Fixed effects models to assess the effectiveness of entrepreneurial diversification strategy in SMEs

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ABSTRACT

The purpose of this paper is to analyze the business environment, before and after 2009, and see if the divesification strategy for types of activity, chosen by Romanian SMEs, was efficient, similarly to porfolio divesification. We explore multiple types of models aiming to differentiate between two categories of companies: those with only one type of activity and those who kept their options open by having multiple types of activities. The studied companies are from the Bucharest-Ilfov metropolitan area, the variables taken into consideration are profit, number of employees, geographical position, type of activity, revenues, losses, and the time period is 2000-2012, so as to properly capture the events in 2008 without straying too far from that point in time.

We fitted fixed linear regression models for panel data, with and without an interaction variable to represent the crysis, as a dummy variable, and the total number of companies as a proxy variable for the level of competition in a certain type of activity and geographical position.

As a matter of expectations, we departred from a similarity with the portfolio theory, and anticipated that we ought to find significant differences in favor of those companies which allow themselves multiple types of activities, more exactly the second category. The results confirmed that there are many differences between the two categories, that companies with multiple types of activity have not been affected by the crysis as much, and they seem to have more stable profits.

Keywords: *fixed effects models, models with interaction term, panel data, SMEs, Romania, economic crisis, entrepreneurial strategies*

JEL Classification: *C33, D22, D81, L25, L26*

INTRODUCTION

Turbulence in business is unavoidable, but companies can most certainly choose how to deal with it. They can navigate between the vortexes or they can be swallowed up. When the economy returns to normal, it does not do so for each branch, market or individual company. Even in the absence of a global financial crisis, the times can be troublesome for certain industries or organizations (Kotler and Casione, 2009). An answer to the rise in uncertainty and complexity in the environment in which firms operate is strategic planning. The word strategy can sound pretentious, even sophisticated, for SMEs, with most of these types of companies being led with a focus on the day to day activities.

One of the important features of the small firm sector is its lack of homogeneity in what concerns size and age of business, sector, location, growth and decline, economic and market conditions, but also their management (Burns, 2011). The company is, in many ways, an extension of the entrepreneur, such as: the main goal of the company (profit, growth, stability, work satisfaction); orientation (technical, commercial, social); style of internal and external communication, working conditions etc. Some business owners are motivated by "true" Schumpeterian entrepreneurship, while others tend towards more traditional models, seeking independence, staying small and having a more comfortable life (Nooteboom, 1993). This might explain the heterogeneity in SME's organizational strategies.

Developing a strategy and following it through can lead to less risk when working in a competitive environment and, as a consequence, an increase in profitability. An OECD report from 2009 warns that in order to survive and grow SMEs need specific policies and programmes even in balanced time. It is even more that in times of crisis SMEs are generally more vulnerable for: "it is more difficult for them to downsize as they are already small; they are individually less diversified in their economic activities; they have a weaker financial structure; they have a lower or no credit rating; they are heavily dependent on credit and they have fewer financing options" (OECD, 2009). Dedicated policies and programs are even more important in the case of a transitional economy, such as Romania, and this report was our source of inspiration in choosing the variables of the research.

After many years of centralized economy, a large part of the population viewed the newly developed SME sector with suspicion. Until 2000 it was impossible to talk about a working market economy, there was chaos because companies worked in a legislative, political and social void which characterized the post revolutionary decade a situation which was enhanced

by the transfer of state property to certain groups without any legal oversight or control. This led to a chaotic and uneven development of the SME sector.

After the year 2000 the economy started on an upward trend, fueled by the desire to join political, economic and military trans-atlantic structures. Everything evolved as expected, dragged back by inertia, but with certain coherence in the integration process and response to the eventual crisis of the latter part of the decade, with an expectation for its effects to end in 2012. That year, however, was one of great political crisis in Romania which lowered confidence and may have led to less foreign direct investments in the country. The research period is therefore relevant, as it was not marred by any other type of event, other than those already familiar to the market economy, as we know it. Concerning the geographical research area, Bucharest-Ilfov, it represents approximately 40% of the Romanian economy. Many large national and international companies are located here and, obviously, SMEs are flourishing around them. Furthermore, 60% of total FDIs are directed to this area, the local economy being especially attractive due to the R&D activities. The level of entrepreneurship diversity, effervescence and density in this area is the only example in the country that is at the same level as the EU average.

