnement du marché du travail, de l'environnement institutionnel formel et informel ainsi que de variables spécifiques à la population des nouvelles entreprises. Enfin, les analyses discriminantes montrent que les cinq thèmes explicatifs considérés (Innovation, Emploi, Institutions formelles, Entrepreneuriat et Gouvernance) diffèrent les classes et expliquent de manière significative la diversité des régimes entrepreneuriaux. Ces résultats ont des implications importantes pour la mise en œuvre de la politique publique afin de promouvoir l'activité entrepreneuriale et de réduire le chômage.

Keywords :
Entrepreneurship, Cluster analysis, Discriminant analysis, Entrepreneurial regimes

JEL Classification: L26, C38, O1
Introduction

After a growth in the size of enterprises, managerial economics of the late 70’s has been shaken up by the emergence of new businesses in new industries, developing new business models. The current period, then, is a period of reemergence of Entrepreneurship in Europe and North America [Audretsch and Thurik (2000; 2001), Thurik (2011)]. While Europe is certainly more entrepreneurial than in the 1960’s and 1970’s, it remains insufficiently so compared to a global economy that has globally become more entrepreneurial (Audretsch, 2006, reports -Global Entrepreneurship Monitor- GEM, years 2000- 2006-2009). According to Schramm (2009), many young American companies are the creators and leaders of new industries and most of these companies are high-growth. In this later population, firms are rather young (Coad and al., 2014) and they generate a disproportionate amount of jobs, innovations, patents and new technologies. Aghion (2014) emphasizes that innovation involves the creation/destruction just like the Schumpeterian entrepreneur and that some countries are better able to "surf" on new waves of innovations, such as information technology and communication, the "cloud computing" and renewable energy. Like the USA, Sweden and Canada benefit from these technologies due to reforms already undertaken in the labor market to make it more dynamic. The comparison with the USA where strong growth of recent years is partly due to the creation of companies in new sectors may shed light on the need to further develop entrepreneurial intensity in Europe, particularly in the advanced technology sectors, and new collaborative social and environmental business models.

The impact of entrepreneurship on economic growth depends on the nature of the entrepreneurial activities and refers to the difference which exists between an entrepreneurial society which develops private initiative and a wage-based society which increases the opportunity cost to undertake new ventures.

Nissan et al. (2011) find that “institutions affect economic growth, specifically formal institutions, such as procedures or time needed to create a new business, indicating that regulation

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1 Already Erkki Liikanen -Member of the European Commission responsible for enterprise and information- society, wrote in 2003 "Europe Suffers from an entrepreneurship deficit in comparison to the USA". According to the Sapir report (An Agenda for a Growing Europe, 2004), entrepreneurship and especially innovative company creation appeared as an important means of implementing the Lisbon Strategy (2000) to strengthen the innovation and growth in Europe and to build "the most competitive and dynamic knowledge-driven economy by 2010".

2 He also highlights the concentration of resources in the economy of knowledge, support for innovative firms, support for employees who leave their jobs and increasing competition in the market for goods and services.
can influence the context in which entrepreneurship affects economic growth”. The institutional system is then decisive because it guides the trajectory of countries between more or less entrepreneurial versus managerial economies (Audretsch and Thurik, 2001). In a recent study Abdesselam et al. (2017) show that the economic performance of OECD countries depends on the level of development and the trajectory of economies - more or less entrepreneurial - conditioned by their institutional system. Thus, advanced knowledge-based countries with developed financial markets, few institutional legal constraints on the labor market, on the openness of countries and on the creation of enterprises, have a high level of entrepreneurship and the lowest unemployment rates.

The aim of this contribution is to establish a typology of European entrepreneurship with respect to variables related to entrepreneurial activity, namely BIRTH, DEATH, SURVIVAL, High Growth enterprises (shares in number and employs); motives to set up a firm; variables related to economic development and variables relative to labour market. This typology is inspired by the ones proposed by Audretsch and Fritsch (2002). The approach adopted is more general, it relies on a combined use of multidimensional data analyses that take into account the characteristics of the countries relative to the twelve active variables previously mentioned. According to the similarity of these variables, we can distinguish five different entrepreneurial regimes. Moreover, in order to better characterize classes, we also consider a wide set of illustrative variables representative of national economic development, labour market functioning, formal and informal institutional environment as well as variables specific to the entrepreneurial population. Finally, a discriminant analysis (AD) has been applied with the aim of highlighting the possible links between the realized partition into five classes of countries - the variable to be explained - and a set of continuous explanatory variables relating to a homogeneous theme. In other words, we want to know if the classes differ on the set of predictive variables, which classes differ and which variables differentiate them. Five explanatory themes were considered, Innovation, Employment, Formal Institutions, Entrepreneurship and Governance.

In the following section, we present a brief review of the literature and a conceptual model. In section 2, we describe the data. Section 3 analyzes the typology of the 28 European Union countries thanks to business demography variables and economic environment. A discriminant analysis is applied to distinguish the relevant illustrated variables of numerous sub-themes. Section 4 concludes and presents implications for economic policies.
1. Literature review and conceptual model

The European Union is composed of 28 distinct nation states that are different in terms of economic variables (level of development and labour market functioning) and entrepreneurial characteristics (motives to set up a firm and business demography). Different national entrepreneurial regimes may be found with the combination of these two groups of active variables and their embedding in the institutional environment.

This section provides a brief overview of the relevant literature to explain differences in entrepreneurial activity across countries. First, we refer to the broad literature that highlights the link between entrepreneurial activity and economic development on the one hand and the functioning of the labour market on the other. Second, we present the national entrepreneurial characteristics, in particular motives to set up a firm and the business demography. Third, we briefly recall the literature on the role of institutions on entrepreneurial activity. Finally, depending on the different levels of development and entrepreneurial activity and demography, we propose a conceptual model presenting different entrepreneurial regimes.

1.1. Economic variables

The level of development

GEM reports (2002, 2006, 2009, and 2014) highlight a high rate of entrepreneurship in countries whose economic development is relatively low. The weight of the primary sector and the functioning of the informal economy explain the high level of entrepreneurial activity in developing countries. Nevertheless, there is also an impact of entrepreneurship on economic growth that depends on the nature of the entrepreneurial activities and especially on the motives to set up a firm (opportunity/necessity-driven). According to Szerb et al., 2013, p. 22, “(A)s an economy matures and its wealth increases, the emphasis of industrial activity shifts towards an expanding services sector (…). The industrial sector evolves and experiences improvements in variety and sophistication. Such a development would be typically associated with increasing research and development and knowledge intensity, as knowledge-generating institutions in the economy gain momentum. This change opens the way for development of entrepreneurial activity with high aspirations.” Wennekers et al. (2010) “argue that the reemergence of independent entrepreneurship is based on at least two ‘revolutions’”: the solo self-employment (Bögenhold and
Fachinger, 2008, Bögenhold et al., 2017, Fachinger and Frankus, 2017) which is important for societal and flexibility reasons and the ambitious and/or innovative entrepreneurs (Acs et al., 1999, Van Stel and Carree, 2004, Audretsch, 2007). Simón-Moya et al. (2014) argue that necessity-driven entrepreneurship plays a more relevant role in countries whose economic development is relatively low and inequality prevails. Conversely, in more developed countries with relatively low income inequality and low level of unemployment, rates of entrepreneurial activity are significantly lower, necessity-driven entrepreneurship is less prevalent, opportunity-driven entrepreneurship is dominant. According to Sambharya and Musteen (2014), “the opportunity-driven entrepreneurship often involves more intensive creative processes while necessity entrepreneurship often relies on imitation of well-known business models”. Both are necessary when considering emerging and developing countries. Yet in the case of advanced economies a high ratio of opportunity/necessity-driven entrepreneurship is better, reflecting a flexible economy more prone to enhance growth. According to Van Stel and al. (2005), the Total Entrepreneurial Activity rate for the 1999-2003 period in 36 countries has a positive and significant impact on economic growth. Nevertheless, this impact is to be differentiated according to the level of development and the development process of the countries. It is less important in transition economies (for example, in Hungary, Poland and Slovenia) and it may even have a negative impact on economic growth in some developing countries (for example in Mexico). The absence of large companies in these countries and a low actual wage may explain that the choice to become an entrepreneur is in favor as it is sometimes the only possibility to earn a living. Abdesselam et al. (2017) study the entrepreneurial behaviors of OECD countries over the period 1999-2012 and show that the level of development and sectoral specialization are crucial for understanding differences in entrepreneurial activity between countries, and to establish a distinction between managerial and entrepreneurial economies.

