Determinants of SMEs' performance: evidence from European countries

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ABSTRACT

This article aims to examine how certain economic and social factors influence short- and long-term performance of small and medium enterprises (SMEs). SMEs' performance is defined by using the value added (VA) by SMEs, as a percent of the total VA by enterprises. The study targets European Union (EU) countries selected by the authors following a cluster analysis procedure. In order to obtain short- and long-term influences, an analysis that carries out three types of tests is conducted: testing stationarity, testing cointegration and testing causality between the indicators identified as influencing factors and the variable measuring the performance of SMEs. The novelty and originality of this research are defined in terms of addressing the performance of SMEs from a new perspective, using an econometric basis in a macroeconomic view. From an econometric perspective, the results are among the most varied, both in the long- and short-term, however they also have a correspondent economic explanation.

1. Introduction

Small and medium enterprises (SMEs) are considered to be the backbone of the European Union's (EU) economy (European Commission, 2016a), while the entrepreneurship is seen as 'an engine of economic growth' (Audretsch, 2009). By definition (European Commission, 2016a), SMEs refer to micro-enterprises (with less than 10 employees and an annual turnover less than €2 million) small enterprises (with less than 50 employees and an annual turnover less than €10 million) and medium-sized enterprises (with less than 250 employees and an annual turnover of less than €50 million). According to the European Commission (2016a) 'in 2015, just under 23 million SMEs generated 3.9 trillion € in value added and employed 90 million people'. In Romania in 2015 SMEs created around 50% of the added value in the economy, compared to 57.3% at EU-28 level.

The importance of studying SMEs performance derives from several salient aspects. First, SMEs have a major influence on both gross domestic product (GDP) and

unemployment. As we have said above, both in the EU and globally, SMEs are responsible for an important share in GDP and the reduction of unemployment; practically, only in case of centralised economic systems this is not true (but these systems are on the verge of extinction) (Ayyagari, Demirguc-Kunt, & Beck, 2003; Robu, 2013). Second, in the current context of rapid changes in the world economy, the interdependencies between national economies (a direct effect of globalisation) and a difficult recovery after the global economic crisis have meant that the role of SMEs has significantly increased, based on their ability to adapt to challenges of a continuously changing environment (The Economist Intelligence Unit, 2013). Third, SMEs represent the framework of free entrepreneurial initiative and entrepreneurship, vital elements defining a competitive economy (Tomovska Misoska, Dimitrova, & Mrsik, 2016). Although with different intensities (from one economy to another, from one geographic area to another or from one entrepreneurial culture to another), it was found that SMEs play a major part in the process of promoting technical progress in society and innovation in economic activity (Ács & Audretsch, 1999; Radas & Bozic, 2009; Zygmunt, 2017).

In terms of the empirical assessment, most of the studies looked at the performance of SMEs at microeconomic (organisational) level, explaining the relationships of SMEs' performance with their internal environment factors, or with a combination of internal and external factors. Although these studies may be useful to entrepreneurs in their efforts to find the most appropriate ways to increase organisational performance in the context of limited resources, they do not help significantly to understand the specific mechanisms and determinant factor of SMEs sector performance in a particular country or another, as a whole.

This article aims to contribute to existing studies that give importance not only to studying the level of performance of SMEs at macroeconomic level, but also to the factors that determine, by their influence, a certain level of performance. Such an approach has the advantage of considering as a whole both the defining elements of SMEs performance and its determinant factors. Moreover, we aim to highlight whether these causal relationships are similar in all European countries, or whether there are distinct patterns for groups of countries/clusters with similar characteristics may be identified.

The novelty and originality of this research consists in addressing the performance of SMEs from a new perspective, using an econometric base in a macroeconomic view. Moreover, cross-country evidence provides an empirical basis for pro-SMEs national and European policies, which would be more accurately shaped for the specific needs of each country/group of countries.

2. Literature review

SMEs' performance can be understood from a quantitative perspective: efficiency, financial results, level of production, number of customers (Anggadwita & Mustafid, 2014), market share, profitability, productivity, dynamics of revenues, costs and liquidity (Gupta & Batra, 2016; Zimon, 2018), etc. and also from a qualitative perspective: goals achievement, leadership style, employee behaviour (Anggadwita &

Mustafid, 2014), customer satisfaction (Alpkan, Yilmaz, & Kaya, 2007), product and process innovation, organisational and marketing innovation (Sheehan, 2013), etc. Gopang, Nebhwani, Khatri, and Marri (2017), in their work, considered a series of 14 indicators to describe SMEs performance: reputation, productivity, employee satisfaction, profits, sales, prompt order delivery, sufficient working capital, effectiveness in operations of production, product quality, achievement of targets, number of clients, easiness in supervision, reduction in product cost and product diversification.

It is not only the study of performance features that is important, it is also relevant to mention research that focused on the factors that influence the performance of SMEs. To survive and succeed in a potentially austere environment, firms must effectively deploy and combine their physical, human and organisational assets. Thus, they will develop long-term competitive advantages and, in turn, achieve superior performance (Lonial & Carter, 2015). However, due to their limited resources, SMEs need to identify and exploit other means to be able to enhance their competitiveness and performance.