We intent to determine the influence of certain important variables – revenues, number of employees, geographical position, and type of activity – on the profit of two types of SMEs: companies with only one type of activity and companies with more than one type of activity, as recorded at the Registry of Commerce. Most of the Romanian literature on SMEs has taken a descriptive or qualitative approach to the problem, therefore the objective of this paper is to quantify the ability of SMEs to obtain a profit in a normal situation as well as in a crisis, in other words, their ability to innovate and to create added value. We use fixed linear regression models for panel data and the statistical data available for the Romanian economy, in the period 2000-2012 and the geographical region of Bucharest-Ilfov.

The paper is organized as follows: the next section provides a literature review on SMEs, both at an international level and in Romania. Section three describes the data, the research methodology and the main results. The last section provides the principal conclusions of the paper.

LITERATURE REVIEW

Considering the important role played by SMEs (statistics show that in most countries they represent the vast majority of the total number of companies, a substantial percentage of GDP and employ the greatest number of people), the institutional and market inefficiencies that they face must

be addressed by the relevant authorities (Pîslaru and Modreanu, 2012). The Small Business Act, adopted in 2008 by the European Union, was the first step in creating a strategic agenda in order to foster an environment in which SMEs can grow. This strategy was further developed in the Horizon 2020 EU Strategy. In spite of the large amounts of money invested in this direction, there is no consensus in terms of results or performance.

The link between entrepreneurship, SMEs and economic growth in Romania (see Marchiş, 2011; Pîslaru and Modreanu, 2012; Nicolescu, 2015; Grigore and Dragan, 2014) has shown that financial and institutional difficulties, a lack of political willpower, the economic crisis (and its effects on the budget), European constraints as well as educational and human resource limitations, have not allowed SMEs to develop to their full potential and have limited their contribution to the GDP. This phenomenon is easy to notice even now, when policy makers do not perceive the importance of entrepreneurship to its full extent. All this has overshadowed the traditional advantages of SMES, such as quick decision process, great ability to adapt and to generate economic innovations that can be applied in the economy, as well as their great potential to create added value.

In Romania, one must make the distinction between the "political entrepreneur", someone who uses political connections in order to obtain a profit, and the "market entrepreneur", who does not use political connections. Ciucan-Rusu and Szabo (2013, see also Armeanu et al., 2014) identify an additional problem of our business environment in general, and SMEs in particular: the transfer of activities, normally done by the public sector, to the politically dominated private sector, to be done by companies which have just one employee, no desire to innovate and don't produce any added value for the client.

In a quantitative approach, Armeanu et al. (2014) wants to measure the contribution of entrepreneurship, expressed as SMEs, to the GDP, as a whole and divided by sectors of the economy. Their message is clear "the Romanian entrepreneurship environment was severely affected by the crisis, SME productivity, for the most important six economic sectors, has been reduced substantially. The factors which have led to this have been a lack of ability to innovate, a high concentration of SMEs in sectors with a low added value, difficult access to financing and inadequate management." The international literature has shown great interest for the connection between entrepreneurship, SMEs and the economic crisis. Among the most important ones are: Ács et al., 2013; Szirmai et al., 2011; Naudé, 2011; Caree and Thurik, 2010; Walzer, 2009; Audretsch et al. 2006; Dejardin, 2000, Klepper, 1996. Pîslaru and Modreanu (2012) consider that: "any attempt at estimating SMEs contribution to economic growth must be based on the reality that there is a

strong variation in the companies' rhythm of growth. Some companies perform better because they make better use of opportunities and create competitive advantages, either by introducing new technologies and radical innovations, or by incremental innovations, reducing costs, improving quality, processes and increasing organizational flexibility.

There are multiple scenarios concerning companies' behavior in a period of crisis, depending on their structure and commercial policy. The entrepreneur's appetite for risk has a significant influence on strategy. Those with a low appetite will prefer so-called "safe" strategies, which minimize outside threats, ensuring low but acceptable profits. On the other hand, an entrepreneur with a high tolerance for risk will choose a more "aggressive" strategy, a more demanding one, with greater risk and greater reward. In this case, innovation is preferable to imitation and offense to defense.

