

Size and survival of the hospitality industry: The case of Spain

Paz Rico Belda 

Universitat de València, Spain

Bernardí Cabrer-Borrás

Universitat de València, Spain

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Abstract

The aim of this study is to analyse the determinants of survival of the hospitality industry. The study pays particular attention to the size of the enterprises since the majority of Spanish hospitality enterprises are microenterprises. Two approaches are considered. The first approach uses a binary choice model to analyse the determinants of survival probability as well as the Blinder–Oaxaca decomposition, proposed by Yun (2004), to quantify the difference between enterprises according to their size and what proportion of this difference is due to observed factors or unobserved factors. The second approach is a survival analysis, carried out through the Cox proportional hazard model, which identifies the determinants of the duration of business activity of a hospitality enterprise. The empirical results show that enterprises without employees encounter less favourable conditions for survival than enterprises with employees and the risk of not surviving decreases as the size of the enterprise increases.

Keywords

binary choice model, Blinder–Oaxaca decomposition, Cox proportional hazard model, enterprise survival, hospitality industry

Introduction

The tourism sector is one of the most important economic sectors of the Spanish economy, hence the interest that it has always attracted in academic literature. This sector includes lodging, food and drink services, known as the hospitality industry, and transportation and entertainment. From the point of view of size, the tourism sector shows a similar profile to that of most Spanish

Corresponding author:

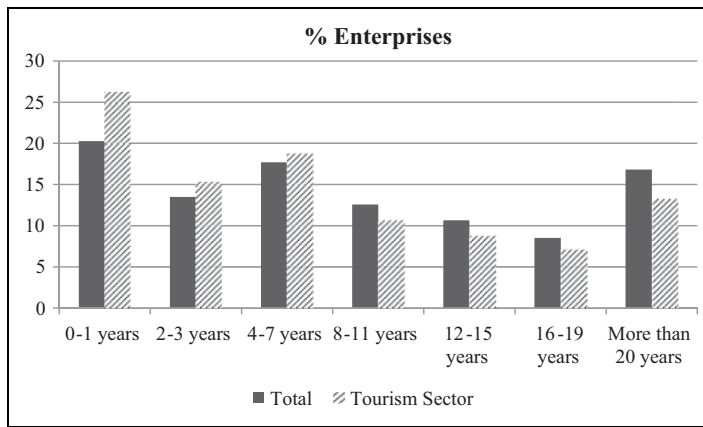
Paz Rico Belda, Facultad de Economía, Universitat de València, Spain Avd. de los Naranjos, S/N, Valencia 46022, Spain.

Email: prico@uv.es

Table 1. Number of enterprises by number of employees.

	Total	%	Tourism sector	%	Rest of service sectors	%
Total	3,337,646	100.00	283,332	100.00	19,70,538	100.00
Without employees	1,845,881	55.30	87,713	30.96	1,151,682	58.45
1–2 employees	910,686	27.29	108,948	38.45	512,146	25.99
3–5 employees	303,574	9.10	56,527	19.95	163,396	8.29
6–9 employees	125,173	3.75	17,055	6.02	65,419	3.32
10–19 employees	80,860	2.42	7,250	2.56	41,518	2.11
More than 20 employees	71,472	2.14	5,839	2.06	36,377	1.85

Source: National Institute of Statistics Spain (INE).

**Figure 1.** Percentage of enterprises by age.

companies in which companies with less than 10 employees tend to predominate (see Table 1). However, in this sector, the percentage of enterprises without employees¹ is notably lower than that of Spanish enterprises overall, yet enterprises with the greatest presence in the tourism sector are those with 1–2 employees. When analysing the distribution of enterprises according to their age, differences are also observed with respect to Spanish enterprises overall. In the tourism sector, the percentage of consolidated enterprises that have been operational for more than 3 years is lower than that of enterprises in general, which suggests a lower survival rate of tourism enterprises (see Figure 1). With this in mind, our study sets out to analyse the survival of tourism enterprises, differentiating according to their size.

The concept of survival is not particularly well defined in empirical economic literature. Most studies to date tend to focus on the reasons for the failure of an enterprise rather than its survival. Generally, the failure of an enterprise can be understood as its exit from the market (De Tienne et al., 2008; Gimeno et al., 1997). However, some authors have a wider concept of failure and argue that business failure occurs when an enterprise declares some form of bankruptcy (Watson and Everett, 1996) or is declared insolvent (Dimitras et al., 1996; Shepherd, 2003). Khelil (2016) extends the understanding of entrepreneurial failure by examining the different factors associated with profiles of failing entrepreneurs. Following Cabrer-Borrás et al. (2019), this study employs

the wider definition of business failure, whereby the interruption of business operations occurs when the enterprise has stopped operating, has dissolved and is in bankruptcy or in the suspension of payments. Enterprises that are not in any of the above situations and maintain their normal business activity are therefore considered active enterprises.

This study analyses the business characteristics that determine the probability of survival of enterprises in the hospitality industry.² To this end, a binary choice model is estimated. The contribution of this study to the empirical literature consists in identifying the existence of differences in the survival rate of enterprises according to their size. As G  mar et al. (2016) indicate, although there is a positive and proved relationship between business survival and size in manufacturing enterprises, there is no conclusive evidence for service enterprises. To deepen this analysis, the Blinder–Oaxaca decomposition proposed by Yun (2004) is used to quantify the difference in the probability of survival between enterprises according to their size. This decomposition also helps to identify the proportion of the difference explained by observed factors, which can be influenced by economic policy measures, and the proportion explained by random factors, which cannot be altered.

In addition, a duration analysis is carried out taking into account the factors that determine the time that elapses from the formation of the enterprise until the interruption of its business activity. These two approaches can be considered alternative approaches. However, given that each of them undertakes the analysis using different techniques, in this study both analyses are considered complementary. Furthermore, this procedure serves to analyse the robustness of the results. Thus, if both approaches yield similar results, their robustness is confirmed.

