

**INFLUENCE OF FIRM CHARACTERISTICS AND THE ENVIRONMENT ON HOTEL SURVIVAL ACROSS MSMES SEGMENTS DURING THE 2007-2015 PERIOD**

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**Abstract**

This paper analyses business survival in 11,558 micro, small, and medium-sized firms (MSMEs) between 2007 and 2015 in the Spanish hotel sector. Using hazard models, the aim is to identify the differences in survival determinants among firm sizes, quantifying the importance of the environment during the recent economic crisis. The results highlight the existence of differences. The environment is the main factor influencing the survival of MSMEs, especially in micro hotels. Regarding the hotel characteristics, the evidence shows that performance has a greater effect on survival in the medium hotels than in the micro and small hotels.

**Keywords:** survival; hotel; MSMEs; environment; size; determinants.

## **HIGHLIGHTS**

The environment plays a key role in the survival of MSMEs.

Micro hotels have greater exposure to the environment, which affects their survival.

The determinants of survival differ across MSME segments.

Seasonality only influences the survival of micro hotels.

Hotel managers should consider the environment to improve survival in MSMEs.

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6     and 2015 in the Spanish hotel sector. Using hazard models, the aim is to identify the differences in survival  
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9     MSMEs, especially in micro hotels. Regarding the hotel characteristics, the evidence shows that performance has  
10    a greater effect on survival in the medium hotels than in the micro and small hotels.

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## 14 **1. INTRODUCTION**

15 Micro, small, and medium-sized firms (MSMEs) play a prominent role in the economy of many  
16 countries, being an important source of wealth and well-being (Kalak & Hudson, 2016). According to the  
17 Spanish Confederation of Small and Medium Enterprises (Cepyme), these companies accounted for 98 percent  
18 of the business sector, generating 75 percent of employment and 65 percent of the Spanish GDP, in 2016.  
19 However, MSMEs have also suffered from the recent economic crisis, showing a high mortality rate that  
20 continues to the present day. Thus, the number of bankruptcies of Spanish MSMEs had almost quadrupled in  
21 2015 compared with 2007 (OECD, 2016).

22 The literature shows that the determinants of bankruptcy in MSMEs differ from those in large firms  
23 (Altman, Sabato, & Wilson, 2010; Cultrera & Brédart, 2016; Vivel-Búa, Lado-Sestayo, & Otero-González,  
24 2016). For example, it is well known especially in entrepreneurship literature that owner-managed and family  
25 firms differ from others SMEs how they survive (Revilla, Pérez-Luño & Nieto, 2016; Minichilli, Brogi &  
26 Calabrò, 2016). Moreover, according to Mellahi & Wilkinson (2004), the liability of smallness suggests that the  
27 failure rate declines with increased size because small firms have problems of access to finance and higher costs,  
28 among others. However, only a few recent empirical studies investigate and confirm that these determinants can  
29 also differ when considering separately the three groups of companies that exist within MSMEs, namely micro,  
30 small, and medium enterprises (Gupta, Gregoriou, & Healy, 2015; Holmes, Hunt, & Stone, 2010; Kalak &  
31 Hudson, 2016). It is relevant because there is a big heterogeneity within MSMEs category (assets size, number  
32 of employees, access to finance, management style, capital structure, default probability, among others) so it  
33 must be considered to study bankruptcy risk (Kalak & Hudson, 2016; Gupta et al., 2015). In fact, according to  
34 Eurostat (2017), the death rate is different across firm size categories showing higher values in small firms.

35 The objective of this paper is to analyse the survival determinants of 11,558 Spanish hotel MSMEs  
36 between 2007 and 2015, studying separately the three groups of companies. Thus, this paper identifies and  
37 evaluates the possible differences in such survival according to the size of these companies, and also identifies  
38 and quantifies the role of the environment. There is little previous empirical evidence on bankruptcy in the  
39 tourism sector and specifically on this phenomenon in the hotel sector, which is its main segment. Although  
40 Gémár, Moniche, and Morales (2016) and Lado-Sestayo, Vivel-Búa, and Otero-González (2016a) study survival  
41 in the Spanish hotel industry, they consider not only MSMEs but also large companies. In addition, Vivel-Búa et  
42 al. (2016) indicate that it is necessary to carry out studies at the sectoral level to obtain a better diagnosis of  
43 bankruptcy and business survival. Therefore, this research contributes to filling this gap.

44 Most companies in the hotel sector are MSMEs, which justifies the need to focus the empirical study on  
45 these types of companies and the importance of doing so. In fact, the recent economic crisis generated an  
46 important adjustment in the number of hotels, their category, and their size. The average number of hotels per  
47 10,000 inhabitants in Spain has evolved from 2.05 in 2008 to 1.94 in 2014 (OSTELEA, 2015). However, this  
48 evolution differs depending on the category and size of the hotel. Thus, there was approximately a 15 percent  
49 reduction in the number of one-star hotels and small size in that period, while the number of hotels with a higher  
50 category and larger size experienced significant growth. Specifically, the number of four-star hotels grew by  
51 27.6 percent and that of five-star hotels by 20.8 percent. Therefore, it is important to study bankruptcy risk in  
52 MSMEs in depth, because they have shown a dramatic bankruptcy rate in recent years, which could be related  
53 especially to the drastic changes in the environment during the recent crisis. In fact, these contexts of economic

54 turbulence require consideration in the study of business failure not only of the internal factors of the company  
55 but also of the external factors.

56 This research focuses on the hotel sector, because it has undergone major expansion in the last six  
57 decades (UNWTO, 2015). Furthermore, tourism is one of the main engines of growth worldwide and the main  
58 component of international trade in services. In fact, international tourism represented 7 percent of the world  
59 exports of goods and services in 2015 compared with 6 percent in 2014 (UNWTO, 2016). In particular, this  
60 research focuses on the market in Spain, where the tourism sector plays an important role in the national  
61 economy. According to the National Institute of Statistics from Spain, tourism accounted for 10.2 percent of the  
62 GDP in 2010, and this increased to 11.1 percent in 2015. Furthermore, 13 percent of the Spanish economy's  
63 employment was generated by tourism in 2015. In addition, Spain has a relevant position in international  
64 tourism, being the first country in the world ranking of tourism competitiveness prepared by the World  
65 Economic Forum in 2015. At the same time, this country is in the top five most important international  
66 destinations, considering both tourist arrivals and income (UNWTO, 2016). In fact, Spain was the first European  
67 country in revenue generated by tourism in 2015 and achieved a record 68 million international arrivals in that  
68 year.

69 Regarding the methodology, this research analyses survival through hazard models to evaluate  
70 corporate bankruptcy. Some previous studies use logistic regression to identify the factors that increase or reduce  
71 the probability of financial insolvency, mainly when matched-pair data is utilized or when time to event (survival  
72 time) is not relevant. In contrast, hazard models are commonly used in survival analysis. Specifically, this  
73 analysis provides three very relevant data for hotel managers and policymakers: the percentage of firms that  
74 survive at certain times, the rate at which they fail, and the determinants of their survival (Lado-Sestayo et al.,  
75 2016a). In addition, this methodology considers the relationship between determinants and survival time and  
76 contributes to comparing survival between groups of companies.

77 The remainder of the paper is organized as follows. A review of the literature is presented in Section 2,  
78 while Section 3 presents the empirical analysis and explains the results. The paper concludes with Sections 4 and  
79 5, in which the conclusions and references are presented, respectively.

## 80 **2. RELATED LITERATURE**

### 81 **2.1. Theoretical approaches on the firm failure**

82 There are two perspectives in the literature about the causes of corporate failure: deterministic and  
83 voluntaristic (Heracleous & Werres, 2016; Lukason & Hoffman, 2015). According to the deterministic  
84 perspective constituted by classical industrial organisation and organisation ecology literature, there are  
85 exogenous factors that can not be fully controlled by managers, influencing their ability to respond to changes in  
86 the environment and industry conditions (Moulton, Thomas, & Pruett, 1996). Thus, failure results from the effect  
87 of these environmental or industry-level factors rather than from the firm-level factors (Barron, 2001).

88 Classical industrial organisation paradigm highlights that there are some firms that survive and others  
89 that disappear as a result of their ability to adapt to the environment (Marks & Vansteenkiste, 2008; Tirole, 1988;  
90 Cameron, Sutton, & Whetten, 1988; Lippman & Rumelt, 1983). Shumpeter (1943) indicates that severe changes  
91 in the environment represent the most important cause of firm failure, while Porter (1980) shows the importance  
92 of growth rate, entry barriers and rivalry. Hollow (2014) find that a company's inability to respond to changes in  
93 the environment, such as those related to a period of crisis, contributes to its bankruptcy risk. In addition,

94 Moulton et al. (1996) and Pal, Medway, and Byrom (2006) argue that one cause of business failure may be  
95 overexpansion in the contexts of economic growth that precede a crisis.

96 Regarding ecological explanations, this paradigm is based on the natural selection model created by  
97 Hannan & Freeman (1977, 1988). It indicates that some firms are more likely to survive than others as  
98 consequence of four factors: size, age, population density and industry life cycle (Heracleous & Werres, 2016;  
99 Hamilton 2006; Singh & Lumsden, 1990). Focused on age and size, previous literature introduced the concepts  
100 of liability of newness (Stinchcombe's, 1965) and the liability of smallness (Freeman, Carroll, & Hannan, 1983;  
101 Sutton & Callahan, 1987). Thereby, the most of empirical research found that older and larger firms are less  
102 likely to fail relative to younger and smaller firms because they have more experience and resources. Regarding  
103 population density, literature proposes a U-shaped relationship respect to failure (Agarwal, Sarkar, &  
104 Echambadi, 2002). Finally, industry life cycle focusses on the changes in the industry's structure and  
105 competitive environment so failure depends on the market efficiencies (Heracleous & Werres, 2016; Agarwal et  
106 al., 2002; Klepper, 1996).