It is well established that economic development and entrepreneurial activities are closely linked and that less developed countries show a higher entrepreneurial activity. Economic development modifies both the weight and nature of self-employment, contributes to the growth of wage employment at the expense of self-employment and leads to sectoral specialization towards a knowledge and service economy. The economy moves towards qualitative entrepreneurship and fosters opportunity-driven entrepreneurship. Therefore, in order to understand the differences in the intensity and nature of the entrepreneurial activity between countries, it is necessary to consider both the variables relating to the level of development and the sectoral specialization of countries.
Labour market functioning

From a microeconomic perspective, the decision to become an entrepreneur is an allocation decision of one’s human capital, balancing an opportunity cost to undertake with a reward expectancy (monetary, symbolic –social recognition- or psychological). In an entrepreneurial society, being an employee does not give the insurance of a stable situation because of the greater flexibility for employers to fire workers. The flexibility of the labour market can more easily encourage individuals to undertake insofar as this action is a positive signal to future employers even if the business is not doing as well as expected. In a salaried society like France, employees have important historical advantages, with social security, relatively stable jobs and the opportunity to benefit from many public goods. Rigidity of the labour market and the stigma of entrepreneurial failure divert a number of students and experienced qualified employees (including researchers) from enhancing their human capital through the entrepreneurial option. In the French case there is also a low commitment of elites in innovative entrepreneurial activity due to the existence of sunk costs for this population, related to network effects and the stigma of entrepreneurial failure should the startup be less successful than expected (Bonnet, Cussy, 2010).

The employee may not engage in an entrepreneurial adventure unless the overall environment is favourable, that is to say that the rate of unemployment is rather low and the labor market is fluid and he/she perceives that his/her eventual entrepreneurial failure will not penalize him/her. The same reasoning can be applied to young students in universities or engineering schools. Greater labour market flexibility associated with securing of career paths preaches for the setting-up of new firms for good reasons. On the other hand, creation costs are higher in economies

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3 GEM studies also point out the importance of the taxation and social benefit attached to the employment status in comparison with the independent status. In the case of France this regime was not very not very favorable to entrepreneurship till the new legislation on the “autoentrepreneurs” appeared at the beginning of 2009. Success was instant: over 600 000 auto-entrepreneurs got registered in 2009 and 2010. The self-creation of his/her activity has become an important intention of work for youth. It also unfortunately often stems from the lack of employment opportunities in existing businesses. This status affects more than 900,000 people in August 2013 -although for a large part of these new entrepreneurs it is more a complement of income related to paid employment or a pension supplement (less than 50 % are economically active and declare a positive turnover)-.

4 The sunk cost is a notion of industrial organization that expresses the fact that certain investments, once they are made, lose any residual value if the object of investment is not used for what it was designed. By extending this concept to human capital, we show that certain educations (labeled “Grandes écoles”, see below) do not encourage risk-taking on the part of graduates because of sunk cost if graduates deviate from their classical trajectory of career.

5 An entrepreneurial failure does not necessarily conduct to bankruptcy—it is rather the exception-. It is just the idea that some firms don’t give the expected returns and that the entrepreneur has to come back to a wage position.
where unemployment is high: for an individual being forced out of entrepreneurship due to lower than expected levels of activity, finding back a job is harder. So an economy that insufficiently creates jobs (low growth rate) and a dysfunctioning of the labour market (an average duration of unemployment being high) reinforce entrepreneurship motivated by negative reasons and especially discourage entrepreneurs motivated by positive ones.

1.2. Entrepreneurial characteristics

Motives to set up a firm

The usual way to describe an entrepreneurial economy is to consider that new entrepreneurs are pulled (“pull” effect) in entrepreneurship by the perception of profit opportunities (Kirzner in 2009). In this sense they respond to positive motivations to start a business (clearing markets or developing new ideas to make the most of). Yet parts of new entrepreneurs are also motivated by a “push” effect like being unemployed and trying to avoid the depreciation of one’s human capital (Bhattacharjee et al., 2010). Thurik and Dejardin, (2011) give other examples of push factors like “uncompetitive compensation schemes, weak social insurance benefits, but also limited autonomy associated with employee status, or the lack of attractive alternative occupational choice”. In a study of self-employment, Congregado and Millan (2013) distinguish the “true self-employed” from the “self-employed of the last resort” and the “dependent self-employed”. The “true self-employed” are distinguished by the fact that employers are therefore creating jobs, the “self-employed of the last resort” create their own jobs primarily for reasons of the low opportunity cost attached to the entrepreneurial undertaking (this is a way out of unemployment), and the “dependent self-employed” are forced to use this status for labor market flexibility reasons (or cost of employment) -the trade relationship being less restrictive than the wage relationship. The first type is obviously the ones to be sought.

The Global Entrepreneurship Monitor Program (GEM) measures the levels of entrepreneurial activity between countries by setting the Total Entrepreneurial Activity (TEA) as the proportion of 18-64 years old who are actively involved in creating a business or running a business for less than 42 months. If the results show a difference between North America and the European Union, they particularly show that opportunity entrepreneurship (as distinguished from an entrepreneurship of necessity) is lower in Europe, and especially in France but also in Germany (GEM 2009). It is therefore necessary to examine the conditions that enable an economy to foster
opportunity entrepreneurship. The proportion in the population of new entrepreneurs driven by reasons of necessity is all the more important that the unemployment rate is high. Yet, in Europe, Wennekers (2006) has shown that there is a negative relationship between the unemployment rate and the total intensity of entrepreneurial countries ("push" and "pull" effects). The two motives are thus not independent. The French economy unfortunately is in a situation where the "push" effects (characterized by constrained motives) dominate, resulting in a global entrepreneurial intensity that is rather low.

**Business demography**

Audretsch and Fritsch (2002) by extending the concept of technological regimes for innovative activities, drawn from the literature of industrial organization, have built a typology into four classes of regional development in Germany. They distinguish: the entrepreneurial regime - with a high level of new business creation and significant job growth -; the routinized regime - where job growth is mainly driven by existing firms, with new firms with relatively low survival and growth prospects compared to the entrepreneurial regime -; the “revolving door” regime - where there is a high rate of entry and exit of new firms and ultimately little impact on employment -; and finally the regime of decline - where heavy job cuts in existing firms combine with low entrepreneurial activity -. The classification is carried out on an ad hoc basis using the values of the rate of enterprise creation and the rate of growth of employment.

Birth rates and Death rates of new firm’s formation may be different between countries as are different the survival rates. In a favorable period to entrepreneurship, the share of high growth firms (in number and in employs) will give us information about the relative prevalence of entrepreneurial dynamics in the creation of jobs.

**1.3 Institutional environment**

For economic institutionalists and following North (1990), “the relevant framework is a set of political, social, and legal ground rules that fixes a basis for production, exchange, and distribution in a system or society”, (Bruton and Ahlstrom, 2003). Scott (1995) distinguishes three institutional categories: regulatory, normative and cognitive. North (1990) proposes to split institutions into formal and informal. The most formal institutions are the regulatory institutions representing standards provided by laws and other sanctions (Bruton and Ahlstrom, 2003).
Normative institutions are less formal or codified and define the roles or actions that are expected of individuals. Cognitive institutions relate more to the cultural, behavioural and role models shared in society. Recent research (Acs et al., 2014) proposes a systemic approach to entrepreneurship with the definition of different national systems of entrepreneurship: “A National System of Entrepreneurship is the dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures”. Regarding entrepreneurship, the “rules of the game” include the development and the operation of the financial system, the intensity of the administrative barriers, the legislation regulating the labor market relations, the fiscal rules, the social security system, legal consequences of the failure of the firm, the entrepreneurial spirit and the collective perception of the failure of the firm as well as the perception of success as an entrepreneur, (Bonnet et al., 2011). The figure 1 summarizes the main institutional determinants of entrepreneurial activities.
A number of recent studies have explored the impact of institutional environment on entrepreneurship activity but they differ not only in the choice of institutions they focus on but also in which institutional variables seem to be the most salient ones. Bosma and Schutjens (2011) point out the importance of institutional factors in explaining variations in regional entrepreneurial attitude and activity. Considering different components of entrepreneurial attitudes, i.e. fear of failure in starting a business, perceptions on start-up opportunities and self-assessment of personal capabilities to start a firm, they argue that institutional conditions influence entrepreneurial behavior not directly, but indirectly, firstly by affecting entrepreneurial attitudes. Nissan et al. (2011) find that “institutions affect economic growth, specifically formal institutions, such as procedures or time needed to create a new business, indicating that regulation can influence the context in which entrepreneurship affects economic growth”. Van Stel et al. (2007) examine the relationship between regulation and entrepreneurship in 39 countries and show that the minimum capital requirement for starting a business does seem to lower entrepreneurship rates across
countries, while administrative procedures such as time, the cost or the number of procedures needed to start a business do not. Valdez and Richardson (2013), using GEM aggregated survey data of individuals at national level, show that normative and cultural-cognitive institutions are the main drivers of entrepreneurship. Simón-Moya et al. (2014) suggest that both formal and informal institutions matter: countries with high levels of economic freedom and education tend to have more opportunity entrepreneurship. Sambharya and Musteen (2014), using cross-sectional data on 42 countries over the 2000-2005 period, show that market openness, regulatory quality (for example time and funds consumed by complying with complex regulatory requirements to set-up a firm) and some elements of entrepreneurial culture (uncertainty avoidance, institutional collectivism and power distance) explain the level of opportunity-versus necessity-driven entrepreneurial activity. Their findings suggest that the impact of institutional factors varies depending on the type of entrepreneurship activity. Aparicio et al. (2016) find that informal institutions, namely control of corruption, confidence in one’s skills, have a higher impact on opportunity-driven entrepreneurship than formal institutions such as number of procedures to start a new business and private coverage needed to get credit. Abdesselam et al. (2017) establish a typology of entrepreneurship for OECD and point out that institutional regulation environment is able to stimulate and inhibit not only entrepreneurial activity, but also the type of entrepreneurial activity.