This article is structured as follows: ‘Theoretical framework’ section discusses the theoretical framework; ‘Methodology’ section describes the methodology; ‘Data and variables’ section analyses the data and variables used; ‘Empirical results’ section details the empirical results and ‘Conclusions’ section provides the main conclusions.

Theoretical framework

The first seminal studies of the determinants of business failure begin with Altman (1968) and Beaver (1968) who applied financial ratios to a discriminant analysis to study the bankruptcy of an enterprise. Subsequently, binary choice models that included factors which explained enterprise failure were used. More recently, survival analysis has been carried out using duration models. Both binary choice model and survival analysis are considered in this article.

Traditionally, the economic performance of enterprises has been regarded as one of the fundamental factors of their survival, such that enterprises with low economic profitability end up leaving the market (Alchian, 1950; Friedman, 1953; Khyzer Bin Dost et al., 2018; Winter, 1964; Williamson, 1991). G  mar et al. (2016) state that profitability is an important indicator for anticipating situations of insolvency and they endorse the use of financial ratios to predict business failure. Bunn and Redwood (2003) find a negative relationship between profit and business failure but conclude that the relationship is not linear since negative performance has a greater effect on the probability of failure.

On the other hand, Audretsch and Mahmood (1995) point out that empirical studies on business dynamics show the survival rate of enterprises is positively related to the size and age of the enterprise. Many authors consider that business survival increases over time and with the size of the enterprise (Dunne et al., 1989; Evans, 1987; Fari  as and Moreno, 2000; Geroski, 1995; Hopenhayn, 1992; Jovanovic, 1982; Preisend  rfer and Voss, 1990). As indicated by Aldrich and

Auster (1986), both new and small enterprises are at a disadvantage because of the absence of economies of scale, a lower profile in the market, limited financial resources and a weak position when actively competing for work. However, the positive relationship between the survival of enterprises and their size has not been validated for service enterprises and, in particular, hospitality enterprises (Gémar et al., 2016). Other business characteristics that have been considered determinants of business survival are liquidity, the capacity to generate resources and capitalisation (Bhattacharjee et al., 2009; Bunn and Redwood, 2003; Geroski and Gregg, 1997; Lennox, 1999).

According to Lennox (1999), the most important determinants of bankruptcy are liquidity, benefits, size, the capacity to generate resources, the industrial sector to which the enterprise belongs and the economic cycle. Additionally, Geroski and Gregg (1997) and Bunn and Redwood (2003) find that the ratio between debt and assets positively affects the probability of closure. Bhattacharjee et al. (2009) show that cash flow, profit and size of the enterprise reduce the probability of liquidation, while the economic cycle only affects enterprises that have been operating for more than 5 years. Cabrer-Borrás and Rico (2017) substantiate that education level, previous work experience, age and gender of the entrepreneur all influence the probability of business survival.

As Gémar et al. (2016) point out, in the hospitality industry, there are few studies dealing with the survival of enterprises. However, some interesting articles which focus on hotel enterprise survival can be cited, such as Baum and Ingram (1998) and Kaniowski and Penede (2008). Likewise, Gémar et al. (2016) analyse survival in the Spanish hotel industry, using a sample of 1033 hotels and considering financial and non-financial characteristics of enterprises. Their results do not identify any financial variable that has a significant impact on the duration of hotels nor are they able to prove the presence of economies of scales associated with survival in relation to the enterprise size in the hotel sector.

This literature review suggests that the survival rate of enterprises depends on their characteristics, such as profitability, size, age, liquidity and financial structure. Our study focuses on analysing how business characteristics determine the survival of Spanish hospitality enterprises and aims to provide conclusive evidence as to whether there is a significant difference in the survival rate of enterprises according to their size.

Methodology

Binary choice models

To select the determinants of survival of hospitality enterprises, a binary choice model is specified and estimated.

Economics literature offers different approaches to interpreting discrete choice models. The most common approach in economics analysis is the random utility theory, where the alternative selected by economic agents will be the one that maximises its expected utility. In other words, an economic agent with a rational behaviour will choose the option – between two mutually exclusive alternatives, (1) or (0) – that will maximise its expected utility. The i th agent will choose option (1) if its utility U_{i1} is greater than the utility provided by option (0), which is U_{i0} . This comparison, from a mathematical point of view, can be expressed through the following probabilistic inequality $\text{Prob}(U_{i1} > U_{i0})$. In our case, if the utility of maintaining business activity is higher than not maintaining it, the entrepreneur will opt to continue with the business.

The utility achieved is quantified by assigning a probability to rational decisions through the following equation:

$$P_i = \text{Prob}(Y_i = 1) = \text{Prob}(U_{i1} > U_{i0}) = F(X_i\beta)$$

where $F(X_i\beta)$ is the distribution function evaluated for each of the characteristics associated with the enterprise (i). The vector of observations of the characteristics of the enterprise is denoted by (X_i) while (β) is the vector of coefficients.

Thus, the following behaviour equation of the logit model represents the choice of the hospitality enterprise:

$$P_i = F(X_i\beta) = \frac{e^{X_i\beta}}{1 + e^{X_i\beta}} = \varphi(Z_i) \quad (1)$$

The proposed model sets out to determine the relevance of the different factors that influence the decision of the hospitality enterprise to maintain or stop the business activity.

In this way, the logit model specified is as follows:

$$Y_i = \varphi(Z_i) + \varepsilon_i \quad (2)$$

where Y_i is a dichotomous variable that takes the value one if the enterprise continues with its business activity and zero if it does not, and Z_i is the index made up of the combination of the coefficients and the characteristics associated with the enterprise i , such as economic profitability, size of the enterprise or liquidity.

