TO WHAT EXTENT DO DEMAND-RELATED DIFFICULTIES INFLUENCES THE DENSITY OF SMES. A PANEL DATA STUDY ON ROMANIAN DEVELOPMENT REGIONS

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ABSTRACT
Small and medium enterprises represent the vast majority of firms and are significant contributors to the creation of jobs and added value; however, they face various challenges and are insufficiently understood and supported by authorities. In this context, we attempted to decipher which are the most significant demand-related obstacles that influence the existence of small and medium firms. Using the autoregressive distributed lag (ARDL) method on panel data on the number of firms and self-reported difficulties in the 8 development regions of Romania during 2002-2019, we intended to analyze which demand-related difficulties are the most significant factors influencing the density of firms in the long and short run. We identified apparently paradoxical relationships in the long run, in that some difficulties (competition) have an expected, unfavorable effect on density, while others (not being well-known) are associated with increases in the density of firms, but with minimal regional variation. In the short term, demand-related difficulties have a smaller impact on density on a national level and vary significantly between regions. We conclude that challenges faced by entrepreneurs tend to be similar between regions in the long run, and that following the effects of these difficulties and counteracting them through well-calibrated measures can contribute to increasing the favorable contribution of small and medium enterprises.

KEYWORDS:*, demand-related difficulties, firm density, Romanian development regions, SME.*

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1. INTRODUCTION

SMEs have significant and varied economic and social contributions, generating jobs, added value, personal incomes, revenues for local and central budgets and it is likely that their potential is still incompletely used. In developed countries, SMEs represent approximately 99% of the total number of firms; additionally, they generate around 70% of jobs and 50-60% of added value. In emerging economies, SMEs contribute to up to 45% of jobs and one-third of GDP (OECD, 2017). If we take into account the informal economy, the contribution of SMEs in developing countries is even greater, contributing to more than half of all jobs and of the GDP. Likewise, the development of SMEs can contribute to diversification and resilience.
The contribution of SMEs to the dynamics of innovation has become especially relevant in the last decades, as increasing incomes, a more specialized market demand and technological change

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allowed SMEs to consolidate their comparative advantages and diminished structural disadvantages stemming from resource constraints and limited potential for scale economies.
While not all SMEs are innovative, small and medium firms are more often than not the drivers of radical innovation that is important for economic growth. SMEs also contribute to the creation of value by adopting innovation generated elsewhere and adapting it to a different context, providing new or niche products tailored to clients' diverse needs or by supplying to client on a scale that would not be of interest to larger firms.
Starting from the premise that the number and density of firms in an area (urban/rural settlements, regions or countries) is suggestive for the level of development of the private sector and private initiative, of entrepreneurial dynamism and the interest in launching new businesses, we investigated how these levels are affected by certain factors, more specifically by a number of obstacles and difficulties. Implicitly, it is essential to know which are these difficulties and to what extent dot hey influence the density of businesses in a defined area.
Subsequently, the aim of our research is to analyze to what extent a series of self-reported difficulties influence the density of firms (i.e. the number of firms per 1,000 active inhabitants) within each Romanian region and its short- and long-term evolution. In the Demographics of Firms section, the National Statistics Institute of Romania collects data on the Distribution of active, newly established firms according to difficulties in obtaining contracts, by development region, and according to supply-related difficulties and demand-related difficulties, respectively. Of the above-mentioned categories, our paper will focus on demand-related difficulties, which consist of the following items: clients with insufficient funds, high competition, market price is too low, the firm is not well-known and low marketing skills (Institutul National de Statistica, 2022).
For the study period (2002-2019), the data is available on a NUTS2 level, according to EU terminology (Parlamentul European, 2021), i.e. the 8 Romanian development regions, namely: North-East (NE), South-East (SE), South-Muntenia (SM), South-West-Oltenia (SVO), West (V), North-West (NV), Center (C), and Bucharest-Ilfov (BI).
This regional approach is grounded in a number of theoretical considerations: first of all, most enterprises are active in and a part of local and regional networks. Secondly, important differences in economic performance, private initiative, economic structures between regions can provide a spatial perspective on the concentration and performance of firms. Finally, given that most EU countries collect regional and national-level data, this allows for better comparisons not only between regions of the same country, but also between regions of different EU countries.
Our regional approach builds on previous studies in the field, some of which support a link between regional development, private initiative/entrepreneurship and the establishment of new firms (Acs, et al., 2014; Acs, et al., 2017; Markley, et al., 2015) and others which focus on regional and national specifics of entrepreneurship (Szerb, et al., 2013; Autio & Acs, 2007).

