Eixo Temático: Estratégia e Internacionalização de Empresas

ENTREPRENEURIAL ACTIVITY AND MACROECONOMIC INDICATORS. THE 2008 MELTDOWN AND CREATION OF NEW FIRMS

ATIVIDADE EMPRESARIAL E INDICADORES MACROECONÔMICOS. THE MELTDOWN 2008 E CRIAÇÃO DE NOVAS EMPRESAS

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ABSTRACT

This paper investigates the relationship between macroeconomic variables and entrepreneurial activity using a panel data model with thresholds. Utilizing data from the Global Entrepreneurship Monitor and the World Bank across 22 countries (mostly developed), spanning from the year 2001 to 2012, it undisclosed a controversial finding, that entrepreneurial activity is at it highest when so is the Unemployment rate. It presents strong empirical evidence of the *refugee effect or employment push*. Another macro variable that displays relevance is the Expenditure on Education, evidencing that the more is spent on education, more likely are individuals to see and act on investment opportunities.

INTRODUCTION

It is not new the attempt to link economic or sociological variables and entrepreneurial activity (EA), and several articles investigate the relationship in the field of economics such the works of Frank (1968), Audretsch and Thurik (1998), Baptista and Thurik (2007), and many more. From the sociological point of view, Kilby (1971) gives a more comportamental and behaviorist approach to entrepreneurship. It explains the source of dynamic entrepreneurial performance in developing countries and discusses the roles in terms of theories of entrepreneurial supply, which are constructed from either psychological or sociological elements.

This work focuses on economic variables ant to start off, is demanded to define entrepreneurship. Many authors have tackled the topic, perhaps being Schumpeter its highest exponent. Backhaus (2003) cites him as the most important economist of the 20th century, for his ideas liaising economic aspects and new firm creation. Despite the vast literature, there is no easy concept of entrepreneurship, as per Schumpeter the emphasis should be placed on innovation, new products, new production methods and new markets. To Cantillon, the entrepreneur is someone who assumes risk and may legitimately appropriate any profits. To Turgot and Say, the entrepreneur is different from the capitalist, who assumes the risk or uncertainty. He obtains and organizes production factors to create value. Bruyat and Jullen (2001) affirm that an entrepreneur is the individual responsible for the process of creating new value.

This paper focus on the relationship between macroeconomic variables and EA. Although the focus gets shifted to just a handful of variables: Unemployment, EA and Expenditure on Education, and investment because of opportunities foresaw. It hypothesized other macroeconomic variables such as CO_2 emissions, Gross Domestic Product, Market Capitalization, Exported Goods, Inflation and many more, but with not much to write about.

Among other authors that studied this type relationships, probably was Oxenfeltdt (1943) that initiated the line of thought that this paper traces. Individuals confronted with unemployment and the lack of prospects, or even on very low wages seek self-employment as a way to break the *status quo*. This effect has been referred as the *refugee, desperation effect,* or *unemployment push.* There are many contradictions to this theory and some points may be raised. High unemployment tend to correlate with plateaued economy, Frank (1968); low income and lower rates of savings and wealth. Plus the unemployed tend to posses fewer personal characteristics to start and sustain a new firm. On the other hand, Hurst and Lusardi (2004), affirm that the propensity to become a business owner is a nonlinear function of wealth and the relationship between wealth and starting a new business is flat over the majority of the wealth distribution. Another perspective is presented by Kapler and Love (2011) who argue that the impact of the economic meltdown of 2008 was negative when related to the creation of new firms, their data show that nearly all countries experienced a sharp drop in business entry. Moreover, they affirm that countries with high levels of financial development experienced a more pronounced drop, so did countries more affected by the crisis. These results go against the ones found on this paper, even though the method is similar, here thresholds were included to scrutinize deeper the effects of high unemployment, plus the EA data source is different.

Plehn-Dujowich (2012) also using data from the GEM monitor report, concludes that past unemployment spurs the creation of new companies. His study looks at the dynamic relationship between entrepreneurship, unemployment, and growth across 10 sectors of the U.S. using quarterly data for the period 2000-2009.

In this research, another macro variable displayed some strong and significant coefficients, the Adjusted Savings – education expenditure (% of GNI) which refers to the current operating expenditures in education, including wages and salaries and excluding capital investments in buildings and equipments.