In short, the discrete choice model enables identification of the enterprise characteristics that significantly influence the probability of keeping the enterprise in operation.

Blinder–Oaxaca decomposition

After the estimation of the logit model, the decomposition proposed by Yun (2004) is applied. The original approach of the variable decomposition method, proposed by Blinder (1973) and Oaxaca (1973), looks for differences between two groups in the endogenous variable and quantifies which part of that difference responds to each one of the two components considered by the researchers. The first component quantifies the difference between the two groups regarding the explanatory variables observed, and the second component quantifies the difference regarding unobservable characteristics, through the discrepancy in the response to the explanatory variables of both groups.

The decomposition method helps to determine which part of the difference in survival probability is due to the characteristics of both groups and which part is due to the responses to these characteristics. The Blinder–Oaxaca method was designed for linear models, but it has also been used for non-linear models. In particular, the method proposed by Yun (2004) can be used for the decomposition of any type of functional relationship and for calculating the contribution of each variable.

In line with Yun (2004), the probability of maintaining business activity P_i , for an enterprise i , through a logit model, can be expressed as follows:

$$P_i = F(X_i\beta) \quad (3)$$

whereas the decomposition of the difference in survival probability between the groups formed by enterprises with employees (C) and enterprises without employees (S) can be

expressed as follows:

$$\overline{P_C} - \overline{P_S} = \left(\overline{F(X_C \hat{\beta}_S)} - \overline{F(X_S \hat{\beta}_S)} \right) + \left(\overline{F(X_C \hat{\beta}_C)} - \overline{F(X_C \hat{\beta}_S)} \right) \quad (4)$$

The first term of the equation identifies the difference explained by the differing characteristics of each group, given the same coefficients. The second term indicates the unexplained difference, that is, the part corresponding to the different responses given by the two groups with the same characteristics.

Also, the decomposition of the probability of survival between microenterprises and larger enterprises is considered.³ To do this, enterprises without employees are eliminated from the sample, which makes it possible to analyse the difference in the probability of success among the groups formed by microenterprises (M) and larger enterprises (G):

$$\overline{P_M} - \overline{P_G} = \left(\overline{F(X_M \hat{\beta}_G)} - \overline{F(X_G \hat{\beta}_G)} \right) + \left(\overline{F(X_M \hat{\beta}_M)} - \overline{F(X_M \hat{\beta}_G)} \right) \quad (5)$$

To obtain the decomposition, Yun (2004) proposes a transformation in two stages. In the first one, the logit model is estimated for the mean values of the regressors and, in the second, a first-order Taylor expansion is performed to linearise the effects associated with the characteristics and the coefficients around the mean, obtaining the following expression for the first set of groups, with and without employees⁴:

$$\overline{P_C} - \overline{P_S} = \sum_{j=1}^k W_{\Delta X}^j \left(\overline{F(X_C \hat{\beta}_S)} - \overline{F(X_S \hat{\beta}_S)} \right) + \sum_{j=1}^k W_{\Delta \beta}^j \left(\overline{F(X_C \hat{\beta}_C)} - \overline{F(X_C \hat{\beta}_S)} \right) \quad (6)$$

where the weights of each variable j on the differences in characteristics and coefficients, respectively, are as follows:

$$W_{\Delta X}^j = \frac{(\bar{X}_C^j - \bar{X}_S^j) \hat{\beta}_S^j}{(\bar{X}_C - \bar{X}_S) \hat{\beta}_S} \quad (6a)$$

$$W_{\Delta \beta}^j = \frac{(\hat{\beta}_C^j - \hat{\beta}_S^j) \bar{X}_C^j}{(\hat{\beta}_C - \hat{\beta}_S) \bar{X}_C} \quad (6b)$$

and the sum of all the weights is equal to 1.⁵

After analysing the characteristics that determine the probability of maintaining business activity, the duration of the enterprise is analysed through the Cox proportional hazard model.

The Cox proportional hazard model

Survival analysis looks at the time an event takes to occur. This statistical technique has been applied to different fields of knowledge such as medicine, biology, economics, engineering and sociology. This analysis has also been used in examining the duration of length of stay in hotels (Barros et al., 2010; Gokovali et al., 2007; Thrane, 2012).

One of the most popular models used for survival analysis is the Cox proportional hazard model (Cox, 1972; Cox and Oakes, 1984). The risk function of the Cox model is given by the following equation:

$$\lambda_i(t) = \lambda_0(t)e^{X_i\beta}$$

where $\lambda_0(t)$ is a non-negative and unspecified function, common to all the subjects in the sample, called the base risk function and β is the coefficients vector of the model.

This model is semiparametric because it includes a parametric part and a non-parametric part. The parametric part corresponds to the exponential function $e^{X_i\beta}$, where β is the parameters to be estimated by maximising the partial likelihood function, as proposed by Cox. The base risk function is the non-parametric part since it is an arbitrary function and is not specified. This function is estimated in a second stage conditioned by the estimation of the parameters β .

The partial likelihood function is called partial because it only takes into account the observations for which the event has occurred (in our case, termination of the business activity) and does not include censored observations (when the event has not occurred by the time the observation of the sample is completed). However, when calculating the probability of survival, all observations are considered.