The empirical literature strongly supports that the three institutional pillars (regulatory, normative, cognitive) can be viewed as important drivers of entrepreneurial activity and contribute to explain both intensity (level and rate) and motives (necessity or opportunity) of entrepreneurship as well as the differences between countries. If an institutional convergence exists in Europe and participates to growth and cohesion especially for Central and Eastern European countries, (Gruševaja, Pusch, 2015), strong differences are still at work and will influence the two groups of active variables.

1.4. The conceptual model

We would like to extent these Regional Entrepreneurial regimes to National Entrepreneurial regimes thanks to the previous discussion. Two groups of active variables are chosen to establish a Cluster Analysis (CA) of the European Union countries in order to identify different “National Entrepreneurial regimes”. These variables are related to economic environment
and entrepreneurial activities. First, we enrich the typology proposed by Audretsch and Fritsch (2002) using a multidimensional analysis taking into account several variables representative of the demography of firms and the motive to set up a firm. We take also into account different variables representative of the Labour market functioning and the Level of development. We can then present a figure that summarises the discussion.

Figure 2: National entrepreneurial regimes

The variables that are used to define and characterize the different entrepreneurial regimes belong to Economic environment and Entrepreneurial activities according to the previous discussion. There is also retroaction between these fields; for example, a bad functioning of the labour market or a weak level of development may induce a high level of necessity motives in the setting-up process. Conversely for different reasons linked to favorable institutional environment
a high level of opportunity motives may lead to a low level of unemployment thanks to many employs created (Schumpeter effect).

Different National entrepreneurial regimes will be found with the combination of the four groups of active variables and their embedding in the institutional environment. « A System of Entrepreneurship is the dynamic, institutionally embedded interaction between entrepreneurial attitudes, ability, and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures. » (Redi report, p. 12). Indeed, for the promoters of GEI, an entrepreneur is a person who has the Kirznerian capacity of “alertness”, in the sense that he sees an opportunity for innovation and seizes it. It is therefore seen that the GEI indicator and its components are meant to measure the conditions for the highest quality of entrepreneurial activity.

2. Data and preliminary analyses

In this section, we describe the data and present summary statistics.

Our proposal aims to establish a Cluster Analysis CA of the European Union countries thanks to variables related to entrepreneurial activity, namely BIRTH, DEATH, SURVIVAL, High Growth enterprises (shares in number and employs); motives to set up a firm, OPPORTUNITY, NECESSITY; variables related to economic development, GDP (rate of growth of GDP), GDPPC (GDP per inhabitant), SELFEMPL (self-employment rate) and variables relative to labour market, UNEMPL (rate of unemployment) and LTUNEMPL (Long Term Unemployment).

These variables are described in Table 1. We consider the 28 European Union member countries and data refer mainly to the year 2014, excepted for the variable DEATH which is only available in 2013. The data are extracted from OECD, Eurostat, GEM and ILO databases.

In Table 2 are reported some summary descriptive statistics relative to the twelve active variables used to elaborate a European Union member countries typology according entrepreneurship and employment.

The coefficient of variation is an appropriate statistic to compare the dispersion level of several series, it ranges from 17.8 % for the variable SURVIVAL to 95.48 % for the GDP.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Period</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIRTH</td>
<td>Birth rate: number of enterprise births in the reference period (t)/ the number of enterprises active in t.</td>
<td>2014</td>
<td>EUROSTAT</td>
</tr>
</tbody>
</table>
DEATH
Death rate: number of enterprise deaths in the reference period (t)/ the number of enterprises active in t.
Survival rate: number of enterprises in the reference period (t) newly born in t-5 having survived to t divided by the number of enterprise births in t-5.

SURVIVAL
Share of high growth enterprises measured in employment: number of high growth enterprises divided by the number of active enterprises with at least 10 employees.

HighGrowthEnt
Employment share of high growth enterprises measured in employment: number of employees among high growth divided by the number of employees among the stock of active enterprises with at least 10 employees.

HighGrowthEmpl

OPPORTUNITY
Percentage of 18-64 population who see good opportunities to start a firm in the area where they live.

NECESSITY
Percentage of those involved in TEA who are involved in entrepreneurship because they had no other option for work.

SELF
Self-employed workers. In percent of the total of employed people (salaried and self-employed).

GDP
Rate of growth of the GDP

GDPPC
GDP per capita (constant 2010 US$)

UNEMPL
Unemployment rate

LTUNEMPL
Long term unemployment refers to the number of people with continuous periods of unemployment extending for a year or longer, expressed as a percentage of the total unemployed.

Notes: a Global Entrepreneurship Monitor, b International Labour Organization

Table 1: Active variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Standard deviation</th>
<th>Coefficient of Variation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIRTH (%)</td>
<td>27</td>
<td>10.68</td>
<td>4.37</td>
<td>24.5</td>
<td>4.16</td>
<td>38.95</td>
</tr>
<tr>
<td>DEATH (%)</td>
<td>27</td>
<td>9.69</td>
<td>3.48</td>
<td>18.10</td>
<td>3.11</td>
<td>32.09</td>
</tr>
<tr>
<td>SURVIVAL (%)</td>
<td>25</td>
<td>44.71</td>
<td>30.23</td>
<td>60.66</td>
<td>7.96</td>
<td>17.80</td>
</tr>
<tr>
<td>HighGrowthEnt (%)</td>
<td>27</td>
<td>9.41</td>
<td>2.16</td>
<td>13.67</td>
<td>2.76</td>
<td>29.33</td>
</tr>
<tr>
<td>HighGrowthEmpl (%)</td>
<td>27</td>
<td>12.81</td>
<td>3.55</td>
<td>19.73</td>
<td>4.33</td>
<td>33.80</td>
</tr>
<tr>
<td>OPPORTUNITY (%)</td>
<td>26</td>
<td>33.51</td>
<td>15.84</td>
<td>70.07</td>
<td>12.97</td>
<td>38.70</td>
</tr>
<tr>
<td>NECESSITY (%)</td>
<td>26</td>
<td>23.11</td>
<td>5.42</td>
<td>46.57</td>
<td>10.05</td>
<td>43.49</td>
</tr>
<tr>
<td>SELF (%)</td>
<td>27</td>
<td>16.10</td>
<td>8.70</td>
<td>36.00</td>
<td>6.42</td>
<td>39.88</td>
</tr>
<tr>
<td>GDP (%)</td>
<td>27</td>
<td>1.99</td>
<td>-1.53</td>
<td>8.46</td>
<td>1.90</td>
<td>95.48</td>
</tr>
<tr>
<td>GDPPC (€)</td>
<td>27</td>
<td>32665.4</td>
<td>7299.5</td>
<td>103923.9</td>
<td>20670.18</td>
<td>63.28</td>
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<tr>
<td>UNEMPL (%)</td>
<td>27</td>
<td>10.60</td>
<td>5.00</td>
<td>26.3</td>
<td>5.21</td>
<td>49.15</td>
</tr>
<tr>
<td>LTUNEMPL (%)</td>
<td>27</td>
<td>45.38</td>
<td>15.00</td>
<td>73.5</td>
<td>13.83</td>
<td>30.48</td>
</tr>
</tbody>
</table>

Table 2: Descriptive statistics

We observe a strong variability of variables related to economic development, namely GDP, GDPPC and UNEMPL, revealing a high heterogeneity between the 28 countries studied in terms of economic performances. The GDP growth rate ranges from -1.53 % in Cyprus to 8.46 %

6 The Total Early stage Entrepreneurial Activity rate is defined as the percentage of individuals aged 18-64 who are either actively involved in creating a business or running a business for less than 42 months.
in Ireland, while GDP per capita ranges from 7299 euros in Bulgaria to 103924 euros in Luxembourg. The rate of unemployment is 26.3% in Greece against only 5% in Germany. Several variables linked to entrepreneurial activity (NECESSITY, SELF, BIRTH and OPPORTUNITY) also exhibit relatively high coefficients of variation showing heterogeneity in entrepreneurial behaviors between European Union member countries.

Motives to set up a firm differ greatly from one country to another: creation per necessity ranges from 5.4% in Denmark to 46.6% in Croatia while creation per opportunity ranges from 15.8% in Bulgaria to 70% in Sweden. The share of self-employment is 36% in Greece compared with only 8.7% in Luxembourg. Otherwise, the birth rate of firms is also very different between the 28 countries, as it reaches 24.5% in Lithuania against only 4.4% in Belgium.

Finally, we find that both the variables related to economic development and those related to entrepreneurial demography differ greatly between the countries of the European Union. This suggests the existence of diverse economic and entrepreneurial development processes in Europe.

Moreover, in order to better characterize classes, we use a wide set of illustrative variables relevant for characterizing the context of entrepreneurship in the different countries. These variables are likely to provide additional information to consolidate and enrich the interpretation of the classes of countries, so they were positioned as supplementary variables in the multidimensional analysis. They do not affect the calculations based upon the twelve active variables: they are not used to determine the principal component factors but are, a posteriori, positioned in order to assess their degree of similarity with the active variables. We consider three categories of variables, representative of national economic development and institutional environment as well as variables specific to the entrepreneurial population. In the category of national economic development, sectoral variables as well as variables representative of the level of development like the importance of innovation, health, finance, the level of education, the connectivity, the complexity of the economy and employment characteristics are found. Formal and informal institutional variables are also recorded as well as entrepreneurial variables like characteristics of the entrepreneurs, the firms and the new founded firms.

