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SURVIVAL OF FIRMS IN CRISIS: EVIDENCE FROM ANTALYA TOURISM CITY

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ABSTRACT

Firm survival in tourism cities has long been a topic of discussion, due to particularly the fragile nature of the tourism industry. Crises make tourism cities even more fragile, which makes them an ideal case for studying the effects of crises on firm survival. Antalya, Turkey's leading tourist destination, has suffered from economic and political crises in recent years. This study investigates the factors influencing firm survival in a crisis-ridden tourism city. The results of a time-discrete survival analysis show that firm survival depends on firm-, industry-, and location-specific factors. Business survival declines in times of downturns. The survival rate is higher for smaller and younger firms and lower for corporate firms. There are no differences between foreign owned and domestic firms.

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INTRODUCTION

Tourism cities are fragile because their economies are heavily dependent on tourism. Specialized regions use the advantages of localization economies but are more fragile to crisis than diversified regions that are based on urbanization economies. Because tourism cities are very sensitive

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to external shocks, they are good cases for exploring the factors that affect firm survival before, during, after economic and political crises.

The impact of (economic and political) crises on firm survival in tourism cities, however, is not well documented and understood. Literature on the impact of crises on firm survival has to date been limited, and those that exist rarely pay attention to the crises themselves. Previous literature on firm survival discusses firm entries and exits (Lay, 2003; Ozturk & Kilic, 2012; Cala et al., 2015), and focuses on the role of firm level indicators such as firm size, business structure, firm age, performance, skilled manpower and ownership structure (e.g., Ericson & Pakes, 1995; Littunen, 2000; Disney et al., 2003; Varum & Rocha, 2012). Only a few studies discuss the impact of crises on firm survival (Varum & Rocha, 2012; Bruni et al., 2014; Kovac et al., 2015) and only few have (Kaniovski et al., 2008; Falk, 2013; Brouder & Ericcson, 2013; Gemar et al., 2016) specifically studied their impact on tourism. Moreover, empirical work on both the entry and exit of companies in all sectors that include geographical and industry specific variables has yet to be done for a tourism city that is hit by a crisis.

The Antalya mass-tourism city and its sub-regions provide an ideal setting for observing the impact of the crisis on firm survival. The economic shocks of 2008 and 2009 and the political shocks of 2015 and 2016 had a negative impact on tourism cities in Turkey. Antalya, Turkey's leading tourism city, attracting around 10 million tourists a year until 2015, has been declined by Russian tourist ban, as well as by terrorist attacks in the country. The aim of this paper is to explore how firm-, geography-, industry- and crisis-specific determinants have affected firm survival in a tourism dominated city.

In this research, we use unique annual firm-level data on entry and exits compiled from the Antalya Chamber of Commerce and Industry (ATSO) between 2000 and 2016. We estimate the effects of both crises on firm survival in the Antalya region by using a complementary log-log model that controls for unobserved heterogeneity among firms, following the works of Fernandes and Paunov (2015), Basile et al. (2017) and Esteve-Perez et al. (2018). We try to show that firm survival declines in downturn periods.

The following sections are organized as follows. Firstly, the data and the descriptive analysis are introduced. In section 3 the empirical methodology and explanatory variables are described on the basis of a

review of related empirical literature. The final section discusses the results of the econometric analysis followed by concluding remarks.

DATA AND DESCRIPTIVE ANALYSIS

To evaluate the effects of crisis on the survival of firms in Antalya, we use firm-level data garnered from the Antalya Chamber of Commerce and Industry (ATSO), NACE Rev. 2 on a 6-digit level. The firm-level data relate to all companies located in the 15 different districts of Antalya, which number over 62,000 for the years 2000-2016[i]. The database contains extensive information on a wide range of topics, including location (district-level), registration date (i.e. firm entry) or deregistration (i.e. firm exit), date of liquidation, current status, legal form, values of paid-in capital, occupation and ownership status of the firm (Turkish or foreign).

We see a particular decline in annual entry rates after 2008, indicating that it became more difficult or less worthwhile to enter the market after the 2008 global financial crisis, and this drop was even more pronounced when Turkey faced a series of political crises in 2015 and 2016, which led to declining tourist arrivals and foreign investments into Antalya region. On the other hand, a sharp rise can be observed in the annual exit rate after 2012 as the economic and political crisis took its toll. It can thus be concluded that both entry and exit rates in the Antalya region depend heavily on not only macroeconomic conditions, but also the political conditions in which the firms operate.

Before investigating the impacts of crisis on firm survival, we present some descriptive statistics related to firm survival for the entire sample, as well as for the various sub-samples, using non-parametric methods. The central issue here is how to calculate the duration or lifespan of firms. Following Fernandes and Paunov (2015) and Basile et al. (2017), firm duration is defined as the length in years that a firm is active. The maximum lifespan possible for each firm for the 2000-2016 period is 17, and Table 2 shows that the average lifespan or duration of firms is 6.62 years, while the median lifespan is 6 years for the entire sample. These findings suggest that firms in the Antalya region have shorter lifespan. Moreover, Table 2 also displays survival rates for selected industries (defined in terms of 2-digit level of Broad Structure of NACE Rev.2). It would appear that manufacturing firms have a higher survival rate, while those in the accommodation and food services sector exhibit lower

survival rates, confirming that the tourism and hospitality industry is more sensitive to economic cycles and political turmoil.