107 The voluntarist perspective is constituted by organizational psychology and organization studies  
108 (Mellahi & Wilkinson, 2004; Hambrick & Mason, 1984; Staw, Sanderlands, & Dutton, 1981). It shows that  
109 business failure is a consequence of the activity of managers. Thus, it emphasizes the importance of firm-level  
110 factors considering strategy, decision making, leadership, actions (resources and capacities), perceptions, and  
111 organisational inertia (Heracleous & Werres, 2016; Argenti, 1976). In relation to this perspective, previous  
112 literature has found that owner-managed and family firms have a different probability of failing. According to  
113 Revilla, Pérez-Luño & Nieto (2016) there is a negative relationship between family involvement in management  
114 and risk of failure, which may be related to the long-term orientation and the multitemporality of these firms  
115 (Chrisman, Chua, & Steier, 2011; Lumpkin & Brigham, 2011). Thus, family businesses and especially those  
116 where the CEO belongs to the family have a higher performance and are more resilient to external shocks such  
117 as, for example, periods of economic crisis, reducing their probability of failing (Minichilli, Brogi & Calabrò,  
118 2016).

119 Most of literature on organisational failure has focused on a debate about whether the causes of failure  
120 could be explained by firm-level factors or industry-level factors (Lukason & Hoffman, 2015). However, both  
121 factors can be relevant and not just one to offer a better explanation of the causes of failure so an integrative  
122 approach on the causes of business failure is important. Ropega (2011) also indicates that the interaction of both  
123 perspectives (deterministic and voluntaristic) must be considered. Recently, Heracleous & Werres (2016) design  
124 a theoretical strategic alignment model that is an integrated perspective of firm- and industry-level factors  
125 relevant to business failure. Consequently, this research considers both factors including variables related to  
126 firm- and industry-specific characteristics to study hotel failure.

## 127 **2.2 Failure determinants**

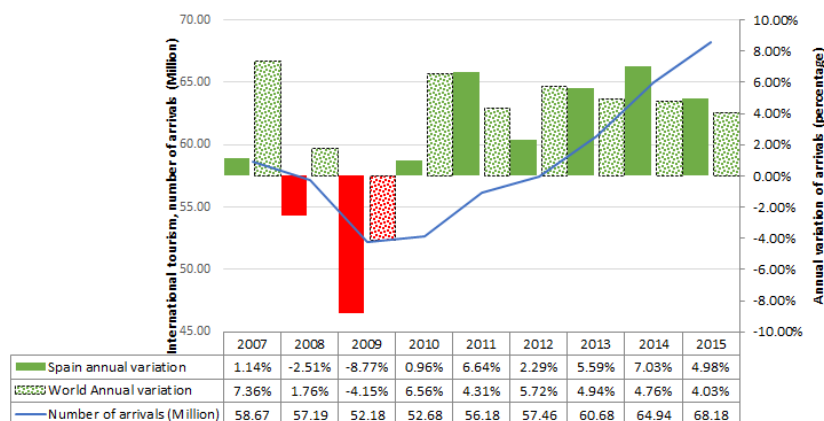
128 The selection of the determinants of business failure is a relevant issue that is analysed in the literature.  
129 Accounting ratios are the most popular variables, although there is no economic theory that specifies which ones  
130 should be considered (Vivel-Búa et al., 2016). Their selection is based on the statistical regularity obtained in  
131 different empirical studies on the one hand and on the application of different techniques, for example the  
132 analysis of principal components, to select the most convenient ones on the other hand (Fernández & Castaño,  
133 2012; Keasey & Watson, 1991). There are no major discrepancies regarding the business characteristics that

134 should be considered, and in general these refer to profitability, indebtedness, liquidity, and economic and  
 135 financial balance. Moreover, some studies also indicate the need to deepen the analysis of aspects related to  
 136 management (Shuai & Li, 2005). However, the recent literature emphasizes the importance of including factors  
 137 related to the environment to improve the study of this phenomenon, as explained above.

138 Focusing on the hotel sector, the environment is a strategic factor because its activity depends to a large  
 139 extent on international tourism and its service offer can only be consumed where it is generated (Lado-Sestayo,  
 140 Otero-González, Vivel-Búa, & Martorell-Cunill, 2016b). In addition, hotels have a high and long-term  
 141 investment in fixed assets, which hinders their ability to adjust their supply in times of low demand. This is  
 142 particularly difficult during crisis periods, as in recent years, which experienced a drastic drop in demand that  
 143 was preceded by strong expansion of international tourism (UNWTO, 2016).

144 During the economic crisis that began in 2007, there was a significant decline in world production, with  
 145 the Spanish economy showing a greater reduction and a lower recovery capacity compared to the rest of the  
 146 world. According to the World Bank, Spanish GDP fell by 3.4% in the 2007-2015 period, while the rest of the  
 147 world showed a growth of 19.86%. This influenced the Spanish tourism industry, which showed a significant  
 148 decrease of 8.77% in the number of visitors in the 2008-2009 period, while the rest of the world only decreased  
 149 by 4.15% (Figure 1).

150 **Figure 1. International tourist arrivals during 2007-2015 period**

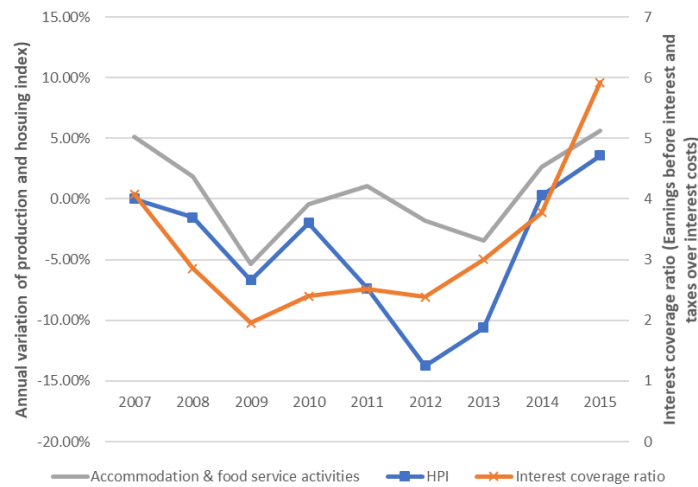


151 Source: Authors' analysis based on World Tourism Organization (UNWTO)

152 At the same time that tourism demand fell sharply in those years, during the recent crisis there was a  
 153 large decrease in the value of real estate assets in Spain and lower access to credit, which could contribute to the  
 154 closure of hotels due to their high level of exposure to the real estate market (Carter & Van Auken, 2006;  
 155 Hausman & Johnston, 2014). In short, sudden changes in the environment are a challenge for hotel management,  
 156 since it is difficult to adapt hotels' activity quickly to the new context and this can greatly influence their survival  
 157 (Enz, Kosová, & Lomanno, 2011). Figure 2 shows a synthesis of this situation, representing the annual variation  
 158 of tourist production, the housing price index and the coverage interest ratio in the Spanish market during the  
 159 2007-2015 period. In this context, it should be stressed that the MSMEs would present greater difficulties during  
 160 this period in accordance with the liability of smallness (Mellahi & Wilkinson, 2004). In fact, as a result of this  
 161 macroeconomic situation, the Spanish hotel offer increased its average size in the 2007-2015 period, showing an  
 162 average number of bed-places per hotel of 90.52 in 2007, which rose to 97.51 in 2015. Therefore, it could be  
 163

164 considered that small hotels have shown a lower capacity to adapt to changes in the environment related to the  
165 economic crisis.

166 **Figure 2. Accommodation & food service activities, housing price index and interest coverage ratio in**  
167 **Spain (2007-2015)**



168

169 Source: Authors' analysis based on Spanish Institute of Statistics and Bank of Spain.

170 Although the environment is a factor that should be considered in the analysis of business failure in the  
171 hotel sector, not many previous empirical studies include it in their analysis or evaluate it profusely. In fact, no  
172 previous research identifies and quantifies the influence of the environment on bankruptcy by considering  
173 independently each category of MSMEs, which had a significant failure rate during the recent economic crisis.  
174 In particular, only Gémar et al. (2016) and Lado-Sestayo et al. (2016a) study hotel survival using variables  
175 related to location. However, Gémar et al. (2016) only analyse hotels with 4 and 5 stars that are less than 12  
176 years old. Additionally, Lado-Sestayo et al. (2016a) consider the entire hotel sector, large corporations and  
177 MSMEs, and evaluate the period 2005–2011, which includes a period of strong growth and a later crisis stage,  
178 which prevents an in-depth understanding of the influence of the new economic context generated during the  
179 recent crisis on hotel survival. This research contributes to filling this gap by evaluating the role of the  
180 environment in the survival of MSMEs, considering a recent period (2007–2015) that stands out for including a  
181 major economic crisis with consequences for the present.

182 Some studies also focus on analysing the bankruptcy process, that is, identifying its different phases. In  
183 this way it is important to anticipate bankruptcy processes and identify their main determining factors with the  
184 aim of facilitating management decisions in the early stages. For example, a hotel requires a high initial  
185 investment so this could be a relevant factor that should be considered in those early stages (Lado-Sestayo et al.,  
186 2016a). Moreover, policymakers could play a key role to reduce the firm's bankruptcy risk contributing to  
187 identify early warnings in the hotel industry because the industry- or tourist destination-level factors have an  
188 important effect on hotel failure (Vivel-Búa et al., 2016; Gémar et al., 2016).