These variables, extracted from various data sources, are described in Table A1 in appendix. We use data mostly related to the year 2014. When data are not available for the year 2014, we complete the database using data for the nearest years, specifically 2013 or 2015.
3. **Empirical results**

To exploit this massive data, two techniques of data analysis are proposed, the first with descriptive purpose Cluster Analysis (CA) (Lebart et al., 2000; Saporta, 2006) and the second with an explanatory purpose Discriminant Analysis (DA) (Celleux, 1990 et Huberty, 1994).

In the first CA, the characteristic variables of the theme entrepreneurial activity, employment and economic development of the EU-28 countries, whose status is said to be active in the analysis, are used to build and characterize the most homogeneous and distinct country classes of the EU-28 countries. According to the similarity of the twelve active variables, we establish a typology of the EU-28 member countries. As for the variables in Table A1 in appendix, which relate to several economic themes and whose status in the CA is illustrative, they are used *a posteriori* to describe the EU country classes previously characterized by the active variables.

In the second DA, we study the effect of an explanatory theme on the entrepreneurial activity, employment and economic development of the EU-28 countries. Five explanatory themes are considered: Innovation, Employment, formal institutions, Entrepreneurship and Governance (see Table A1 in appendix). In other words, for each explanatory theme, we try to determine the characteristics which discriminate and well separate the classes of EU-28 countries characterized by the CA.

3.1 **Typology of the demography of business demography and employment in the EU-28 countries**

The approach adopted relies on a combined use of multidimensional data analyses that take into account the characteristics of the countries relative to the twelve active variables described above. According to the similarity of these variables, we can establish a typology of the 28 European Union member countries. A CA is applied to group the 28 countries into homogeneous classes. More precisely, a Hierarchical Ascendant Clustering (HAC) according to the Ward criterion\(^7\), was used on the significant factors of the Principal Component Analysis (PCA). This methodological linking of factorial and clustering methods constitutes an instrument for statistical observation and structural analysis of data. The dendrogram in figure 2 represents the hierarchical tree of the UE-28 countries according to the active variables.

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\(^7\) Generalised Ward’s Criteria, i.e. aggregation based on the criterion of the loss of minimal inertia.
The CA identifies five distinct entrepreneurial activity and employment types in Union European. Table A2 shown in the appendix summarizes the main results of the characterization of the chosen partition into five classes obtained from the cut of the hierarchical tree in figure 2.

**Figure 2: Hierarchical tree for the 28 European Union member countries**

**Class 1: Non entrepreneurial wage-based economies with opportunity Entrepreneurship**

The class 1 gathers nine countries, namely Austria, Denmark, Estonia, Finland, France, Germany, Luxembourg, Netherlands and Sweden. In these countries business creation is driven by opportunity motives. The countries are the most developed in terms of GDP/inhabitant, and business survival at 5 years is rather good. There are fewer creations per necessity, unemployment as well as long term unemployment is lower, the self-employed share is low, and finally the mortality rate is low.

These countries have rather high levels of employment in services and benefit of an economic context very favorable to innovation. They display a high level of R&D expenditures as
well as numerous researchers, a high quality scientific research revealed by importance of patents and scientific and technical journal articles. Healthcare spending is important, the economy of finance is developed ... Connectivity is strong, education is developed and economic complexity is strong. The proportion of young people in employment is high, as is the employment rate for those over 15 years of age. Employees are in high proportion, Part time is developed and the unemployed are educated.

Employment in industry (% of total employment) and employment in agriculture (% of total employment and in value added) are rather weak. Vulnerable employment is low, as is the unemployment rate of 15-24 year-olds.

Many variables related to the institutional environment are significant, especially those related to informal institutions. Indeed, most of GEM/GEDI variables linked to entrepreneurship attitudes, abilities and aspirations as well as governance are positively significant. If we look more closely the results, we observe that concerning formal institutions, countries of this class present attractiveness of production factors, including labor-inflows of foreign populations that are significantly higher than average but the real minimum wages are rather high. These countries also present unfavorable net barter terms of trade. Although entrepreneurial activities are valued, intentions to start a business are rather low and the assessment of entrepreneurial skills is weak. Eight governance variables out of ten are significant: corruption is rather low, economic freedom, effectiveness of taxes, quality of tertiary education, firm level technology absorption capability, venture capital business strategy... have rather high levels. It seems that in this class, governance is favorable to opportunity entrepreneurship and business survival. These results are in line with those of Simón-Moya et al. (2014) and Abdesselam et al. (2017) that show that business freedom, trade freedom and labor market freedom are favorable to opportunity entrepreneurship.

The proportion of people who know business creator, the percentage of the TEA businesses that are highly active in technology sectors (high or medium) and the percentage of the TEA businesses started in those markets where not many businesses offer the same product are high. The entrepreneurial activity is not much important as not so many male people are engaged in Nascent entrepreneurship. There are relatively few ambitions for growth, there are small size for new-firm startups at the exit, few jobs (in share) are created at the birth and are concerned by exit of new-firm startups. The share of jobs in new-firm startups that reach their five years ‘old is rather
low among all the jobs. Finally, the percentage of the TEA businesses using new technology is rather weak.

The class 1 gathers countries that are rather wage-based economies where much of the development is also carried out by existing companies. Opportunity entrepreneurship and good survival are the main entrepreneurial characteristics of this class.

**Class 2: Non entrepreneurial self-employed based economies**

The second class contains six countries, including Belgium, Cyprus, Czech Republic, Italy, Romania and Slovenia. These countries have a high level of self-employment relative to all countries of our sample as well as a high business survival rate at 5 years. They are also characterized by low rates of births and low shares of high-growth firms as well in terms of number of firms as number of jobs.

The countries of this class present high rates of vulnerable employment and low shares of salaried workers. These countries present strong institutional environment constraints relative to entrepreneurship, namely the cost of becoming an entrepreneur is high. Furthermore, variables relative to governance reveal a high level of corruption and a weak effectiveness of using the taxes.

This class reported rather few established firms, few new-firm startups created by female. People know few people who create; few companies with high growth expectation are reported in ICT and real estate, and also in share of jobs for the ICT branch of activity.

**Class 3: Non entrepreneurial self-employed based economies in crisis with necessity entrepreneurship**

The third class comprises three countries: Croatia, Greece and Spain. Unemployment rates as well as long term unemployment rate are high. This class is also characterized by a high self-employment rate and by necessity driven entrepreneurship. Unemployed people set up their own firms and are characteristic of “push” entrepreneurs. Opportunity entrepreneurship is low.

The labor force participation rate is rather lower than the average of the countries under study. The share of the wage and salaried workers is rather low as a share of total employment and the unemployment rate of the youth is rather high. Moreover, these economies are not innovative; the businesses less than 42 months are little involved in the launching of new products or services. The Economic complexity is rather low as is the technology transfer.
The barriers to entrepreneurship are high. Many GEM/GEDI indicators related to informal institutions are negatively significant: entrepreneurship environment and governance are unfavorable to entrepreneurship. Attitudes and aspirations indexes to entrepreneurship are rather low. Although there is no fear of creating, successful entrepreneurs do not receive recognition. This may be linked to the weight of entrepreneurship of necessity in those countries; this status does not lead to social valuation. Governance variables reveal high level of corruption, low absorption of techniques, limited economic freedom (property rights, labor market) and venture capital business strategy poorly developed. These results corroborate those of Aparicio et al. (2016), Pinho (2016) and Simón-Moya et al. (2014) who show the relevance of informal institutions like control of corruption, confidence in one’s skills, business freedom, property rights..., as determinants of opportunity entrepreneurship at a macro-level.

The size of the surviving 5 year olds enterprises is rather high; the share of jobs of high growth new-firms is low in the IC branch of activity.

Class 4: Entrepreneurial economies with high-growth new firms and high GDP growth

The fourth class consists of seven countries: Bulgaria, Hungary, Ireland, Latvia, Malta, Poland and the United Kingdom. These countries registered a significantly a high rate of growth in 2014. They are also characterized by numerous high growth new-firms and the employment share of these enterprises measured in employment is high.

Health expenditure and especially public health expenditure are significantly below the average of European Union countries. These economies are not innovation oriented: scientific institutions and availability of scientist are little developed and scientific and technical journal articles are rather scarce.

Only three institutional regulatory variables are significant. The countries of this class present favorable net barter terms of trade with low employment regulation. They also suffer from some restrictions to entrepreneurship like time required starting a business. There exist numerous high growth new-firms in the IC and real estate branches of activity. The employment share of these enterprises measured in employment is high for both sectors and they are created with a high

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8 See appendix.
average size. The size of new entrants is high and as the size of exiting new firms. Firms aged 0 till 5 years represent a large share of jobs.

Class 5: Entrepreneurial economies with revolving door effect

The countries of the third class (Lithuania, Portugal and Slovakia) are only characterized by business demography variables. They present a dynamic entrepreneurship with both a high start-up as well as a high exit rates; the survival rate at five years is low. These specificities are qualified by Audretsch and Fritsch (2002) as revolving doors effect. The characteristics of this class relative to the other variables are similar to those of the sample’s mean.

