Economic Modelling xxx (2018) 1–9

Contents lists available at ScienceDirect

Economic Modelling

journal homepage: www.journals.elsevier.com/economic-modelling

Geographical factors and business failure: An empirical study from the Madrid metropolitan area

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ARTICLE INFO

JEL Code:
G30
M21
R12

Keywords:
Business failure
Spatial probit
Geographical proximity
External economic agents
Transport facilities

ABSTRACT

Geography has been considered a decisive factor in different fields of business-related research. This paper provides some evidence concerning the role of geography on business failure in urban environments. The paper use spatial econometric methodology to evaluate the impact of the geographical location of external economic agents on the probability of business failure. In addition, it is shown that probabilities of business failure for geographically close firms are correlated. A firm-level empirical application based on 3125 industrial small and medium firms (SMEs) located on the Madrid metropolitan area (Spain) confirms that the geographical proximity between firms, external economic agents and transport facilities has a determinant impact on business failure among these companies. This study contributes to gaining a greater understanding of the factors that determine SMEs business failure, highlighting the importance of geographical factors.

1. Introduction

Business failure has been paid a good deal of attention in the scholarly literature (Van Gelder et al., 2007). These studies have mainly focused on internal financial variables, and have aimed to produce predictable models of business failure. Owing to the unavailability of financial information, small-sized enterprises are a relatively neglected subject as far as business failure is concerned. The limited number of studies that focus on Small and Medium Enterprises (SMEs) find that some financial features may play a significant role in predicting financial business failure (some studies in Altman et al., 2010; Sohn and Kim, 2013; Andreeva et al., 2016 or Calabrese et al., 2017). However, failure is also caused by external factors over which entrepreneurs have little or no control (Everett and Watson, 1998). Therefore, companies fail not only as a result of the decisions adopted by their executives, but also of unavoidable environmental factors, which can vary substantially from place to place (Raspe and van Oort, 2011). In this context, the location of businesses and their proximity to one another and to external agents has scarcely been considered. Some results can be found in Fernandes and Artes (2016), who developed a credit scoring model which includes a variable that represents spatial dependence between Brazilian SMEs. The spatial model proposed by Fernandes and Artes (2016) yields better results than the models which do not include this variable. Calabrese et al. (2017) analyse the effects of including spatial dependence between London small businesses into standard scoring models. They also find that spatial interdependence is a significant variable. In addition, the inclusion of this variable improves the ability to predict business defaults.

The present study builds on the above to analyse the effects on business failure of interdependence between geographically close companies, and of the geographical proximity to external agents, by imposing additional research questions to the current literature. In particular, we apply a spatial econometric analysis to a specific metropolitan area in Spain in order to answer the following questions: are there significant spatial co-localised patterns in the local distribution of business failure in the case under consideration? Does geographical distance between companies and both external agents (such as suppliers and providers) and transportation facilities have an influence on the probability of business failure? The answers to these questions may be relevant for researches and policy makers in order to understand the impact of accessibility and geographical proximity on the business failure. External information

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https://doi.org/10.1016/j.econmod.2018.05.022
Received 7 September 2017; Received in revised form 16 April 2018; Accepted 24 May 2018
Available online xxxx

flows from external agents provides firms with a privileged awareness of market changes, and allow them to adopt the necessary measures to adapt to changing conditions. Therefore, geographical proximity between firms and external economic agents in their local environments could be considered to improve the firms' chances of survival.

This study is based on detailed empirical data collected among industrial small and medium firms (SME) located in the Madrid metropolitan area (Spain). The territory of Madrid is an interesting scenario to develop our study given the prominent place held by the region in terms of business failure. Madrid accounts for approximately 10% of all failed companies in Spain in the period 2011–2015 (Official Spanish Statistical Institute, www.ine.es). Our study geo-locate different transportation facilities and economic agents in the Madrid area whose geographical proximity to SMEs could have a positive impact on their probabilities of survival. We have applied this information in an exploratory analysis based on Join-Count tests, with the goal of contrasting spatial co-localized patterns in SMEs business survival. Afterwards, relying on the spatial conditional probit model, we estimate the role played by the spatial dependence between SMEs and the geographical proximity to external economic agents and the probability of failure. Therefore, in contrast with previous studies, we consider other geographical variables apart from spatial interdependencies between SMEs in order to examine the relevance of business environment on the prediction of business failure.