In general, various factors of the internal environment, which potentially influence the performance of SMEs, are mentioned in the literature. Of these, particular attention is paid to: firm age and size (Arend, 2014; Nicolini, 2001), human resources and human resource practices (Katou, 2012; Sheehan, 2013), entrepreneurial networks (Bratkovič Kregar & Antončič, 2016;) occupational health and safety measures (Gopang et al., 2017), product, process, organisational, marketing innovation (Altuntas, Cinar, & Kaynak, 2018; Wolff & Pett, 2006), sustainable leadership (Suriyankietkaew & Avery, 2016), planning and strategy (Aragón-Sánchez & Sánchez-Marín, 2005; Leitner & Güldenberg, 2010), organisational orientations (market, entrepreneurial, and learning orientations) (Lomberg, Urbig, Stöckmann, Marino, & Dickson, 2017), internationalisation (Chiao, Yang, & Yu, 2006; Majocchi & Zucchella, 2003), export (Altuntas et al., 2018), market orientation, planning flexibility (Alpkan et al., 2007), ownership and family involvement (Lien & Li, 2017), intellectual capital (Gomezelj Omerzel & Smolčić Jurdana, 2016), etc.

Although most of the published literature analyse different specific elements of the organisation's internal and external environment as being critical to their performance, there are also a number of studies that also take into account the macroeconomic/contextual factors. In this respect, Kanu (2015) focuses on studying the influence of the general level of corruption on SMEs performance.

Also, various factors of the external environment are subject to researchers' attention. For instance, the impact of the state government approach to business development is carefully considered for SMEs in Malaysia (Rasiah, 2002). In the U.K., researchers focus on the innovation policy, which has a great impact on service and manufacturing SMEs (Foreman-Peck, 2013). In Brazil, researchers report the impact of a cluster development policy on SMEs' performance (Figal Garone, Maffioli, de Negri, Rodriguez, & Vazquez-Bare, 2015), while Lin and Lin (2016), studying a sample of 77 Taiwanese SMEs, found that the level of organisational performance depended on the types of network relationships. In Taiwan, Chi, Wu, and Lin (2008) explore the impact of foreign direct investment (FDI) on SMEs and organisational performance, mediated by FDI related programmes of training.

There are also studies that suggest a holistic approach, integrating the internal and external environment factors in a synergetic influence on SMEs' performance. According to Aceleanu, Traşcă, and Şerban (2014), the SMEs degree of development and performance are influenced by three categories of factors: (1) the general economic climate that directly or indirectly influences GDP and gross national product (G.N.P.), as well as the capacity to invest; (2) the structural characteristics of economy, reflected in the level of technologies used, public and private R&D and innovation spending, and innovating activities deployed; and (3) microeconomic factors, such as the number and structure of enterprises by size class or the survival rate.

Thus, Ipinnaiye, Dineen, and Lenihan (2016) consider that both SMEs' performance determinants originated in their internal environment (company characteristics and strategy) as well as macroeconomic determinants (unemployment rate [UR], inflation rate, national competitiveness, real effective exchange rate, and domestic credit to the private sector). Gupta and Batra (2016) analysing survey data collected from 198 manufacturing Indian SMEs found a strong positive relationship between entrepreneurial orientation (EO) and firm performance, while environmental contingencies (demand growth and competitive intensity) were found to have a moderating influence on the EO–performance relationship. Beck, Demirgüç-Kunt, and Maksimovic (2005), based on a survey database covering 4,000 SMEs from 54 countries, analyse the effects of firm size, financial, legal and corruption-related barriers on SME growth rates, taking into account GDP per capita, GDP (million $) and inflation as control variables.

There are authors developing different types of models in order to obtain evidence on the level of firm performance: a structural model based on innovation (Hall, Lotti, & Mairesse, 2009), a decision model based on the application of a multiple criteria decision aid method (Voulgaris, Doumpos, & Zopounidis, 2000) or a two-part equation model to investigate the key firm- and industry-specific restrictions to the firm performance (Lejárraga & Oberhofer, 2015).

Last but not least, social responsibility and environmental responsibility (Choongo, 2017; Rekik & Bergeron, 2017) can contribute, through 'green practices', to increased business performance.

All the above studies looked at the performance of SMEs at the microeconomic (organisational) level. However, a more comprehensive picture of SME performance is borne out by analysing it at macroeconomic level. Such an approach has the advantage of taking into account as a whole, both the defining elements of SME performance and its determinant factors. From these perspective, SMEs performance is seen by the European Commission as a three-dimension outcome (European Commission, 2016a): the number of SMEs, the number of employees in SMEs and the added value of SMEs. Osakwe, Verter, Bečvářová, and Chovancová (2015) analyse the influence of critical macroeconomic variables on SME growth in the Czech Republic, suggesting a concave relationship between unemployment and growth of SMEs, a positive relationship between economic growth and growth of SMEs, while the domestic credit offered by the financial sector has no statistically significant influence.

As for the methodology employed in analysing the relationships between various economic or social factors and performance in SMEs, either multiple linear

regression (Moorthy et al., 2012), regression with panel data (Ipinnaiye et al., 2016), ordered logit analysis (Sheehan, 2013), causal analysis (Cahydin, 2017; Heshmati & Lööf, 2008), entropy-based TOPSIS approach (Kaynak, Altuntas, & Dereli, 2017) or structural equation modelling (SEM) are used (Gupta & Batra, 2016; Katou, 2012).

3. Data

To carry out this analysis we needed a proxy for SME performance. The choice for the value added (VA) at factor costs for SMEs, a variable calculated by the European Commission (2016a), is largely based on the quantitative aspect of this indicator and on its capacity to provide information upon the outcome obtained from the SMEs' activity.