This class includes rather sparsely urbanized countries who are unattractive (net migration population relative to total population is rather low) and present few barriers to entrepreneurship. The real minimum wage is rather low and it is not a market of pure and perfect competition.

There is a real entrepreneurial dynamic on emerging firms with average of nascent firms that is higher for this class, as are all averages for new enterprises less than 42 months. Share of jobs created by new firms from 0 to 5 years is high; the size of new firm startups is high as is the size of exited new-firm startups. Churn is high; yet net growth in the number of firms is also high.

3.2 Discriminating effects of themes on the entrepreneurial activity of the EU-28 countries

The objective of a HAC is descriptive, we use the data to characterize unknown and homogeneous classes of observations according to a set of variables related to a chosen theme. In contrast, the AD is designed to classify data in known classes. It has two main objectives: the first is descriptive; It consists in determining which of the explanatory variables are discriminating.

The AD method is a special ACP, it produces discriminant factors which are linear combinations of the explanatory variables and establishes graphical representations on discriminant factorial planes making it possible to distinguish the classes, then explain their respective positions. The second objective is predictive or decision-making; It consists in classifying new anonymous explanatory data in these known classes using the discriminant linear functions established previously.

Our goal is search to identify themes - homogeneous sets of explanatory variables - which discriminate the five classes presented in the section 4.1.
Discriminant analysis is a multidimensional method, it allows to highlight the links existing between a target qualitative variable to explain, in this case, the variable synthesis of entrepreneurial activity into five modalities corresponding to the previous partition into five classes of the EU-28 countries, and a set of continuous explanatory variables relating to a homogeneous theme. Five explanatory themes were considered, Innovation, Employment, Formal Institutions, Entrepreneurship and Governance.

Tables 3, 4 and 5 summarize the main results of the five discriminant analysis\(^9\) (DA). For each theme, are mentioned the explanatory variables that discriminate and well separate each of the entrepreneurial classes characterized by the Cluster analysis (CA). In general, all the five discrimination models considered are overall significant, the p-value of the Fisher F statistic of the Wilk’s lambda\(^{10}\) is less than or equal to the error risk \(\alpha = 5\%\). So, we reject the null hypothesis that classes are confused. In the same way, an explanatory variable is significantly discriminating if the corresponding p-value is less than or equal to the error risk \(\alpha = 5\%\).

\(^{9}\) DA is based on the normality of populations. The discriminant functions are linear if the matrices of variances and covariances of these populations are equal, otherwise they are quadratic. All these conditions of application have been checked.

\(^{10}\) Note that, the Wilk’s lambda is an indicator that allows to statistically evaluate whether the model as a whole is significantly discriminating. It is value ranges from 0 to 1. Closer it is to 0, more the model is discriminant and more the classes are distinct. More it tends to 1, more the classes are confused and not separable – no discrimination. The Wilks statistic can be approximated by a Fisher law.
With regard to the DA with innovation explanatory variables, the model as a whole is very significant (p-value = 0.09% <5%) with a very good predictive performance, more than 85% of the 28 countries are correctly classified by the model. Only two variables NSERPRO and ARTI13 are not discriminating. The significant discriminant factor opposes and well separates the countries of class 1 with high levels of expenses in R&D in %age of the GDP, high number of researchers (per million inhabitants), high level of patents application by residents (%age of the labor force), high level of technology transfer and also of the variable science (product of GDERD, quality of Scientific institutions and availability of scientists from the from the countries of classes 2 and 3.

**Table 3: DA – Economic Themes: Employment and Innovation**

With regard to the DA with innovation explanatory variables, the model as a whole is very significant (p-value = 0.09% <5%) with a very good predictive performance, more than 85% of the 28 countries are correctly classified by the model. Only two variables NSERPRO and ARTI13 are not discriminating. The significant discriminant factor opposes and well separates the countries of class 1 with high levels of expenses in R&D in %age of the GDP, high number of researchers (per million inhabitants), high level of patents application by residents (%age of the labor force), high level of technology transfer and also of the variable science (product of GDERD, quality of Scientific institutions and availability of scientists from the from the countries of classes 2 and 3.

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11 The overall rate of misclassified is given to judge the predictive quality of the model.
## Multivariate Statistics and F Approximation

<table>
<thead>
<tr>
<th>Fisher statistical test</th>
<th>Wilks’ Lambda Value</th>
<th>Variable</th>
<th>NOCOR</th>
<th>BRISK</th>
<th>FPROP</th>
<th>TGOV</th>
<th>CREGU</th>
<th>EDUC</th>
<th>TABSO</th>
<th>LMARK</th>
<th>FSTRA</th>
<th>INFIN</th>
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<tbody>
<tr>
<td>Governance</td>
<td>0.0402</td>
<td>R-Square</td>
<td>0.5732</td>
<td>0.1479</td>
<td>0.4977</td>
<td>0.3942</td>
<td>0.4960</td>
<td>0.1295</td>
<td>0.5041</td>
<td>0.3027</td>
<td>0.5460</td>
<td>0.1228</td>
</tr>
<tr>
<td>F Value</td>
<td>1.83</td>
<td>F Value</td>
<td>7.72</td>
<td>1.00</td>
<td>5.70</td>
<td>3.74</td>
<td>5.66</td>
<td>0.86</td>
<td>5.84</td>
<td>2.50</td>
<td>6.91</td>
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</tr>
<tr>
<td>Pr &gt; F</td>
<td>0.0187*</td>
<td>Pr &gt; F</td>
<td>0.0004**</td>
<td>0.4288</td>
<td>0.0024**</td>
<td>0.0174*</td>
<td>0.0025**</td>
<td>0.5050</td>
<td>0.0021**</td>
<td>0.0709</td>
<td>0.0008**</td>
<td>0.5348</td>
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The overall error rate is 14.29% for the theme Governance

<table>
<thead>
<tr>
<th>Fisher statistical test</th>
<th>Wilks’ Lambda Value</th>
<th>Variable</th>
<th>ISTAR</th>
<th>DESIR</th>
<th>FAIL</th>
<th>NFAI</th>
<th>EGROW</th>
<th>HSTAT</th>
<th>MSUCC</th>
<th>SKILLS</th>
<th>CARST</th>
<th>ATT</th>
<th>ABT</th>
<th>ASP</th>
<th>GEI</th>
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<td>Entrepreneurship</td>
<td>0.0184</td>
<td>R-Square</td>
<td>0.2221</td>
<td>0.1342</td>
<td>0.0427</td>
<td>0.2059</td>
<td>0.0998</td>
<td>0.3801</td>
<td>0.1755</td>
<td>0.1958</td>
<td>0.0844</td>
<td>0.5250</td>
<td>0.4162</td>
<td>0.4837</td>
<td>0.5117</td>
</tr>
<tr>
<td>F Value</td>
<td>1.83</td>
<td>F Value</td>
<td>1.64</td>
<td>0.89</td>
<td>0.26</td>
<td>1.49</td>
<td>0.64</td>
<td>3.53</td>
<td>1.22</td>
<td>1.40</td>
<td>0.53</td>
<td>6.36</td>
<td>4.10</td>
<td>5.39</td>
<td>6.03</td>
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<tr>
<td>Pr &gt; F</td>
<td>0.0190*</td>
<td>Pr &gt; F</td>
<td>0.1979</td>
<td>0.4848</td>
<td>0.9029</td>
<td>0.2377</td>
<td>0.6408</td>
<td>0.0220*</td>
<td>0.3281</td>
<td>0.2653</td>
<td>0.7149</td>
<td>0.0013**</td>
<td>0.0119*</td>
<td>0.0033**</td>
<td>0.0018**</td>
</tr>
</tbody>
</table>

The overall error rate is 14.29% for the theme Entrepreneurship

Significance level $\alpha$: **$\alpha \leq 1\%$** ; *$\alpha \in [1\% ; 5\%]$*

**Table 4: DA - Themes Governance and Entrepreneurship**
### Multivariate Statistics and F Approximation

#### Formal characteristics

**Complete model: 15 explanatory variables**

- **Fisher statistical test**
  - Wilks’ Lambda: 0.0071
- **Stepwise Selection Summary**
  - Step 1: Entered Variable: BARR
  - Step 2: Removed variable: TRADE
  - Step 3: Enter Variable: ECH
  - Step 4: Enter Variable: NMIG
  - Step 5: Enter Variable: TRADE
  - Step 6: Enter Variable: TRADE
  - Step 7: Enter Variable: COST
  - Step 8: Enter Variable: STRIC
  - Step 9: Enter Variable: TIME
  - Step 10: Enter Variable: FDIIn

#### Reduced model: 7 explanatory variables

- **Wilks’ Lambda**: 0.0459
- **R-Square**: 0.3515
- **F Value**: 3.03
- **Pr > F**: 0.0001

The overall error rate is 17.86% for the theme Formal Characteristics

**Significance level α:** **α ≤ 1%; *α ∈ [1%; 5%]**

**Table 5: DA - Theme Formal characteristics**
According to Employment theme, the model is also significant with five discriminant variables with a risk of error of 5%, note that the variable LFP15 is significant with a risk of error of 5.4%. We observe an opposition between countries of class 1 with high rates of employed population and young employed population (15-24)-in %age of the population aged 15 and more-, a high level of wage and salaried workers (% of the total employment) and the countries of Classes 3 and 5 with high rates of vulnerable employs and young unemployed (15-24).