189 Table 1 summarizes the previous literature that analyses different aspects related to MSMEs,  
190 differentiating each group of companies. These studies evaluate the capital structure, innovation, and personnel  
191 management, finding some differences between these companies, which underline the need to deepen the study  
192 of this heterogeneity. Focusing on bankruptcy, there are only three studies that demonstrate the existence of this  
193 heterogeneity in bankruptcy risk among micro, small, and medium enterprises, which can be identified in Table

194 1. In fact, most of the previous empirical literature on corporate bankruptcy analyses large companies due to the  
195 availability of information (Cultrera & Brédart, 2016). Other research focuses on analysing financial insolvency  
196 only in MSMEs or considers the identification of differences in the behaviour of their bankruptcy risk with  
197 respect to large firms (Altman & Sabato, 2007; Altman et al., 2010; Watson & Everett, 1996). Holmes et al.'s  
198 (2010) study provides the first empirical evidence on bankruptcy differentiating each category of MSMEs. These  
199 authors study bankruptcy in MSMEs in North-East England (United Kingdom), focusing on the manufacturing  
200 sector between 1973 and 2001 and finding differences between the three categories of firms. Subsequently, using  
201 a sample of UK MSMEs, Gupta et al. (2015) find differences in the bankruptcy risk attributes of micro firms and  
202 SMEs (small and medium-sized firms). In relation to the US, Kalak and Hudson (2016) find differences between  
203 micro and small companies when they analyse the bankruptcy of US MSMEs between 1980 and 2013 but do not  
204 identify different behaviour in medium-sized companies. In short, a limited literature emphasizes the need to  
205 deepen the study of this diversity in the analysis of bankruptcy in MSMEs considering the size differences of  
206 these companies. This will help to identify whether it is necessary to consider each type of company separately  
207 when modelling its survival, which would be very useful for lenders and for improving the decisions related to  
208 organizational management.

209

**Table 1. Previous literature distinguishing between micro, small, and medium firms**

<i>Focus</i>	<i>Authors</i>	<i>Sample</i>			<i>Methodology</i>	<i>Results</i>	
		<i>Geographical location</i>	<i>Size</i>	<i>Period</i>			<i>Economic sector</i>
Bankruptcy risk	Kalak and Hudson (2016)	US	11,117	1980–2013	Non-financial sectors	Hazard model	Micro and small firms need to be considered separately when bankruptcy risk is studied.
Bankruptcy risk	Gupta et al. (2015)	UK	393,895	2000–2009	Industrial sectors	Hazard model	Micro firms need to be studied separately from SMEs to analyse bankruptcy risk.
Capital structure	Mateev et al. (2013)	Central and Eastern Europe	3,175	2001–2005	All sectors	Dynamic panel data	There are differences between micro, small, and medium firms when they decide to finance their activity. Micro and small firms prefer trade credit and short-term bank loans, while medium firms mainly use long-term bank debt.
Bankruptcy risk	Holmes et al. (2010)	North-East England (UK)	781	1973–2001	Manufacturing sector	Hazard model	There are differences in the bankruptcy determinants between micro and SME firms at the firm level and the macro-economic level.
Capital structure	Ramalho and Silva (2009)	Portugal	4,692	1999	All sectors	Binary choice model and fractional regression model	There are differences in the determinants of the capital structure between micro, small, and medium firms. Particularly, micro firms prefer to use long-term debt.
Innovation	De Mel, McKenzie, and Woodruff (2009)	Sri Lanka (excluding the Northern province)	2,800	2008	All sectors, especially the wholesale and retail trade and manufacturing sectors	Probit model and OLS regression	There are differences in the processes and organizational innovations between micro, small, and medium firms.

Capital structure	Beck, Dermirguc-Kunt, and Maksimovic (2006)	80 developing and developed countries around the world	10,000	1999–2000	All sectors	Ordered probit model	There are differences in the capital structure and financial constraints between small and medium firms. Specifically, these types of firms show greater financing obstacles than large firms.
Personnel management	Kotey and Slade (2005)	Australia	1,330	1996	All sectors	One-way analysis of variance (ANOVA)	There are differences in the personnel management between small and medium firms. The implementation of formal human resource structures depends on the firm size.

212 Note: The papers highlighted in grey analyse the credit risk across MSME segments.

### 3. EMPIRICAL ANALYSIS

This research analyses business survival in the MSMEs of the Spanish hotel sector by dividing the sample into three main segments, called micro, small, and medium. The main objective is to identify and evaluate the possible differences in survival between these groups of companies according to their size, paying special attention to the impact of factors related to the environment. According to Recommendation 2003/361/EC of the European Commission, medium-sized enterprises employ fewer than 250 persons and have either an annual turnover not exceeding 50 million euros or an annual balance sheet total not exceeding 43 million euros. Small firms employ fewer than 50 persons and have an annual turnover or annual balance sheet total that does not exceed 10 million euros. Finally, micro firms employ fewer than 10 persons and have an annual turnover or annual balance sheet total that does not exceed 2 million euros.

The sample consists of 11,558 MSMEs, made up of 4,422 micro hotels, 4,998 small hotels, and 2,138 medium hotels, and considers the period 2007–2015. The sources of information used are the SABI database to identify the characteristics of the hotel and the Hotel Occupancy Survey published by the Spanish National Statistics Institute to identify the variables related to the environment in which the hotel undertakes its business activity. Regarding accounting rules in Spanish MSMEs, the Spanish PGC (General Accounting Plan) is mandatory for all companies considered in this research, which is in accordance with the International Financial Reporting Standards (IFRS). In addition, the manager is responsible for the accounting information published by the company that is obligatorily deposited in a registry every year.

Table 2 identifies the explanatory variables considered in the empirical analysis, identifying the expected sign of survival. According to the previous literature (Fernández & Castaño, 2012), and focusing on the characteristics of the hotels, this research considers performance, indebtedness, cash flow, current ratio, working capital, size, and asset turnover. Regarding the environment, the analysis includes the occupancy rate, seasonality, market share, market concentration, and accessibility represented by the distance from the hotel to international airports. These environmental variables were selected based on Gémár et al. (2016) and Lado-Sestayo et al. (2016a), which are the only previous papers that consider location in their analysis of hotel survival. Unlike other sectors, the environment in the hotel sector is related to the location of the hotel, so that external factors must include variables that consider their impact.

Focusing on hotel characteristics, previous research has showed that greater performance increases firm survival because it reduces the bankruptcy risk (Cultrera & Brédart, 2016). Respect to leverage, the previous literature emphasises and support that there is a negative relation between this variable and firm survival (Carter & Van Auken, 2006; Barniv, Agarwal, & Leach, 2002; Moulton et al., 1996). Also, the difficulties to restructure the debt payments, less flexible than the payments to the shareholders, can generate bankruptcy to get rid of their debts, especially due to changes in the environment (Balcaen & Ooghe, 2006). This is because firms must meet contractual debt obligations as they come due while the payments to the shareholders depend on business results (Tinoco & Wilson, 2013). Moreover, managers must have cash flow to meet the payments on the debt. Therefore, the availability of cash flow is positively related to firm survival (Guariglia, Spaliara & Tsoukas, 2016; Almamy, Aston & Ngwa, 2016). Regarding current ratio and working capital, both variables were proposed in the seminal research of Altman (1968) and Zmijewski (1984) because they represent the economic-financial balance of a firm. Thus, a positive relationship between these variables and firm survival is expected. Considering the liability of smallness, as explained above, a positive relationship is also expected for a greater

253 size (Pe'er, Vertinsky & Keil, 2014). Finally, a positive relationship between asset turnover and firm survival is  
 254 proposed. Inefficiencies represent the lack of knowledge of the company about itself and about the market in the  
 255 early stages while in the mature stages they represent rules and routines that generate costs (Fackler, Schnabel &  
 256 Wagner, 2013; Stinchcombe, 1965).

257 In relation to the environment, previous studies confirm that occupancy rate is one of the main  
 258 determinants of hotel survival (Vivel-Búa et al., 2016). According to Lado-Sestayo et al. (2016a), this effect can  
 259 be related to the high fixed costs of the hotel sector which generate a strong price competition in a context of low  
 260 occupancy rates. Moreover, it is also important to consider the effect that changes in outbound demand generates  
 261 in the occupancy rate. Thus, a positive relationship with hotel survival is expected.

262 Previous literature has not obtained conclusive results concerning the impact of seasonality on firm  
 263 survival. Some studies have proposed a negative relationship because the high seasonality generates idle  
 264 resources during a part of the year, so the management and recruitment of personnel is difficult (Karamustafa &  
 265 Ulama, 2010). Also, important variations in the level of activity generate that the cost of financing increases  
 266 (Park, 2013; Ganguin & Bilardello, 2005). On the other hand, other studies have shown a positive relationship  
 267 because the price level can increase in periods of high demand (Cuccia & Rizzo, 2011). With respect to market  
 268 share, a positive relationship is expected because this variable reflects the market power of a firm against its  
 269 competitors (Landes & Posner, 1981; Lado-Sestayo et al., 2016b).

270 According to Kaniovski and Peneder (2008) and Falk (2013), a greater market concentration increases  
 271 firm survival because, for example, it favors collusive practices, which increases the profit margin (Lado-Sestayo  
 272 et al., 2016b). However, a higher concentration also reduces the level of competition, influencing the  
 273 competitiveness of the tourist destination in the long term (Lado-Sestayo et al., 2016a; Porter, 1990). Thus, the  
 274 impact of market concentration on firm survival is unclear.

275 Proximity to transport nodes is another important variable. According to the theoretical models of  
 276 location, tourists prefer hotels near points of tourist interest, such as airports (Ashworth & Tunbridge, 2000). In  
 277 fact, previous studies confirm a negative relationship between distance to international airports and hotel survival  
 278 (Gémar et al., 2016). For this reason, it has been suggested that there is a negative relationship between the  
 279 distance to airports and firm survival.