A key assumption of the Cox model is the proportional hazard, which means that the quotient between the risk for two subjects with the same vector of variables is constant over time:

$$\frac{\lambda_i(t)}{\lambda_j(t)} = \frac{\lambda_0(t)e^{X_i\beta}}{\lambda_0(t)e^{X_j\beta}} = \frac{e^{X_i\beta}}{e^{X_j\beta}} \quad (7)$$

Data and variables

The data used in this research come from the Iberian Balance Sheet Analysis System (SABI) database, which provides information on the economic and financial accounts of Spanish and Portuguese enterprises. Specifically, the sample is comprised of hospitality enterprises (codes 55 and 56 from Clasificación Nacional de Actividades Económicas 2009, accommodation services and catering services) that were formed during the period 2009–2015. At the end of December 2016,⁶ the status of each enterprise is analysed and a binary variable is generated that takes value one if the enterprise remains active and zero otherwise. In addition, the duration or number of years that enterprises have remained active is calculated. Thus, the variable duration includes the number of years since the enterprise was formed until December 2016 or until the enterprise ceases to be active.

When choosing the sample, two filters are set: the data must correspond to Spanish enterprises and they must not have negative equity. Observations are eliminated from the sample if they do not provide information on any of the variables considered, giving a final sample size of 7,988 enterprises. The information obtained from SABI for each of the enterprises in the sample includes the number of employees, sales, assets, liquidity or cash flow, level of debt, financial leverage and economic profitability.

The theoretical framework suggests that enterprises' survival rate depends on their characteristics: profitability, size, age, liquidity and financial structure. Clear definitions of these characteristics, as outlined below, are important before their inclusion in the models.

An enterprise's size may be defined according to different criteria. Many studies have measured enterprise size through its total assets. Other studies consider the criterion of volume of sales. This study uses the first criterion, the total assets of the enterprise, as an indicator of enterprise size. In

addition, according to the number of employees, a distinction has been made between enterprises without employees, microenterprises and large enterprises.

The profitability of an enterprise has been measured through the return on assets (ROA), which is defined as the quotient between the profit before interest and taxes and the total assets of the enterprise. To collect the different responses of survival probability to profitability, as pointed out by Bunn and Redwood (2003), a dichotomous variable is generated; it takes value one if the ROA of the enterprise is positive and zero otherwise.

The enterprise's financial structure is measured through the variable debt, defined as the quotient between total liabilities and net worth.

The age of an enterprise refers to the number of years since it was formed until the end of the period under analysis, in this case December 2016, or to the time when the enterprise ceased its activity. This variable coincides with the period during which the enterprise is active and is the endogenous variable in the Cox proportional hazard model.

The productivity of an enterprise is quantified by the logarithm of the quotient between sales and the number of workers.⁷ Another aspect is financial leverage, which is the effect that using funds or external debt produces on the profitability of owned funds or financial profitability. If the financial leverage is positive, financial profitability can be increased by increasing the debt. The necessary condition for positive financial leverage is that the economic profitability of the investments is greater than the financial cost of the debt.

Lastly, cash flow indicates the capacity of the enterprise to generate resources to self-finance. If cash flow is zero or negative, the enterprise has no capacity to deal with its debts, based on the results of the year. Thus, a dichotomous variable is generated that takes value one if the enterprise presents positive cash flow and zero if it is zero or negative.

By way of summary, Table 2 includes the definition and expected sign of each the variables considered in the probability of survival, based on the logit model, and in the risk of interruption of business activity, based on the Cox model. In addition, Table 3 presents the descriptive statistics of the selected variables for all the enterprises in the sample, distinguishing between active enterprises, enterprises without employees, microenterprises and large enterprises.

The descriptive statistics indicate a high dispersion of the data on enterprise assets, sales and profitability. The dispersion of sales in enterprises with employees is especially high. The high dispersion of the variables highlights the heterogeneity of Spanish hospitality enterprises.

With regard to the age of the enterprise, the average age of enterprises without employees is slightly lower than that of enterprises with employees (microenterprises and larger enterprises).

Regarding enterprise size, as expected, enterprises without employees have an average size, based on assets, that is much lower than that of enterprises with employees. They also present a smaller dispersion. This is also observed with the sales variable, which has traditionally been considered an alternative measure of enterprise size. Here, the average sales volume of enterprises without employees is lower than that of enterprises with employees and their dispersion is lower.

In terms of profitability, as expected, active enterprises have an average return, measured by the median of the series, which is higher than that of all enterprises in the sample. When comparing the average profitability of enterprises according to their size, it can be seen that this grows with the size of the enterprise, meaning that larger enterprises are more profitable. However, around 70% of the enterprises in the sample show a positive economic return.

Table 2. Definition of the explicative variables and expected sign of their coefficients.

Variable	Name	Definition	Cox model	Logit model
Size	SIZ	Total assets (Neperian logarithm)	–	+
Without employees	WEM	Value 1 if the companies do not have employees and 0 if they do	+	–
Microenterprises	MIC	Value 1 if the company has between 1 and 9 employees and 0 in other case	+/-	+/-
Large companies	LRC	Value 1 if the company has more than 9 employees and 0 in other case	+/-	+/-
Profitability	ROA	ROA	–	+
Positive profitability	PEP	ROA greater than zero	–	+
Debt	DEB	Passive $\times$ 100/net equity	+	–
Age	AGE	Number of years active up until the end of the sample period		+
Productivity	PRO	Sales/workers	–	+
Positive leverage	PLE	Value 1 if the leverage is positive and 0 if the leverage is null or negative	–	+
Positive cash flow	PCF	Value 1 if the cash flow is positive and 0 if it is null or negative	–	+

Source: Compiled by the authors in a theoretical framework.

Lastly, the average debt, which would reflect the financial structure of the enterprise, is higher in the group of enterprises with employees than in the group of enterprises without employees, perhaps because the larger size of the former grants them greater access to external financing. In fact, around 85% of the enterprises in the sample remain active, and the percentage of surviving enterprises increases with the size of the enterprises. However, the percentage of enterprises without employees that show a positive leverage and positive cash flow is lower than the rest of the enterprises.

In summary, enterprises without employees, microenterprises and larger enterprises present significant differences, which are manifested in their different volumes of assets and sales. Enterprises without employees have a lower level of debt, with a smaller percentage of these enterprises presenting liquidity and positive leverage in relation to the other enterprises.