The survival rates of firms are also diversified by geographical location. As Table 1 shows, firms located in the district of Korkuteli and city of Antalya exhibit lower survival rates than other districts. Findings for Kemer and Serik, which are important tourism destinations in the Antalya region, showed longer lifespan than other districts. Of course, this does not necessarily suggest that firms located in touristic places are much less sensitive to crisis, since the sample period under consideration covers periods of both expansion and recession. For the geographical variables, what we can clearly say is that the findings for the city of Antalya, and for Korkuteli, Kemer and Serik, show that firm survival and geography is location and sector specific, even within the same region.

As for the legal form[ii], cooperatives have the longest lifespan, followed by corporations and limited liability companies. Sole proprietorship firms, on the other hand, have the lowest average lifespan, indicating that they are more sensitive to economic and political crisis than any other type of firm. Next, we compare the lifespan of firms across sizes. For our sampling design, we use paid-in capital value data to divide firms into four categories: micro, small, medium and large[iii]. The results reported in Table 2 indicate that the average lifespan of large and medium firms is longer than that of small and micro firms, and this result is quite consistent with previous studies, demonstrating that small firms have a lower survival rate than larger firms (Varum & Rocha, 2012; Kovac et al., 2015). Finally, our comparison of the duration of domestic and foreign-owned firms reveals that domestic establishments, on average, have slightly longer durations than foreign establishments. This finding partially supports Mata and Freitas' (2012) argument that foreign firms are more footloose than domestic firms. They seem to exit during economic downturns, having looser attachments to a particular location than domestic firms.

Table 1. *Summary statistics of firms' lifespan (in years) in Antalya region, 2000-2016*

	# firms	Observed life span in years	
		Mean	Median
Full sample	48,628	6.62	6
By industry			
Manufacturing	4,244	6.96	6
Construction	6,741	6.40	6
Wholesale and retail trade	19,163	6.71	6
Accommodation and food	4,209	6.04	5
By district			
Antalya (city)	41,538	6.60	6
Kemer	3,000	7.33	7
Korkuteli	655	5.96	5
Serik	2,068	7.16	7
By legal form			
Sole proprietorship	15,544	5.84	5
Limited liability company	27,089	7.31	7
Corporation	5,951	5.41	4
Cooperative	310	8.40	9
By size			
Micro	12,518	7.40	7
Small	28,243	5.99	5
Medium	6,706	7.41	7
Large	1,161	9.05	9
By ownership			
Domestic	44,888	6.65	6
Foreign	3,740	6.22	6

Source: Authors' own calculations based on ATSO's database.