280

**Table 2. Explanatory variables**

<i>Code</i>	<i>Definition</i>	<i>Expected relationship</i>
Performance	(Net income/total assets)*100	+
Debt	(Total liabilities/total assets)*100	-
Cash flow	(Cash flow/total sales)*100	+
Current ratio	(Current assets/current liabilities)*100	+
Working capital	(Working capital/total assets)*100	+
Size	Logarithm of total assets	+
Asset turnover	Net sales revenue/total assets	+
Occupancy	Average annual occupancy rate in the tourist destination where the hotel is located	+
Seasonality	Range of the occupancy rate in the tourist destination where the hotel is located	+/-
Share	Percentage that the hotel has of the total tourist destination sales	+
HHI	Logarithm of the Herfindahl–Hirschman index	+/-

281 Note: This research considers all the tourist destinations identified by the National Statistics Institute (INE) from  
282 Spain.

283

### 284 **3.1. Descriptive analysis: Hotel survival across MSME segments**

285 This section presents the descriptive study of the sample, including a difference of means test for  
286 unpaired samples with different variances following the approach by Welch (1947) (Table 3). This paper  
287 considers failure from a legal perspective. In accordance with the current legislation in Spain (law 22/2003 of 9  
288 July), bankruptcy implies that the company is currently in the situation of financial insolvency or that it will be  
289 in the short term. Thus, hotels that ended their activity in that status in the in the period 2007–2015 are  
290 considered as failed.

291 The results show that failed hotels have lower profitability, cash flow and current ratio as well as greater  
292 indebtedness to healthy hotels. These differences are statistically significant in all the segments of companies,  
293 namely micro, small, and medium-sized hotels. Also, failed micro and small hotels have lower working capital  
294 than healthy hotels, which could be related to financial constraints. Focusing on the size variable, the analysis  
295 determines that the small hotels that failed have a larger size relative to their healthy counterparts. This result  
296 could be explained by the existence of idle capacity during the recent economic crisis, when there was a  
297 significant reduction in the level of demand and a drastic fall in the value of real estate assets, which are one of  
298 the main components of hotel investment. According to Pal et al. (2006), this overcapacity could explain the  
299 business failure processes. Moreover, these results do not support the liability of smallness regarding hotel size,  
300 which demands further analysis. On the other hand, the asset turnover only shows significant differences in  
301 micro enterprises and medium-sized enterprises, in which the failed hotels have a lower average value.

302 Considering the environment in which the hotel is located and engages in its activity, the descriptive  
303 analysis shows that the recent economic crisis had different consequences according to the category of MSMEs.  
304 In particular, the failed micro hotels are located in tourist destinations with a lower occupancy rate, higher  
305 competition and have a smaller market share than healthy micro hotels. In relation to small hotels, they could  
306 benefit from seasonality, since those that failed are in tourist destinations with lower seasonality than healthy  
307 hotels. Therefore, small hotels have the capacity to take advantage of peak demand moments and to overcome  
308 the off-peak periods, which could be related to their greater operational flexibility due to their smaller investment  
309 in fixed assets compared with bigger hotels. Regarding the accessibility of the hotels, there are important  
310 differences. The failed micro hotels have a shorter distance to international airports than the healthy ones. On the  
311 contrary, the distance to international airports is greater in failed hotels than in healthy hotels in the small and  
312 medium-sized categories. The orientation of the hotel towards a particular type of tourism, such as rural or  
313 national tourism, among others, could explain these differences. For example, rural tourism is an important  
314 source of income in Spain, and its offer is concentrated in micro hotels. However, there is a large presence of  
315 medium-sized hotels in the business tourism offer (INE, 2016).

Table 3. Descriptive statistics

	MSMEs			MICRO			SMALL			MEDIUM		
	Failed	Healthy		Failed	Healthy		Failed	Healthy		Failed	Healthy	
	Mean sd	Mean sd	T p value	Mean sd	Mean sd	T P value	Mean sd	Mean sd	t P value	Mean sd	Mean sd	T P value
Performance	-4.065 14.131	0.977 9.601	-14.799 <0.001	-3.794 13.6	0.344 9.233	-8.116 <0.001	-2.614 11.826	1.219 9.748	-8.737 <0.001	-8.614 19.857	1.488 9.862	-8.485 <0.001
Debt	86.075 34.466	64.928 34.073	25.234 <0.001	90.464 34.356	71.985 35.371	14.176 <0.001	82.742 35.08	61.256 33.729	16.449 <0.001	83.543 32.891	61.443 32.6	11.099 <0.001
Cash flow	-4.774 37.518	7.276 24.654	-13.328 <0.001	-5.645 40.077	6.695 28.547	-8.205 <0.001	-2.73 38.201	7.49 21.667	-7.251 <0.001	-7.933 27.225	7.765 23.976	-9.550 <0.001
Current ratio	1.350 2.038	1.778 2.812	-8.509 <0.001	1.193 2.139	1.854 3.279	-7.941 <0.001	1.524 2.189	1.855 2.737	4.022 <0.001	1.298 1.151	1.476 2.024	-2.487 0.013
Working capital	-9.798 34.226	-3.330 26.311	-7.821 <0.001	-17.406 37.303	-8.044 28.822	-6.676 <0.001	-4.663 31.43	-0.626 25.644	3.462 0.001	-3.707 32.797	-1.57 23.215	-1.083 0.280
Size*	4097.040 3800.562	3438.713 4573.133	7.07 <0.001	836.75 1658.549	913.735 1609.988	-1.226 0.220	4547.093 4322.806	3062.937 4072.677	9.226 <0.001	11346.223 5772.78	8516.165 7834.425	8.009 <0.001
Asset turnover	0.620 0.661	0.738 0.828	-7.272 <0.001	0.543 0.639	0.733 0.849	-7.730 <0.001	0.707 0.702	0.747 0.804	-1.521 0.129	0.589 0.605	0.724 0.847	-3.640 <0.001
Occupancy	55.149 13.528	56.447 13.309	-3.947 <0.001	50.72 13.388	52.132 13.462	-2.782 0.006	56.925 14.068	56.977 13.672	-0.099 0.921	61.913 12.303	62.467 12.166	-0.744 0.458
Seasonality	38.621 13.020	39.059 13.501	-1.381 0.167	40.13 12.186	40.392 13.003	-0.564 0.573	37.596 13.287	38.707 13.617	-2.241 0.025	37.432 14.269	37.624 14.04	-0.222 0.824
Share	0.977 1.447	1.165 1.563	5.327 <0.001	0.447 0.708	0.558 0.937	-4.066 <0.001	1.245 1.721	1.2 1.628	0.703 0.482	1.639 1.977	2.099 2.143	-3.834 <0.001
HHI*	0.035 0.035	0.034 0.032	1.177 0.239	0.04 0.038	0.043 0.039	-2.081 0.037	0.033 0.034	0.031 0.029	1.584 0.113	0.029 0.028	0.028 0.031	0.588 0.556
Airport	58.859 57.047	56.230 50.905	1.901 0.058	57.588 54.194	64.14 52.091	-3.195 0.001	63.029 60.154	56.229 52.54	3.043 0.002	51.099 55.465	42.994 44.751	+2.424 0.016
Obs.	1,747	51,913		725	17,583		742	23,823		280	10,507	

318 Notes: \* Variable without logarithm transformation. "Obs." means the number of observations, and "sd" is the standard deviation. The size variable is quantified in thousands  
319 of euros.

320 Focusing on the methodology to study bankruptcy, the first researchers' descriptive studies are based on  
 321 accounting information (Beaver, 1966; Fitzpatrick, 1932; Smith & Winakor, 1935). Altman's (1968) subsequent  
 322 study proposes the Z-score model through multiple discriminant analysis, which is very popular in later studies.  
 323 Logistic regression is the predominant methodology in research conducted from the 1970s to the present  
 324 (Arquero, Abad, & Jiménez, 2009; Foreman, 2003; Martin, 1977), and recently artificial intelligence techniques  
 325 have also begun to be used (Fernández & Castaño, 2012). The hazard model methodology can also be used to  
 326 analyse corporate bankruptcy, as applied in recent research focusing on MSMEs (Gémar et al., 2016; Gupta et  
 327 al., 2015; Kalak & Hudson, 2016; Lado-Sestayo et al., 2016a). This methodology identifies the time until  
 328 bankruptcy occurs and the differences between failed firms at a time point in relation to the period of observation  
 329 used in the empirical study. Although logistic regression identifies the determinants of bankruptcy probability  
 330 and it is a popular methodology when matched-pair data is utilized or when survival time is not relevant, the  
 331 hazard models are also suitable for a more complete study of this phenomenon, because they identify the  
 332 variables that influence the time until this event occurs and its determinants (Lado-Sestayo et al., 2016a;  
 333 Fuentelsaz, Gómez, & Polo, 2004).

334 Next we present a study of the expected survival across MSME segments in the Spanish hotel sector  
 335 during the 2007–2015 period using the Kaplan–Meier estimator  $\hat{S}(t)$ . This estimator considers censorship and  
 336 shows the evolution of the percentage of hotels that survive according to their age (Figure 3). Its definition is as  
 337 follows:

338 
$$\hat{S}(t) = \prod_{t_i \leq t} \left[ \frac{n_i - d_i}{n_i} \right] \quad [1]$$

339 where

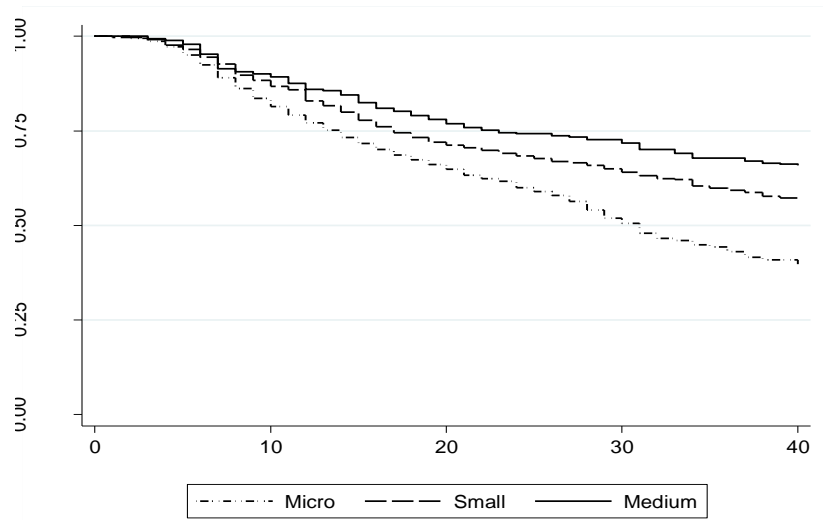
- 340 •  $d_i$  is the number of hotels that failed in period  $t_i$ ;
- 341 •  $n_i$  is the number of active hotels in period  $t_i$ .