Figure 2 shows the evolution of the survival rate of enterprises in the sample. The survival rate is the percentage of enterprises that remain active compared to the total number of enterprises that started each year. This graph shows that the survival rate depends on enterprise size, with the survival rate of enterprises with employees being higher than that of enterprises without employees. Also, the survival rate of larger enterprises is higher than that of microenterprises. The high survival rate in the sample of enterprises started in the last few years is surprising because it does not accurately reflect reality, where around 20% of enterprises disappear in the first few years of life. The reason for this discrepancy is that official statistics register the start and cessation of enterprises, but SABI takes the data from the Mercantile Registers. Insolvent enterprises, which should register their cessation, fail to provide their accounting data to the Mercantile Registry and so these observations are missing from the SABI database.

Table 3. Descriptive statistics of the data of the sample.

	Total enterprises	Active enterprises	Enterprises without employees	Microenterprises	Large enterprises
Number of observations	7,988	6,809	917	4,696	2,375
Percentage	100.00	85.24	11.48	58.79	29.73
Age (years)					
Average	4.68	4.64	4.58	4.63	4.83
Median	4.60	4.49	4.48	4.53	4.76
Deviation	1.69	1.73	1.70	1.69	1.67
Coefficient of variation	0.36	0.37	0.37	0.36	0.35
Active (thousands of euros)					
Average	611.29	654.28	250.60	274.41	1,416.66
Median	150.67	160.31	44.77	111.68	397.76
Deviation	3,697.21	3,920.40	2,365.52	1,041.29	6,384.49
Coefficient of variation	6.05	5.99	9.44	3.79	4.51
ROA (%)					
Average	-3.31	5.42	-26.22	-2.97	4.87
Median	2.97	3.84	1.45	2.48	4.57
Deviation	250.54	30.31	453.07	256.88	34.87
Coefficient of variation	75.69	5.59	17.28	86.37	7.16
Debt (%)					
Average	76.29	68.69	103.85	72.24	73.68
Median	75.96	74.37	72.52	77.11	75.03
Deviation	339.33	30.96	973.61	80.34	79.17
Coefficient of variation	4.45	0.45	9.38	1.11	1.07
Employees (number)					
Average	9.93	10.32	—	4.85	23.42
Median	6.00	6.00	—	5.00	15.00
Deviation	33.33	23.63	—	2.18	40.44
Coefficient of variation	3.36	2.29	—	0.45	1.73
Sales (thousands of euros)					
Average	692.15	745.90	141.71	365.43	1,550.71
Median	379.89	412.05	90.59	315.59	953.64
Deviation	1,897.07	2,026.67	227.58	433.23	3,263.61
Coefficient of variation	2.74	27.17	1.61	1.19	2.10
Survival (%)	0.85	—	0.76	0.84	0.91
Positive profitability (%)	0.69	0.73	0.60	0.67	0.76
Positive leverage (%)	0.64	0.67	0.51	0.62	0.72
Positive cash flow (%)	0.78	0.82	0.69	0.77	0.84

Note: ROA: return on assets.

Source: Compiled by authors from SABI.

Empirical results

A logit model is specified and estimated to determine the probability of survival of enterprises in the hospitality industry based on size, age, economic profitability, debt, productivity and whether they present positive profitability, positive leverage and positive cash flow.⁸

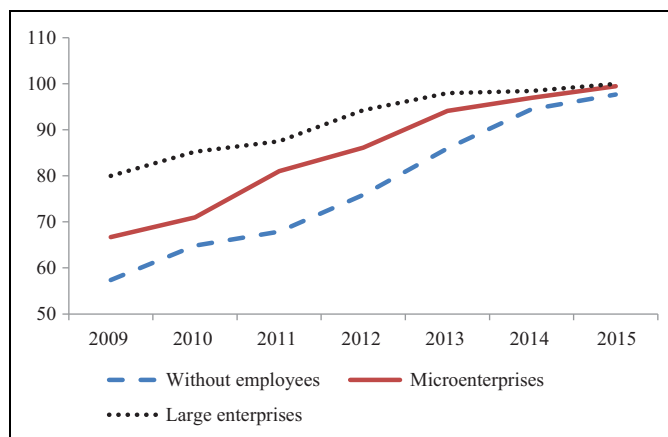


Figure 2. Evolution of the survival rate of enterprises in the sample.

Table 4 presents the results of the estimation of four logit models⁹: one model for all enterprises in the sample, and three models according to the size of the enterprises. The objective is to compare the results obtained for the different types of enterprises.

The results for the complete sample, collected in Model (1) of Table 4, indicate that the group of enterprises that do not have employees shows a negative differential effect on the probability of remaining active compared to the reference category and microenterprises. On the other hand, larger enterprises have a positive differential effect compared to microenterprises. As expected, the size, age, profitability and employees' productivity positively affect the probability of staying operational. Furthermore, the higher an enterprise's debt is, the lower its probability of survival. Nevertheless, profitability and debt have a reduced marginal effect. Enterprises with positive economic returns experience a positive differential effect compared to unprofitable enterprises.

Enterprises with positive leverage, that is, with the ability to improve their financial results by increasing their debt, have a higher probability of survival than those without leverage. On the other hand, enterprises with positive cash flow are more likely to generate funds to finance themselves than enterprises with a zero or negative cash flow.

These results are consistent with the literature, which considers models first introduced through the seminal work of Altman (1968) for predicting business failure. In addition, these results highlight the importance of good management practices. According to G  mar et al. (2016), better management practices go hand in hand with a higher probability of survival. Good management practices would be reflected in the economic and financial structure of the enterprise and, therefore, in its profitability, liquidity ratio, productivity and leverage.

