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ORGANIZATIONAL FOUNDINGS, DISBANDINGS, AND THE COVID-19 PANDEMIC: EVIDENCE FROM THE TURKISH CONSTRUCTION SECTOR

Abstract

Purpose: The present study aims to understand the effect of the macro-level economic phenomena observed within a specific time interval on the founding (birth) and disbanding (deaths) of organizations in the construction sector of Turkey that has been growing steadily for many years. In addition, the effects of the COVID-19 pandemic were also taken into consideration.

Methodology: The construction sector in Turkey was analyzed within the framework of the theoretical infrastructure of organizational ecology, i.e. a theoretical perspective that has not received enough attention, except in North America, as an organizational community, while joint-stock, limited, and cooperative companies were also analyzed as organizational populations. Focusing on the period between January 2017 and December 2020, a number of foundings and disbandings of joint-stock, limited and cooperative companies operating in the construction sector, the house price index and house sales statistics, which are thought to affect these rates, were used as data. Additionally, the COVID-19 pandemic period between March 2020 and December 2020 was included in the analysis as a dummy variable. The ARDL bounds test was used for data analysis.

Results: The findings indicate differentiated effects of the house price index, house sales statistics, and the COVID-19 period on both the organizational community of the construction sector and the aforementioned populations.

Conclusion: The results, which are expected to contribute to business economics and organizational theories, studies on the construction sector, knowledge of the evaluation of socioeconomic effects of the COVID-19 pandemic and future studies, were obtained in the study.

Keywords: Organizational ecology, organizational foundings and disbandings, Turkish construction sector, COVID-19, ARDL bounds test

1. Introduction

In the late 1970s, organizational ecology theory, which emerged by distinguishing the key points from highly popular theoretical explanations in that period, built this differentiation based on two columns. In the first column, organizational population ecology expanded the term "organization", which is a traditional research object and unit of organizational analysis, and included "organizational population" and "organizational communities" as the units of analysis in the literature (Carroll, 1984; Hannan & Freeman, 1977, 1989). Accordingly, organizations that live in the same environment within a specific social system during a specific historical period are gathered under "organizational forms" parallel with the concept of "species" in biology. It was also emphasized that the organizations sharing the same organizational form together generate their own "organizational populations" (Aldrich & Ruef, 2006; Baum, 1996; Baum & Amburgey, 2002; Baum & Shipilov, 2006; Romanelli, 1991). Organizational populations generate *"organizational communities"* with other populations existing in the same environment and organizational communities constitute an ecosystem together with a social and economic system (Baum, 1996; Baum & Amburgey, 2002; Baum & Shipilov, 2006; Hannan & Freeman, 1989).

The second fundamental column differing this from other theories is its adoption of the "natural selection" approach rather than "adaptation" used in other theories regarding the relationship between an organization and its environment (Aldrich & Ruef, 2006; Amburgey & Rao, 1996; Baum, 1996; Baum & Amburgey, 2002; Baum & Shipilov, 2006).

Therefore, the organizational ecology approach pays special attention to organizational foundings (births) and disbandings (deaths) (Aldrich & Ruef, 2006; Baum, 1996; Baum & Amburgey, 2002; Baum & Shipilov, 2006; Hannan & Freeman, 1987, 1988; Önder & Üsdiken, 2007). The factors affecting organizational foundings (births) and disbandings (deaths) are explained by means of three categories: *demographic* factors such as size and age, *ecological* factors such as population density and population dynamics, and *environmental* factors such as technical, legal and political factors.

It may be said that many empirical studies have been carried out on the factors affecting the foundings (births) and disbandings (deaths) of organizations (Baum & Amburgey, 2002; Baum & Shipilov, 2006). However, it can be seen that these studies are usually subjected to testing the *demographic variables* such as size and age, and *ecological variables* such as population density and population dynamics. In return, it is emphasized that the studies on *environmental variables* such as corporate, technical, legal and political elements have not been sufficiently carried out (Önder & Üsdiken, 2007, p. 189). Thereby, in the organizational ecology literature, it appears that the effects of *environmental variables* such as corporate, economic, technical, legal and political elements on the foundings (births) and disbandings (deaths) of organizations are not sufficiently focused on. Additionally, it is stressed that the organizational ecology approach is a theoretical perspective that has not received adequate attention, except in North America, where it originates from (Önder & Üsdiken, 2007, p. 191; Üsdiken, 1995).

Within the framework provided by the organizational ecology approach, the present study tries to understand *the effect of economic phenomena observed within a specific time interval on foundings and disbandings of organizations in the construction sector that continued to expand consistently for a long time in Turkey*. Besides, it endeavors to scrutinize *the effects of the COVID-19 pandemic as a dramatic phenomenon that has created macro-level economic, political and social effects all over the world in the same period*. At this point, it is thought that the COVID-19 pandemic presents a unique research area to be able to understand the "selection and retention" processes that organizational ecology theory especially emphasizes (Aldrich & Ruef, 2006; Amburgey & Rao, 1996; Baum, 1996; Baum & Amburgey, 2002; Baum & Shipilov, 2006).