342 To analyse the significance of the differences observed in the Kaplan–Meier estimator, the Logrank test  
 343 (Mantel, 1966) was conducted. Likewise, the hazard ratio of each category of companies, that is, micro, small,  
 344 and medium, was calculated through the univariate Cox proportional hazards regression model (Cox, 1972).  
 345 Thus, the Logrank test analyses the equality of the distribution of the survival functions of different groups,  
 346 while the hazard ratio identifies the increase or decrease in the risk of failure (Table 4).

347 The results show that micro hotels have a much lower expected survival rate than small and medium-  
 348 sized hotels. Specifically, the probability of surviving thirty years in micro hotels is 50 percent, while the value  
 349 is higher than 70 percent in medium hotels and around 65 percent in small hotels. According to the Logrank test,  
 350 these differences are statistically significant in all the categories of MSMEs. Focusing on the quantification of  
 351 these differences, the hazard ratio indicates that micro hotels have a probability of failing that is between 52  
 352 percent and 88 percent higher than that of medium and small hotels. Medium-sized hotels have a probability of  
 353 failing that is between 13 percent and 38 percent lower than that of the other two groups (micro and small), while  
 354 small hotels have a probability of failing that is between 20 percent and 1.2 percent lower than that of the other  
 355 hotel groups (micro and medium). Thus, micro hotels have a much higher probability of failure than small and  
 356 medium-sized hotels during the period of economic crisis analysed. This result could be explained by the  
 357 existence of differences in the characteristics of the hotel and/or the environment identified in Table 3 or by the

358 existence of differences in the determinants of survival, which will be evaluated in the subsequent empirical  
 359 analysis.

360 **Figure 3. Kaplan–Meier estimator across MSME segments in the Spanish hotel sector (2007–2015)**



361

362

**Table 4. Logrank test and hazard ratio**

MSMEs	Logrank test	p-value	Hazard ratio	95 percent interval
Micro	101.61	<0.001	1.690	1.523–1.876
Small	4.83	0.028	0.890	0.801–0.988
Medium	13.02	<0.001	0.735	0.620–0.871

363

364 The methodology used considers that the survival of the company in the market is a random variable  $t$   
 365 with a cumulative probability distribution function ( $F(t)$ ) defined as:

$$366 \quad F(t) = \text{Prob}(T \leq t) \quad [2]$$

367  $F(t)$  is an increasing function of which the complementary (and therefore decreasing) function is the  
 368 survival function, which is defined as:

$$369 \quad S(t) = 1 - F(t) = \text{Prob}(T \geq t) \quad [3]$$

370 In addition, the density function of the survival function is:

$$371 \quad f(t) = \frac{dF(t)}{dt} = -S'(t) \quad [4]$$

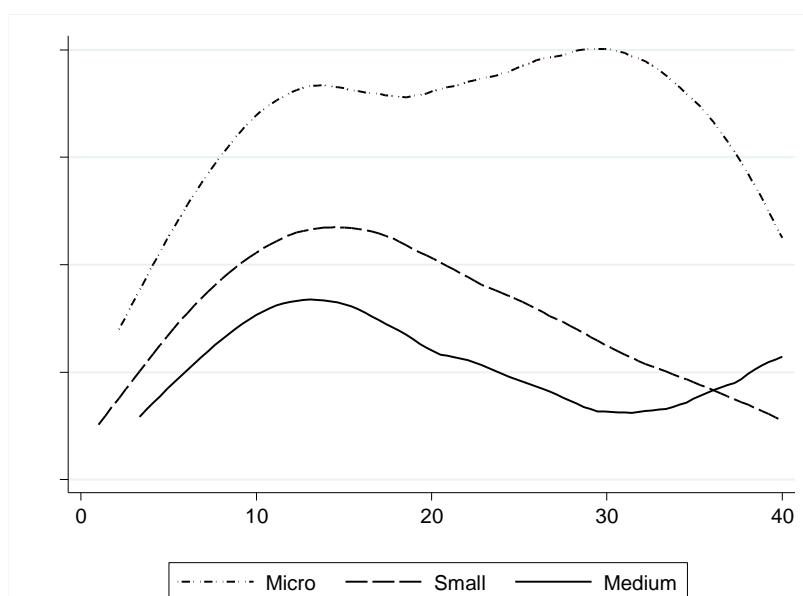
372 Using the two previous expressions, the hazard function or function of conditional risk of failure is  
 373 defined as:

$$374 \quad h(t) = \lim_{\Delta t \rightarrow 0} \frac{\text{Pr}(t + \Delta t > T > t | T > t)}{\Delta t} = \frac{f(t)}{S(t)} = \frac{-d(\log S(t))}{dt} \quad [5]$$

375 Figure 4 shows  $h(t)$ , which is the smoothed hazard rate, which may have a value equal to or greater  
 376 than 0. Therefore, this rate indicates whether a hotel maintains its probability of survival or reduces it. The  
 377 results show that there is an inverted U ratio in the risk rate, which is also found in some previous studies on  
 378 business failure (Kalak & Hudson, 2016; Lado-Sestayo et al., 2016a). The probability of failure increases during

379 the first years, reaching a maximum before the age of 15 in all the categories of MSMEs. In addition,  
 380 considering only micro hotels, the probability of failure increases again after 20 years of age, reaching another  
 381 maximum around 30 years. This could be related to a generational change in the management of these  
 382 companies, because they are generally managed by families. Another cause could be related to the need for  
 383 reinvestment to renew the structure of the micro hotel. With regard to medium-sized hotels, there is also a new  
 384 increase in the probability of failure, but it occurs around 35 years. However, it should be emphasized that there  
 385 is a smaller sample size in this age group, which makes it difficult to obtain conclusive evidence for this segment  
 386 (medium hotels).

387 **Figure 4. Hazard rate across MSME segments in the Spanish hotel sector (smoothed, 2007–2015)**



388  
 389 Finally, Table 5 shows Cox's test (Cox, 1972) using a Wald test to evaluate the impact of the  
 390 explanatory variables on survival in the three categories of MSMEs. This table also identifies the hazard ratio for  
 391 each variable. Therefore, first, this research confirms that there are significant differences in some of the  
 392 variables identified in Table 2 between micro, small, and medium hotels, considering both hotel and  
 393 environment characteristics (Table 3). Second, this research also verifies that there are significant differences in  
 394 survival between these three groups of companies (Figures 3 and 4). Consequently, the differences in survival  
 395 could be explained by the differences in the variables that are analysed or because these variables have different  
 396 impacts on survival across MSME segments. Next, the empirical study focuses on assessing whether these  
 397 variables individually may explain the differences in survival between MSME categories (Table 5). Hazard ratio  
 398 represents the extent to which the baseline hazard is increased as a result of a change in the explanatory variable.  
 399 Therefore, the hazard ratio in each variable reflects its impact on the survival of the company. Values lower than  
 400 unity increase the expected survival and higher values reduce it.

401 In general the evidence obtained indicates that performance, cash flow, and working capital are  
 402 variables that reduce the probability of failure in all the groups, while the level of indebtedness has the opposite  
 403 effect. The current ratio reduces the probability of failure in micro and small hotels, while size only has a  
 404 significant and positive effect in micro hotels. In addition, micro and medium-sized hotels reduce their  
 405 probabilities of failure if they improve their asset turnover. Focusing on the variables related to the environment,

406 the results show that the level of occupation, seasonality, and distance to international airports have a positive  
 407 effect on the probability of failure only in micro hotels. With respect to the market share, this variable reduces  
 408 the probability of failure not only in micro hotels but also in medium hotels.

409 Using the Wald test, the evidence shows that the performance, the level of indebtedness, and the cash  
 410 flow are the variables with greater statistical significance. In particular, indebtedness is especially relevant in  
 411 micro and small hotels, which may have greater difficulties in obtaining financing through alternative sources  
 412 (Mateev et al., 2013).

413 **Table 5. Cox's test**

Variables	MICRO		SMALL		MEDIUM	
	Hazard ratio (t student)	Wald $\chi^2$	Hazard ratio (t student)	Wald $\chi^2$	Hazard ratio (t student)	Wald $\chi^2$
Performance	0.967*** (0.003)	90.40	0.970*** (0.003)	70.64	0.954*** (0.006)	53.63
Debt	1.012*** (0.001)	117.00	1.018*** (0.001)	246.3	1.019*** (0.003)	51.33
Cash flow	0.990*** (0.001)	87.91	0.987*** (0.001)	121.1	0.982*** (0.003)	41.21
Current ratio	0.921*** (0.025)	9.30	0.894*** (0.033)	9.369	0.908 (0.054)	2.616
Working capital	0.991*** (0.002)	19.13	0.990*** (0.002)	17.53	0.989** (0.005)	3.865
Size	0.836*** (0.051)	8.818	1.058 (0.059)	1.05	1.141 (0.116)	1.672
Asset turnover	0.640*** (0.089)	61.77	0.910 (0.088)	1.393	0.685** (0.216)	6.563
Occupancy	0.992** (0.004)	3.971	0.999 (0.004)	0.027	0.991 (0.008)	1.186
Seasonality	0.993* (0.004)	2.912	0.994 (0.005)	1.708	0.995 (0.008)	0.393
Share	0.826** (0.065)	5.834	0.977 (0.034)	0.434	0.900*** (0.044)	7.073
HHI	0.930 (0.060)	1.277	1.024 (0.065)	0.146	1.007 (0.123)	0.00296
Airport	0.997** (0.001)	4.969	1.001 (0.001)	0.663	1.004 (0.002)	2.639

414 Notes: \*\*\*, \*\*, and \* = significant at 1 percent, 5 percent, and 10 percent, respectively.

415

### 416 3.2. Regression models: The effect of size on the failure probability across MSME segments

417 Having found evidence indicating that the variables considered in this research could individually  
 418 explain the differences in survival across MSME segments, the objective in this section is to assess their impact  
 419 on different categories of MSMEs using multivariate regression models. Table 7 presents the four econometric  
 420 models applied to each category of companies (micro, small, and medium): the Cox model, exponential model,  
 421 Weibull model, and Gompertz model. In addition, the explanatory variables included in the models are those  
 422 defined in Table 2 and temporary dummy variables to consider factors related to the environment that are not  
 423 included in the observed variables.