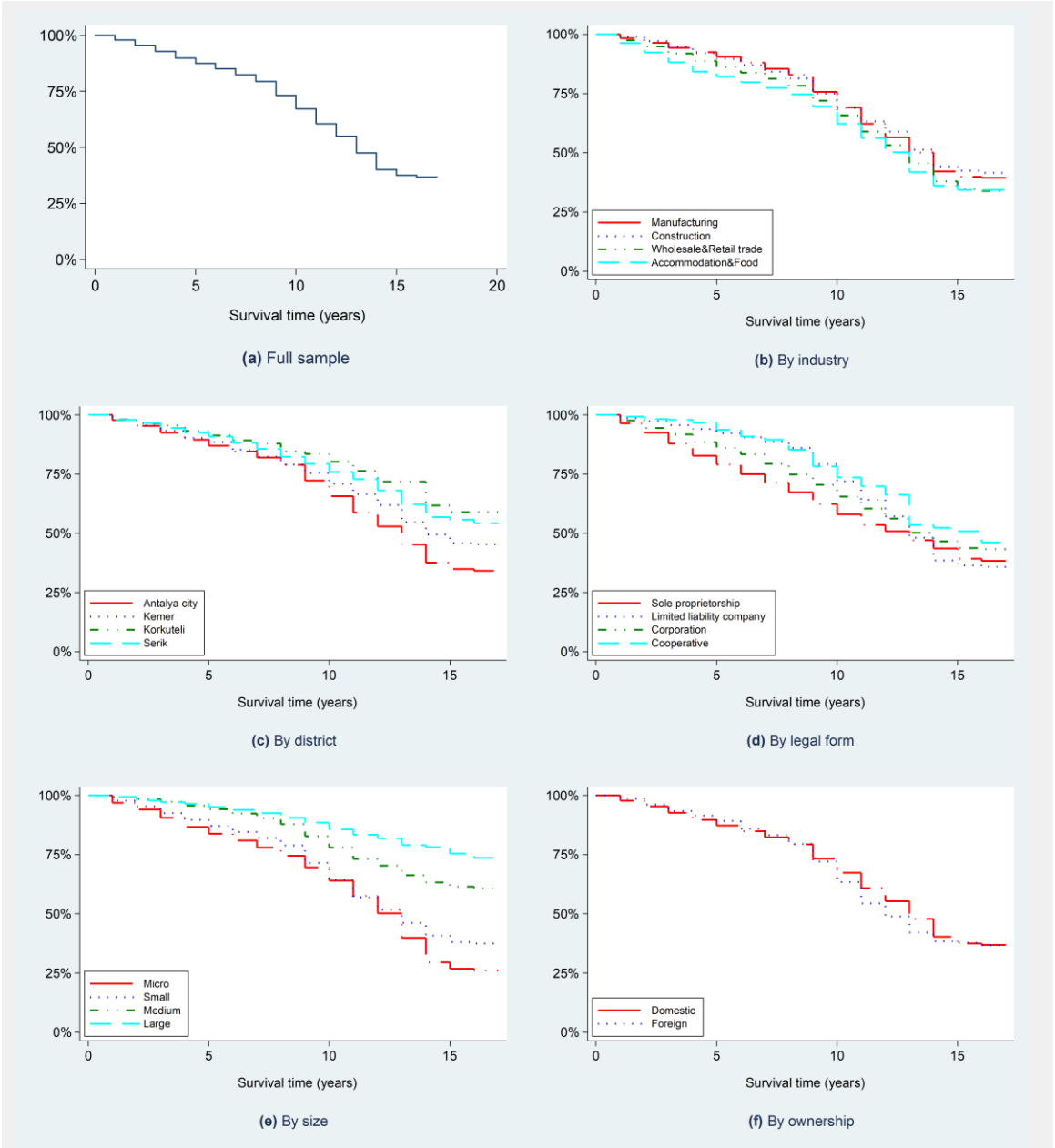

Figure 1. *Kaplan-Meier estimates of survival functions of firms in Antalya region*

To analyse the survival of firms in the Antalya region, we estimate the survival functions of firms using the Kaplan-Meier method for the full sample and sub-samples. The survival function, depicted as a solid line in Figure 1 (a), is downward sloping with a decreasing slope, implying that the probability of firm survival increases as firms in Antalya region stay in business for longer periods. Notably, the figure shows that the probability of surviving the first five years is approximately 85 percent, and existence for more than 10 years is around 65 percent. The probability of firm survival throughout the entire period is only 40 percent, suggesting that

firms in the Antalya region are short-lived. In addition, the results also show that the survival rates vary according to firm characteristics, as can be understood from Figure 1 (b-d). In particular, the firms in the manufacturing and construction sectors locating in the districts of Korkuteli (rural region) and Serik (tourism region), cooperatives and corporations, large- and medium-sized firms, and domestic firms demonstrate higher probabilities of survival than their counterparts. On the contrary, accommodation and food industry seem to exhibit the lower survival rates compare to other industries, confirming that tourism-related firms are more sensitive to economic cycles and political turmoil.

EMPIRICAL METHODOLOGY AND EXPLANATORY VARIABLES

Empirical methodology

Impact of economic and political crises on firm survival in Antalya region is scrutinized using a discrete-time duration models, following the works of Fernandes and Paunov (2015), Basile et al. (2017) and Esteve-Perez et al. (2018). In this study, our interest is in the impact of crises on the hazard rate of a firm, referring to the probability that a firm will exist for a given period, conditional on survival up to that period. Using the same notations as Esteve-Perez et al. (2018), we define $\mathrm{T_i}$ as a continuous, non-negative random variable measuring the survival time of a particular firm. The hazard probability is then defined as the probability of firm survival i within the specified time interval $[t-1, t]$, given that failure had not occurred prior to the starting time of the interval. This conditional probability can be expressed as a discrete-time hazard rate:

$$h_i(t,X) = Pr(t-1 < t | T_i \geq t-1) = 1 - exp[-exp(\beta' X_{it} + \gamma_t)] \qquad (1)$$

where X_{it} is a vector of the time-varying covariates of firm, industry and macro-specific covariates that are assumed to effect the hazard rate; β is a vector of the coefficients to be estimated; and γ_t is the baseline hazard rate for the t th interval that allows the hazard rate to vary across periods. A positive (negative) sign of coefficients means higher (lower) likelihood of firm exit, and consequently a lower (higher) probability of firm survival.

In order to estimate the parameters of Equation (1), it is necessary to determine the functional form of the hazard rate, $h_i(t,X)$. Following Prentice and Gloeckler (1978) and Jenkins (2005), the hazard rate, $h_i(t,X)$ is assumed to follow complementary log-log distribution or cloglog (Prentice

& Gloeckler, 1978). Accordingly, the discrete-time hazard function takes the following form:

$$cloglog[1-h_t(X_{it})] \equiv log(-log[1-h_t(X_{it})]) = \beta' X_{it} + \gamma_t \qquad (2)$$

The cloglog model (2) fails to account for potential unobserved heterogeneity among firms, in that the baseline hazard in Equation (2) is assumed to be constant and the same across firms over duration time. Ignoring unobserved heterogeneity may produce a severe bias in the nature of duration dependence and the estimates of the covariate effects. The most common way of dealing with unobserved heterogeneity is to include random effects in the hazard function. In the cloglog model in (2), unobserved heterogeneity v_i is introduced as follows:

$$cloglog[1-h_t(X_{it}|v_i)] \equiv log(-log[1-h_t(X_{it}|v_i)]) = \beta' X_{it} + \gamma_t + u_i \qquad (3)$$

where v_i is the firm-level random effects that are included through the error term $u_i = ln(v_i)$, where the error term is assumed to be normally distributed with zero mean and variance σ^2.