As for the significant model on entrepreneurship theme, it opposes and therefore well discriminates between countries in Class 1 with high rates of GEI, ATT, ABT, ASP and HSTAT, with those of classes 3, 4 and 5. Our results validate the relevance of the GEDI indicators related to attitudes, abilities and aspirations for entrepreneurship that well discriminate the five entrepreneurial regimes.

The first significant discriminant factor of the governance model distinguishes and differentiates the countries of class 5 characterized by high rates of Nocorruption, capability of technology absorption by a firm, high rates of business freedom and property rights and venture capital availability, with the countries of classes 3 and 4. The second, well separates the countries of classes 3 and 5 with those of class 1. The class Non entrepreneurial wage-based economies with opportunity Entrepreneurship is ahead the fifth and third class for the absence of corruption, for the security of the property that lead to high level of activity, for the effectiveness of public expenses, for the functioning of the markets that are more competitive and also for the availability of venture capital and the abilities of companies to pursue different strategies and optionally competitive qualitative labor market with a risk of error of 7.09%.

So there exist a hierarchy in these variables and three variables seem to be important to differentiate the fourth class (the class that registers a high level of GDP growth and the fifth class (revolving door effect). These variables are the effectiveness of tax government –the idea that public expenses are well done, i.e. they provide qualitative services-, competitive functioning of the markets and labor market freedom combined with staff training.

As for the formal characteristics theme, the complete model with fifteen explanatory variables is not significant, the p-value = 6.51% of the F statistic of the Wilk’s lambda is greater than the error risk $\alpha = 5\%$. So, we apply a variable selection procedure - Stepwise method allows to identify the most powerful combination of explanatory variables. The seven variables selected for the reduced model are presented in the Table 5. Thus, the first discriminant factor opposes and
well separates countries of the class 4 with high rates of level of trades and also barriers to entrepreneurship to the countries of class 5. The second factor distinguishes the countries of the class 2 with a high rate of net Migration (positive), from those of the class 5.

4. Conclusion and policy implications

This study contributes to existing literature in several ways: first, it proposes a better understanding of the complex relationships between level of development, functioning of the labour market, motives to set-up a firm and entrepreneurial dynamics at a country level; second, it determines different “entrepreneurial regimes” (Audretsch, Fristch, 2002), and characterizes these regimes thanks to numerous illustrative variables at the economic, institutional and entrepreneurial levels. Third, thanks to the availability of massive data, we emphasise that informal institutional variables and especially governance variables conditioned strongly the variables chosen to build our different “entrepreneurial regimes”.

Using a combined use of multidimensional data analyses, we propose a classification of European countries relative to variables pertaining to entrepreneurial activity, growth and labor market situation. According to the similarity of the twelve active variables, we establish a typology of the EU-28 member countries and identify five different “entrepreneurial regimes”. Thanks to supplementary variables representative of economic development, institutional environment and entrepreneurial characteristics the classification is enriched and the different kinds of development highlighted.

Our results suggest that opportunity entrepreneurship is linked to the most developed countries that register a high level of innovation, a high standard of living with also a high level of health expenses and of course a great attractiveness (positive net migration). These countries are wage-based economies and the opportunity cost to set-up a firm is high. But thanks to their development, to their wealth they are able to promote efficient policies to support opportunity entrepreneurship…

Differentiating the class of Entrepreneurial economies with high-growth new firms and high GDP growth from the class of Entrepreneurial economies with revolving door effect lead us to consider that the first class benefit from qualitative public services and a competitive functioning of the markets. Even if some barriers to entrepreneurship still exist, labour market freedom in
opened countries with low level of strictness of employs and investment in the training of employees insure these countries to benefit from their “entrepreneurial regime”. Conversely too few barriers to entrepreneurship combined with a low level of minimum wage and a low level of qualitative public services may lead to the revolving door effect and also a net migration that is negative.

Finally, discriminant analyzes (AD) show that the five explanatory themes that are considered (Innovation, Employment, Formal Institutions, Entrepreneurship and Governance) differentiate the classes and significantly explain the diversity of entrepreneurial regimes.

In a previous research (Abdesselam et al., 2017) we have shown that advanced knowledge economies, with developed financial markets, fewer regulatory institutional constraints and scope for qualitative entrepreneurship, have lower unemployment rates. We now emphasize with this complementary research that unformal institutional variables play a significant role to create effective “entrepreneurial regimes” favorable to growth. From a theoretical implication point of view, this study provides a better understanding of the components of the national environment (level of development, entrepreneurial characteristics and institutional environment) that promote or deter opportunity entrepreneurship, and contributes to explaining the different “entrepreneurial regimes”.

It appears that policymakers should: first, alleviate some constraints on entrepreneurship and the functioning of the labor market only if the context of good governance is fulfilled. Especially a certain degree of efficiency in the public services, of competitive markets (products and labour) and openness of the country is needed. It is only a certain level of development that will insure opportunity entrepreneurship and finally it is in the wage-based economies that we find the best conditions of this kind of entrepreneurship.
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## Appendix

### Economic Development

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Period</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVA</td>
<td>Agriculture, value added (% of GDP)</td>
<td>2014</td>
<td>World Bank/ OECD(^a)</td>
</tr>
<tr>
<td>IVA</td>
<td>Industry, value added (% of GDP)</td>
<td>2014</td>
<td>World Bank/ OECD(^a)</td>
</tr>
<tr>
<td>SVA</td>
<td>Services, etc., value added (% of GDP)</td>
<td>2014</td>
<td>World Bank/ OECD(^a)</td>
</tr>
<tr>
<td>AEMP</td>
<td>Employment in agriculture (% of total employment)</td>
<td>2014</td>
<td>ILO(^a)</td>
</tr>
<tr>
<td>IEMP</td>
<td>Employment in industry (% of total employment)</td>
<td>2014</td>
<td>ILO</td>
</tr>
<tr>
<td>SEMP</td>
<td>Employment in services (% of total employment)</td>
<td>2014</td>
<td>ILO</td>
</tr>
</tbody>
</table>

- **Relative to the level**
  
  **Innovation**
  
<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Period</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDERD</td>
<td>Research and development expenditure (% of GDP)</td>
<td>2014</td>
<td>UNESCO(^c)</td>
</tr>
<tr>
<td>ARTI13</td>
<td>Scientific and technical journal articles/Labor force (%)</td>
<td>2013</td>
<td>NSF(^d)</td>
</tr>
<tr>
<td>RD</td>
<td>Researchers in R&amp;D (per million people)</td>
<td>2014</td>
<td>UNESCO</td>
</tr>
<tr>
<td>PATENTS</td>
<td>Patent applications, residents/ Labor force (%)</td>
<td>2014</td>
<td>WIPO(^e)</td>
</tr>
<tr>
<td>NSERPRO</td>
<td>Percentage of TEA who indicate that their product or service is new to at least some customers</td>
<td>2014</td>
<td>GEM(^f)</td>
</tr>
<tr>
<td>TECHTR</td>
<td>These are the innovation index points from GCI: a complex measure of innovation including investment in research and development (R&amp;D) by the private sector, the presence of high-quality scientific research institutions, the collaboration in research between universities and industry, and the protection of intellectual property.</td>
<td>2014</td>
<td>GEDI(^{12})</td>
</tr>
<tr>
<td>SCIENCE</td>
<td>GERD* Average of Scientific Institutions and Availability of Scientist</td>
<td>2014</td>
<td>GEDI</td>
</tr>
</tbody>
</table>

- **Health**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Period</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTHPR</td>
<td>Health expenditure, private (% of GDP)</td>
<td>2014</td>
<td>WHO(^h)</td>
</tr>
<tr>
<td>HEALTHPU</td>
<td>Health expenditure, public (% of GDP)</td>
<td>2014</td>
<td>WHO</td>
</tr>
<tr>
<td>HEALTHT</td>
<td>Health expenditure, total (% of GDP)</td>
<td>2014</td>
<td>WHO</td>
</tr>
</tbody>
</table>

- **Finance**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Period</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCR</td>
<td>Domestic credit provided by the financial sector (% of GDP)</td>
<td>2014</td>
<td>IMF(^i)</td>
</tr>
<tr>
<td>DCRPS</td>
<td>Domestic credit to private sector (% of GDP)</td>
<td>2014</td>
<td>IMF</td>
</tr>
<tr>
<td>PERSFUNDS</td>
<td>%age 18-64 pop who have personally provided funds for a new business (3y)</td>
<td>2014</td>
<td>GEM</td>
</tr>
<tr>
<td>DCM</td>
<td>The Depth of Capital Market</td>
<td>2014</td>
<td>GEDI</td>
</tr>
</tbody>
</table>

- **Connectivity**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Period</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>URBAN</td>
<td>Urban population (% of total)</td>
<td>2014</td>
<td>UN(^j)</td>
</tr>
<tr>
<td>AGGLOMERATION</td>
<td>(URBANIZATION*INFRASTRUCTURE )</td>
<td>2014</td>
<td>GEDI</td>
</tr>
</tbody>
</table>