This analysis will use a series of macroeconomic indicators, which capture both economic aspects of SMEs activity and social issues, which the authors considered to have an impact on the performance of SMEs. Therefore, in Table 1, the indicators chosen for the analysis to be developed, together with their coding and source, can be found.

Several considerations for choosing these variables of influence for the SMEs performance may be stated. First, the level of corruption is a factor with a contextual evolution that can negatively influence the activity and performance of SMEs; it 'plays a dual role, serving as both grease and sand' for entrepreneurship (Chowdhury, Audretsch, & Belitski, 2015). Second, the absorption of EU funds gives an overview of an important mean to support SMEs development, while they create added value for economic growth. Therefore, choosing the GDP as a representative factor for economic growth is not a coincidence. Third, the level of government spending is a factor of interest in this analysis as it has a positive influence on the performance of SMEs by facilitating access to financing (through national grant programmes, subsidies, etc.). Fourth, the inflation rate influences the cost of capital, thus increasing the cost of production of goods and of providing services. The life expectancy at birth, as

Table 1. Macroeconomic indicators used in the causality analysis.

| No.	Indicator	Measurement unit	Codification	Source
1	Value added at factor costs	% of total value added by enterprises	VA	European Commission (2017)
2	Corruption perceptions index	0–100	CPI	Transparency International (2016)
3	Funds absorption rate	%	FAR	European Commission (2016b)
4	Gross domestic product at market prices	Current prices, P.P.S. per capita	GDP	Eurostat (2017a)
5	General government expenditure	% of GDP	GE	Eurostat (2017b)
6	Inflation rate	Annual average rate of change (%)	IR	Eurostat (2017c)
7	Life expectancy at birth	years	LEB	Eurostat (2017d)
8	People at risk of poverty or social exclusion	% of total population	PRPSE	Eurostat (2017e)
9	Population by educational attainment level - Tertiary education (levels 5–8)	%	PTE	Eurostat (2017f)
10	Unemployment - annual average	% of active population	UR	Eurostat (2017g)

Source: Authors.
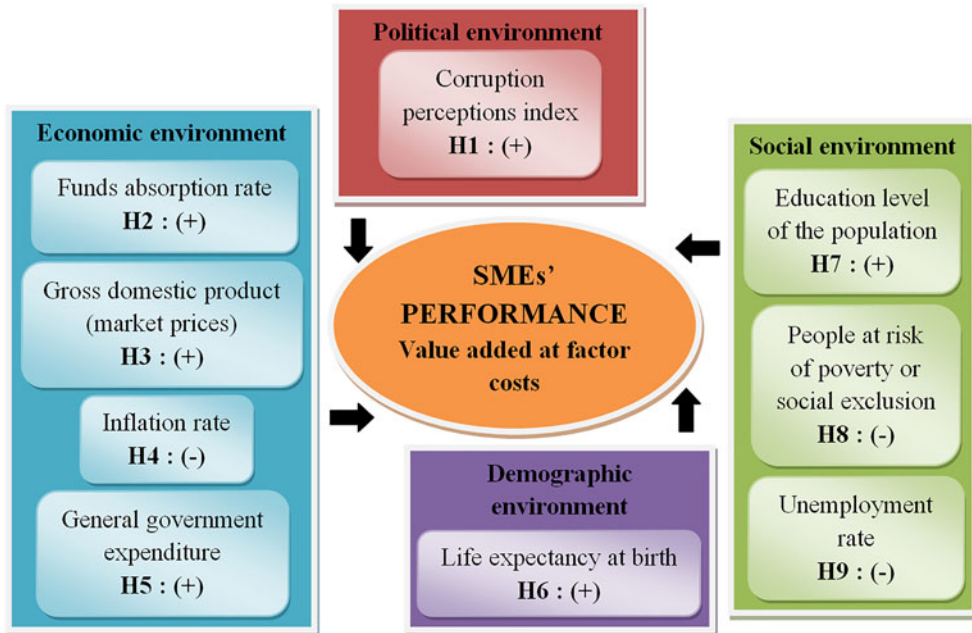
Figure 1. Macroeconomic model of performance influence factors. *Source*: Authors.

a social indicator, indirectly provides information about employees' health, vital for a high performance of SMEs, while the level of education influences the employment choice, and the work performance. Moreover, SMEs help reduce poverty in a country and the higher the UR, the greater the impact on the performance of SMEs in the sense of diminishing it.

All nine variables constitute themselves in performance predictors, from which we expect a specific influence in both the short- and long-run. Figure 1 provides a view of the macroeconomic model considered in this article. It also comprises the hypotheses to be tested for describing the influence in the long-run and the direction of the relationship to be tested in the short-run. For instance, the first hypothesis is as follows: The corruption perception index (CPI) positively influences the SMEs performance. We should clarify that greater values of this index reveal a less corrupt country, so any increase in its value describes a positive impact on the performance indicator.

The VA at factor costs for SMEs was firstly reported by the European Commission in 2008. Other indicators such as GDP at market prices or Inflation rate have the oldest data in 2007. Thus, considering that the variable range of time for the VA at factor costs for SMEs is 2008–2015, our analysis covers the 28 European countries for a period of eight consecutive years.