In this regard, in order to estimate the effects of economic and political crisis on firm survival, we first proceed with the discrete-time cloglog model without frailty (unobserved heterogeneity), after which, we consider the discrete-time cloglog model with frailty, which incorporates firm-level random effects to account for firm-specific variations as a robustness check. These specifications of the cloglog model require the underlying firm database to be expanded into firm-period format, and then for the firm duration to be transformed into a binary variable. Specifically, if the spell of the i th subject (firm i) is completed, then the binary dependent variable assumes the unit value for the last time point (T_i), and zero for the rest of the time points ($1,2,\ldots T_i - 1$) in the time interval.

Explanatory variables

To examine the durations of firms in the Antalya region, this paper considers several of the firm, industry and macroeconomic variables suggested in literature part. The choice of the explanatory variables (covariates) included in Equation (3) is dictated entirely by existing studies on firm survival and the information contained in our data set. The explanatory variables analysed in this study are: (i) firm-specific variables,

(ii) industry-specific variables, (iii) macroeconomic variables and (iv) other control variables (see Table 2).

Firm-specific variables

Firstly, we analyse the effects of firm age on firm survival. Several previous empirical studies have shown that firm survival increases with firm age (see, for example Dunne & Hughes, 1994; Neffke et al., 2012), which can be attributed to the fact that younger firms face a higher risk of failure due to shortcomings in managerial knowledge, financial management and accumulated experience (Kaniovski & Peneder, 2008; Esteve-Perez et al., 2018). In addition, the risk of failure is more likely to be lower among older firms given their access to more resources and their greater accumulated experience. Moreover, older firms are more diversified which makes them less vulnerable to the business cycles (Kaniovski & Peneder, 2008). That said, there are recent studies that challenge this view, suggesting instead that older firms can be inflexible, slow to change, and less likely to adopt new technologies, and so their survival rates decline steadily with age (Sorensen & Stuart, 2000; Kaniovski & Peneder, 2008). Taken together, these theoretical and empirical studies present a rather ambiguous picture of the relationship between firm age and survival. Firm age is measured as the number of years from the date of establishment. Following Cefis and Marsili (2005), we also include the squared term of age (Age2) based on the recent evidence of a U-shaped relationship between age and survival rate. This allows us to account for non-linear effects of firm age on the probability of firm survival.

Recent research has also shown that firm size can influence firm survival. According to Basile et al. (2017), firm size accounts for scale effects. In comparison to larger firms, small firms face greater difficulty in accessing capital and skilled labour, as well as tougher tax conditions. As a result, they have lower survival rate (i.e. higher hazard rate) as they find it difficult to reach the minimum efficient scale. We therefore include the size variable in our analysis to investigate whether or not a firm's size improves the survival probability of a firm. Size is a dummy variable that takes on a value of one for firms that are classified as medium and large according to the values of capital-in-paid, and zero otherwise.

Table 2. *Definition of explanatory variables, data sources, expected signs, and summary statistics*

Variable	Definition	Source	Mean	SD	Min.	Max.
Firm-level						
Age	No. of years since the firm entry.	ATSO	4.95	3.35	1.00	16.00
Age^2	Squared no. of years since the firm entry.	ATSO	35.69	43.79	1.00	256.00
Size	Takes value one if the firm is medium or large firm, zero otherwise.	ATSO	0.19	0.39	0.00	1.00
Corporation	Takes one if the company is organized as a limited liability company, corporation cooperative, limited partnership and some other legal form, and zero otherwise if the firm is organized as a sole proprietorship and unlimited liability company.	ATSO	0.72	0.45	0.00	1.00
Foreign	Takes value one if the firm is owned by a foreign entity, zero otherwise.	ATSO	0.08	0.26	0.00	1.00
Industry-level						
Industry agglomeration	Natural log of number of firms at 2-digit Broad Structure of NACE Rev.2.	ATSO	8.01	1.25	0.00	9.53
Industry $agglomeration^2$	Squared value of log of no. of firms at 2-digit level of Broad Structure of NACE Rev.2.	ATSO	65.77	19.14	0.00	90.80
Herfindahl index	Reciprocal of number of firms, constructed at 2-digit level of Broad Structure of NACE Rev.2.	ATSO	0.00	0.01	0.00	1.00
Entry rate	The proportion of new firms in a given year relative to the total stock of the previous year, constructed at 2-digit level of Broad Structure of NACE Rev.2.	ATSO	0.17	0.11	0.04	2.50
Macro-level						
Downturn	Takes value one if the year is 2008, 2009, 2015 and 2016, zero otherwise.					
Industry dummies	Takes value one if the firm belongs to NACE 2-digit industry, zero otherwise.					
District dummies	Takes value one if the firm is located in a specific district, zero otherwise.					
Year dummies	Dummy for years (2001-2016).					

Source: Authors' own calculations based on ATSO's database.

The legal structure of the firm may also affect its survival. Mata and Portugal (2002) hypothesized that "firms operating under limited liability face lower probabilities of exit than those of unlimited liability". The general argument put forward is that limited liability firms will exit later due to the fact that the owner is not personally responsible for the debts of the firm. Unlike limited liability firms, sole proprietorships, unlimited liability companies or limited partnership companies, on the other hand, remain personally liable for many obligations to business creditors, lenders and landlords. As a result, the risk of such firms exiting the

business increases. Consistent with expectations, Mata and Portugal (2002) found that unlimited liability firms are more likely to exit than limited liability ones, and Esteve-Perez and Manez-Castillejo (2008) found that limited liability companies survive longer. Accordingly, a particular measure is introduced to take into account the effects of the legal form of the firm. In our analysis, the legal structure of a firm is captured through the dummy variable corporation, that takes the value of one if the company is organized as a limited liability company, corporation cooperative, limited partnership or some other legal form, and zero otherwise if the firm is organized as a sole proprietorship or unlimited liability company. We can expect this variable to show a positive effect on firm survival.