424 The Cox model considers the following function of the hazard rate:

425

[6]

426 where  
 427  $h_0(t)$  is the baseline hazard;  
 428  $\beta$  are the coefficients to be estimated;  
 429  $X_i$  are the observed variables of hotel  $i$ ;  
 430  $e^{\beta X_i(t)}$  is the hazard ratio.

431 In accordance with Kalak and Hudson (2016) and Lado-Sestayo et al. (2016a), to evaluate the  
 432 robustness of the empirical study, other models are estimated, including temporal modifications in the baseline  
 433 hazard and considering the unobservable heterogeneity through the incorporation of random effects and shared  
 434 frailty. Thus, this research controls aspects related to the different survival behaviour between segments of  
 435 companies (micro, small, and medium) as well as unobservable characteristics that may have a relevant impact  
 436 on survival, such as the quality of the management. With respect to the modifications to the baseline hazard, this  
 437 research uses the three modifications proposed in the literature for proportional hazard models: the exponential  
 438 model, the Weibull model, and the Gompertz model. Furthermore, the Wald test of the nullity of the parameters  
 439 that modify the baseline hazard is applied. Table 6 defines these three parametric models.

440 **Table 6. Exponential, Weibull, and Gompertz models**

Model	Baseline hazard	Wald test definition
Exponential	$h_0(t) = \lambda$ $\lambda > 0$	-
Weibull	$h_0(t) = \lambda \alpha t^{\alpha-1}$ $\lambda > 0$ & $\alpha > 0$	$\alpha = 1$
Gompertz	$h_0(t) = \lambda e^{\gamma t}$ $\lambda > 0$ & $\gamma \in (-\infty, \infty)$	$\gamma = 0$

441  
 442 The results show that there are no significant differences in the estimated coefficients (hazard ratios)  
 443 between the Cox model and the parametric models of survival (exponential, Weibull, and Gompertz),  
 444 emphasizing that the empirical study is robust (Table 7). None of the hazard ratios change their impact or modify  
 445 their statistical significance considering the confidence level of 10 percent. However, according to the Akaike  
 446 information criterion (AIC) and the Bayesian information criterion (BIC), the parameterization of the baseline  
 447 hazard improves the specification of the model in all the groups of companies (micro, small, and medium). In  
 448 fact, the Weibull model is the parametric model that presents the best fit across the MSME segments. In addition,  
 449 according to the LR test, the results show that the inclusion of random effects to consider the unobservable  
 450 heterogeneity is important in this parameterization, which emphasizes the relevance of including unobservable  
 451 business characteristics (unobservable heterogeneity).

452 Overall, the determinants of survival related to hotel characteristics are the same across MSME  
 453 segments, but not determinants of survival related to the environment (Table 7). Therefore, the differences

454 observed in survival across MSMEs segments could be explained by differences in hotel characteristics or by a  
455 different impact of environment changes (Figure 1 and Figure 2). These results discuss the interaction effects  
456 between size and covariates found by Fackler et al. (2013) for MSMEs in the hotel sector, and consequently it  
457 confirms the importance of sectoral studies. Also, it highlights the importance of managing the environment  
458 changes supporting the integrated approach of firm failure.

459 Performance, cash flow, and asset turnover have a positive effect on business survival while  
460 indebtedness and size have the opposite effect in all the groups analysed (micro, small, and medium). Hotel  
461 characteristics are important to explain survival so these findings are in line with the findings of Lado-Sestayo et  
462 al. (2016a) and G mar et al. (2016) in the Spanish hotel market. Unlike other authors such as Kalak and Hudson  
463 (2016) and Gupta et al. (2015), these results do not show that the explanatory power of firm characteristics  
464 increases with the firm size. Also, according to the results for debt and cash flow variables, the differences in  
465 capital structure across MSMEs segments could be related to the observed differences in survival (Ramalho &  
466 Da Silva, 2009).

467 In relation to the environment, there are important differences between these categories of companies.  
468 Consequently, the environment exhibit a significant power to explain hotel survival, which confirms the  
469 evidence obtained by Lado-Sestayo et al. (2016). These authors found that location explains about 75 percent of  
470 hotel survival, but they did not study survival differences across MSMEs segments. This research confirms that  
471 the environment has different influences on micro, small, and medium hotels, and researchers and hotel  
472 managers should consider this heterogeneity in the modelling and management of credit risk. It is in line with  
473 Holmes et al. (2010) that studied newly established manufacturing firms in north-east England and found micro  
474 firms and SMEs survival are differentially affected by macro-economic variables. According to Heracleous and  
475 Werres (2016), and Ropega (2011), this research also confirms that factors related to the environment and not  
476 only the hotel characteristics are important to explain survival. Table 7 shows that the occupancy rate is relevant  
477 to increasing survival in small and medium-sized hotels, while the level of market concentration (*HHI*) reduces it  
478 only in small hotels. With regard to the market share, this variable has a positive impact on survival in smaller  
479 hotels (micro and small), especially in micro hotels. This result could be explained by the importance of a  
480 minimum efficiency scale in the hotel sector (Audretsch & Mahmood, 1994). The effect of seasonality is only  
481 significant in micro hotels, contributing to increasing their survival. The higher operational flexibility of micro  
482 hotels could explain this result and consequently it is not possible to confirm the liability of smallness regarding  
483 seasonality. Finally, accessibility (airports) has different effects according to the segment of MSMEs. The  
484 distance to international airports has a positive effect on survival in micro hotels, while its effect is negative in  
485 medium-sized hotels and not significant in small hotels. This evidence is in line with the findings of G mar et al.  
486 (2016) for four-star and five-star hotels and confirms that differences across MSMEs segments are important  
487 regarding this variable.