The results indicate that geography is a determinant factor on business failure among SMEs in the analysed sample. In this regard, significant spatial co-localized patterns concerning the distribution of failed/healthy companies in Madrid can be identified. In addition, the examination of other factors, such as geographical interdependence and proximity between firms and transportation facilities and external economic agents also yielded significant results. Our analysis measures both the extension and the intensity of the areas of influence of external economic agents stressing the substantial role played by logistic centres, industrial estates and transport facilities in reducing business failure in the territory of Madrid.

After this introduction, the rest of the paper is organized as follows. Section 2 reviews the literature that the present paper draws upon. Section 3 describes the data set, the variables and the methodology used. Section 4 shows our empirical results. Finally, Section 5 includes the discussion and our main conclusions.

2. Business failure: spatial considerations and implications

Geography has been considered a decisive factor in different fields of business performance. Regarding previous literature, two different theoretical perspectives may be identified, which examine the impact of geography on business results: these theoretical perspectives deal respectively in transportation costs and external economies. The former is underpinned on the hypothesis that companies close to other economic agents have easy access to external resources, such as suppliers and financial providers, and therefore, minimize transportation costs (Weber, 1909). The external economies perspective states that business location triggers different forms of interaction between firms and between firms and their environment (Marshall, 1920). In particular, industry specialization and knowledge spillovers can potentially strengthen interaction between companies and external agents.

2.1. Industry specialization

The benefits to be derived from industrial specialization are related to the exchange of knowledge between companies working in similar or different sectors. Empirical studies suggest that both inter-industry and intra-industry specialization exerts a positive effect on business performance. This is due to the proximity between firms and between firms and specialized suppliers, which lowers transaction costs (Fujita and Thisse, 2002). Despite this general understanding, the literature on business survival is not conclusive about the effects of industrial specialization. Although in general terms results are positive, some studies have reached the opposite conclusion. These studies state that the presence of a large number of firms operating in the same industrial sector may increase competition, reducing the probabilities of survival (Khelil, 2016). Da Silva and McComb (2012) conclude that a high density of firms operating in the same industry located within a one-mile radius results in a higher failure rate than that found among firms located further away. Folta et al. (2006) reach similar conclusions, and claim that the probability of failure increases in areas where a relatively large number of akin companies operate. However, in general terms, it is assumed that the advantages derived from inter-industrial specialization offset the limitations and therefore, that companies located in these environments have a higher probability of surviving (Weterings and Marsili, 2015). In addition, the presence of intra-industry specialization, often attracts a diversity of actors, including industrial agents and organizations, universities, industrial research laboratories, trade associations and other knowledge-generating organizations. Diversity encourages the production and assimilation of knowledge through cross-sector spillovers, which is a stimulus for growth at the regional level (Harrison et al., 1997). In this regard, intra-industry specialization will result in lower operational costs and will thus increase the firms' chances of survival (Peña, 2002). This theoretical framework also highlights the local labour market as a source of economic benefits. Industry specialization tends to provide a pool of specialized labour to which companies have easy access.

2.2. Knowledge spillover

Knowledge spillover occurs when there is a flow of information between agents working in the same area. Knowledge is more likely to spill over between geographically closer firms. This proximity facilitates the formation and transmission of social capital, enhancing trust and the ability to share vital information (Karlsson et al., 2015). Managers working in the same environment normally have the opportunity to build face-to-face relationships, exchange ideas and learn from one another's' experience. As a result, positive network externalities will ensue and companies will be able to learn from the failure and success of other firms sooner than they would if no direct contact between was possible (Maskell, 2001). Transportation facilities also foster knowledge spillovers between companies and external economic agents. Proximity to major highways, seaports, rail stations and airports strengthens the firms' interaction with their environments. Previous studies suggest that the proximity of transport infrastructures is a major factor in the choice of location of new firms (Chatman et al., 2016). Therefore, it is expected that companies near transport infrastructures have easier access to external knowledge, resulting in a lower probability of failure.

3. Methodology and database

In order to analyse the effect of geography on business failure, two tests have been undertaken. Initially, the Join-Count tests are used to identify spatial pattern structures in binary variables (failure versus no-failure companies). Second, a spatial probit model is estimated in order to determine which factors play a greater role in business failure, including the instances of spatial interdependence identified with the Joint-Count tests. The following subsections provide a brief description of the methodologies applied.

3.1. Spatial autocorrelation tests for qualitative data: the Joint-Count tests

The Joint-Count tests compare spatial co-localized patterns in dichotomy variables (Cliff and Ord, 1981 p.36). In this paper two values of this variable must be distinguished: failed business (F) versus healthy business (H).[1] Based on these categories, three different connections are

[1] Traditionally the letters B (Black) and W (White) are used to denote the two possible categories.