The last firm-specific variable included in the cloglog model regressions is foreign company dummy variable. Wagner and Gelübcke (2012) claim there are two main theoretical viewpoints on the impact of foreign ownership on firm survival. On the one hand, it is commonly argued that foreign-owned firms have a higher chance of survival than their domestic counterparts in that they have better access to such resources as capital, brands, knowledge and superior technologies from the parent firm. In addition, foreign firms may also incur a substantial amount of fixed or sunk costs, which are likely to be higher than for establishing a purely domestic firm in the local economy. In this regard, they are more likely to continue operating if the shock is only temporary (Godart et al., 2012). That said, one could also argue that foreign firms are likely to be less rooted (i.e. more footloose) in the local economy and may be quicker to close down production when the local economy shrinks. This may be due to the fact that foreign-owned firms may be part of a global production network in which production can be easily shifted between locations, meaning that they can respond swiftly to changes in local conditions by switching production location to another country (Varum et al., 2014). Hence, this argument implies a negative relationship between foreign ownership and firm survival. Empirical evidence has so far provided mixed results with regard to the impact of foreign ownership on firm survival (Wagner & Gelübcke, 2012). Based on the reviewed literature, a complex and ambiguous relationship between the variable foreign and firm survival can be expected.

Industry-specific variables

The survival of a firm may not depend solely on firm-specific characteristics but also industry-level conditions. To account for such conditions, we include a number of industry-specific variables that are commonly used in firm survival studies, all of which are computed at the two-digit level of NACE, Revision 2. The first variable, industry agglomeration, is included to assess the impact of agglomeration on a firm's survival. Basile et al. (2017) suggest that firms within a cluster benefit from positive externalities, including the availability of a specialized labour market pooling, easy access to intermediate inputs, higher chances of knowledge spill over, supply of local public services, etc. All of these factors can result in lower costs or higher productivity, which in turn facilitate a higher survival rate, although a larger number of firms also means tougher competition and firm selection, and therefore an increase in the propensity to exit can be expected. In this study, we use the logarithm of the number of firms in the sector as a proxy for agglomeration economies in our regressions, following the study of Randelli and Ricchiuti (2015) and Resende et al. (2016), and one would expect an ambiguous effect of that variable on firm survival. The quadratic term for industry agglomeration is also included to check for the presence of a non-linear influence on firm survival.

Moreover, we also use another industry-specific variable, the Herfindahl index, to test the effects of lack of diversification on firm survival, which is computed as the reciprocal number of firms in a given sector. The index falls as the number of firms rises (as the industry becomes more competitive). Varum et al. (2014) states that the presence of strong competition may have a negative impact on the survival of incumbents, although it may also raise the probability of survival, since incumbent firms may have sufficient power to prevent new firms from entering a sector. Cala et al. (2015) also point out that the Hirschman-Herfindahl index, which indicates a lack of diversity in a region, may have a negative effect on firm survival due to getting more vulnerable to crisis. Previous empirical research reports offered mixed conclusions regarding the impact of industrial concentration.

Another industry-level variable relating to the intensity of competition is the entry rate in a given sector. A relatively high entry rate reflects tougher competition and may reduce the likelihood of survival for firms (Mata & Portugal, 2002; Taymaz & Özler, 2007; Resende et al., 2016), and the negative impact of this variable on firm survival is confirmed by a

large number of studies (e.g. Varum & Rocha, 2012; Varum et al., 2014). Entry rate is computed as the number of new firms in a given sector and year divided by the total number of firms operating in that sector in the previous year. This variable entry rate is thus expected to have a negative impact on firm survival.

Macro-level variables

Macroeconomic conditions can also impact upon a firm's survival prospects (Varum et al., 2014). Favourable economic conditions can be expected to result in higher demand and price-cost margins, and may possibly improve the survival of firms, as incumbents do not have to act aggressively against new entrants (Basile et al., 2017). On other hand, during economic downturns the survival chances of firms could be adversely affected, resulting in a negative relationship. There are a large number of studies (e.g. Kaniovski & Peneder, 2008; Varum et al., 2014; Resende et al., 2016) investigating and supporting the positive effects of industry or market growth on the likelihood of firm survival. In addition, several recent studies show that economic downturns have had a detrimental impact on the survival of firms (Varum & Rocha, 2012; Varum et al., 2014).