2. THEORETICAL BACKGROUND

SMEs can adapt rapidly to market fluctuations without risking a significant capital, and in many countries, they are the main suppliers of non-substitutable products which respond to the needs of a wide variety of customers (Madgazieva & Kazuo, 2018). Because SMEs are less capital-intensive than large firms, they find it easier to diversify their services and reorient to other activities (Beck, et al., 2005), they can invest in developing into new fields, in increasing their production capacity, create opportunities for economic growth, jobs and improve living standards. SMEs respond more rapidly to changes in the business environment and can serve as indicators of both economic development and of the effectiveness of government reforms. Nonetheless, the role of SMEs in industrial activity is still underestimated, while their development is still hindered by many constraints and deficiencies in most countries.

The conditions in which the SME sector develops and performs are undoubtedly different in developing and developed countries. Despite being the main creator of jobs in developing countries, they underperform regarding their contribution to added value and productivity (Honjo & Harada, 2006). SMEs in these countries face systematic difficulties in accessing advanced technology and funding, as well as challenges in developing a high-performing management and finding qualified employees.

Multiple studies and reports have focused on the development of SMEs and the main obstacles which, once corrected, would ensure the development of small and medium businesses (European Commission, Internal Market, Industry, Entrepreneurship and SMEs, 2020; OECD, 2019; Audretsch & Thurik, 2001; Beck, et al., 2005). Unsurprisingly, a careful literature survey shows that the fundamental aspect of developing a business is the motivation and commitment of its leaders: without the engagement of the management team in growing a business, it will simply not happen (Ratté, 2015).

However, the will to grow is not sufficient, as the business needs the capacity and resources to grow. The management team must be capable to control the greater complexity associated with growth. These abilities stem from a number of sources: recruiting qualified employees, stimulating cooperation, supporting employees to adapt to the frequent changes brought by growth. Likewise, managers must be capable to exploit advanced equipment and ensure that employees receive adequate training in this regard.

Another essential aspect in creating growth potential refers to the market: managers and, overall, the firm need a solid understanding of the market in which they are active or target in their plans for growth. They need to be careful about the needs of existing and potential customers, adapt and innovate, either by introducing new products and services, or by modernizing existing processes and business models (Ratté, 2015; OECD, 2019).

Additionally, managers should consider the financial capacity of the business. Supporting growth needs significant resources, and the business must be capable to generate a sufficient cash flow and increase the profitability of its operations, in order to convince partners and potential investors that the business is solid and profitable (Banerjee, 2014; Badulescu, 2013).

In any case, successful growth also depends on external factors, especially pertaining to the environment of the firm's activity. Undoubtedly, all entrepreneurs hope for favorable conditions, such as a growing demand for the firm's products and services, access to qualified labor force, good networks of suppliers, access to funding, research and technology (Badulescu & Badulescu, 2014; Cadar & Badulescu, 2015). However, the reality is often much more difficult, and entrepreneurs need to find ingenious solutions to cope with unfavorable factors in the environment, to market pressures, regulations and lack of official support.

In other words, the growth of SMEs depends on a multitude of factors, varying from fundamental aspects of the business to others which pertain mostly to a business's ability to exploit external opportunities.

2. MATERIALS AND METHOD

We attempted to analyze to what extent the density of firms is influenced by reported difficulties in a number of demand-related items, as well as the short- and long-term dynamics of this relationship, on a national and regional level.

Annual, regional-level data on difficulties encountered by firms, the total number of firms and the active population were obtained from the National Statistics Institute for each region of Romania during 2002-2019.