Bourletidis & Triantafyllopoulos (2014) states that there are companies, which show a remarkable yield and it seems that they get a benefit from the crisis and make use of chances. The difference of the companies' attribution still observed in the same geographical region even though to the same local market. Penrose (2000) says that a company's perceptions of crises have a profound effect on primary crisis management activities, in other words the way decision makers perceive the crisis directly affects the way they will respond to it and they will involve in any activity. Soininen et al.(2010) asked the question "Does entrepreneurial orientation matter?" for SMEs in a period of crisis. Their results show that the different dimensions of the entrepreneurial orientation can have diverging effects on how firms are impacted by the recession. In general, the more innovative and proactive the firm is, the less its operations are affected by the recession and the more risk taking the firm is, the more its profitability is affected by recession.

Another type of pressure that companies, working in a dynamic environment, must endure is choosing between their main activity and new business alternatives (Fauchart &Keilback, 2009). The literature speaks of "ambidexterity" as a strategic option to improve performance. Ambidexterity is when firm`s managers aim simultaneously to improve their current operations and to expand them by implementing breakthrough new ideas (Gibson and Birkinshaw, 2004; Jansen et al, 2012).

De Clercq et al. (2014), in a study conducted on a sample of SMEs, have shown that "the contextual ambidexterity–performance relationship is suppressed at higher levels of internal rivalry and amplified at higher levels of external rivalry. The same authors suggest, based on their findings, that "developing an ambidextrous posture should not be an end by itself, and they point to the need for SMEs to understand how the features of their internal and

external environments affect the performance consequences of such posture". A similar study could be relevant for Romania as well because, to the best of our knowledge, it has not been conducted yet. Some investigations in this area would allow understanding how entrepreneurs can choose to behave so as to be competitive in an ever-changing environment.

DATA AND METHODOLOGY

Data and variable description

The dataset analyzed in this paper contains 132929 observations concerning companies set up at the Registry of Commerce, during the period 2000-2012, corresponding to the different geographic positions and types of activity in the Bucharest-Ilfov area. The following variables are taken into consideration:

1. SIRUTA Code – indicating the geographical position of the company.
2. NACE Code – indicating the activity for each SIRUTA code, meaning that there may be more than one NACE code for each SIRUTA code. SIRUTA - NACE combinations identify unique observations in the dataset.
3. Total number of companies registered each year for each NACE - SIRUTA combination.
4. Total revenues – the sum of all the revenues for all the companies in each NACE - SIRUTA combination.
5. Total losses – the sum of all the losses for all the companies in each NACE - SIRUTA combination.
6. Total employees – the total number of people working for all the companies in each NACE - SIRUTA combination.
7. Total profit – the sum of all the profits recorded by all the companies in each NACE - SIRUTA combination.

In total there are 1728077 observations, resulting from 132929 NACE - SIRUTA combinations taken into account for 13 years. The main characteristic of this data is that it contains only aggregated information, grouped by geographical position and business activity, and there is no information pertaining to individual companies. The data has a cross-sectional component, given by the fact that it is grouped into NACE - SIRUTA combinations, as well as a time series component, given by the 13 years taken into consideration. Therefore, we will use an econometric approach specific to panel data which will allow us to take into account the autoregressive nature of the data as well as the fixed component specific to each observation.

An important characteristic of the dataset is the absence of companies for certain NACE-SIRUTA combinations. In order to avoid the 0 values in the data to affect the final results, we only took into consideration those combinations where the number of companies is greater than zero. This resulted in an unbalanced panel dataset. Even though it would have been ideal to work with a balanced dataset, modern data analysis software can handle unbalanced data, and so does R. Furthermore, the descriptive statistics revealed asymmetry in the distribution of the data; the literature recommend a log transformation in order to account for the consequences, however, a significant amount of the data is zero, be it profit, number of employees or another variable in the dataset. Eliminating them would have been useful in order to abide by the requirements of the theoretical model, but it also would have obfuscated the phenomena as it manifests itself in reality. Therefore, we have chosen to keep the data in its original format and accepted the possible problems regarding the accuracy of the results.