4. Methodology

4.1. Cluster analysis

Since we have found significant differences among European countries in terms of the number of SMEs, number of employees within SMEs and their contribution to

VA in the preliminary step of the research, we have identified a number of country typologies/profiles with reference to the above-mentioned characteristics, and consecutively, the countries presenting the smallest distance from the clusters' centres to be considered as representative for each of these typologies. Thus, further analyses will be able to: (1) more accurately identify the specific causality relationships between the independent variables and the dependent variable; and (2) comparisons between the specific results obtained for each country (as representative for one of the typology/profile) could be made.

For this purpose, we employed k-means type of cluster analysis and Euclidean distance as measure of similarity. K-means is a non-hierarchical cluster analysis, which requires the researcher to specify the number of clusters (k). The k-means algorithm begins by assigning an initial centre for each of the k clusters, followed by an iterative process which include each case/observation (based on the distance between it and the centroid) in one of the existing clusters, then recalculate the centre of the cluster (based on the average of the cases/observations it contains), until new rearrangements of cases are no longer able to increase the inter-cluster variability and decrease the intra-cluster variability.

4.2. Three step methodology for determining long- and short-term influences

4.2.1. Testing stationarity

With the aim to test stationarity, we used the Augmented Dickey Fuller (ADF) test. This type of test deals with a null hypothesis of nonstationary or the existence of a unit root in the econometric terminology, and also with an alternative hypothesis, namely the existence of the stationarity. Using an econometric software (Eviews) we can observe values for the ADF test for three different confidence levels (99%, 95% and 90%). One can reject the null hypothesis only if the value of the test is lower than the values returned from the programme.

The ADF test may be applied to a series of data as they are, or to the first level differences (meaning the difference $X_t - X_{t-1}$) or to the second level differences. In the end, we will be dealing with series integrated of order 'p' if we had to make 'p' differences to obtain a stationary series.

To move forward to the next step, we need to keep only the series integrated of the same order with the main variable of interest, in this case, the VA from SMEs.

4.2.2. Testing cointegration

For this step it is necessary to form regression equations with VA as a dependent variable and by turn, each independent variable (only if at the stationarity testing they proved to be integrated of the same order with VA). The linear combination of them will give a series of residuals which will have to be integrated at a lower level than the variables themselves. The coefficients of the variables are estimated through a least squares method.

4.2.3. Testing causality

The third step is based on the use of Granger causality test. This test assumes that between two variables could exist a causality relationship in a way that the values of one variable could be influenced by its own past values or by the second variables' past values. By using EViews, one needs to specify the number of lags, in order to see after how many periods of time a variable could be useful in predicting the other one. In this case, we chose to work with a lag of 1, as the time series are annual.

The null hypothesis of the test refers to a double assumption and it is formulated as in this example: X does not Granger cause Y and Y does not Granger cause X

The alternative hypothesis reflects the opposite idea, meaning: X Granger causes Y and Y Granger causes X

This decision rule regarding rejecting or accepting the null hypothesis is made after comparing the values of the probabilities (associated to F-statistic) with the values for a level of confidence of 95%. If the probability reported for F-statistic is lower than 0.05, then the null hypothesis could be rejected, otherwise it will be accepted.

5. Results

5.1. Cluster analysis results

To conduct the k-means cluster analysis on the 28 European countries, we have chosen three variables which define the concept of SMEs' performance in the European Commission's (2016a) vision: number of SMEs (% of number of enterprises) – SMEs, number of employees from SMEs (% of total number in enterprises – E.M.P. and VA brought by the activity developed within SMEs (% of total VA by enterprises) – VA Based on standardised values of the three variables, a four-cluster solution emerged.

In Figure 2, there are briefly presented the four clusters profiles in terms of the three variables on which they were formed: cluster 1 is characterised by high weights for all three variables of interest (number of SMEs, number of employees from SMEs and VA brought by the activity developed within SMEs), while at the opposite pole is cluster 4. It is interesting to analyse the profile of cluster 2, in which case the relatively high share of SMEs is reflected in their reduced contribution to VA, and especially cluster 4, where a relatively low number of SMEs and employees within SMEs contribute significantly to the creation of added value.

The clusters' centres (centroids) were calculated as means for each variable, reflecting in this way the specific characteristics of each cluster. Since we aimed to conduct the causality analysis based on country real data, from each cluster we have chosen the country with the lowest distance from the centre of the cluster, considering to be the most representative. So, the smallest distance from the centre of cluster 1 is assigned to Latvia (0.363), Sweden ranks itself at the smallest distance from the centre of cluster 2 (0.451), while for clusters 3 and 4, Romania (0.509) and Austria (0.427) were selected as representative (see Table 2).