488

Table 7. Regression models: Survival determinants across MSME segments

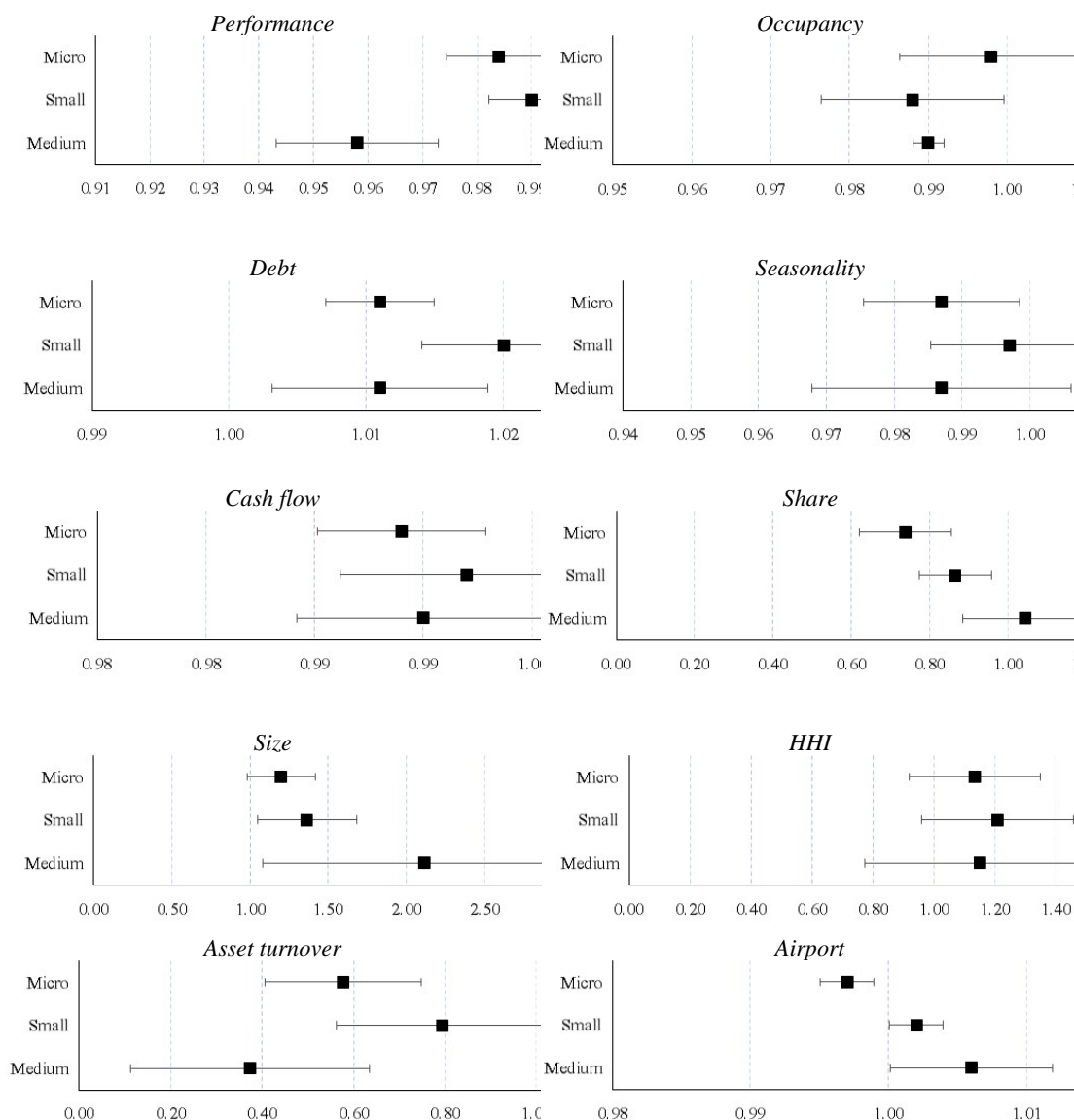
Variables	MICRO				SMALL				MEDIUM			
	Cox Hazard ratio (Std. Error)	Exponential Hazard ratio (Std. Error)	Weibull Hazard ratio (Std. Error)	Gompertz Hazard ratio (Std. Error)	Cox Hazard ratio (Std. Error)	Exponential Hazard ratio (Std. Error)	Weibull Hazard ratio (Std. Error)	Gompertz Hazard ratio (Std. Error)	Cox Hazard ratio (Std. Error)	Exponential Hazard ratio (Std. Error)	Weibull Hazard ratio (Std. Error)	Gompertz Hazard ratio (Std. Error)
Performance	0.989*** (0.004)	0.988*** (0.004)	0.984*** (0.005)	0.989*** (0.004)	0.990** (0.004)	0.992* (0.004)	0.990** (0.004)	0.992* (0.004)	0.965*** (0.007)	0.966*** (0.007)	0.958*** (0.008)	0.964*** (0.008)
Debt	1.007*** (0.001)	1.007*** (0.001)	1.011*** (0.002)	1.007*** (0.001)	1.014*** (0.001)	1.015*** (0.002)	1.020*** (0.003)	1.014*** (0.001)	1.011*** (0.003)	1.007** (0.003)	1.011*** (0.004)	1.009*** (0.003)
Cash flow	0.991*** (0.001)	0.992*** (0.001)	0.989*** (0.002)	0.992*** (0.001)	0.994*** (0.002)	0.994*** (0.002)	0.992*** (0.003)	0.994*** (0.002)	0.989*** (0.003)	0.991*** (0.003)	0.990*** (0.003)	0.989*** (0.003)
Current ratio	0.972 (0.024)	0.969 (0.026)	0.956 (0.030)	0.970 (0.026)	0.956 (0.032)	0.968 (0.031)	0.958 (0.036)	0.972 (0.030)	0.928 (0.071)	0.954 (0.069)	0.938 (0.077)	0.941 (0.074)
Working capital	0.998 (0.002)	0.998 (0.002)	0.998 (0.003)	0.998 (0.002)	1.004 (0.003)	1.003 (0.003)	1.005 (0.003)	1.002 (0.003)	1.007 (0.006)	1.005 (0.007)	1.007 (0.007)	1.007 (0.007)
Size	1.105 (0.075)	1.145* (0.079)	1.200** (0.103)	1.141* (0.077)	1.319*** (0.104)	1.281*** (0.107)	1.365*** (0.135)	1.272*** (0.102)	1.772*** (0.273)	1.809*** (0.258)	2.115*** (0.343)	1.909*** (0.288)
Asset turnover	0.659*** (0.106)	0.684*** (0.106)	0.577*** (0.179)	0.691*** (0.105)	0.792** (0.137)	0.880 (0.122)	0.794* (0.175)	0.906 (0.118)	0.479*** (0.387)	0.531*** (0.376)	0.374*** (0.609)	0.470*** (0.445)
Occupancy	0.999 (0.005)	0.998 (0.005)	0.998 (0.006)	0.998 (0.005)	0.994 (0.005)	0.991* (0.005)	0.988** (0.006)	0.992 (0.005)	0.992*** (0.001)	0.993*** (0.001)	0.990*** (0.001)	0.993*** (0.001)
Seasonality	0.989** (0.005)	0.989** (0.005)	0.987** (0.006)	0.989** (0.005)	1.000 (0.005)	0.998 (0.005)	0.997 (0.006)	0.998 (0.005)	0.988 (0.009)	0.990 (0.010)	0.987 (0.010)	0.987 (0.010)
Share	0.813** (0.080)	0.781** (0.080)	0.738** (0.089)	0.785** (0.080)	0.867** (0.049)	0.879** (0.049)	0.865** (0.058)	0.884** (0.048)	1.011 (0.069)	1.049 (0.077)	1.042 (0.084)	1.051 (0.083)
HHI	1.126 (0.082)	1.116 (0.088)	1.134 (0.107)	1.114 (0.084)	1.200** (0.094)	1.199** (0.103)	1.209* (0.118)	1.201** (0.096)	1.125 (0.167)	1.070 (0.175)	1.151 (0.202)	1.090 (0.186)
Airport	0.997** (0.001)	0.997** (0.001)	0.997** (0.001)	0.997** (0.001)	1.002 (0.001)	1.002 (0.001)	1.002 (0.001)	1.002 (0.001)	1.006*** (0.002)	1.005** (0.002)	1.006** (0.003)	1.006** (0.002)
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Variables	MICRO				SMALL				MEDIUM			
	Cox Hazard ratio (Std. Error)	Exponential Hazard ratio (Std. Error)	Weibull Hazard ratio (Std. Error)	Gompertz Hazard ratio (Std. Error)	Cox Hazard ratio (Std. Error)	Exponential Hazard ratio (Std. Error)	Weibull Hazard ratio (Std. Error)	Gompertz Hazard ratio (Std. Error)	Cox Hazard ratio (Std. Error)	Exponential Hazard ratio (Std. Error)	Weibull Hazard ratio (Std. Error)	Gompertz Hazard ratio (Std. Error)
Gamma ( $\gamma$ )				-0.004				-0.010				0.018
1-Gamma (1- $\gamma$ )				0.996				0.990**				1.018***
Test ( $\gamma=0$ )				(0.006)				(0.004)				(0.006)
				0.05				374.84				40.98
				0.8214				<0.001				<0.001
Alpha ( $\alpha$ )			1.510***				1.377***				1.756***	
Test ( $\alpha = 1$ )			(0.140)				(0.154)				(0.165)	
			3.59				3.63				10.57	
			0.0580				0.057				0.001	
Theta ( $\tau$ )		0.014	0.712	0.000		0.003	0.591	0.000***		0.192***	0.812	0.398***
Test ( $\tau = 0$ )		(0.040)	(0.503)	(0.001)		(0.098)	(0.473)	(0.000)		(0.071)	(0.302)	(0.119)
		0.08	8.23	0.00		0.002	3.96	0.00		2.13	7.47	4.80
		0.391	0.002	0.99		0.483	0.023	0.99		0.072	0.003	0.014
Obs.		16,797				22,177				9,592		
Wald test	519.4	389.8	182.4	504.4	423.7	237.6	121.8	446.7	175.0	204.4	272.6	228.2
Log likelihood	-1929	-565.0	-556.8	-564.9	-1695	-549.8	-546.5	-548.0	-394.3	-167.5	-161.2	-165.4
AIC	3895.981	1172.063	1157.628	1173.875	3427.312	1141.636	1137.087	1140.004	826.6304	377.0275	366.3594	374.8739
BIC	4042.831	1334.371	1327.665	1343.912	3579.442	1309.779	1313.236	1316.154	962.8354	527.5698	524.0705	532.5849

492 Notes: \*\*\*, \*\*, and \* = significant at 1 percent, 5 percent, and 10 percent, respectively. Obs. is the number of observations. Theta ( $\tau$ ) is the variance of the random effect, while Test ( $\tau = 0$ ) is a  
493 likelihood ratio test of the nullity of the parameter. Alpha ( $\alpha$ ) and Gamma ( $\gamma$ ) are the parameters of the Weibull and Gompertz models. Test  $\alpha = 1$  and Test ( $\gamma = 0$ ) are Wald tests. AIC (Akaike  
494 information criterion) is a criterion used for the selection of models, while BIC (Bayesian information criterion) evaluates the explanatory power between models. The Wald test is a joint test of  
495 the nullity of the estimated parameters. Loglikelihood is the value of the likelihood function.

496 Figure 5 shows the hazard ratios and their 95 percent confidence interval in each segment of MSMEs.  
 497 The evidence shows that performance has a greater positive impact on survival in medium-sized hotels than in  
 498 micro and small hotels. Considering the environment, the market share has a greater positive effect on survival in  
 499 the micro hotels than in the medium hotels. Focusing on the distance to airports, the evidence points that micro  
 500 hotels benefit from that distance, while the effect is the opposite for medium hotels.