For the purposes of our analysis, the dataset has been split in two categories: companies with a single main activity (these will be referred to as companies with only one stated NACE and denoted by "NACE = 1") and those companies which have chosen to keep their options open and have the prospect to run multiple types of main activity. In this case, the category was identified as "NACE = 0", or multiple NACE codes category. We will fit two different models for each category, with and without an interaction term, and then compare the results.

Methodology

In order to explain the variation in profit for each NACE-SIRUTA combination, as it can be associated to the number of companies, total revenues, number of employees and the total losses, we fitted a fixed effects linear regression model for panel data. To account for the effects of the crisis, a dummy variable was introduced in the model: it takes the value 0 for every year up to and including 2008, and 1 for every year starting with 2009. The first step is to apply the following model for both categories:

Profit = No. of companies, Total revenues, No. of employees, Total losses, Crisis (1)

After testing for multicollinearity, we resume to the following model for multiple NACE codes companies and discuss the findings:

Profit = No. of companies, Crisis (2)

The final part of the analysis involves a model with interaction for both types of companies. For the single NACE code companies we use model (3) and, for the multiple NACE codes companies, model (4):

*Profit = No. of companies, Total revenues, No. of employees, Total losses, Crisis, No. of companies*Crisis* (3)
*Profit = No. of companies, Crisis, No. of companies*Crisis* (4)

Our expectation regarding the chosen variables is still unclear in the first phase of the investigation. On the one hand, we expect that a larger number of companies will lead to higher values in profit. However, the increased level of competition in certain areas may have the opposite effect. Total revenues are expected to have a positive impact on profit, the reasoning behind this being in the very definition of profit, however our expectations can be deceived by having companies which record very high costs. At this stage, however, there is the clear expectation that there is a direct relationship between total revenues and profit. The number of employees can be expected to have a negative impact on profit because they represent a cost for the company, but we cannot be sure for now: it may also be the case that an increased number of employees may end up in higher levels of production and potentially a to a higher profits.

Losses, naturally, are expected to have a negative impact on profit, when talking about a single economic entity. In this case, however, we are working with aggregated data from all the companies in a region. As a consequence, it is possible to have profit at the regional level, yet experience a significant level of losses for some individual companies. Therefore, even if we expect a negative relationship between losses and profits, we cannot outright eliminate the possibility that there might be a different result, which might indicate a flow in revenues from those experiencing losses towards those with profits. At last, the dummy variable records the year and allows us to differentiate between results before and after the economic crisis. We expect it to have a significant negative impact on the profit during the period after 2008.

The model with all the variables, for companies with "NACE=1" (single NACE code)

We extracted, from the original dataset, only those NACE-SIRUTA combinations which have a positive number of companies and obtained an unbalanced panel with a total of 1052771 recordings for a total number of 129773 combinations for which there has been at least one company recorded for at least 1 of the 13 years taken into consideration, specifically between 2000 and 2012.

To test for multicoliniarity we used the pooled OLS model, in which we used the data as they are, without taking into consideration the longitudinal structure. This is justified, in the literature, by the fact that multicollinearity is checked in relation to the other independent variables and there is no need to take into account the fixed effects specific to panel data. We can see, in Table 1, that none of the variables has a variance inflation factor above the acceptable limit; therefore we will keep all the variables in the fixed model.

VIF for the OLS model with the afformendioned variables, "NACE=1" category

Table 1

Variable	No. of companies	Total revenues	No. of employees	Total losses	Crisis
VIF	1.37	1.44	1.39	1.21	1

The second column in Table 2 shows that the signs for all the coefficients involved in the estimate are as expected. The number of companies, and total revenues, impact positively the profit, whereas the number of employees, along with the crisis variable, have a negative impact. The coefficient for losses is positive, however, due to the way in which the values are recorded, it actually denotes a negative relationship with profit. All the variables are significant at the 0.1% level and the F-value shows that the model, as a whole, is significant as well.

The explanatory power of the model is 11.31%. It's not clear whether this is due to the fact that, in general, fixed effect models have a lower explanatory power than their corresponding OLS models, or if this is actually the real explanatory power of the model with the variables that have been taken into consideration.