To properly assess the effects of economic and political crisis on firm survival, we employ a downturn dummy that takes into account whether or not the economy is facing a period of economic and political crisis. Our use of the word "downturn" in this case refers to all forms of crisis in the Turkish economy, of which at least two types are included in the analysis. One is an economic crisis period, referring to a year in which the economy experiences a severe decline in GDP; and the other is a political crisis, referring to a year in which the country suffers political crisis, which may take the form of war, coup or terrorism. Turkey's GDP declined by almost 5 percent between 2008 and 2009 following the 2008–2009 global financial crisis, and Turkey's economy, particularly the tourism sector, experienced major losses in the wake of repeated terror attacks and coup attempts in 2015 and 2016. Consequently, we consider downturn periods to have occurred in the Turkish economy in 2008, 2009, 2015 and 2016, and measure the impact of these downturns through the addition of a dummy variable to the discrete-time analysis, which take the value of one when Turkey was in downturn, and zero otherwise. In line with previous studies, the downturn variable is expected to have a

negative effect on the probability of survival, or equivalently, a positive effect on the hazard.

In the second part of the analysis, we combine the interactions of this dummy variable with several firm-specific variables to differentiate between their effects in periods of downturn. The first interaction term entered into the model is size x downturn, which is included to investigate whether the effect of firm size varies during downturns, following the strategy of Varum and Rocha (2012). Small firms may face a higher probability of failure during a crisis than out-of-the crisis due to their lack of access to financial resources, to human resources, to technology, and most importantly, to their declining profitability. Unexpectedly, Varum and Rocha (2012) found that during downturns, even though small firms generally have a higher risk of exiting, larger firms affects from firm exit than smaller ones. Similarly, Ferreira and Saridakis (2017) show that micro-sized firms experience a higher risk of exiting during the pre-crisis period than in periods of crisis. At the same time, their results also suggest that the hazard rates of larger firms are found to increase during periods of crisis. The sign and significance of the interacted term will thus reveal whether the impact of firm size on survival differs during downturn periods.

Using our second interaction variable, corporation x downturn, we explore whether or not the legal form of the firm plays a significant role in firm survival during periods of downturn. Non-corporate firms, such as sole proprietorship companies or unlimited liability companies are typically smaller than corporate firms, and so may suffer more during an economic downturn due to the likely limited access to financial resources. Moreover, non-corporate firms are heavily reliant upon bank borrowing, and during downturns, they are less likely to be approved for loans. We would therefore expect corporate firms to be more prone to credit constraints during crisis periods than non-corporate firms. Taking these facts into account, it is expected that corporate-type firms face lower probabilities of exit than non-corporate firms during downturns.

Finally, following Varum et al. (2014), we utilize a foreign x downturn variable to investigate whether or not foreign-owned firms are more resilient during the downturn periods. There are presently two conflicting arguments on the role of foreign ownership on firm survival during downturns (Godart et al., 2012, Varum et al., 2014), one which argues that multinationals are more footloose than domestic firms, and thus more likely to exit in times of crisis; and the other that claims that

multinationals typically have larger sunk costs than domestic firms, and have better access to resources and capabilities. This implies that they will be less reluctant to exit the market during a downturn, and may prefer to operate at a loss for a while, hoping that the economy will get back on track. The behaviour of foreign firms during downturns has been investigated in several previous researches, and the empirical evidence on this matter confirms the mix of theoretical predictions. Given this diversity of previous studies, the issue of the behaviours of foreign-owned firms during downturns warrants further investigation.

Control Variables

In addition to the explanatory variables, we covered several control variables that have been shown in previous studies to be significant in explaining company survival (Holmes et al., 2010; Varum & Rocha, 2012; Esteve-Perez et al., 2018). First, 18 industry dummies are added to the analysis to control for any industry-specific effects that may affect survival rates. Second, 14 district dummies are included to identify the effect on firm survival of being located in a particular district. Finally, 13 annual time dummies are incorporated into the analysis to account for the effects of business cycles on firm survival.

EMPIRICAL RESULTS

The results of the discrete-time proportional hazard model shown in Table 3 obtained from a discrete-time proportional hazard model with a complementary log-log hazard function (cloglog). The dependent variable for the cloglog models is binary or dichotomous, the value of which is equal to one if the firm is exited, and zero otherwise, and is regressed on a set of firm, industry and macroeconomic variables along with other control variables. The results reported in Table 3 correspond to the four different specifications of the cloglog models. In Column 1 of Table 3, the results for the basic model are presented, with no consideration of any potential unobserved heterogeneity (Model 1). The second column of Table 3 presents the cloglog estimates when the unobserved heterogeneity is taken into account through firm-specific random effects (Model 2). The third column in the table corresponds to Model 1, but includes also several interaction variables between the downturn variable and firm-specific variables, namely size, corporation and foreign variable (Model 3). The

fourth column reports the results of Model 2 with the aforementioned interaction terms (Model 4).

To check whether the model controlling for unobserved firm heterogeneity should be preferred to the basic model, we need to look at the estimate of the likelihood ratio test of rho (ρ), which is the fraction of error variance explained by variations in the unobserved individual factors. When the rho parameter is zero, we should reject the null hypothesis that unobserved individual heterogeneity is not relevant. As shown in the third and fourth columns of Table 3, the likelihood-ratio tests (the rho parameter) clearly reject the null hypothesis of unobserved heterogeneity, suggesting that models with unobserved heterogeneity are appropriate for estimations. For the remainder of the analysis, we will therefore focus primarily on the results of Models 2 and 4.

It is important to note that the reported coefficients in Table 3 represent hazard ratios. A positive coefficient for an explanatory variable means that the hazard rate is increasing, and equivalently, that the survival rate is declining. Conversely, a negative regression coefficient implies a decreased hazard and increased survival rates.