The GEM started in 1999 as a joint project between Babson College (USA) and London Business School (UK). The aim was to consider why some countries are more 'entrepreneurial' than others. The GEM monitor has been used by many authors in essays on the topic of entrepreneurship research. It consists of 16 years of data, more than 200.000 interviews a year, over 100 countries investigated, 500 specialists in entrepreneurship research, hundreds of academic and research institutions and more than 200 funding institutions. In each economy, GEM looks at two elements: the entrepreneurial behavior and attitudes of individuals and the national context and how that impacts entrepreneurship.

The motivation and relevance lay on the objective of shedding some light in the complex and ambiguous relationship between economic indicators and EA, focusing mainly in unemployment and the creation of new firms. Most of the literature that approached the topic in question used regression functions, identical across all observations in a sample. That practice is contra productive as financial and economic data is far from being linear and should be treated in different ranges (Hansen, 1999).

REVIEW OF LITERATURE

The practice of linking economic growth to industrial organization goes back at least to Schumpeter (1934). Even though the relationships between entrepreneurship and economic indicators have been widely studied, the results are still unclear (Calmfors and Holmlund, 2000). To exteriorize the conundrum that have been the many attempts to link these two classes of indicators, can be pointed out the works of Mueller (2007) and Solow (1956); the former says that an increase in start-up activity generates economic growth, the latter does not even include entrepreneurship in his neo-classical model of economic growth. Audretsch and Fritsch (2002), Caves (1998) and Sutton (1997) link positively economic growth and the creation of new firms. However utilizing data from the GEM Monitor, Reynolds et al., (2001) cannot

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determine causality with cross-sectional data of National Economic Growth and Entrepreneurship, but EA can lead to growth in size, scope and diversity of economic sectors, as per the authors. Van Steel, Carre and Thurik (2005), investigating TEA influences on GDP growth, find that TEA does affect growth but depends on the *per capita* income; suggesting that EA plays a different role in countries in different stages of economic development.

Other indicators such as Household savings have also been used to correlate with EA. Hurst and Lusardi (2006), found positive correlation but only at the highest wealth distribution percentile. Buera (2009) shows that in a dynamic model, the existence of financial constraints to the creation of businesses implies a non-monotonic relationship between wealth and risking capital in the creation of a new firm. The likelihood of becoming an entrepreneur as a function of wealth is increasing for low wealth levels, but it is decreasing for higher wealth levels.

Bjørnskov and Foss (2006), using measurements of economic freedom ask which elements of economic policy making are responsible for the supply of EA (using GEM data). They find that the size of government is negatively correlated with EA but sound money (measurement of economic freedom) is positively correlated to EA.

The other type of integration surfaced by this paper is more straight forward, Expenditure on Education and EA. Even though this relationship is not well documented in literature some mentions can be found in Michellacci (2003) as it points out the importance of the liaison and cooperation between knowledge accumulation and entrepreneurs. Wennerkers et al. (2005) contributes affirming that one way of improving this cooperation is by boosting joint ventures between private firms, universities and the government (this last one subsiding research and development).

Olaniyan and Okemakinde (2008), find empirical evidence that investments in educational

development correlates positively with economic growth. Versakelis (2006), has in its findings evidence that support the hypothesis that the higher the investment of a society in the quality of education, the higher the output of innovation activity.

Nevertheless, even for this straighter forward relation, there are alternative views that can somewhat be referred; Schmitz (1989) says that for poor or developing countries, entrepreneurs should not focus on the creation of new technologies, they might as well copy or imitate, reducing implementation expenditures and costs of producing knowledge.

DATA AND METHOD

Data

Entrepreneurial indicators were extracted from the Global Entrepreneurship Monitor (GEM). The GEM provides results of a survey on entrepreneurship held every year across the world. The rising number of participating countries and consistent conceptual framework, surveying tools and applied methodology contribute to build the biggest database on entrepreneurship in the world. According to GEM, its survey generates a variety of relevant primary information on different aspects of entrepreneurship and provides harmonized measures about individuals attributes and their activities in different phases of venturing (from nascent to start-up, established business and discontinuation).