The model with all the variables for companies with "NACE=1" (multiple NACE code)

For the second model, we only kept the companies with multiple NACE codes, or those "zero" NACE codes observations, where the number of companies was positive. This resulted in an unbalanced panel with 3156 regional observations with periods between 1 and 13 years, for a total of 23523 observations. We fitted a similar model as before; the results can be found in the third column of Table 2. Once again, the relationships between the independent variables and profit are as expected, they are statistically significant, as is the model as a whole. However, for companies with multiple NACE codes, the crisis variable is not statistically significant. In different words, although crisis years seem to be associated with lower profits, the differences before and after 2008 are not themselves significant. Another aspect that is worth pointing out

is that the model has a much higher explanatory power, 75.82%. This time, the variations in the predictors taken into consideration are able to explain a higher proportion of the variations in profit, than for the previous category.

Because the models were applied on distinct sets of data, we cannot compare the differences between the coefficients we obtained. However, we can compare the specific influence that each variable has on profit. Concerning the number of companies registered in a certain region, the marginal contributions of another company are similar in both cases: 26729 thousand lei for companies with a single NACE and 22680 thousand lei for those with multiple NACE-codes. Even though, as stated, we cannot speculate with regard to the difference between the coefficients, we can discuss the fact that the companies in the first category seem to contribute more, possible as a result of the heterogeneity of their activity (different industries, opportunities). Another particularity of the two groups is that, for firms with a single NACE code, a single unit of revenue will contribute more to profit than the same unit for a multiple NACE codes company: for 1000 units of revenue, the profit of single NACE code companies will rise by 85, but only by 59 for the other group.

A comparisson between the results obtained for the fixed effects models fitted on the categories, illustrating the influence that each independent variable has on profit

Table 2

Model	**Model for single NACE code**	**Model for multiple NACE code**
No. of companies	26729 *** (t-value = 27.34)	22680 *** (t-value = 109.35)
Total revenues	0.085 *** (t-value = 349.05)	0.059 *** (t-value =88.29)
No. of employees	-581.42 *** (t-value = -12.30)	- 6514.00 *** (t-value =-123.25)
Total losses	0.067 *** (t-value = 30.615)	0.033 *** (t-value = 7.98)
Crisis • After 2008: 1 • Before 2009: 0	-298300 *** Reference (t-value = -7.8671)	-64155 Reference (t-value = 1.177)
Adjusted R^2	11,311%	75,82%
F - statistic	27344.4 (p-value: < 2.22e-16)	28760.2 (p-value: < 2.22e-16)

Losses have and adverse impact, although it seems to be more pronounced for companies with a single NACE code. There are significant differences when discussing the impact that employees have on a company.

For both groups there is an inverse relationship between the number of employees and profit, however, for companies with a single NACE code, the marginal influence of a single employee is much higher than for firms in the other category. The impact of the financial crisis represents another notable difference between the two categories. For the first group, the crisis had statistically significant impact, and much higher in magnitude than the second group: 298300 thousand lei, compared to 64155 thousand lei. Finally, the explanatory power of the models is significantly different between the two groups. Another aspect which is worth pointing out is that the variable with the greatest impact on profit is different between the two: total revenues (t-value=349.05) has the greatest impact on profit for single NACE code companies, whereas, in the case of multiple NACE codes companies the number of employees seems to have the greatest impact (t-value= -123.25).

Although the analysis presented in Table 2 is fairly eloquent, we cannot ignore the problem put forward by the information present in Table 3, which shows the existence of a strong multicollinearity between the independent variables in the multiple NACE codes model ("NACE=1"). From an econometric point of view, multicollinearity influences estimator values, but it is usually considered a problem related to the structure of the data and some author recommend no measures to correct it in any way, especially when the different variables included in the model are economically relevant in the model. In our case, however, it means that the number of companies in each NACE – SIRUTA combination is strongly correlated with total revenues, the number of employees or total losses, and this is not something which happens for the single NACE code category.