Final Cluster Centers
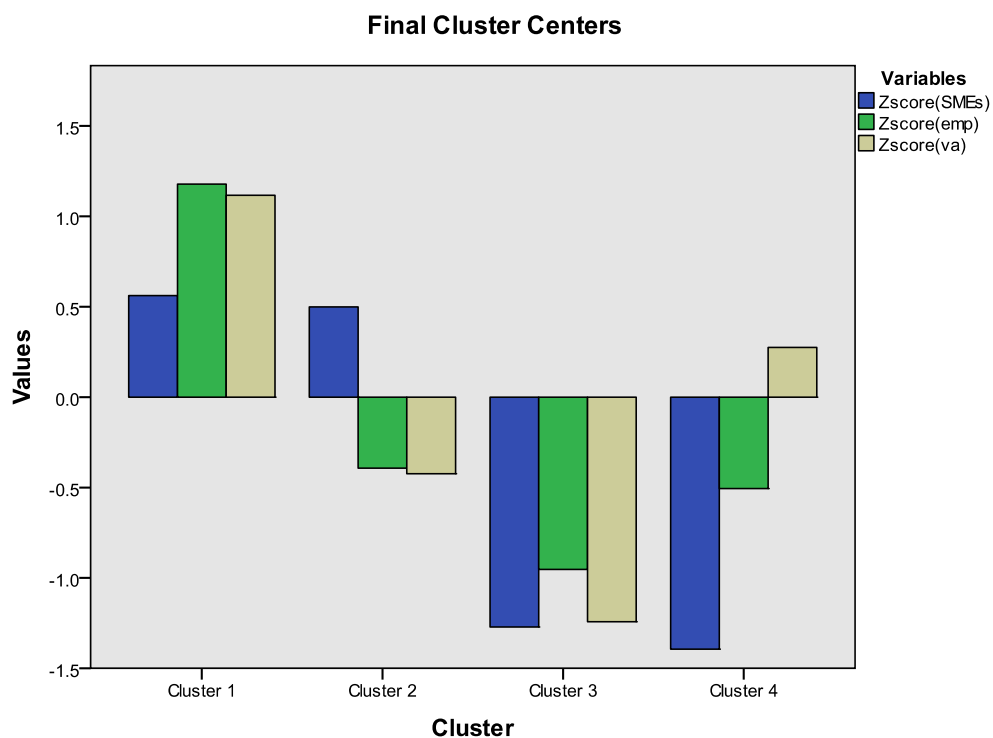
Figure 2. Cluster profiles. *Source*: Authors.

Table 2. Clusters and distance from the center of each cluster.

No.	Country	Clusters	Distance
1	**Latvia**	Cluster 1	**0.363**
2	Cyprus		0.589
3	Lithuania		0.630
4	Portugal		0.675
5	Italy		0.862
6	Bulgaria		0.959
7	Malta		1.042
8	Estonia		1.108
9	Greece		1.425
10	**Sweden**	Cluster 2	**0.451**
11	Belgium		0.455
12	Czech Republic		0.465
13	Slovakia		0.589
14	Netherlands		0.633
15	Slovenia		0.703
16	France		0.747
17	Hungary		0.760
18	Poland		0.841
19	Spain		0.856
20	Finland		0.904
21	**Romania**	Cluster 3	**0.509**
22	Croatia		0.801
23	Ireland		1.176
24	Germany		1.342
25	UK		1.477
26	**Austria**	Cluster 4	**0.427**
27	Denmark		0.769
28	Luxembourg		1.114

Source: Authors' calculation in SPSS.

Table 3. The order of integration for variables.

No.	Country	The order of integration for the variable of interest	The order of integration for the influencing variables
1	Austria	d(VA,1)	d(CPI,1), d(FAR,1), d(GDP,1), d(GE,1), d(IR,1), d(LEB,1), d(PRPSE,1), d(PTE,1), d(UR,1)
2	Latvia		d(IR,0), d(UR,0) d(CPI,1), d(FAR,1), d(GE,1), d(PRPSE,1) d(GDP,2), d(LEB,2), d(PTE,2)
3	Romania		d(IR,0), d(PRPSE,0) d(CPI,1), d(GE,1), d(UR,1) d(FAR,2), d(GDP,2), d(LEB,2), d(PTE,2)
4	Sweden		d(IR,0) d(CPI,1), d(FAR,1), d(GDP,1), d(GE,1), d(LEB,1), d(PRPSE,1), d(UR,1) d(PTE,2)

Source: Authors' calculation in Eviews.

5.2. The results of testing stationarity

In Table 3, we can find mainly stationary series after the first difference was applied (the ones integrated of order 1, notation: d(variable, 1)) . We can also find stationary series in the level for Latvia, Romania and Sweden and stationary series after the second difference was applied (the ones integrated of order 2, notation: d(variable, 2)).

To move on to the next step, we kept only variables integrated of order 1 and the main reason for selecting them is the fact that they are integrated of the same order with the variable of interest, namely the VA of SMEs.

5.3. The results of testing cointegration

Table 4 reports that all residual series are stationary in level (for which the notation d(residual,0) was used), except three situations for Sweden, where the residuals series are stationary after applying the first difference (for which the notation d(residual,1) was used) or even the second difference (d(residual,12). This means that each regression that has a series of residuals stationary in level, reflects a long-run relationship. In order to capture the magnitude of such a relationship, we should look at the estimated coefficients and not only. The table also reports the probabilities associated to the t-statistic for the intercept (the first value) and then for the estimated coefficients of each independent variable (the second value). These values will help us understand the statistical significance at different levels of confidence.

The estimated coefficients are statistically significant and can be interpreted if the reported probabilities for t-statistic are below the 1%, 5% or 10% levels of relevance, which correspond to 99%, 95% and 90% levels of confidence.

5.4. The results of testing causality

In the table below (Table 5), the bolded hypotheses were those that could be rejected, given the rule of thumb, for a 95% confidence level: we only rejected the assumptions for which probabilities associated with the F test were lower than 0.05.

Table 4. Regression equations in the cointegration phase.