When estimating the logit model for enterprises according to number of employees, the size of an enterprise, measured by its assets, affects the probability of its survival, as seen in the case of enterprises without employees but not for enterprises with employees (see models (2)–(4) of Table 4). There is also a big difference in the differential effect of positive profitability in enterprises according to their size: The differential effect in larger enterprises is double that of enterprises without employees. However, productivity has a positive influence on the probability of survival in larger enterprises, with a marginal effect twice that of microenterprises, while enterprises without employees are not affected by this variable. Having positive cash flow only

Table 4. Estimation of logit model.

	Model (1)		Model (2)		Model (3)		Model (4)	
	Total sample		Enterprises without employees		Microenterprises		Large enterprises	
Variables	Coefficient	Statistic z	Coefficient	Statistic z	Coefficient	Statistic z	Coefficient	Statistic z
Constant	−1.73	−2.19	−3.04	−2.37	−1.19	−1.09	−4.49	−4.86
WEM	−0.40	−3.06	—	—	—	—	—	—
LRC	0.61	5.00	—	—	—	—	—	—
SIZ	0.09	2.21	0.41	3.58	0.06	1.12	−0.08	−0.90
AGE	2.85	26.74	3.08	10.93	2.78	21.00	2.89	12.04
ROA	0.00	2.62	0.01	2.40	0.00	1.86	0.00	−0.66
PEP	0.69	5.71	0.57	1.72	0.62	4.15	1.14	4.23
DEB	0.00	−3.94	−0.01	−3.10	−0.01	−3.06	−0.01	−2.62
PRO	0.28	4.51	0.18	1.49	0.28	3.37	0.61	3.79
PLE	0.30	3.04	0.46	1.74	0.22	1.83	0.45	1.97
PCF	0.36	2.85	−0.14	−0.42	0.48	3.06	0.24	0.80
Number of observations	7,988		917		4,694		2,375	
Log. of likelihood	−1,834.37		−260.13		−1,165.90		−3,87.21	
McFadden R^2	0.45		0.49		0.43		0.46	
Prediction R^2	93.04		91.06		92.46		95.45	

Note: SIZ: size; WEM: without employees; LRC: large companies; AGE: age; ROA: profitability; PEP: positive profitability; DEB: debt; PRO: productivity; PLE: positive leverage; PCF: positive cash flow. The models show standard deviations of robust estimators with heteroscedasticity. The name of the variables is explained in Table 2.

affects microenterprises since the differential effect does not turn out to be statistically significant either in enterprises without employees or in larger enterprises. The marginal effect of age is higher in enterprises without employees than in enterprises with employees. Finally, the marginal effect of the level of debt is very similar in all three groups of enterprises. Therefore, these results show that, although the probability of survival of enterprises according to their size is determined by the same factors, the effects of these factors on probability are not equal.

To further examine the comparison between enterprises according to their size, the statistical decomposition technique of Blinder–Oaxaca is applied. Firstly, the technique is applied by differentiating between enterprises with and without employees and then by differentiating between microenterprises and larger enterprises. In the first comparison, this methodology enables verification of the existence of a statistically significant difference of 11 percentage points in the probability of remaining active between enterprises with and without employees. Likewise, quantification of the difference shows that unobserved factors are not significant and that the total difference is due to discrepancies in the characteristics of both types of enterprises (see Table 5). If enterprises without employees had the same characteristics as enterprises with employees, their probability of survival would be the same. These results show a differential behaviour with respect to Spanish enterprises overall, where the percentage difference between both collectives is lower and is explained by both observed and unobserved component, see Cabrer-Borrás et al. (2019).

Table 5. Blinder–Oaxaca decomposition logit model.

	Probability	Statistic z	Percentage
With employees	0.865	248.480	–
Without employees	0.758	17.620	–
Difference	0.107	2.470	100.00
Observed component	0.091	2.120	85.52
Unobserved component	0.015	1.200	14.48
Large enterprises	0.910	190.140	–
Microenterprises	0.842	174.520	–
Difference	0.068	14.030	100.00
Observed component	0.031	5.010	45.53
Unobserved component	0.037	5.020	54.47

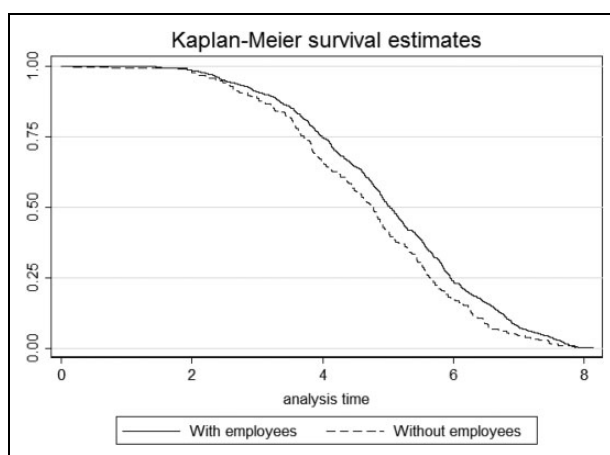
**Figure 3.** Survival curve of Kaplan–Meier for enterprises with and without employees.

Figure 3 illustrates that enterprises without employees have a lower probability of survival than enterprises with employees, but in the early years, the difference is minimal with the gap widening over time.

Table 5 also presents the decomposition of Blinder–Oaxaca of the probability of survival among microenterprises and larger enterprises. This decomposition indicates that the difference in the probability of remaining active between microenterprises and larger enterprises is equal to 6.8 percentage points that, although small, is nevertheless statistically significant. Over half of this difference in probability can be explained by unobserved factors. Unobserved factors include variables related to the existence of economies of scales and a stronger position in the market for larger enterprises in relation to microenterprises.