In 2014, more than 206,000 individuals were surveyed across 73 economies and 3936 national experts on entrepreneurship from 73 economies participated in the survey. Using the United Nations classification for regions, and the World Economic Forum Global Competitiveness Index Report's classification for economic development levels, GEM participant economies represent 72.4% of the world's population and 90% of the world's GDP, which enables GEM to feature different profiles of entrepreneurship according to regions and economic

development stage.

From GEM, two indicators are used - TEA and OPPORTYY, the former is the percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business, and the latter, the percentage of individuals who perceive good opportunities to start a business in the area where they live. TEA includes individuals in the process of starting a venture and those running a new business less than 3 1⁄2 years old.

The variable treated here as OPPORTYY, is the percentage of individuals involved in early-stage entrepreneurial activity who claim to be purely or partly driven by opportunity as opposed to finding no other option for work. This includes taking advantage of a business opportunity or having a job but seeking better opportunity.

Macroeconomic indicators are extracted from the World Bank Database. The World Bank it is an institution that dispenses any presentations, and its data provide the statistical capacity of countries and contains helpful tools and processes that World Bank staff, individuals and clients can use to make improvements regarding research, policy making and much more. Macro variables that were initially included in this research are: Gross Domestic Product, Gross Domestic Product Growth, Gross Domestic Product *per capita*, Density, CO_2 Emissions, Electricity Production, Savings, Expenditure on Education, Inflation, Market Capitalization, Export of Goods and Services, Internet Users and Net Taxes. As previously mentioned, the ones which yielded relevance are: Unemployment and Expenditure on Education, the other ate taking into calculation but their participation in the overall analysis goes as far as that. Moreover, even though EA data goes as far as 2014, macroeconomic indicators go up only to 2012. That data is included in the model to find lead/lag relationships with EA. Those relationships have not been found.

INSERT TABLE 1 HERE

The countries included in this research are: Argentina, Belgium, Brazil, Chile, China, Croatia, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Netherlands, Norway, Slovenia, South Africa, Spain, Sweden, United Kingdom, and United States of America. Over 100 countries were considered but due to the lack of data, the great majority had to the excluded.

INSERT TABLE 2 HERE

Method

The data panel method with threshold is a non-standard asymptotic theory of inference that permits the allocation of confidence intervals and hypotheses testing. It was first used in Hansen (1999), to test whether financial constraints affect investment decisions. The idea behind this method is that regression functions are not identical across all observations in a sample and many authors advocate for the threshold method over the more commonly used data panel, such as Drukker, Gomis-Porqueras and Hernandez-erme (2005).

$$y_{it} = \mu_i + \beta_1' x_{it} I(q_{it} \leq \gamma) + \beta_2' x_{it} I(< q_{it} \leq \gamma) + e_{it} + \beta_3' x_{it} I(q_{it} > \gamma) + e_{it} \qquad (1)$$

$$y_{it} = \begin{cases} \mu_i + \beta_1' x_{it} + e_{it}, & q_{it} \leq \gamma \\ \mu_i + \beta_2' x_{it} + e_{it}, & q_{it} < \gamma \leq q_{it} \\ \mu_i + \beta_3' x_{it} + e_{it}, & q_{it} > \gamma \end{cases}$$

$$x_{it}(\gamma) = \begin{cases} x_{it} I(q_{it} \leq \gamma) \\ x_{it} I(q_{it} < \gamma \leq q_{it}) \\ x_{it} I(q_{it} > \gamma) \end{cases}$$

and $\beta = (\beta_1' \quad \beta_2' \quad \beta_3')'$ so that (1) equals

$$y_{it} = \mu_i + \beta' x_{it}(\gamma) + e_{it} \qquad (2)$$

$$\overline{y_i} = \mu_i + \beta'\overline{x_i}(\gamma) + \overline{e_i} \qquad\qquad (3)$$

where $\overline{y_i} = T^{-1}\sum_{t=1}^{T} y_{it}$, $\overline{e_i} = T^{-1}\sum_{t=1}^{T} e_{it}$, and

$$\overline{x_i}(\gamma) = \frac{1}{T}\sum_{t=1}^{T} x_{it}(\gamma)$$

$$= \begin{pmatrix} \dfrac{1}{T}\sum_{t=1}^{T} x_{it}\, I(q_{it} \leq \gamma) \\[2ex] \dfrac{1}{T}\sum_{t=1}^{T} x_{it}\, I(\, q_{it} < \gamma \leq \; q_{it}) \\[2ex] \dfrac{1}{T}\sum_{t=1}^{T} x_{it}\, I(q_{it} > \gamma) \end{pmatrix}$$