No.	Country	Regression equations	Residuals	Probabilities
1	Austria	$VA_{AUT} = 64.89 - 0.0509 \times CPI_{AUT}$	d(residual,0)	0/0.3012
		$VA_{AUT} = 59.93 + 9.769 \times FAR_{AUT}$		0/0.0838
		$VA_{AUT} = 56.13 + 0.000144 \times GDP_{AUT}$		0/0.1911
		$VA_{AUT} = 54.83 + 0.119 \times GE_{AUT}$		0/0.4948
		$VA_{AUT} = 61.52 - 0.238 \times IR_{AUT}$		0/0.2510
		$VA_{AUT} = -23.26 + 1.04 \times LEB_{AUT}$		0.5/0.0532
		$VA_{AUT} = 69.59 - 0.448 \times PRPSE_{AUT}$		0/0.1665
		$VA_{AUT} = 59.71 + 0.069 \times PTE_{AUT}$		0/0.0858
		$VA_{AUT} = 56.6 + 0.881 \times UR_{AUT}$		0/0.0096
2	Latvia	$VA_{LAT} = 55.02 + 0.305 \times CPI_{LAT}$	d(residual,0)	0/0.0040
		$VA_{LAT} = 70.17 - 1.49 \times FAR_{LAT}$		0/0.9364
		$VA_{LAT} = 84.85 - 0.378 \times GE_{LAT}$		0/0.0692
		$VA_{LAT} = 89.87 - 0.557 \times PRPSE_{LAT}$		0/0
3	Romania	$VA_{ROM} = 56.67 - 0.154 \times CPI_{ROM}$	d(residual,0)	0/0.3552
		$VA_{ROM} = 35.51 + 0.395 \times GE_{ROM}$		0/0.1000
		$VA_{ROM} = 66.68 - 2.42 \times UR_{ROM}$		0/0.0193
4	Sweden	$VA_{SWE} = 91.77 - 0.361 \times CPI_{SWE}$	d(residual,0)	0/0.1221
		$VA_{SWE} = 39.98 + 0.00057 \times GDP_{SWE}$		0.005/0.086
		$VA_{SWE} = -188.29 + 3.023 \times LEB_{SWE}$		0.1044/0.0458
		$VA_{SWE} = 63.31 - 0.54 \times UR_{SWE}$		0/0.5158
		$VA_{SWE} = 58.75 + 2.782 \times FAR_{SWE}$	d(residual,1)	0/0.7627
		$VA_{SWE} = 67.06 - 0.155 \times GE_{SWE}$		0.0681/0.8003
		$VA_{SWE} = 34.44 + 1.554 \times PRPSE_{SWE}$	d(residual,2)	0.0123/0.0448

Source: Authors' calculation in Eviews.

Table 5. The Granger causality test for cointegrated variables.

No crt.	Case	The null hypothesis of the test	F-statistic	Probability
1	Austria	d(CPI,1) does not Granger Cause d(VA,1)	9.33281	0.0378
2	Latvia	d(CPI,1) does not Granger Cause d(VA,1)	18.6553	0.0125
		d(FAR,1) does not Granger Cause d(VA,1)	19.7827	0.0113
3	Romania	d(UR,1) does not Granger Cause d(VA,1)	24.7520	0.0076
4	Sweden	d(GDP,1) does not Granger Cause d(VA,1)	10.6092	0.0312

Source: Authors' calculation in Eviews.

Statistically, causality relationships can be interpreted as follows: past values of some independent variables help to improve (statistically speaking) the dependent variable's prediction; therefore, we may say that the dependent variable is a Granger cause of the independent variables.

6. Discussion

Four clusters have been identified in order to conduct the analysis. Considering the selected variables (number of SMEs as a percentage of number of enterprises, number of employees from SMEs as a percentage of the total number in enterprises and VA brought by the activity developed within SMEs as percentage of total VA by enterprises), for each cluster a representative country was revealed. Table 6 presents the characteristics of each representative country, defining in this way the profile of the clusters.

Observing the geographic distribution of the four countries selected as representative for the 4 clusters (according to calculations) at the EU level, one can find that Sweden is representative for the group of Nordic countries (Finland, Sweden,

Norway, Denmark), which have a certain specificity when it comes to national economies. Moreover Austria is the representative of the Western European countries that have been part of the EU for a long time. Thus, Austria is the average among the highly developed countries (Germany, France, the U.K., the Netherlands, and Luxembourg). Romania and Latvia are representative of the countries of Central and Eastern Europe (Poland, Hungary, Czech Republic, Slovakia, Romania, Bulgaria, Slovenia, Lithuania, Estonia, Cyprus, Greece, Croatia, etc.).

Going forward to the results obtained in the stationarity and cointegration testing, some salient aspects can be discussed and analysed. First, Austria and Sweden show a large number of regression equations in the co-integration phase (9 and 7) as compared to Latvia and Romania (4 and 3). This large number of equations can be interpreted on the basis that the economies of the two countries (compared to Latvia and Romania) are stable economies and the links between variables have been established over many decades (as opposed to the other two countries in Eastern Europe).

Also at this stage, based on the values of the t test and associated probabilities, some results can be interpreted. For instance, for Austria, of the nine long-term relationships, only one relationship can be interpreted at a confidence level of 99% (1% level of relevance) for the estimated coefficients of the influencing variables. So, a 1% increase in the UR generates an increase of 0.881% in the performance level of SMEs. The conclusion may seem surprising, given that unemployment is a phenomenon that has negative influence on most processes in an economy. However, at least in the case of Austria, this positive (relatively small) influence on SMEs performance can be justified by the fact that an increase in unemployment leads to a reduction in the employed population (working in companies) in the context of maintaining the same level of production (GDP), which ultimately leads to a productivity increase (calculated between production and number of employees) and thus an improvement in SMEs performance.