Firms' density, the dependent variable in subsequent analyses, was calculated as the number of firms per 1,000 active inhabitants. We preferred using this variable instead of the unadjusted total

number of firms because it allows for better comparisons between regions and precludes the need for normalization.
The independent variables represent the difficulties faced by firms, and are expressed as the percentage of interviewed firms which encountered said difficulty. The National Statistics Institute provides data for 3 types of difficulty encountered by firms, namely demand-related, supply-related and difficulties regarding contracts. In the present paper we focused on the first group. The precise items are the following (variable names in bold in parentheses): clients with insufficient funds (**funds**), competition is too high (**competition**), market price is too low (**market price**), the firm is not sufficiently known (**unknown**), insufficient marketing skills (**marketing**) (Institutul National de Statistica, 2022).
Initially, brief descriptive statistics and Pearson correlations are computed, to paint a general picture of the available data and highlight comparable behaviors between series.
Subsequently, we will perform stationarity/unit root tests for each time series, to identify the appropriate method which can be used to model the relationships.
The panel unit root tests is chosen based on the structure of the panel and the results of cross-sectional dependence tests. If cross-sectional dependence is identified, a second-generation panel unit root test is recommended, such as Pesaran's cross-sectionally augmented Im-Pesaran-Shin (CIPS) test (Pesaran, 2007).
Finally, bivariate panel ARDL models are computed for the density of firms and each difficulty reported by firms, in order to identify long-term equilibria and short-term relationships between the variables.
Statistical analyses were performed in Eviews 9 (for panel ARDL models) and R 4.2 (R Core Team, 2022) (data manipulation using base R, unit root tests and cross-sectional dependence with packages plm and bootUR, graphs with packages ggplot2 and gridextra).
The significance threshold was 0.05 and multiple comparison corrections were not performed.

3. RESULTS

3.1 Descriptive statistics

Firms' density ranges from 26.752 (North-East, 2002) și 104.229 (Bucharest-Ilfov, 2009), with mean 55.897 and standard deviation 17.996. While the exact value of this series is noticeably different between regions, its behavior is practically identical, as highlighted by Pearson correlation coefficients between 0.795 (South-Muntenia and Bucharest-Ilfov) and 0.997 (North-East and North-West). The correlation matrix is presented in Table 1 for firms' density and in the Appendix for the other variables.
On the other hand, the other time series have a less similar behavior between regions, with correlation coefficients closer to 0.

Table 1. Pearson correlations for the values of density in each region

density	NE	SE	SM	SVO	V	NV	C	BI
NE	1	0.995	0.992	0.994	0.979	0.997	0.963	0.85
SE	0.995	1	0.98	0.982	0.993	0.994	0.982	0.883
SM	0.992	0.98	1	0.996	0.956	0.986	0.93	0.795
SVO	0.994	0.982	0.996	1	0.959	0.991	0.938	0.823
V	0.979	0.993	0.956	0.959	1	0.979	0.994	0.909
NV	0.997	0.994	0.986	0.991	0.979	1	0.967	0.868
C	0.963	0.982	0.93	0.938	0.994	0.967	1	0.924
BI	0.85	0.883	0.795	0.823	0.909	0.868	0.924	1

Source: Authors' computations

3.2 Cross-sectional dependence and unit root tests

Cross-sectional dependence is tested using the Pesaran CD (Pesaran, 2004) and Breusch-Pagan (Breusch & Pagan, 1980) tests. The latter is recommended for long panels (more time moments than individuals), and Pesaran's test otherwise.

Taking into account the relatively small size of the panel (N=8, T=18), both tests are performed, with similar results (cross-sectional dependence exists for all time series), presented in Table 2.

Table 2. Breusch-Pagan and Pesaran test results for each variable

	Pesaran CD		Breusch-Pagan LM	
Variable	**Statistic**	**P-value**	**Statistic**	**P-value**
funds	21.327	<0.001	456.413	<0.001
competition	8.084	<0.001	110.444	<0.001
market price	2.496	0.013	75.439	<0.001
unknown	11.45	<0.001	141.809	<0.001
marketing	9.625	<0.001	119.859	<0.001

Source: Authors' computations

Subsequently, a cross-sectionally robust test would be recommended, such as the CIPS test. However, it can only be computed for panels with at least 10 individuals. Subsequently, a first generation test is calculated, namely that of Levin, Lin and Chu (Levin, et al., 2002), which was described by Hlouskova and Wagner to be the most appropriate for small sample sizes (Hlouskova & Wagner, 2006). While the series corresponding to difficulties encountered by firms tend to be trend-stationary, the test statistic for density barely reaches significance.