First of all, starting with firm-specific variables, the results of Model 2 show that firm age and its squared counterpart have a positive and significant effect on the probability of exit. Contrary to our expectations, this finding indicates a lack of a non-linear relationship between firm age and survival. This is a rather surprising result, given the fact that younger firms have liabilities of newness, and so one may expect to see a higher hazard rate among them (Mata & Portugal, 2002). However, our results seem to suggest that the hazard rate increases in the years immediately after entry, and continues to increase as the firm age increases (monotonically). This finding contradicts the "liability of newness" or "liability of adolescence" hypothesis which suggests respectively that inverted U-shaped relationships and U-shaped between firm age and survival (Mata & Portugal, 2002). This may be attributed to the fact that new firms exhaust their available financial resources, which may not be readily available in developing countries, before building strong linkages with their customers and suppliers, and therefore are forced to exit the market.

In line with the hypothesis, we find that the firm size variable exerts a negative and significance influence on the hazard rate, suggesting that larger firms are more likely to survive. This finding is consistent with

the findings of Basile et al. (2017), who identify a positive relationship between firm size and firm survival. The findings for Antalya confirm also the arguments related to small firms suggesting that they may face cost disadvantages and greater difficulties in gaining access to capital and labor markets than large firms (Esteve-Perez et al., 2004; Varum & Rocha, 2012). Moreover, the results also support the hypothesis that corporate types of business structure (proxied by the corporation variable) strongly increase the probability of survival, suggesting that being liable for the debts of the company and having limited assets or resources leads to higher hazard rates. Meanwhile, our analysis shows that foreign ownership has a statistically significant negative impact on firm survival, and this is consistent with the results of Varum and Rocha (2012). The available data on Antalya firms provides evidence for the hypothesis, indicating that foreign firms are more footloose than their domestic counterparts.

Turning now to the results for industry-specific variables, we find that the agglomeration variable has an inverted U-shaped relationship with firm survival, as indicated by the positive coefficient on the variable and the negative coefficient of its square, which concurs with the results of previous studies (Cala et al., 2015; Cainelli et al., 2014; Varum et al., 2014). The results show that specialization diminishes firm exit, which supports the findings of the descriptive analysis of firm survival in specialized districts, such as those seen in the Kemer and Belek tourism districts. Our findings related to the decline of survival with increasing agglomeration, such as that seen in the central Antalya case, supports this argument related to the service-sector dominated tourism city case, and the evidence also supports the view that the intensity of competition or diseconomies of agglomeration lower the chances of survival of firms.

Regarding the influence of industrial concentration, the Herfindahl index is found to point to a reduction in the likelihood of survival in the Antalya region. This suggests that in more concentrated markets, the probability of survival is lower. In other words, firms operating in highly competitive markets are more likely to survive than those in poorly competitive markets, and this concurs with the results of Kaniovski and Peneder (2008) and Resende et al. (2016). Moreover, the entry variable exerts a negative influence on the survival rates of firms, and so there is evidence that the entry of new firms increases competition, and consequently, reduces the chance of survival, which is in line with the evidence provided in Varum et al. (2014).

Table 3. *Estimates of the complementary log-log model*

	Model 1	**Model 2**	**Model 3**	**Model 4**
Age	0.066***	0.074***	0.068***	0.076***
	(0.000)	(0.000)	(0.000)	(0.000)
Age^2	0.001***	0.002***	0.001**	0.002***
	(0.005)	(0.001)	(0.010)	(0.001)
Size	-0.714***	-0.781***	-0.750***	-0.803***
	(0.000)	(0.000)	(0.000)	(0.000)
Corporation	-0.222***	-0.271***	-0.278***	-0.327***
	(0.000)	(0.000)	(0.000)	(0.000)
Foreign	0.056	0.068*	0.060	0.073*
	(0.124)	(0.094)	(0.137)	(0.099)
Industry agglomeration	11.530***	11.414***	11.469***	11.357***
	(0.000)	(0.000)	(0.000)	(0.000)
Industry agglomeration^2	-1.291***	-1.300***	-1.296***	-1.304***
	(0.000)	(0.000)	(0.000)	(0.000)
Herfindahl index	63.119***	61.580***	63.587***	62.093***
	(0.000)	(0.003)	(0.000)	(0.002)
Entry rate	8.579***	8.733***	8.535***	8.679***
	(0.000)	(0.000)	(0.000)	(0.000)
Downturn	34.753***	35.714***	35.109***	35.991***
	(0.000)	(0.000)	(0.000)	(0.000)
Size x downturn			0.175**	0.124
			(0.021)	(0.106)
Corporation x downturn			0.340***	0.341***
			(0.000)	(0.000)
Foreign x downturn			-0.017	-0.025
			(0.855)	(0.787)
Industry dummies	Yes[a]	Yes	Yes	Yes
District dummies	Yes[a]	Yes	Yes	Yes
Year dummies	Yes[a]	Yes	Yes	Yes
ρ		0.273		0.261
		(0.000)		(0.000)
Observations	303,903	303,903	303,903	303,903
Log likelihood	-40,135	-40,118	-40,108	-40,094

Notes: The table reports estimated coefficients and the corresponding p-values (in parentheses). *,**, and *** indicate significance at 10%, 5%, and 1% confidence levels, respectively. The dependent variable is a binary variable that takes the value of one in the year of exit for firms and 0 otherwise. The covariates are defined in Table 3. Models 2 and 4 correspond to models 1 and 3, respectively, but include an unobserved heterogeneity that is accounted for through the use of firm random effects. ρ is the fraction of error variance that is explained by variation in the unobserved individual factors. All models include also industry dummies, district dummies as well as year dummies. All left-censored observations are excluded from the data used in the estimations. [a] Estimates are not reported but can be provided upon request.