One of the main stylised facts of the Spanish economy is that it is characterised by a strong presence of small enterprises, particularly in the hospitality industry. In addition, small enterprises are at a disadvantage compared to larger ones so, to increase the survival rate, authorities need to

Table 6. Decomposition by type of company of the Blinder–Oaxaca logit Model.

	Total of enterprises		Enterprises without employees		Microenterprises		Large enterprises	
	Probability	Statistic z	Probability	Statistic z	Probability	Statistic z	Probability	Statistic z
Recently formed	0.9590	255.71	0.910	21.240	0.958	210.630	0.983	220.860
Consolidated	0.7890	132.43	0.666	24.320	0.769	91.420	0.871	106.090
Difference	0.1710	24.26	0.244	4.800	0.189	19.820	0.112	11.990
Observed component	−0.2170	−8.74	−0.341	−1.490	−0.192	−8.250	−0.178	−5.460
Unobserved component	0.3880	15.44	0.586	3.080	0.381	15.130	0.290	8.250

give more support to small enterprises. This can be done through subsidies to invest in innovation and improvements in facilities.

To better analyse the differences between enterprises according to their size, a differentiation between consolidated enterprises and recently formed enterprises is carried out. The results of the Blinder–Oaxaca decomposition are presented in Table 6. These results, in terms of life expectancy of enterprises, can be understood using a similar analogy to human life expectancy. When a child is born, their life expectancy is high but decreases with age. Adults have a lower life expectancy compared to children but not as low as newborns, who are more vulnerable.

In the case of enterprises without employees, the difference between consolidated enterprises and recently formed enterprises is 24.4 percentage points and the entire gap can be explained by unobserved factors. In the case of microenterprises, if the consolidated enterprises presented the characteristics of recently formed enterprises, they would have a probability of 19.2 percentage points less than their actual percentage. Finally, if the larger consolidated enterprises had the characteristics of the new enterprises, their probability of survival would be 17.8 percentage points less than their actual percentage. As expected, larger and consolidated enterprises have a survival probability (0.871) greater than microenterprises (0.769) and consolidated enterprises without employees (0.666). These results show that hospitality enterprises with employees have, at all stages of their evolution, survival rates higher than those of enterprises without salaried employees and that the probability of survival increases with the size of the enterprise. This evidence is consistent with Aldrich and Auster (1986) who consider new and small enterprises to be at a disadvantage, because of the absence of economies of scale, their lower profile in the market, their limited financial resources and their weak position when actively competing for work. Finally, these results show, unlike empirical literature, that there is conclusive evidence of a relationship between size and survival in the hospitality industry. Moreover, this empirical evidence suggests the need for authorities to offer new enterprises greater support.

After analysing the probability of business survival, the factors affecting the duration of an enterprise are considered. In the Cox proportional risk model, the duration period considered is the time that elapses from the start of the business activity to the time when the enterprise leaves the market or until the end of the observation period of the current study. From a statistical point of view, these latter observations are considered censored.

Table 7. Estimation of the Cox proportional hazard model.

Variables	Model (1)		Model (2)		Model (3)		Model (4)	
	Cox model		Cox model stratified		Cox model		Cox model	
	Total sample		Enterprises without employees		Microenterprises		Large enterprises	
	Hazard ratio	Statistic z	Hazard ratio	Statistic z	Hazard ratio	Statistic z	Hazard ratio	Statistic z
WEM	1.32	3.53	—	—	—	—	—	—
LRC	0.70	−4.32	—	—	—	—	—	—
SIZ	0.88	−5.15	0.74	−4.96	0.92	−2.62	1.03	0.57
ROA	1.00	0.18	1.00	0.74	1.00	6.90	1.00	−0.91
PEP	0.49	−8.89	0.58	−2.78	0.50	−7.05	0.42	−4.42
DEB	1.00	1.78	1.00	1.01	1.00	7.48	1.00	1.45
PRO	0.81	−5.82	0.90	−1.54	0.76	−5.59	0.56	−5.77
PLE	0.72	−4.93	—	—	0.79	−2.96	0.59	−3.39
PCF	0.62	−5.84	0.82	−1.04	0.62	−4.90	0.64	−2.17
Number of observations	7,988		917		4,696		2,375	
Log. of likelihood	−8,931.54		−1,090.73		−5,227.63		−1,348.52	

Note: SIZ: size; WEM: without employees; LRC: large companies; AGE: age; ROA: profitability; PEP: positive profitability; DEB: debt; PRO: productivity; PLE: positive leverage; PCF: positive cash flow.

The Cox model is interpreted in terms of the level of risk or hazard ratio; thus, values lower than one imply a reduction in risk and, therefore, an increase in the duration of the enterprise. In this case, the coefficients are negative and the factors have a positive influence on the duration. Conversely, values higher than one imply risk factors, positive coefficients and, therefore, variables that negatively affect enterprise duration.

Table 7 presents estimates corresponding to the hazard ratio of the Cox model. Model (1) in Table 7 shows that enterprises without employees have a risk of not surviving that is 1.32 times higher (32% higher) than that of microenterprises, which are the reference category. Conversely, larger enterprises have a risk of not surviving that is 30% less than that of microenterprises. Therefore, as evidenced by the logit model, the risk of closure decreases with the size of the enterprise. However, it should be noted that the proportionality contrast of risk, on which the model is based, rejects the hypothesis of proportionality for the variables without employees, positive profitability and positive leverage. Possible solutions to avoid the risk not being proportional in these variables are to estimate the model for each one of the categories; to estimate an extended Cox model in which the factors are time-dependent or to estimate a stratified Cox model, in which case it is implicitly considered that the effect of the factors is the same for the different categories. The solution adopted in this study has been that of the first alternative, that is, to estimate the model for each of the categories according to the size of the enterprise. Models (2)–(4) collect the Cox model for the enterprises in the sample, grouped according to their size. The contrast of proportionality of risk does not reject the hypothesis of proportionality for the observations corresponding to microenterprises and larger enterprises for the variable positive financial leverage but

it does in enterprises without employees. For this reason, Model (2) is a stratified model for the dichotomous variable positive financial leverage for enterprises without employees.