For Latvia, of the four long-term relationships, only the one between the level of performance in SMEs and the level of European funds absorption cannot be interpreted as the probability associated with the t test is very high, close to 0.9, which means a very low level of confidence. With regard to the relationship between the perceived level of corruption and SMEs performance, the estimated coefficient for the independent variable is statistically significant at a confidence level of 99%. Thus, in the long-run, as the CPI increases with a unit (the country becomes less corrupt), then the performance level in SMEs increases by 0.305%.

Moving forward, three long-term relationships can be observed for Romania. The performance in SMEs receives long-run influence from the perceived level of corruption, the level of government spending, and from unemployment. For instance, when the UR increases by a percentage unit, then the performance of the SME activity decreases by 2.42% (this coefficient is considered statistically significant at a confidence level of 95%). As compared to Austria, the situation is reversed in terms of the influence of unemployment. This can be explained by the fact that Romania, unlike Austria, does not have a high level of automation/technology/robotics in the economy; therefore, any increase in unemployment means a reduction in the employed

Table 6. Representative countries for each cluster.

			Specificity according to following variables		
No. crt.	Representative country	Cluster number	number of SMEs	number of employees from SMEs	value added
1.	Latvia	1	↗	↗	↗
2.	Sweden	2	↗	↘	→
3.	Romania	3	↘	→	↓
4.	Austria	4	↘	→	→

Note: The symbols ↑, ↓ and → represent high value, small value and medium value correspondingly.
Source: Authors.

Table 7. Hypotheses testing for all nine variables.

Hypotheses	Austria	Latvia	Romania	Sweden
H1: (+) influence from CPI	rejected	accepted at 99% confidence level	rejected	rejected
H2: (+) influence from FAR	accepted at 90% confidence level	rejected	could not be tested	rejected
H3: (+) influence from GDP	rejected	could not be tested	could not be tested	accepted at 90% confidence level
H4: (−) influence from IR	rejected	could not be tested	could not be tested	could not be tested
H5: (+) influence from GE	rejected	Rejected. (−) influence revealed with 90% confidence level	Rejected. (−) influence revealed with 90% confidence level	rejected
H6: (+) influence from LEB	accepted at 90% confidence level	could not be tested	could not be tested	accepted at 95% confidence level
H7: (+) influence from PTE	accepted at 90% confidence level	could not be tested	could not be tested	could not be tested
H8: (−) influence from PRPSE	rejected	accepted at 99% confidence level	could not be tested	Rejected. (+) influence revealed with 95% confidence level
H9: (−) influence from UR	Rejected as (+) influence revealed with 99% confidence level	could not be tested	accepted at 95% confidence level	rejected

Source: Authors.

population (working in companies), which results in a decline in output (GDP) and, ultimately, a reduction in SME performance.

For Sweden, of the seven long-term relationships, only two can have interpretations on the short-run. Therefore, a one year increase in life expectancy generates a 3.023% growth in SMEs performance, while a one unit increase in the level of GDP triggers a very small increase in the performance level.

Consequently, after presenting the cointegration results for all countries, the acceptance or rejection of the nine hypotheses stated in the beginning can be further discussed. They were referring to either positive or negative influence of the factors on SME performance. Table 7 manages to comprise all information on the hypotheses testing.

Accordingly, as a conclusion for the cointegration step, one can already observe a pattern of the developed economies (Austria and Sweden), both having an influencing factor on the long-run the education variable. As regards the Eastern European countries, the results suggest their dependence on government spending to increase SME performance (they are relatively young economies developed over the last 30 years).

Next, after testing for causality, we managed to identify five short run relationships. For Austria, there was only one unidirectional causal relationship: CPI →VA For Latvia, two unidirectional causal relationships were identified: CPI → VA, FAR → VA, while for Romania, a single unidirectional causal relationship has been identified: UR → VA Finally, for Sweden, a single unidirectional causal relationship was revealed: GDP → VA

The Granger causality concept does not necessarily imply an economic causality. However, we can still find an economic correspondent for the statistical relationships. Intuitively, we can explain the unidirectional causal relationships that arise by invoking several points. For instance, for Austria and Latvia, the perceived level of corruption can establish a short-term relationship with the level of performance in SMEs. Most of the time, corruption has a bad influence on SMEs' activity (on the quality of goods and services, on productivity, on the entrepreneur's decision to further develop the business, to recruit and train employees).

Moving on to the case of Latvia, there is a unidirectional causal relationship, which concerns the rate of European funds absorption, as a factor that can influence the performance of SMEs in the short-term. The European funds absorption rate (FAR) refers to a major source of non-reimbursable financing, to which SMEs have access and which entrepreneurs can use in the development of their business. For this reason, the revealed relationship can definitely have a justification, more so as European funds are very important to Eastern European countries, which have not benefited from them for a very long time and have to recover an important economic gap as compared to Western European countries.

Considering the case of Romania, the economic explanation of the short-term relationship appearing from the UR to the performance level in SMEs is as follows: as SMEs are a means of generating new jobs (Osakwe et al., 2015), when the UR increases, the performance in SMEs is decreasing. In fact, this idea was previously explicitly explained when a long-term relationship between these two variables was discovered in the cointegration testing phase.