The key explanatory variable in this paper is the downturn variable, which has been incorporated into the estimation models to estimate the effects of economic and political crisis on firm survival in the Antalya region. The results show that downturns lower the survival prospects of firms, in line with the findings of Varum and Rocha (2012) and Varum et

al. (2014), and so the result is generally consistent with the hypothesis that firm exists are more common during unfavourable macroeconomic conditions.

Model 4 adds several interaction terms to Model 2 to investigate whether firm survival rates vary by size of firm, type of the legal structure and type of ownership (foreign/domestic) during periods of economic downturn. The signs and statistical significance of the coefficients are generally the same for the results of both Model 2 and Model 4. First, the size x downturn variable is added to test whether firms of different size are affected differently by downturns. The coefficient of the interaction term is found to be statistically insignificant, in contrast with the findings of Varum and Rocha (2012). That is, we are unable to support the claim that large-sized firms suffer less during downturn periods. In addition, we incorporate the corporation variable into the downturn variable to test whether these firms are better able to weather crisis, and this interaction of corporation x downturn returns a positive coefficient, indicating that the periods of downturns weaken the higher survival rates of corporate firms. Finally, when the downturn dummy is incorporated into the foreign ownership variable, the cloglog model does not return a statistically significant effect. This evidence suggests that during times of crisis, the survival probabilities of foreign-owned firms are no different to their domestic counterparts. That is, when the economy is shrinking, foreign-owned firms are just as likely to exit as domestic firms. This tendency can be seen especially in cities that are dominated by one sector, especially those dominated by the fragile tourism sector.

CONCLUSIONS

This paper employs survival analysis to examine the impact of crises on firm survival in Antalya. Preliminary results show that both entry and exit rates in the Antalya region heavily depend on not only macroeconomic conditions, but also the political conditions in which the firms operate. In addition, we show that cooperatives and corporations, large and medium-sized firms, and domestic firms seem to enjoy higher probabilities of survival. For the industry- and location-specific variables, descriptive studies indicate that firms in the manufacturing and construction sectors, and those located in the districts of Kemer and Serik (tourism regions), exhibit higher probabilities of survival. The lower survival rates for companies operating in the accommodation and food services sectors confirms that the tourism and hospitality sectors are more crisis sensitive

than others, although the findings incorporating geographical variables show some contrasting results for the tourism sector. This contrasting result can be explained by the positive externalities of localization economies created in specialized tourism regions such as Kemer and Serik, which makes firms located in those regions less fragile to crises.

Using a sample of 48,628 firms spanning from the period 2000-2017, we also attempt to assess the effect of the economic crisis on firm survival by employing a complementary log-log model with firm-specific random effects. Our results suggest that firm survival declines in periods of economic and political crisis. In addition, we find that large-sized firms and foreign-owned firms are no different to their domestic counterparts in terms of their survival probabilities during downturn periods. Moreover, only in the issue of business structure did the findings indicate that corporate-type firms have lower survival rates during periods of downturn.

According to findings, a number of regional policy implications can be suggested. In order to increase the probability of survival, urban developers, planners and policy makers should pay more attention to active policies towards attracting more foreign capital and large investments through spatial planning, as was done in the tourism centers like Belek and Kemer, corporate business structures, and large-sized investments, as these can lead to cities and regions becoming more resilient and sustainable.

Limitations and further research

The major limitation of this paper is the lack of data on the exit behaviour of firms. The results would be more interesting if the relevant data concerning whether firms have closed their doors for good in a crisis period or not, whether they merged with another business or created an entirely new companies, are obtained. When available, the exit behaviour of firms could be analysed and the effects of crises on firm survival in different periods could be investigated more carefully. In addition, an extensive research is needed on how firm survival is related to innovation during downturn periods.

In future research, comparative empirical studies from different tourism cities of different countries should be stimulated to get more comprehensive information on firm survival in crisis-ridden tourism

cities. In addition, firm survival could be elaborated in a more detailed way for different crisis periods with richer data (if available) such as data on the role of innovation, global and local networks, R&D, mobility in tourism labour to different companies and smart strategies of companies.

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[i] There are 19 districts in the city of Antalya but 15 of them are included in Antalya's Chamber of Commerce database

[ii] The legal forms of firms in the ATSO database are classified in the following way: 1-Sole proprietorship, 2-Limited liability company, 3-Corporation, 4-Unlimited liability company, 5-Limited partnership, 6-Cooperative, 7-Foundation company, 8-Association management, 9-Other.

[iii] Size in this study is defined in the following way: Micro-paid-in capital<=5,000 TL, Small - 5,000 TL<paid-in capital<=100,000 TL, Medium - 100,000 TL<paid-in capital<=1,000,000 TL, Large-1,000,000 Tl <paid-in capital.