- **Education**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Period</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDU13</td>
<td>Government expenditure on education, total (% of GDP)</td>
<td>2013-11-12</td>
<td>UNESCO</td>
</tr>
<tr>
<td>LBTE13</td>
<td>Labor force with tertiary education (% of total)</td>
<td>2013</td>
<td>ILO</td>
</tr>
</tbody>
</table>

- **Economic complexity**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Period</th>
<th>Source</th>
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<tbody>
<tr>
<td>ECONOMIC COMPLEXITY</td>
<td>The complexity of the economy is assessed.</td>
<td>2014</td>
<td>GEDI</td>
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</table>

- **Relative to Unemployment/Employment characteristics**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Period</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUNEMP</td>
<td>Unemployment with tertiary education (% of total unemployment)</td>
<td>2014</td>
<td>ILO</td>
</tr>
<tr>
<td>PUNEMP</td>
<td>Part time employment, total (% of total employment)</td>
<td>2014</td>
<td>ILO</td>
</tr>
<tr>
<td>VUNEMP</td>
<td>Vulnerable employment, total (% of total employment)</td>
<td>2014</td>
<td>ILO</td>
</tr>
<tr>
<td>EMPT15</td>
<td>Employment to population ratio, 15+, total (%) (national estimate)</td>
<td>2014</td>
<td>ILO</td>
</tr>
<tr>
<td>E1524</td>
<td>Employment to population ratio, ages 15-24, total (%) (national estimate)</td>
<td>2014</td>
<td>ILO</td>
</tr>
</tbody>
</table>

---

\(^{12}\) Global Entrepreneurship Index. We thank Laslo Szerb to provide us with the variables of the GEI. The new Global Entrepreneurship index structure is based on the review paper by Acs and Szerb (2016). It is an improvement of the GEDI -Global Entrepreneurship and Development Index. This global index reflects a country's ability to promote quality entrepreneurship, which is a factor of growth and employment.
### Institutional environment

**- Formal**

**Fiscality,**

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
<th>Year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAXES%REV13</td>
<td>Taxes on income, profits and capital gains (% of revenue)</td>
<td>2013</td>
<td>IMF</td>
</tr>
<tr>
<td>TAXES%TAXES1</td>
<td>Taxes on income, profits and capital gains (% of total taxes)</td>
<td>2013</td>
<td>IMF</td>
</tr>
<tr>
<td>PROFIT.TAX</td>
<td>Profit tax (% of commercial profits)</td>
<td>2014</td>
<td>World Bank</td>
</tr>
</tbody>
</table>

**Openness,**

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
<th>Year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRADE</td>
<td>Trade (% of GDP)</td>
<td>2014</td>
<td>World Bank/ OECD</td>
</tr>
<tr>
<td>ECH</td>
<td>Net barter terms of trade index (2000 = 100)</td>
<td>2014</td>
<td>UN</td>
</tr>
<tr>
<td>FDI_In</td>
<td>Foreign direct investment, net inflows (% of GDP)</td>
<td>2014</td>
<td>IMF</td>
</tr>
<tr>
<td>FDI_Out</td>
<td>Foreign direct investment, net outflows (% of GDP)</td>
<td>2014</td>
<td>IMF</td>
</tr>
<tr>
<td>IMS15</td>
<td>International migrant stock (% of population) données 2015</td>
<td>2015</td>
<td>UN</td>
</tr>
<tr>
<td>NMIG</td>
<td>Net migration/total population (%) données 2012</td>
<td>2012</td>
<td>UN</td>
</tr>
</tbody>
</table>

**Entrepreneurship,**

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
<th>Year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME</td>
<td>Time required to start a business (days)</td>
<td>2014</td>
<td>World Bank</td>
</tr>
<tr>
<td>COST</td>
<td>Cost of business start-up procedures (% of GNI per capita)</td>
<td>2014</td>
<td>World Bank</td>
</tr>
<tr>
<td>PROC</td>
<td>Procedures required to start a business (number)</td>
<td>2014</td>
<td>World Bank</td>
</tr>
<tr>
<td>BARR</td>
<td>Barriers to entrepreneurship</td>
<td>2013</td>
<td>OECD</td>
</tr>
</tbody>
</table>

**Labor market,**

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
<th>Year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRICT</td>
<td>Strictness of employment protection</td>
<td>2013</td>
<td>OECD</td>
</tr>
<tr>
<td>RMINW</td>
<td>Real minimum wages (hourly, USSPPP)</td>
<td>2014</td>
<td>OECD</td>
</tr>
</tbody>
</table>

**- UnFormal**

**Entrepreneurship,**

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
<th>Year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISTAR</td>
<td>Percentage of 18-64 population (individuals involved in any stage of entrepreneurial activity excluded) who intend to start a business within three years</td>
<td>2014</td>
<td>GEM</td>
</tr>
<tr>
<td>DESIR</td>
<td>Percentage of 18-64 population who agree with the statement that in their country, most people consider starting a business as a desirable career choice</td>
<td>2014</td>
<td>GEM</td>
</tr>
<tr>
<td>FAIL</td>
<td>Percentage of 18-64 population with positive perceived opportunities who indicate that fear of failure would prevent them from setting up a business</td>
<td>2014</td>
<td>GEM</td>
</tr>
<tr>
<td>NFFAI</td>
<td>The percentage of the 18-64 aged population stating that the fear of failure would not prevent starting a business</td>
<td>2014</td>
<td>GEM</td>
</tr>
<tr>
<td>EGROW</td>
<td>Percentage of TEA who expect to employ at least five employees five years from now</td>
<td>2014</td>
<td>GEMI</td>
</tr>
<tr>
<td>HSTAT</td>
<td>Percentage of 18-64 population who agree with the statement that in their country, successful entrepreneurs receive high status</td>
<td>2014</td>
<td>GEMI</td>
</tr>
<tr>
<td>MSUCC</td>
<td>Percentage of 18-64 population who agree with the statement that in their country, you will often see stories in the public media about successful new businesses</td>
<td>2014</td>
<td>GEM</td>
</tr>
<tr>
<td>SKILLS</td>
<td>Percentage of 18-64 population who believe to have the required skills and knowledge to start a business</td>
<td>2014</td>
<td>GEM</td>
</tr>
<tr>
<td>CARST</td>
<td>The status and respect of entrepreneurs calculated as the average of Carrier and Status</td>
<td>2014</td>
<td>GEM</td>
</tr>
<tr>
<td>ATT</td>
<td>Attitudes Sub-Index (Opportunity percept, StartupsSkills, Risk perception, Networking, Cultural Support)</td>
<td>2014</td>
<td>GEDI</td>
</tr>
<tr>
<td>ABT</td>
<td>Abilities Sub-Index (opprt startup, techn Absorpt, Human capital, Competition)</td>
<td>2014</td>
<td>GEDI</td>
</tr>
<tr>
<td>ASP</td>
<td>Aspiration Sub-Index (prod innov, Process Innov, High Growth, Internationalization, Risk capital)</td>
<td>2014</td>
<td>GEDI</td>
</tr>
<tr>
<td>GEI</td>
<td>Global Entrepreneurship index</td>
<td>2014</td>
<td>GEDI</td>
</tr>
</tbody>
</table>

**Governance,**

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
<th>Year</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOCOR</td>
<td>The Corruption Perceptions Index (CPI) is assessed.</td>
<td>2014</td>
<td>GEDI</td>
</tr>
<tr>
<td>BRISK</td>
<td>(RISK ACCEPTANCE*COUNTRY RISK)</td>
<td>2014</td>
<td>GEDI</td>
</tr>
<tr>
<td>FPROP</td>
<td>Economic Freedom * Property Rights</td>
<td>2014</td>
<td>GEDI</td>
</tr>
<tr>
<td>TGOV</td>
<td>Measures the effectiveness of using the taxes</td>
<td>2014</td>
<td>GEDI</td>
</tr>
<tr>
<td>CREGU</td>
<td>Regulation * Market Dominance</td>
<td>2014</td>
<td>GEDI</td>
</tr>
<tr>
<td>EDUC</td>
<td>Tertiary Education * Quality of Education</td>
<td>2014</td>
<td>GEDI</td>
</tr>
</tbody>
</table>
Entrepreneurial Variables

- Characteristics of the entrepreneurs

Establish,
Percentage of 18-64 population who are currently owner-manager of an established business, i.e., owning and managing a running business that has paid salaries, wages, or any other payments to the owners for more than 42 months

Establish, 2014

Nascent,
Percentage of 18-64 population who are currently a nascent entrepreneur, i.e., actively involved in setting up a business they will own or co-own; this business has not paid salaries, wages, or any other payments to the owners for more than three months

Nascent, 2014

Nascentnewent,
Percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business

Nascentnewent, 2014

Nascentnewentf,
Percentage of female 18-64 population who are either a nascent entrepreneur or owner-manager of a new business

Nascentnewentf, 2014

Nascentnewentm,
Percentage of male 18-64 population who are either a nascent entrepreneur or owner-manager of a new business

Nascentnewentm, 2014

Culture,
The percentage of the 18-64 aged population knowing someone who started a business in the past 2 years