Taking the difference between (2) and (3) yields

$$y_{it}^* = \beta' x_{it}^*(\gamma) + e_{it}^* \qquad\qquad (4)$$

Where

$$y_{it}^* = y_{it} - \overline{y_i}\,,$$

$$x_{it}^*(\gamma) = x_{it}(\gamma) - \overline{x_i}(\gamma),$$

and $\qquad\qquad e_{it}^* = e_{it} - \overline{e_i}$

Let
$$y_i^* = \begin{bmatrix} y_{i2}^* \\ . \\ . \\ . \\ y_{iT}^* \end{bmatrix},\quad x_i^*(\gamma) = \begin{bmatrix} x_{i2}^*(\gamma)' \\ . \\ . \\ . \\ x_{iT}^*(\gamma)' \end{bmatrix},\quad e_i^* = \begin{bmatrix} e_{i2}^* \\ . \\ . \\ . \\ e_{iT}^* \end{bmatrix}$$

Denote…. for example,

$$X^*(\gamma) = \begin{bmatrix} x_1^*(\gamma) \\ \cdot \\ \cdot \\ \cdot \\ x_i^*(\gamma) \\ \cdot \\ \cdot \\ \cdot \\ x_n^*(\gamma) \end{bmatrix}$$

Using this notation, (4) is equivalent to

$$Y^* = X^*(\gamma)\beta + e^* \tag{5}$$

For any given …

That is,

$$\hat{\beta}(\gamma) = \left(X^*(\gamma)'X^*(\gamma)\right)^{-1}X^*(\gamma)'Y^* \tag{6}$$

The vector…

$$\hat{e}^*(\gamma) = Y^* - X^*(\gamma)\hat{\beta}(\gamma)$$

And the sum of …

$$S_1(\gamma) = \hat{e}^*(\gamma)'\hat{e}^*(\gamma)$$

$$= Y^{*\prime}\left(I - X^*(\gamma)'\left(X^*(\gamma)'\,X^*(\gamma)\right)^{-1}X^*(\gamma)'\right)Y^* \tag{7}$$

Chan (1993)…

$$\hat{\gamma} = \underset{\gamma}{\operatorname{argmin}}\; S_1(\gamma) \tag{8}$$

$$\hat{\sigma}^2 = \frac{1}{n(T-1)}\hat{e}^{*\prime}\hat{e}^* = \frac{1}{n(T-1)}\,S_1(\hat{\gamma}) \tag{9}$$

RESULTS

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Most of the variables tested, across the three threshold regimes, do not bring any clarity to the research proposed. It is important to note that two entrepreneurship variables, TEA and OPPORTYY are considered, the former is the percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business, and the latter, the percentage of individuals who perceive good opportunities to start a business in the area where they live. Statistic significance in many indicators such as Market Capitalization, Exported Goods, Inflation, Population Density, Net National Savings, GDP *per capita* is found, but as their coefficient is too low, or the indicator did not make the list on the other thresholds they are not discussed further. Full results can be seen in Table 3.

The main findings lie on the indicators Education Expenditure and Unemployment. Education Expenditure displayed strong coefficient in the second (2.093) and third regime (2.811), for the *Opportunity* independent variable. The second regime is the average range, and the third is when the coefficient for the indicator is at it highest range. So when expenditure on education is higher, so is the percentage of people who create new firms, because they see good opportunities. One can infer the more educated people are, more opportunities they see. Another interesting effect is that people tend to see more opportunities when they are unemployed, in this case the coefficient reaches a *beta* of 1.303.

As per the other dependent variable, TEA (Total Entrepreneurial Activity), there is strong evidence that unemployment forces individuals to seek self employment. The *beta* is strong for the indicator in the third threshold regime (0.876), meaning that when entrepreneurial activity is at its highest, so is unemployment. It also comes about when the creation of new firms is slow, but with a very small coefficient (-0.098). Full descriptions of variables that are included in this research can be seen in Table 4.