Recently, bootstrapped unit root tests have been described as more robust in the case of cross-sectional dependence. We performed the test described by Palm, Smeekes and Urbain (Palm, et al., 2011), a modification of the Im-Pesaran-Shin test (Im, et al., 2003) and available in the bootUR R package. The test returns the highest statistic and lowest p-value of the 3 possibilties (no intercept and no trend, intercept and no trend, intercept and trend). In this case, firms' density is shown to have a unit root, while funds and marketing are close to the significance threshold. The results are presented in Table 3.

Table 3. Panel unit root test results (level)

	Levin-Lin-Chu			Palm-Smeekes-Urbain
Variable	**No intercept, no trend: statistic (p)**	**Intercept, no trend: statistic (p)**	**Intercept and trend: statistic (p)**	**Union: statistic (p)**
density	-1.025 (0.275)	-3.176 (0.021)	-3.436 (0.047)	-0.895 (0.302)
funds	-0.458 (0.517)	-8.3 (<0.001)	-9.055 (<0.001)	-1.237 (0.028)
competition	-0.672 (0.426)	-6.17 (<0.001)	-6.158 (<0.001)	-1.401 (0.006)
market price	-1.377 (0.157)	-4.802 (<0.001)	-4.94 (<0.001)	-1.533 (0.003)
unknown	-0.94 (0.31)	-8.219 (<0.001)	-8.243 (<0.001)	-3.776 (<0.001)
marketing	-1.059 (0.262)	-7.413 (<0.001)	-7.607 (<0.001)	-1.356 (0.012)

Source: Authors' computations

3.3 ARDL models

To understand the long- and short-term association between the variables we use panel autoregressive distributed lag (panel ARDL) models with the Pooled Mean Group technique (Pesaran, et al., 1999).

ARDL models require either stationarity of first-order integrated series. This is verified by repeating the above unit root tests for the series after taking first differences. Both tests show highly significant results for all series (see Table 4), and we conclude that all series are either stationary or first-order integrated.

Table 4. Panel unit root tests for the first-differenced series

	Levin-Lin-Chu			Palm-Smeekes-Urbain
Variable	**No intercept, no trend: statistic (p)**	**Intercept, no trend: statistic (p)**	**Intercept and trend: statistic (p)**	**Union: statistic (p)**
density	-5.656 (<0.001)	-7.725 (<0.001)	-7.722 (<0.001)	-1.963 (<0.001)
funds	-17.922 (<0.001)	-11.92 (<0.001)	-11.92 (<0.001)	-5.92 (<0.001)
competition	-12.439 (<0.001)	-12.477 (<0.001)	-12.482 (<0.001)	-6.975 (<0.001)
market price	-20.601 (<0.001)	-20.638 (<0.001)	-20.655 (<0.001)	-9.383 (<0.001)
unknown	-14.324 (<0.001)	-14.765 (<0.001)	-14.833 (<0.001)	-6.94 (<0.001)
marketing	-13.295 (<0.001)	-13.397 (<0.001)	-13.467 (<0.001)	-7.531 (<0.001)

Source: Authors' computations

ARDL models combine an autoregressive and a distributed lag term and, after reparametrizing, are characterized by the following equation:

$$\Delta Y_{i,t} = \delta_i(y_{i,t-1} - \beta_i X_{i,t}) + \sum_{j=1}^{p-1} \gamma_{i,j} \Delta y_{i,t-j} + \sum_{j=1}^{q-1} \lambda_{i,j} \Delta X_{i,t-j} + \mu_i + \varepsilon_{i,t} \quad (1)$$

Where $\gamma_{i,j}$ and $\lambda_{i,j}$ are the short-term coefficients of the autoregressive and distributed-lag component respectively, δ_i is an error-correction term that shows the existence of a long-term equilibrium and the rate at which it is reached, while β_i indicates the strength of the long-term relationship between X and Y.

Due to the relatively small size of the panel, we limit ourselves to a lag of 1 year for regressors and the dependent variable.

To confirm the existence of a long-term equilibrium, the error-correction term δ_i must be negative and significant and the coefficient β_i must be significant, while a short-term relationship is suggested by a significant $\lambda_{i,j}$ coefficient.