VIF for the OLS model with the affordmendioned variables, "NACE=0" category

Table 3

Variable	No. of companies	Total revenues	No. of employees	Total losses	Crisis
VIF	18.38	14.26	12.72	4.30	1

Fixed effects model explaining variations in profit as determined by variations in the number of companies and the year of the result, for companies with "zero" NACE

Table 4

Model	Estimator	Standard Error	t-value	Pr(>|t|)	Signif.
No. of companies	20890.219	79.368	263.2068	< 2.2e-16	***
Crisis • After 2008: 1 • Before 2009: 0	554822.1 Reference	73225.72	7.58	3.691e-14	***
Adjusted R^2	66,984%				
F - statistic	34816.6 (p-value: < 2.22e-16)				

This aspect will be discussed in more detail in the results section, but, for now, we will eliminate this phenomenon by keeping only the total number of companies as an independent variable. Table 4 shows the results obtained from model (2), presented at the beginning of this section. Both variables are statistically significant, and so is the model as a whole. The coefficient for the "number of companies" variable is positive, as before. What is different, when compared to Table 2, is the impact of the dummy variable that is now statistically significant and has a positive, direct influence: the impact of the crisis on the profit of single NACE code companies was a rise in profit. This result will be discussed as well in the final section. Another difference, in comparison to Table 2, is the lowered explanatory power of the model. This is not surprising: a decrease in the coefficient of determination is to be expected when eliminating variables; therefore it will not be considered a problem for the new model.

Models with interaction betweem the crysis and the number of companies

The last step of this investigation involves a model with interaction term meant to investigate the nature of the positive influence the crisis had on companies with a multiple objects of activity. The results reported in the second column of Table 5 show that a rise in the number of companies *during the crisis* has an adverse effect on profit, even though otherwise the number of companies was positively associated with the profit.

In other words, when the number of companies and the crysis are taken separately, neither of them have an adverse effect on profit. However, when a new company is accounted during a crysis year, the overall profit suffers. An interesting observation can be derrived as a result of the function

obtained from the econometric model presented in Table 5. Presented below are the two forms of the model – before and after 2008:

Estimated total profit = 20890.219 * No. of companies + 554822.1 * 1 - 13219.6 * No. of companies * 1, *for the years after 2008* (5)

Estimated total profit = 20890.219 * No. of companies + 554822.1 * 0 - 13219.6 * No. of companies * 0, *for the years up to and including 2008* (6)

For the same NACE – SIRUTA observation, the difference in average profit for a year up to and including 2008 differs from those after 2008 by 554822.1 - 13219.6 * No. of companies, a value obtained from the difference between (5) and (6). That means that profit is improved in a year after 2008 only if the number of companies in that specific NACE – SIRUTA combination is smaller than 42, a value obtained from the condition 554822.1 - 13219.6 * No. of companies > 0.

Fixed effects model with and without interaction, for companies with multiple NACE codes ("NACE=0")

Table 5

Model	Results without interaction	Results with interaction
No. of companies	20890.219 *** (t-value = 263.207)	20890.219 *** (t-value = 263.2068)
Crisis • After 2008: 1 • Before 2009	 554822.1 *** Reference (t-value = 7.58)	 554822.1 *** Reference (t-value = 7.57)
(No. of companies)* (Crisis) • After 2008: 1 • Before 2009	 -	 -13219.6 *** Reference (t-value = -16.179)
Adjusted R^2	66,984%	67.23%
F - statistic	34816.6 (p-value: < 2.22e-16)	23595.5 (p-value: < 2.22e-16)

A comparisson between the results obtained for the fixed model without the interaction and the one with the interaction between the number of companies and the year of the result, for companies with single NACE code ("NACE=1")

Table 6

Model	**Results without interaction**	**Results with interaction**
No. of companies	26729 *** (t-value = 27.34)	68672 *** (t-value = 59.98)
Total revenues	0.085 *** (t-value = 349.05)	0.087*** (t-value = 355.32)
No. of employees	-581.42 *** (t-value = -12.30)	-543.75 *** (t-value = -11.54)
Total losses	0.067 *** (t-value = 30.615)	0.054 *** (t-value = 23.772)
Crisis • After 2008: 1 • Before 2009: 0	 -298300 *** Reference (t-value = -7.8671)	 -28890 Reference (t-value = -0.760)
(No. of companies)* (Crisis) • After 2008: 1 • Before 2009: 0	-	- 50955 *** (t-value = 69.857)
Adjusted R^2	11,311%	11,713%
F - statistic	27344.4 (p-value: < 2.22e-16)	23720.8 (p-value: < 2.22e-16)