Insert Table 3 here

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Insert Table 4 here

Likelihood ratio test

To test if the econometric model is statistically significant, the likelihood ratio test is used. The LRT is a statistical test of the goodness-of-fit between two models, in this case between the simple regression and the threshold method. So the relatively more complex model is compared to the simpler model, in order to see if it fits a particular the dataset better. The LRT is only valid if used to compare hierarchically nested models. That is, the more complex model must differ from the simple model only by the addition of one or more parameters. Adding additional parameters will always result in a higher likelihood score. The LRT provides one objective criterion for selecting among possible models and as displayed in Table 3 results corroborate to the inclusion of more parameters.

The formula for the lr test statistic is:

$$lr = -2\ln(\frac{L(m1)}{L}(m2))$$ (10)

Where L(m*) denotes the likelihood of the respective model (either model 1 or model 2), and ll(m*) the natural log of the model's final likelihood (i.e., the log likelihood). Where m1 is the more restrictive model, and m2 is the less restrictive model.

The resulting test statistic is distributed chi-squared, with degrees of freedom equal to the number of parameters that are constrained (in the current example, the number of variables removed from the model, i.e., 2).

Determining the number of thresholds

The econometric model proposed differs from the majority due to the inclusion of thresholds. The model with no thresholds is the simple data panel, and alternative models can have one, two or more thresholds. The determination is made by computational bootstrap to approximate de asymptotic p-value. As the null asymptotic distribution of the likelihood ratio test in non-pivotal, the bootstrap simulation should approximate the sampling distribution. As econometric software does all the calculation, no further discussion is given to this step.

CONCLUSION

This research computes macroeconomic data and entrepreneurial activity indicators from 22 countries, for over a decade and its contribution is empirical result that shed some light in the conundrum of the relationship between unemployment and the creation of new firms. Results show that when entrepreneurial activity is the highest, so is unemployment. This result have been documented before in literature, although most authors point towards an opposite direction. The difference may dwell in the threshold method utilized in this paper, that filters results by a discrete range. This method is used because financial and economic data present a particular kind of nonlinear asymmetric dynamics, and can be better analyzed when isolating regimes (Hansen 1999).

No econometric model is need to confirm that after the 2008 crisis, EA soars almost everywhere. Only by looking at TABLE 4, for most countries after the 2008 subprime meltdown, EA skyrockets. There is a clear increase in firm creation. Although the reasons are somewhat unclear, one can infer the notion that lack of employment springs people to seek self employment.

The other finding, not so controversial, is the relationship of opportunity driven entrepreneurship and expenditure in education. The causality can be easily interpreted in way

that the more educated people are, more chances they have to minimize the risk of starting a new company (this notion is not backed up in literature). That could be because they understand or are familiar with a new process, product or idea. Perhaps this predisposition is also linked to the likely fact that they hold more cash or savings, to acquire or start up a new business.

It is important to note that almost 100 countries have been considered to take part on this essay, however only 22 made the cut. The remaining did not have enough data to run the econometric model. The great majority of those countries, which have not been included, are poor and underdeveloped, therefore results only apply for the higher end of national wealth.

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TABLE 1 – *Percentage of 18-64 who see good opportunities to start a firm in the area where they live*