We conclude that a long-term equilibrium exists between density and both competition and unknown. More specifically, increasing by 1 the percentage of firms that complain of excessive competition is associated with a reduction in firms' density by 0.468 per 1,000 active inhabitants. On the other hand, increasing by 1 the percentage of firms that complain of the firm not being well-known is associated with an increase in density of 0.195 per 1,000 active inhabitants.
Statistically significant short-term results are identified for funds and market price. While being of a lower magnitude than long-term effects, they are both positive: namely, an increase by 1% in the fraction of firms complaining of difficulties regarding the access to funds is associated with an increase in density by 0.078 firms per 1,000 active inhabitants, while a similar increase in the percentage of firms complaining of a low market price is associated with an increase of 0.159 firms/1,000 inhabitants,
Insufficient marketing skills have a negligible impact in the short run, while in the long run we fail to show the existence of a long-term equilibrium, as shown by a non-significant δ coefficient.
The complete long- and short-term results are presented in Table 5.

Table 5. Overall panel ARDL model results

Variable	Long-term coefficients		Short-term coefficient
	$\beta\ (p)$	$\delta\ (p)$	$\lambda_{j=1}\ (p)$
funds†	342 (0.984)	0.0004 (<0.001)	0.0781 (<0.001)
competition*	-0.468 (<0.001)	-0.181 (<0.001)	0.033 (0.280)
market price†	169 (0.956)	0.0014 (<0.001)	0.159 (<0.001)
unknown*	0.195 (0.028)	-0.205 (<0.001)	-0.0076 (0.497)
marketing	1.471 (<0.001)	-0.032 (0.348)	-0.03 (0.345)

Note: Significant long-term effects are marked with *, significant short-term effects are marked with †
Source: Authors' computations

To better understand these associations, regional-level coefficients were explored and the complete results are included in Table 6. It should be noted that the Pooled Mean Group methodology presumes that the β_i coefficient does not vary between regions and is therefore only reported in Table 5.
Regarding long-term effects, 4 regions (South-East, South-Muntenia, South-West-Oltenia and Bucharest-Ilfov) were found to show an equilibrium relation between firms' density and low marketing ability, a relationship which is not statistically significant on a national level.
Short-term effects tend to be more variable between regions:

- complaints about competition show a positive effect on firms' density in South-East, West and Bucharest-Ilfov, a negative effect in South-Muntenia and South-West-Oltenia and non-significant otherwise
- complaints about the firm not being well-known are positively linked to density in Bucharest-Ilfov, negative in South-West, South-East, South-West-Muntenia and Center, and non-significant otherwise
- marketing inability has a positive effect on density in North-West, North-East and West, a negative effect in South-West, South-East, South-West-Muntenia and Center and is not significantly associated with density in Bucharest-Ilfov.

Table 6. The error-correction term and short-term coefficient for each region, grouped by independent variable