The results of causality testing suggest that in developed economies, as Austria and Sweden, in the short-run, factors such as the perceived level of corruption or the level of GDP influence on SMEs performance, but in a subtle, indirect way, while in developing economies, such as Romania and Latvia, SMEs' performance establishes a relationship on the short-run with factors having a more direct influence, factors such as the FAR or the unemployment.

All these differences reveal cross-country evidence and provide an empirical basis for SMEs national and European policies, which would be more accurately shaped for the specific needs in terms of performance for each country or group of countries. The representative countries of the four clusters, may become peers for countries within the cluster.

7. Conclusion

Given both the socially and economically increasing importance that SMEs have at the European level, finding the most appropriate means to increase their performance

Table 8. Econometric results of the analysis.

The proxy variable for performance	Variables influencing performance	Country	Phase		
			Stationary after the first difference	Cointegration	Causality
Value added at factor costs (VA)	Corruption perceptions index (CPI)	Austria	✓	✓	✓
		Latvia	✓	✓	⊗
		Romania	✓	⊗	⊗
		Sweden	✓	⊗	⊗
	Funds absorption rate (FAR)	Austria	✓	✓	⊗
		Latvia	✓	⊗	✓
		Romania	⊗	⊗	⊗
		Sweden	✓	⊗	⊗
	Gross domestic product at market prices (GDP)	Austria	✓	⊗	⊗
		Latvia	⊗	⊗	⊗
		Romania	⊗	⊗	⊗
		Sweden	✓	✓	✓
	General government expenditure (GE)	Austria	✓	⊗	⊗
		Latvia	✓	✓	⊗
		Romania	✓	✓	⊗
		Sweden	✓	⊗	⊗
	Inflation rate (IR)	Austria	✓	⊗	⊗
		Latvia	⊗	⊗	⊗
		Romania	⊗	⊗	⊗
		Sweden	⊗	⊗	⊗
	Life expectancy at birth (LEB)	Austria	✓	✓	⊗
		Latvia	⊗	⊗	⊗
		Romania	⊗	⊗	⊗
		Sweden	✓	✓	⊗
	People at risk of poverty or social exclusion (PRPSE)	Austria	✓	⊗	⊗
		Latvia	✓	✓	⊗
		Romania	⊗	⊗	⊗
		Sweden	✓	✓	⊗
	Population by educational attainment level (PTE)	Austria	✓	✓	⊗
		Latvia	⊗	⊗	⊗
		Romania	⊗	⊗	⊗
		Sweden	⊗	⊗	⊗
	Unemployment (UR)	Austria	✓	✓	⊗
		Latvia	⊗	⊗	⊗
		Romania	✓	✓	✓
		Sweden	✓	⊗	⊗

Source: Authors.

can be considered as a priority for the EU as a whole and for each of the Member States. In this context, the purpose of this article is to analyse the contribution that various determinants can have on the performance of SMEs at a macroeconomic level.

Compared to previous studies, the novelty of this research lies in using a macroeconomic approach based on econometric means in order to analyse SMEs performance and influences received on short- and long-run from socio-economic determinants.

From the literature development perspective, one of the main achievement of this study is the creation of the macroeconomic model for SMEs' performance. According to this model, we can identify nine variables (classified in four types of environment – economic, social, political and demographic), with large influence over the SMEs' performance.

Another useful contribution to the literature is the use of cluster analysis, not only for grouping the countries considering several performance characteristics, but also for selecting a country as being representative.

The econometric links among each socio-economic-political-demographic determinant and the proxy variable for SMEs performance are summarised in Table 8:

We can highlight that each determinant influences in different specific way the performance of SMEs for each of the four analysed countries. This result demonstrates the fact that the analysis (and implicitly the results) for the four chosen countries are representative for a specific typology.

Of the nine variables with an influence on the performance in SME activity, only four of them have established unidirectional causal relationships with it: the Corruption perceptions index (CPI), the FAR, the UR and GDP Additionally, occurring cointegration relationships (in the long-run) are more numerous and the coefficients arising from the estimation of regression equations applied to the residuals of the series can be interpreted at 90% and 95% levels of confidence.

By adding the theoretical macroeconomic model of SMEs' performance (created by the authors), we succeed to introduce suggestive aspects (different independent variables, classified on several types of environment) with great influence over SMEs' performance. Furthermore, as an implication for researchers (or practitioners), this theoretical model can be used as a starting point by other researchers in their works to study SMEs' performance, for different geographic areas.

In addition to highlighting the contribution of this study it is also necessary to emphasise its limits. Among these we can mention the relatively limited time period for which complete data sets are available. In fact, this time limitation of the analysis is inversely proportional to the spatial limitation of the analysis. Higher the number of independent variables (covering a broad spectrum of human activity), than shorter the timeframe for analysing, due to the unavailability of statistical data series for all analysed variables. For objective reasons related to the availability of the statistical data (the VA at factor costs for SMEs was firstly reported by the European Commission in 2008), the time frame is reduced to eight years, but the coverage of the analysis is widened by including nine variables as influencing factors.

Another limit of this study refers to the limited number of variables (both dependent and independent) taken into account. Undoubtedly, research can be continued by taking into account other factors that can influence VA As an example, the income (different from the GDP per capita) can be analysed, the country's energy potential with direct influence on VA (which in turn can be broken down into different types of energy: solar, wind, hydro, nuclear, biomass, fossil fuels), the political climate, environmental issues (pollution level by category) and so on.

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