Country/Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Argentina	20,00	21,00	65,00	57,00	58,00	57,00	61,00	47,00	44,00	50,00	56,00	50,00	41,00	31,91
Belgium	20,00	16,00	18,00	38,00	43,00	15,00	16,00	14,00	15,00	40,00	43,00	33,00	31,00	35,93
Brazil	41,00	41,00	41,00	44,00	43,00	37,00	39,00	41,00	47,00	48,00	43,00	52,00	51,00	55,54
Chile	-	31,00	34,00	-	49,00	42,00	49,00	27,00	52,00	65,00	57,00	65,00	68,00	67,00
China	-	27,00	32,00	-	21,00	31,00	39,00	-	25,00	36,00	49,00	32,00	33,00	31,88
Croatia	-	17,00	26,00	19,00	37,00	43,00	44,00	44,00	37,00	23,00	18,00	17,00	18,00	18,43
Denmark	46,00	51,00	42,00	49,00	66,00	65,00	71,00	62,00	34,00	46,00	47,00	44,00	-	59,66
Finland	55,00	51,00	49,00	38,00	47,00	50,00	53,00	50,00	40,00	51,00	61,00	55,00	44,00	42,38
France	7,00	10,00	9,00	21,00	22,00	21,00	23,00	22,00	24,00	34,00	35,00	38,00	23,00	28,26
Germany	24,00	20,00	14,00	13,00	18,00	20,00	-	24,00	22,00	28,00	35,00	36,00	31,00	37,59
Hungary	9,00	10,00	-	17,00	10,00	16,00	28,00	19,00	3,00	33,00	14,00	11,00	19,00	23,40
Ireland	34,00	39,00	33,00	45,00	52,00	44,00	46,00	27,00	-	23,00	26,00	26,00	28,00	33,36
Italy	48,00	40,00	34,00	25,00	15,00	23,00	39,00	30,00	25,00	25,00	-	20,00	17,00	26,57
Japan	7,00	5,00	7,00	14,00	17,00	9,00	9,00	8,00	8,00	6,00	6,00	6,00	8,00	7,27
Netherlands	42,00	49,00	29,00	38,00	39,00	46,00	42,00	39,00	36,00	45,00	48,00	34,00	33,00	45,55
Norway	59,00	44,00	37,00	41,00	46,00	51,00	46,00	39,00	49,00	50,00	67,00	64,00	64,00	63,45
Slovenia	-	30,00	32,00	37,00	21,00	39,00	48,00	45,00	29,00	27,00	18,00	20,00	16,00	17,25
South Africa	20,00	14,00	28,00	32,00	27,00	28,00	-	37,00	35,00	41,00	41,00	35,00	38,00	37,00
Spain	48,00	42,00	31,00	39,00	38,00	33,00	34,00	25,00	16,00	19,00	14,00	14,00	16,00	22,61
Sweden	42,00	45,00	39,00	41,00	45,00	46,00	50,00	-	-	66,00	71,00	66,00	64,00	70,07
UK	23,00	27,00	35,00	36,00	39,00	37,00	39,00	30,00	24,00	29,00	33,00	33,00	36,00	40,99
USA	35,00	37,00	31,00	34,00	32,00	24,00	25,00	37,00	28,00	35,00	36,00	43,00	47,00	50,85

Source – GEM Consortium

TABLE 2 – *Percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business*

Country/Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Argentina	9,90	14,20	19,70	12,80	9,50	10,20	14,40	16,50	14,70	14,20	20,80	18,90	15,90	14,41
Belgium	4,20	3,00	3,90	3,40	3,90	2,70	3,10	2,90	3,50	3,70	5,70	5,20	4,90	5,40
Brazil	13,80	13,50	12,90	13,50	11,30	11,70	12,70	12,00	15,30	17,50	14,90	15,40	17,30	17,23
Chile	15,70	15,70	16,90	11,10	11,10	9,20	13,40	13,10	14,80	16,80	23,70	22,60	24,30	26,83
China	12,10	12,10	12,90	13,70	13,70	16,00	16,40	18,80	18,80	14,40	24,00	12,80	14,00	15,53
Croatia	3,60	3,60	2,60	3,70	6,10	8,50	7,30	7,60	5,60	5,50	7,30	8,30	8,30	7,97
Denmark	7,20	6,50	5,90	5,30	4,70	5,30	5,40	4,00	3,60	3,80	4,60	5,40	5,47	5,47
Finland	8,20	4,60	3,10	4,40	4,90	5,00	6,90	7,30	5,20	5,70	6,30	6,00	5,30	5,63
France	5,70	3,10	1,60	6,00	5,40	4,40	3,20	5,60	4,30	5,80	5,70	5,20	4,60	5,34
Germany	6,30	5,20	5,20	4,40	5,10	4,20	3,80	3,80	4,10	4,20	5,60	5,30	5,00	5,27
Hungary	10,90	6,50	4,30	4,30	1,90	6,00	6,90	6,60	9,10	7,10	6,30	9,20	9,70	9,33
Ireland	11,40	9,10	8,10	7,70	9,80	7,40	8,20	7,60	6,80	6,80	7,20	6,20	9,20	6,53
Italy	9,10	5,70	3,10	4,30	4,90	3,50	5,00	4,60	3,70	2,40	4,30	4,30	3,40	4,42
Japan	3,10	1,70	2,80	1,50	2,20	2,90	4,30	5,40	3,30	3,30	5,20	4,00	3,70	3,83
Netherlands	5,90	4,60	3,60	5,10	4,30	5,40	5,20	5,20	7,20	7,20	8,20	10,30	9,30	9,46
Norway	7,40	8,60	7,40	6,90	9,10	8,90	6,20	8,70	8,50	7,70	6,90	6,80	6,30	5,65
Slovenia	4,60	4,60	4,00	2,60	4,40	4,60	4,80	6,40	5,40	4,70	3,70	5,40	6,50	6,33
South Africa	6,50	6,30	4,20	5,30	5,10	5,10	7,80	7,80	5,90	8,90	9,10	7,30	10,60	6,97
Spain	6,30	4,60	6,60	5,10	5,70	7,30	7,60	7,00	5,10	4,30	5,80	5,70	5,20	5,47
Sweden	5,70	3,90	4,10	3,70	4,00	3,40	4,20	4,90	4,90	4,90	5,80	6,40	8,20	6,71
UK	6,50	5,40	6,40	6,20	6,20	5,80	5,50	5,90	5,70	6,40	7,30	9,00	7,10	10,66
USA	11,10	10,60	11,90	11,30	12,40	10,00	9,60	10,80	8,00	7,60	12,30	12,80	12,70	13,81