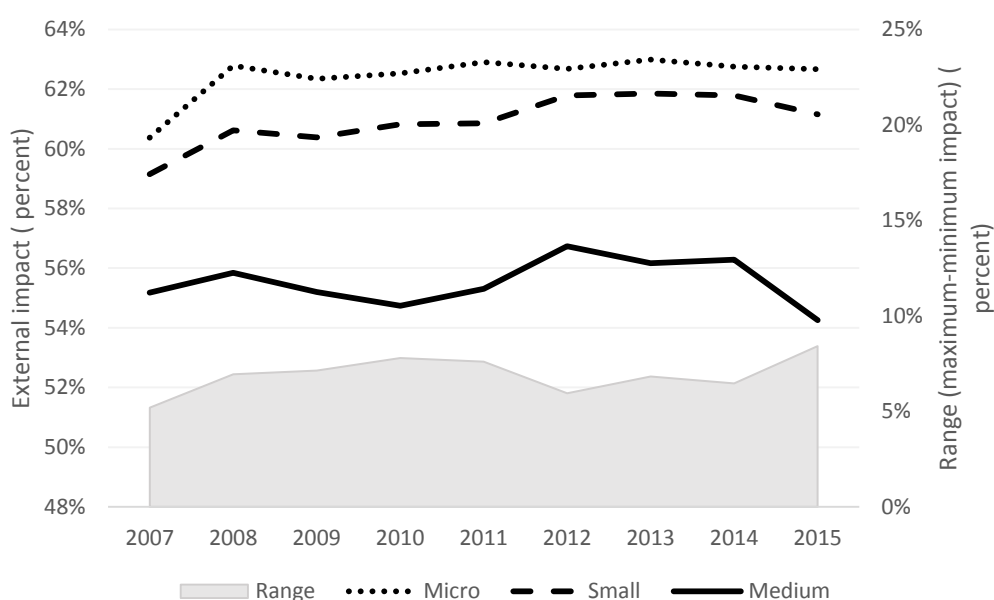
501 **Figure 5. Hazard ratios and 95 percent confidence intervals across MSME segments (2007–2015)**



502  
 503 Using the Weibull model, which, as indicated, presents the best fit of all the estimated models, the risk  
 504 of business failure between hotel and environment characteristics is decomposed considering the three segments  
 505 of MSMEs. The main objective is to identify the evolution of the importance of the environment by deepening  
 506 the knowledge of its impact on the survival of MSMEs during the recent economic crisis. Figure 6 identifies the  
 507 average percentage of expected survival that is explained by the environment or location and, by the difference  
 508 with respect to 100 percent, the percentage explained by the hotel characteristics. The results show that the  
 509 environment and hotel location particularly influences the survival of micro and small hotels, increasing its

510 importance in recent years. Thus, these hotels present greater exposure to adverse economic cycles, which would  
 511 explain their higher closing rate in the period analysed. On the contrary, the external factors have lost importance  
 512 in medium-sized hotels. This evidence emphasizes that external factors have influenced the survival of MSMEs  
 513 differently according to their size and supports that liability of smallness could be related to response to changes  
 514 in the environment. Despite their higher operational flexibility, micro and small hotels could have lack of  
 515 resources and capabilities to respond changes in the environment. In particular, the difference in the impact of  
 516 external factors between micro and medium-sized hotels was 5.19 percentage points in 2007 and rose to 8.41  
 517 percentage points in 2015. These results confirm the growing importance of external factors in managing the  
 518 business failure of MSMEs and the important role of policymakers in the management of the tourist destinations  
 519 variables. In addition, they emphasize that hotel managers should consider and manage the environment,  
 520 especially in micro hotels, which were more exposed during the crisis period.

521 **Figure 6. External impact on hotel survival across MSME segments (2007–2015)**



522

#### 523 4. CONCLUSIONS

524 This paper has evaluated the determinants of hotel survival in MSMEs, considering each segment  
 525 (micro, small, and medium) separately to identify differences according to their size during the period 2007–  
 526 2015. As the previous literature proposes (Lado-Sestayo et al., 2016a), this paper has considered simultaneously  
 527 internal and external factors as determinants of failure. In fact, this paper contributes to identifying the extent to  
 528 which the environment influenced survival in these companies during the recent economic crisis.

529 In general, the results show that hotel survival is influenced by hotel characteristics and especially the  
 530 environment. According to Heracleous and Werres (2016) and Ropega (2011), this research confirms that factors  
 531 related to the environment and not only the firm characteristics are important to explain survival. Specific, at the  
 532 firm level, the determinants are the same in all three categories of companies (micro, small, and medium). In  
 533 particular, profitability, cash flow, and asset turnover have a positive impact on survival, while indebtedness and  
 534 size have a negative effect. Thus, focusing on the hotel sector, the results do not confirm that the explanatory  
 535 power of firm characteristics increases with the firm size. Kalak and Hudson (2016) and Gupta et al. (2015)  
 536 found this effect when they studied the US non-financial sectors and English industrial sectors, respectively.

537 Focusing on the environment, this paper has found that this factor has a different influence in each group of  
538 companies, which is greater in micro hotels than in small and medium hotels. Seasonality only influences the  
539 survival of micro hotels, while the market share is important for both micro hotels and small hotels. The  
540 occupancy rate influences only the survival of small and medium-sized hotels. Finally, the distance to  
541 international airports is a relevant variable to the survival of micro and medium hotels, although its effect is  
542 positive in smaller hotels and negative in medium-sized hotels.

543 These results contribute to explaining the evidence found by Lado-Sestayo et al. (2016a), who observe a  
544 greater impact of location on hotel survival in Spain during the first years of the crisis but do not deepen their  
545 study. In addition, the differences found between micro, small, and medium hotels justify the suggestion that the  
546 results obtained by Gémar et al. (2016) and Lado-Sestayo et al. (2016a) on survival in the general hotel sector  
547 (including large hotels) may not be extrapolated directly to MSMEs, especially micro hotels. In accordance with  
548 Vivel-Búa et al. (2016), this research also contributes to confirming the need to develop models of business  
549 survival at the sectoral level that consider the particularities of strategic sectors, such as the hotel sector in Spain.  
550 Regarding other previous studies that analyse the survival of MSMEs in different sectors, for example Kalak and  
551 Hudson (2016), this paper identifies specific aspects of MSMEs that must be managed to improve their survival,  
552 especially in relation to the environment.

553 Therefore, this research has implications for hotel managers. Considering hotel characteristics, a  
554 strategy to flexibilize assets could contribute to improving asset turnover, exerting a positive impact on survival.  
555 In addition, a discounted price policy could increase the cash flow by improving survival. Hotel managers should  
556 apply this strategy cautiously, because it could also reduce profitability by worsening survival. The negative sign  
557 found for the variables related to indebtedness and size shows that credit restrictions and the housing market  
558 crash during the recent crisis had a negative impact on survival (Hausman & Johnston, 2014). Thus, hotel  
559 managers could increase the use of alternative sources of finance, such as equity, and diversify their assets. In  
560 this regard, before the crisis Spain had high levels of inflation and property asset prices and a good credit flow.  
561 All these factors could contribute to excessive investment in the hotel sector. As the hotel demand is highly  
562 dependent on the business cycle, hotels' management should properly evaluate the investments made in times of  
563 economic growth to avoid jeopardizing their future activity if there are adverse and drastic economic  
564 fluctuations.

565 From the point of view of the environment, hotel managers should take advantage of the effect of  
566 seasonality on survival in micro hotels, increasing their operational flexibility. In addition, they should avoid  
567 locations with high accessibility that in general are related to holidays and urban tourism. In this way, micro  
568 hotels could increase their market share by focusing on other types of tourism, such as cultural, religious, and  
569 gastronomic tourism, among others, which are very important in Spain. With regard to small hotels, the evidence  
570 shows that the enhancement of the tourist destination to increase the occupancy rate could have a positive effect  
571 on their survival. Nevertheless, the results also indicate that an increase in the hotel supply could jeopardize their  
572 survival, so the strategies and policies that limit the expansion of the sector could positively influence these  
573 hotels. Finally, considering medium-sized hotels, this paper confirms that increases in the level of demand in the  
574 tourist destination improve their survival, as in small hotels, and that an improvement in accessibility also has a  
575 positive effect, unlike micro hotels. The orientation of medium hotels towards mass tourism and holidays and the  
576 focus on large groups of customers could explain these results. In this context these hotels can collaborate with

577 policymakers to increase the accessibility of the tourist destination, which can generate conflicts of interest with  
578 micro hotels, which could be affected adversely by an excessive increase in this type of demand, which worsens  
579 other types of demand. An example of such conflicts can be found in cities with mass tourism, which even  
580 occasionally generate rejection on the part of the resident population, such as Barcelona and especially Venice.  
581 These conflicts of interest between different MSME segments should be considered by policymakers when  
582 designing their policies in this sector.

583 This paper also presents some limitations that open future lines of research. Due to the non-availability  
584 of information, this research could not deepen the analysis of unobservable heterogeneity, which could be related  
585 to the quality of management or other aspects that require further studies. Moreover, although, in general, the  
586 Spanish accounting standards are the same for the three types of companies considered (medium, small and  
587 micro) in this paper, not all companies in the sample were audited. In particular, all medium-sized companies  
588 were audited, but only 10.5% of small companies and 2.6% of microenterprises. This could influence the  
589 reliability of the accounting information used in this investigation, since it is necessary to consider that when a  
590 firm faces economic challenges, it might have more pressure for earnings management and financial statement  
591 planning. However, the research by Campillo, Serer and Ferrer (2013) confirmed that the prediction models of  
592 failure in small Spanish companies are valid using accounting information generated in very different economic  
593 contexts, that is, before and after the crisis. In spite of this, it is convenient to consider this limitation related to  
594 the accounting audit for a better interpretation of the results indicating that this requires further study.

595 Focusing on the hotel sector, the study of a broader set of variables that can be determinants of hotel  
596 survival would contribute an important future line of research. For example, the structure of ownership of capital  
597 with special attention to the existence of family businesses would be interesting since previous literature  
598 indicates that there is a negative relationship between family property and the probability of failure of the  
599 company. Also, another important factor to consider would be the analysis of the organizational relationship of  
600 hotels such as hotel chains versus independent hotels. The hotel chains have significantly increased their position  
601 in the market in recent years and have an average size higher than the independent hotels, which are usually  
602 small and family owned, so there could be differences in their survival. Moreover, due to the turbulence in the  
603 Spanish real estate market during the last decade generating a sharp drop in prices, as indicated in the paper, it  
604 would be interesting to analyze its impact on the hotel survival.

605 Finally, it would also be interesting to expand the analysis to consider other geographic markets; for  
606 example, from the point of view of tourism, it could investigate the US, China, and France, among others, and  
607 evaluate other sectors. In fact, this paper highlights that sectoral studies studying each category of MSMEs  
608 separately are important to analyse firm survival.

609

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