Funds		
Region	$\delta_i\ (p)$	$\lambda_{i,j=1}\ (p)$
NE	0.00037 (0.364)	0.0549 (<0.001)
SE	0.00052 (0.506)	0.0984 (<0.001)
SM	0.00071 (0.617)	0.1667 (<0.001)
SVO	0.00018 (0.115)	0.0314 (<0.001)
V	0.00019 (0.127)	0.0255 (0.0059)
NV	0.00052 (0.502)	0.1086 (<0.001)
C	0.00043 (0.427)	0.0376 (<0.001)
BI	0.00051 (0.494)	0.1018 (0.003)
Competition		
Region	$\delta_i\ (p)$	$\lambda_{i,j=1}\ (p)$
NE	-0.11282 (<0.001)	-0.000699 (0.780)
SE	-0.103322 (<0.001)	0.01492 (<0.001)
SM	-0.047263 (0.0014)	-0.025403 (0.005)
SVO	-0.078615 (0.0019)	-0.00816 (0.0241)
V	-0.152794 (<0.001)	0.0424 (<0.001)
NV	-0.16981 (<0.001)	0.000583 (0.843)
C	-0.387258 (<0.001)	0.00051 (0.806)
BI	-0.39636 (<0.001)	0.239063 (<0.001)
market price		
Region	$\delta_i\ (p)$	$\lambda_{i,j=1}\ (p)$
NE	0.001995 (0.2306)	0.156489 (<0.001)
SE	0.00269 (0.3532)	0.244635 (<0.001)
SM	0.000694 (0.0228)	0.059477 (<0.001)
SVO	0.000463 (0.0075)	0.062116 (<0.001)
V	0.001154 (0.0806)	0.141658 (<0.001)
NV	0.001449 (0.1307)	0.129389 (<0.001)
C	0.001246 (0.0953)	0.096939 (<0.001)
BI	0.001659 (0.1694)	0.37835 (<0.001)
Unknown		
Region	$\delta_i\ (p)$	$\lambda_{i,j=1}\ (p)$
NE	-0.154505 (<0.001)	0.004087 (0.203)
SE	-0.261912 (<0.001)	-0.031693 (<0.001)
SM	-0.092236 (0.0012)	-0.018533 (0.0014)
SVO	-0.134948 (<0.001)	-0.017719 (0.003)
V	-0.179833 (<0.001)	-0.002725 (0.0911)
NV	-0.178943 (<0.001)	-0.004759 (0.3159)
C	-0.199176 (<0.001)	-0.047811 (<0.001)
BI	-0.436906 (<0.001)	0.058463 (0.001)
Marketing		
Region	$\delta_i\ (p)$	$\lambda_{i,j=1}\ (p)$
NE	0.053947 (0.0059)	0.063951 (0.0033)
SE	-0.178424 (<0.001)	-0.184052 (<0.001)
SM	-0.166903 (<0.001)	-0.148903 (<0.001)
SVO	-0.027358 (<0.001)	-0.037975 (<0.001)
V	0.048978 (0.0018)	0.057126 (0.001)
NV	0.05474 (0.0019)	0.020554 (0.0305)
C	0.00847 (0.1815)	-0.021151 (0.0264)
BI	-0.046107 (0.0084)	0.005822 (0.5698)

Source: Authors' computations

4. DISCUSSION AND CONCLUSIONS

In this paper we started from the premise that the number and density of firms in a region is a suitable indicator of private initiative and interest in launching new businesses. Subsequently, we discovered that the presence of SMEs is affected by a number of difficulties and obstacles. In this context, our objective was to analyze to what extent the demand-related difficulties we identified influence the density of firms in the short and long run. In brief, the main highlight of our research is that the relationship between the density of firms and the difficulties they encounter is complex and often paradoxical; moreover, different regions can have different responses to increases in specific difficulties, and that difficulties that are significant in some regions can lose their significance at a national level.

A first general observation is that the density of firms is very strongly correlated between regions. The only region with a slightly different dynamic is Bucharest-Ilfov. On the other hand, the evolution of difficulties tends to be quite dissimilar between regions.

Another preliminary observation is that, in general, the evolution of difficulties follows a weakly stationary pattern, while density is best described by a random walk with drift and is only first-difference stationary. An important caveat is the fact that unit root tests which are both robust for cross-sectional dependence, can be applied on small panels and are well-documented in the literature are unavailable in R or Eviews.

In this context, ARDL methods are the most suitable for the data. Moreover, they can take into account both long-term and short-term (in this case, one year) associations. Specifically, on a national level, we have identified a long-term equilibrium between the density of firms and difficulties regarding competition and difficulties resulting from the fact that the firm is not well-known. Low marketing skills are in a long-term equilibrium in South-East, South-Muntenia, South-West-Oltenia and Bucharest-Ilfov, but not nationally. Interestingly, while a greater proportion of firms complaining of competition is associated with a moderate decrease in density, while more firms complaining of being insufficiently known is linked to a slight increase in density.

We could rationalize these apparently contradictory results as follows: the actions of competitors represent an existential threat to small firms, which would force them to limit their activity and potentially lead to their disappearance, especially for firms that are unprepared and lack the resources and abilities necessary to adapt. On the other hand, despite the unfavorable consequences that stem from a firm not being well-known (e.g. not attracting enough clients) a relative obscurity also signifies a more discrete and safer position, especially in small, low-level, niche markets. In other words, these firms are somewhat protected from the negative actions of powerful competitors, and would allow for survival and a slow growth in size and number, at the expense of size and visibility.

Short-term effects are of a lower magnitude and typically defy common-sense expectations. Of all significant predictors, the only one to have a negative association with density is access to employees. On a regional level, these associations tend to vary markedly: the same difficulty can have a negative effect on density, can be "beneficial" or not statistically significant. The phenomenon can be merely spurious regression or could stem from the very short time frame (1 year past) that we imposed to the short-term component.