Therefore, the interaction model allows us to determine that the positive effects of a larger number of companies manifest themselves only up to a certain point. Beyond that threshold however, the crowding on the market leads to worse results. It terms of performance, the model with interaction is not significantly better compared to the one without interaction. A model with a similar interaction, but for companies with single NACE codes, can be found in the third column of Table 6.

Table 6 helps us make an efficient comparison between the model without the interaction and the one with the interaction between the number of companies and the year of the result, for companies with a single NACE code: the estimated coefficients are similar, with the exception of the total number of companies: for the interaction model, the estimated coefficient in much larger, but it is compensated by the value of the interaction coefficient. Using an approach similar to the one used for the relationship between (5) and (6), the results in Table 6 tell us that, ceteris paribus, the difference between

the average profit for a crysis year (starting with 2009) and any year before the crysis (up to and including 2008) is:

-28890 - 50955 * No. of companies (7)

The interaction model, compared to the one without itnteraction, shows that increasing the number of companies does not have a positive effect on profit unless this growth is associated with a year up to or including 2008. The coefficient for the interaction term tells us that during a crysis year, under no circumstance, will an increase in the number of companies lead to an increase in profit. This result will be discussed in the last section.

CONCLUSIONS, DISCUSSIONS AND INTERPRETATIONS

Concerning the debate between those who claim that the best strategy for the development of a company is to specialize on a single type of activity, intensive development, versus developing several activities – be they complementary or not, extensive development, the result presented in this paper, surprisingly for some, is that during a period of crisis, companies with multiple NACE codes fare better. The result is based on data for the Bucharest-Ilfov region, in the aforementioned time period and analyzed using linear regression models.

We found that there are real differences between the two categories taken into account: the total number of companies in a NACE – SIRUTA combination for the multiple NACE codes category is strongly correlated with total revenues, total number of employees, or total losses. This is something that does not happen in the single NACE code category. One possible interpretation could be that profit, for companies with a single type of activity, is strongly connected with revenues because these flows are well known and, just like costs, very specialized, with the number of employees adjusted to the dimension of the company. For a company with a single activity, fixed costs are known, therefore, when revenues drop so does profit.

The number of employees has a negative effect on profit in both situations, but it is much more profound for companies with multiple types of activity. First of all, the fact that it has a negative impact is an anomaly in itself: if the number of employees was better adjusted to the size of the company, and should the company be better organized, then each employee would have to create added value, meaning profit. Unfortunately, the technological, industrial and cultural level of Romanians is low – labor productivity is among

the lowest in the EU. If a company can develop in different directions while keeping employment at a minimum, there is a chance for profit. But if the company starts to hire new people in order to cover as many competencies as possible then, as the model demonstrates for this geographical area, profit disappears.

Model (2), obtained after eliminating multicollinearity between variables in the multiple NACE dataset, showed that profit could be increased during a crisis, as opposed to companies with a stated NACE code that recorded worse results than in the years prior to 2009. A company that specializes in an area has more expertise when it comes to the available technology and management practices. But it also has a well-defined market, which shrinks during a period of crisis. It makes quality products, but during a period of crisis there isn't enough money for this to be a key factor. A multidextrous company can, usually, optimize its expenses by reducing its fixed costs and it can access multiple markets. At the same time, in a crisis period there are certain situations that can be better exploited by a more opportunistic firm.

The two interaction models show that the crisis is not the only one to have negative effects, in the same sense that increasing the number of companies is not a solution for unlimited growth in profit, irrespective of the external economic environment. The introduction of the interaction term helped clarify the limits of growth for companies in the multiple NACE codes category and showed how they differ from those with a single NACE code. As we have seen, companies with multiple types of activity have the potential to pass relatively unscathed through a crisis: smaller fixed costs, diversified markets, elastic and opportunistic management, and this study have proven this beyond doubt.

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