Focusing on Models (2) and (4), it can be seen that the size of enterprises reduces the risk of closure for smaller enterprises while having no significant effect on larger enterprises. In enterprises without salaried employees, the effect is greater than in microenterprises. However, the debt of an enterprise is a statistically significant factor only in microenterprises. Even so, it turns out to be a neutral factor since its hazard ratio has almost a unitary value, indicating that this variable does not significantly influence the risk rate. Profitability does not affect the risk but having positive profitability does reduce the risk of closure, more so in enterprises without employees where the effect is greater. Positive cash flow reduces the risk of closure in enterprises with employees while not affecting enterprises without employees. Finally, productivity does not affect the duration of business activity in enterprises without employees but it does reduce the risk of closure in enterprises with employees.

The results of the estimates of the logit model and the Cox duration model confirm the robustness of the results. Both models suggest that size, age, productivity, financial leverage, positive profitability and liquidity positively affect the survival of hospitality enterprises. Profitability and the level of debt do not seem to affect survival, as judged by the reduced marginal effect shown in the estimation of the logit model and the fact that the hazard ratio of the Cox duration model is unitary. However, both models indicate differences according to the enterprise size in how these variables influence their survival. Thus, the size of the enterprise has an effect on enterprises without employees, whereas productivity and positive profitability have a greater effect on enterprises with employees.

Conclusions

This study analyses the determinants of the survival of the Spanish hospitality industry. After applying two different but complementary methodologies, the results obtained are robust and indicate that size, age, productivity, financial leverage, positive profitability and liquidity positively affect the survival of hospitality enterprises, whereas profitability and the level of debt do not.

The results highlight the importance of good management practices because they ensure good performance in terms of positive profitability, financial leverage and productivity. Good management implies a longer duration for enterprises, according to G  mar et al. (2016). Management practices usually refer to the working methods and innovations that managers use to improve the effectiveness of businesses. Management practices include many aspects such as empowering and training of employees, introducing methods for improving quality and encouraging innovation and use of new technology. An improvement in any of these aspects would contribute to a longer survival of hospitality enterprises.

The evidence of the empirical analysis shows that hospitality enterprises without employees present less favourable conditions for survival: their probability of survival at all stages of their evolution is lower than that of enterprises with employees. In addition, the smaller the enterprise, the greater the risk of not surviving. For example, enterprises without employees have a risk of not surviving that is 30% higher compared to microenterprises and 60% higher compared to larger enterprises. These results show that there is conclusive evidence of a positive link between size and duration in the hospitality industry.

The results imply that, to increase the percentage of consolidated hospitality enterprises, authorities should look for ways to promote business survival in the hospitality industry overall but especially for enterprises without employees and microenterprises. This could be done by supporting new businesses with viable projects and promoting measures that help companies increase their size, productivity and leverage. Enterprises could increase their size through merger or acquisition but also by accessing subsidies for employment costs. Promoting innovation would increase size and productivity. With regard to increasing leverage, more financial help could be given to small- and medium-sized enterprises, provided that their economic profitability exceeds the cost of the debt and that increases in financial profitability are guaranteed. Another feasible action would be to offer entrepreneurship courses for workers or unemployed people interested in starting a business to make them aware of the need to research the market thoroughly beforehand. It must be borne in mind that many entrepreneurs of necessity end up opening establishments in the catering sector because little investment is needed, but they fail to carry out an initial market study to analyse the viability of the business. The Chamber of Commerce or another specialised organisation could promote this training. Once established, this organisation could also advise entrepreneurs on making investments, expanding the enterprise or taking on debt. These advisory practices do not necessarily have to be free but could be financed through progressive fees in line with business turnover.

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ORCID iD

Paz Rico Belda  <https://orcid.org/0000-0002-5634-6022>

Notes

1. According to Eurostat, 'enterprise is an organisational unit producing goods or services, having a legal basis on a natural person or a legal person or a combination of them, and carrying out one or more activities at one or more locations'. Enterprises without employees refer to firms that do not have any employees.
2. This article focuses on lodging, food and drink services and does not include transportation and entertainment.
3. Microenterprises are considered to be enterprises with less than 10 employees, and larger enterprises to be enterprises with 10 or more employees.
4. With the second collective group, microenterprises and larger enterprises, the same procedure is followed.
5. $\sum_k^j W_{\Delta X}^j = \sum_k^j W_{\Delta \beta}^j = 1$
6. The year 2016 is chosen so that enterprises that were started in 2015 show at least 1 year of business activity.
7. Workers include the total number of people working in the enterprise, including owners and employees.
8. The model includes temporal dummies. As indicated by Bunn and Redwood (2003), the marginal effects associated with these temporal dummies are closed to the effect generated by the economic cycle.
9. The models show standard deviations of robust estimators with heteroscedasticity.

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Author biographies

Paz Rico Belda is a lecturer at Department of Economic Analysis, Faculty of Economics, the University of Valencia (Spain). Her research is focused on quantitative method in economics and business administration. In particular, she has focused on innovation, financial economics and, nowadays, in entrepreneurship and tourism. She has published several articles on these subjects.

Bernardí Cabrer-Borrás is a professor of econometrics at the University of Valencia. His academic interests are the quantitative methods for the analysis of the economy, tourism and social sciences in general. He has worked on several competitive research projects. He has published numerous articles and more than 20 competitive articles in journals in economics, regional economics and tourism. In addition, he has made publications for teaching purpose.