Culture, 2014

Education,
Percentage of the TEA businesses owner/managers having participated over secondary education

Education, 2014

Gazelle,
Percentage of the TEA businesses having high job expectation average (over 10 more employees and 50% in 5 years)

Gazelle, 2014

- Characteristics of the firms

Business Growth,
Net growth of the number of Businesses

NetBG, 2014

Size new,
Average size of newly born enterprises: number of persons employed in the reference period (t) among enterprises newly born in t divided by the number of enterprises newly born in t

Sizenuew, 2014

Size death,
Average employment in enterprise deaths: number of persons employed in the reference period (t) among enterprise deaths in t divided by the number of enterprise deaths in t

Sizedeath, 2014

Sizesurv5,
Average size of five-year old enterprises: number of persons employed in the reference period (t) among enterprises newly born in t-5 having survived to t divided by the number of enterprises in t newly born in t-5 having survived to t

Sizesurv5, 2014

Employment shares,
Employment share of enterprise births: number of persons employed in the reference period (t) among enterprises newly born in t divided by the number of persons employed in t among the stock of enterprises active in t

Employment shares, 2014

Employment share of enterprise deaths: number of persons employed in the reference period (t) among enterprise deaths divided by the number of persons employed in t among the stock of active enterprises

Employment shares, 2014

Churn,
Business churn: birth rate + death rate

Churn, 2014

-Sectorial
High Expectancy Growth

SIZEHG
Average size of high growth enterprises measured in employment: number of employees in the reference period (t) among high growth enterprises measured in employment in t divided by the number of high growth enterprises measured in employment in t

HGENTIC
Share of high growth enterprises measured in employment: number of high growth enterprises divided by the number of active enterprises with at least 10 employees sector: Information and communication

HGENTREA
Share of high growth enterprises measured in employment: number of high growth enterprises divided by the number of active enterprises with at least 10 employees sector: Real estate activities

HGEMPLIC
Employment share of high growth enterprises measured in employment: number of employees among high growth divided by the number of employees among the stock of active enterprises with at least 10 employees sector: Information and communication

HGEMPREA
Average size of high growth enterprises measured in employment: number of employees among high growth divided by the number of employees among the stock of active enterprises with at least 10 employees sector: Real estate activities

SIZEHGIC
Average size of high growth enterprises measured in employment: number of employees in the reference period (t) among high growth enterprises measured in employment in t divided by the number of high growth enterprises measured in employment in sector: Information and communication

SIZEHGREA
Average size of high growth enterprises measured in employment: number of employees in the reference period (t) among high growth enterprises measured in employment in t divided by the number of high growth enterprises measured in employment in sector: Real estate

COMPET
Percentage of the TEA businesses started in those markets where not many businesses offer the same product

EXPORT
Percentage of the TEA businesses where at least some customers are outside country (over 1%)

CUSTOUT
Percentage of TEA who indicate that at least 25% of the customers come from other countries

TECHSECT
Percentage of the TEA businesses that are active in technology sectors (high or medium)

NEWT
Percentage of the TEA businesses using new technology that is less than 5 years old average (including 1 year)

1.1 Table A1: Supplementary variables

<table>
<thead>
<tr>
<th></th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
<th>Class 4</th>
<th>Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (%)</td>
<td>9 (32.14%)</td>
<td>6 (21.43%)</td>
<td>3 (10.71%)</td>
<td>7 (25.00%)</td>
<td>3 (10.71%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Countries</th>
<th>Austria</th>
<th>Denmark</th>
<th>Estonia</th>
<th>Finland</th>
<th>France</th>
<th>Germany</th>
<th>Luxembourg</th>
<th>Netherlands</th>
<th>Sweden</th>
<th>Belgium</th>
<th>Cyprus</th>
<th>Czech Republic</th>
<th>Italy</th>
<th>Romania</th>
<th>Slovenia</th>
<th>Croatia</th>
<th>Greece</th>
<th>Spain</th>
<th>Bulgaria</th>
<th>Hungary</th>
<th>Ireland</th>
<th>Latvia</th>
<th>Malta</th>
<th>Poland</th>
<th>United Kingdom</th>
<th>Lithuania</th>
<th>Portugal</th>
<th>Slovakia</th>
</tr>
</thead>
</table>

2: International Labour Organization: http://www.ilo.org
4: National Science Foundation: https://www.nsf.gov/
7: The Global Entrepreneurship Development Institute: https://thegedi.org/
9: The International Monetary Fund: http://www.imf.org/
<table>
<thead>
<tr>
<th>Profile (+)</th>
<th>Economic Development</th>
<th>Illustrative variables</th>
<th>Institutional Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ OPPORTUNITY</td>
<td>+ SEMP</td>
<td>+ NMIG</td>
<td>+ ECH</td>
</tr>
<tr>
<td>+ GDPPC</td>
<td>+ TECHTR</td>
<td>+ IMS15</td>
<td>+ TIME</td>
</tr>
<tr>
<td>+ SURVIVAL</td>
<td>+ RD</td>
<td>+ RWMIN</td>
<td></td>
</tr>
<tr>
<td>- NECESSITY</td>
<td>+ GDERD</td>
<td>+ HSTAT</td>
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</tr>
<tr>
<td>- LT.UNEMPL</td>
<td>+ PATENTS</td>
<td>+ ATT</td>
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<td>- SELF</td>
<td>+ ART13</td>
<td>+ ABT</td>
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<td>- UNEMPL</td>
<td>+ HEALTHPU</td>
<td>+ ASP</td>
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</tr>
<tr>
<td>- DEATH</td>
<td>+ DCM</td>
<td>+ GEI</td>
<td></td>
</tr>
<tr>
<td>+ OPPORTUNITY</td>
<td>- IEMP</td>
<td>+ FINANCE AND STRATEGY</td>
<td>+ STRIC</td>
</tr>
<tr>
<td></td>
<td>- AEMP</td>
<td>+ FREEDOM PROPERTY</td>
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<td></td>
<td>- AVA</td>
<td>+ TABSO</td>
<td>- Net Migration12</td>
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<tr>
<td></td>
<td>- VUNEMP</td>
<td>+ CREGU</td>
<td>- BARR</td>
</tr>
<tr>
<td></td>
<td>- U1524</td>
<td>+ TGOV</td>
<td>- RWMIN</td>
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<tr>
<td></td>
<td>- TECHTR</td>
<td>+ NOCOR</td>
<td>- CREGU</td>
</tr>
<tr>
<td>+ SELF</td>
<td>- NSERPRO</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table A2: Synthesis of the partition into 5 classes of the EU-28 countries

Note: Table A2 summarizes the main results of the HAC (Hierarchical Ascending Clustering) characterization of the chosen partition into five classes of countries, obtained from the cut of the hierarchical tree of the figure 7. Division is carried out according to the positions of the countries, on the factorial axes of the PCA. All the active and illustrative variables mentioned in this table are significant at the level of 5%.
### Table A3: Synthesis of the thematic Discriminant Analysis

<table>
<thead>
<tr>
<th>Description</th>
<th>Class 1: Non entrepreneurial wage-based economies with opportunity Entrepreneurship</th>
<th>Class 2: Non entrepreneurial self-employed based economies</th>
<th>Class 3: Non entrepreneurial self-employed based economies in crisis with necessity entrepreneurship</th>
<th>Class 4: Entrepreneurial economies with high-growth new firms and high GDP growth</th>
<th>Class 5: Entrepreneurial economies: revolving doors effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (%)</td>
<td>9 (32.14%)</td>
<td>6 (21.43%)</td>
<td>3 (10.71%)</td>
<td>7 (25.00%)</td>
<td>3 (10.71%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Austria, Denmark, Estonia, Finland, France, Germany, Luxembourg, Netherlands, Sweden</th>
<th>Belgium, Cyprus, Italy, Czech Republic, Romania, Slovenia</th>
<th>Croatia, Greece, Spain</th>
<th>Bulgaria, Hungary, Ireland, Latvia, Malta, United Kingdom, Poland</th>
<th>Lithuania, Portugal, Slovakia</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU Countries</td>
<td>+ RD, + GDERD, + PATENTS, + TECHTR, + SCIENCE</td>
<td>- RD, - GDERD, - PATENTS, - TECHTR, - SCIENCE</td>
<td>- RD, - GDERD, - PATENTS, - TECHTR, - SCIENCE</td>
<td>+ VUNEMP, + U1524</td>
<td>+ VUNEMP, + U1524</td>
</tr>
<tr>
<td>Entrepreneurship</td>
<td>+ NOCOR, + FPROP, + TGOV, + CREGU, + FSTRA, + LMARK</td>
<td>- NOCOR, - TABSO, - FPROP, - FSTRA</td>
<td>- NOCOR, - TABSO, - FPROP, - FSTRA</td>
<td>- NOCOR, - TABSO, - FPROP, - FSTRA</td>
<td>- NOCOR, - TABSO, - FPROP, - FSTRA</td>
</tr>
<tr>
<td>Governance</td>
<td>+ NMIG</td>
<td>- ECH, + BARR</td>
<td>- ECH, + BARR</td>
<td>- ECH, - BARR</td>
<td>- NMIG</td>
</tr>
<tr>
<td>Formal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**1.3** Table A3: Synthesis of the thematic Discriminant Analysis