Source – GEM Consortium

TABLE 3 – *Data panel with thresholds results*

TEA (y2) First Regime			OPPORTYY (y1) First Regime		
Variables	Coefficient	t-test	Variables	Coefficient	t-test
			GDPP	**0.000**	2.802
EXPGS	**0.029**	3.547			
INFGD	**0.141**	2.700			
UNEM	**-0.098**	-3.471			
ASEE	**-0.515**	-3.101			
MKTCAP	**0.013**	4.345			
PD	**-0.006**	-5.137	PD	**-0.039**	-7.123
Second Regime Thresholds 8.300			Second Regime Thresholds 28.000		
Variables	Coefficient	t-test	Variables		
GDPP	**0.000**	-8.000			
EXPGS	**-0.032**	-3.231			
INFGD	**0.158**	4.154	INFGD	**0.326**	2.078
ASEE	**1.129**	5.790	ASEE	**2.093**	5.129
MKTCAP	**0.017**	3.006			
ASNNS	**0.140**	6.403	ASNNS	**0.200**	3.395
Third Regime Thresholds 15.300			Third Regime Thresholds 48.000		
Variables	Coefficient	t-test	Variables		
GDPP	**0.001**	7.024			
UNEM	**0.876**	6.424	UNEM	**1.303**	4.900
ASEE	**-1.146**	-2.623	ASEE	**2.811**	4.230
MKTCAP	**-0.023**	-2.137			
PD	**0.068**	2.120			
			ASNNS	**0.325**	2.811
LR Test for threshold effect 205,777 (0.000)			LR Test for threshold effect 154,25 (0.000)		

TABLE 4 – *Entrepreneurial activity and macroeconomic variables*

Variable	Description
OPPORTYY	Percentage of 18-64 who see good opportunities to start a firm in the area where they live
TEA	Percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business
TEAYYNEC_P	Percentage of those involved in TEA who are involved in entrepreneurship because they had no other option for work
GDPG	GDP growth (annual %)
GDP	GDP (current US$)
GDPP	GDP per capta
EXPGS	Exports of goods and services (% of GDP)
INFGD	Inflation, GDP deflator (annual %)
INT	Internet users (per 100 people)
UNEM	Unemployment, total (% of total labor force) (modeled ILO estimate)
ASEE%	Adjusted savings: education expenditure (% of GNI)
ASNNS	Adjusted savings: net national savings (% of GNI)
EP	Electricity production (kWh)
MKTCAP	Market capitalization of listed companies (% of GDP)
NTP	Net taxes on products (current US$)
PD	Population density (people per sq. km of land area)