The main limitations of the paper stem from the small sample size (8 regions and 18 periods): we could not apply the well-documented CIPS unit root test, and we limited ourselves to a lag of 1 year for the short-term component of the ARDL model, which is probably too short to capture the complexity of the phenomena. Some of the series corresponding to difficulties encountered by firms were highly collinear, which prevented us from creating convincing multivariate models.

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APPENDIX. Correlation matrices for each series, by region

funds	NE	SE	SM	SVO	V	NV	C	BI
NE	1	0.073	0.792	0.306	0.541	0.702	0.313	0.425
SE	0.073	1	0.096	0.602	-0.211	0.063	0.667	0.212
SM	0.792	0.096	1	0.242	0.564	0.789	0.285	0.479
SVO	0.306	0.602	0.242	1	-0.308	0.305	0.877	0.422
V	0.541	-0.211	0.564	-0.308	1	0.489	-0.164	0.088
NV	0.702	0.063	0.789	0.305	0.489	1	0.391	0.621
C	0.313	0.667	0.285	0.877	-0.164	0.391	1	0.423
BI	0.425	0.212	0.479	0.422	0.088	0.621	0.423	1

competition	NE	SE	SM	SVO	V	NV	C	BI
NE	1	-0.267	-0.222	0.393	-0.127	0.825	0.519	0.126
SE	-0.267	1	0.6	-0.429	0.692	-0.262	-0.198	-0.098
SM	-0.222	0.6	1	-0.414	0.592	-0.122	0.016	-0.109
SVO	0.393	-0.429	-0.414	1	-0.323	0.522	0.6	0.244
V	-0.127	0.692	0.592	-0.323	1	-0.16	-0.035	-0.161
NV	0.825	-0.262	-0.122	0.522	-0.16	1	0.583	0.162
C	0.519	-0.198	0.016	0.6	-0.035	0.583	1	0.169
BI	0.126	-0.098	-0.109	0.244	-0.161	0.162	0.169	1

market_price	NE	SE	SM	SVO	V	NV	C	BI
NE	1	0.501	0.316	0.279	0.42	0.516	0.674	0.151
SE	0.501	1	0.497	0.57	0.246	0.575	0.504	0.456
SM	0.316	0.497	1	0.555	0.631	0.582	0.535	0.579
SVO	0.279	0.57	0.555	1	0.34	0.674	0.361	0.551
V	0.42	0.246	0.631	0.34	1	0.52	0.799	0.619
NV	0.516	0.575	0.582	0.674	0.52	1	0.745	0.563
C	0.674	0.504	0.535	0.361	0.799	0.745	1	0.519
BI	0.151	0.456	0.579	0.551	0.619	0.563	0.519	1

unknown	NE	SE	SM	SVO	V	NV	C	BI
NE	1	0.316	0.757	0.673	0.68	0.606	0.538	0.607
SE	0.316	1	0.455	0.308	-0.216	0.627	-0.136	0.188
SM	0.757	0.455	1	0.547	0.482	0.488	0.252	0.633
SVO	0.673	0.308	0.547	1	0.638	0.456	0.432	0.364
V	0.68	-0.216	0.482	0.638	1	0.247	0.629	0.521
NV	0.606	0.627	0.488	0.456	0.247	1	0.255	0.519
C	0.538	-0.136	0.252	0.432	0.629	0.255	1	0.139
BI	0.607	0.188	0.633	0.364	0.521	0.519	0.139	1

marketing	NE	SE	SM	SVO	V	NV	C	BI
NE	1	0.447	0.373	0.125	0.489	0.658	0.264	0.297
SE	0.447	1	0.12	0.25	0.389	0.38	0.252	0.385
SM	0.373	0.12	1	0.067	0.386	0.564	0.069	0.082
SVO	0.125	0.25	0.067	1	0.496	0.452	0.56	0.033
V	0.489	0.389	0.386	0.496	1	0.676	0.492	-0.189
NV	0.658	0.38	0.564	0.452	0.676	1	0.581	0.112
C	0.264	0.252	0.069	0.56	0.492	0.581	1	0.024
BI	0.297	0.385	0.082	0.033	-0.189	0.112	0.024	1