It is anticipated that this study can contribute to the following points:

a) The fact that the foundings (births) and disbandings (deaths) of organizations that have a significant place in the framework of organizational ecology theory, which has not received sufficient attention outside of North America (Önder & Üsdiken, 2007, p. 191; Üsdiken, 1995), have not been adequately studied especially when it comes to the effects of macro-environmental variables,

b) Studies in the field of construction that have tried to analyze its relationship with the economy over the macro-economic data many times, but have not adequately mentioned organizational foundings (births) and disbandings (deaths) in the sector as a dependent variable,

c) The effects of COVID-19 that has suddenly affected the whole world on the field of economics.

Within this framework, focusing on the period between January 2017 and December 2020, a number of founding and disbanding *joint-stock, limited* and *cooperative* companies, and the *residential property price index (RPPI)* and *house sales statistics (HSS*) that are considered to affect them, were used as data in this study. Additionally, the COVID-19 pandemic period was included in the analysis as a dummy variable. The Autoregressive Distributed Lag (ARDL) approach designed by Pesaran and Shin (1999) and Pesaran et al. (2001) was used in data analysis.

2. Socioeconomic context: The construction sector in Turkey and COVID-19

Both in the world and in Turkey, it appears to be a widely accepted opinion that the construction sector is one of the locomotives of the economic structure. The share of the construction sector in Turkey in economic growth has been steadily increased, especially after 1980 (Kolsuz & Yeldan, 2014). A report published in 2018 stated that by the year 2017 the share of the construction sector in the global economy was about 10-12%. In Turkey, this share was about 8-9% for the same year. It is estimated that by the year 2025 the share of the construction sector in the economic structure will be 10% and 16-17% for developed and developing countries, respectively (Zengin, 2018).

It is possible to indicate that research into the relationship between the construction sector and economic development has a very old history (Giang & Sui Pheng, 2011). These studies mostly focus on the relationship between gross fixed capital formation or the outputs, such as added value, related to the construction sector and the total outputs, such as GDP or GNP (Giang & Sui Pheng, 2011). However, research into environmental factors influencing the foundings and disbandings of construction organizations appears to be an area that has not been adequately addressed.

The coronavirus (COVID-19) outbreak that started in China at the beginning of 2020 has spread all over the world in a very short time. The World Health Organization (WHO) declared this situation as a Public Health Emergency of International Concern at the end of January.

In the case of such a shock that suddenly affects the whole world, different reactions of countries and specifically the reflections of these reactions on economic life seem to have been the subject of various academic studies even when the crisis has still been ongoing. These studies generally focused on the relationships between the pandemic and economic data (e.g. Akhtaruzzaman et al. (2021), Al-Awadhi et al. (2020), Ali et al. (2020), Ashraf (2020a, 2020b), Baig et al. (2021), Phan & Narayan (2020), Salisu et al. (2020), Topcu & Gulal (2020), Zhang et al. (2020)). In these studies, it is understood that the possible influence of the pandemic on the foundings (births) and disbandings (deaths) of organizations have not yet been the subject of research. Just as organizational ecology theory emphasizes, the COVID-19 pandemic precisely points out a dramatic "selection and retention" (Aldrich & Ruef, 2006; Amburgey & Rao, 1996; Baum, 1996; Baum & Amburgey, 2002; Baum & Shipilov, 2006) process that is impossible to be anticipated in terms of organizational populations and that provides a significant opportunity for research. Based on this quality, the environmental conditions created by the COVID-19 pandemic also laid the groundwork for our study.

3. Data, method and model

The data used in this study include a number of foundings and disbandings of joint-stock, limited and cooperative companies operating in the construction sector, obtained from TOBB statistics and the RPPI and HSS, which are considered to affect these numbers and which are taken from the Electronic Data Delivery System (EVDS) of the Central Bank of the Republic of Turkey (TCMB).

In the Turkish legal system, companies have been subject to various regulations, primarily the Turkish Commercial Code (TCC, 2011). Within the framework of the regulations,

a) Joint-stock companies are defined as capital company organizations that bring large capital accumulations together and rank first in terms of capital load.

Limited companies are defined as capital company organizations that can be established with smaller capital accumulations compared to joint-stock companies and rank first in terms of the number.

Cooperative companies are defined as organizations established to protect the interests of shareholders rather than gain profit.

b) Although it is stated in the TCC that all three organizational forms are commercial companies (TCC, Article 124(1)), the main regulations regarding cooperative companies are placed in cooperative laws.

c) Although joint-stock and limited companies, whose main regulations are part of the TCC, share some similar characteristics, they differ from each other due to the provisions which they are subject to, such as the maximum number of shareholders, the minimum capital amount required for their founding, the financial responsibilities of shareholders, regulations regarding tax legislation, their rights to go public, the structures of management bodies and the rules regarding a share transfer (Erdem, 2012; Kızılot, 2012).

Within this framework,

a) based on the premise that “even though organizations subject to different laws and regulations (...) have a similar organizational form, they must be considered separately” (Önder & Üsdiken, 2007, p. 142), *cooperative companies* were treated as *a separate population,*

b) although their basic regulations are included in the same law, it seems necessary that *joint-stock* and *limited companies,* which are clearly seen as separate organizational forms based on their structural differences, *were treated as individual populations* in this study.

The RPPI is an index that includes price changes on the housing market in Turkey and is formed by using the price data for all houses subject to sale in its calculation (TCMB, 2021a). HSS is a data set that includes the number of first sales and second-hand sales of houses throughout Turkey (TCMB, 2021b). The COVID-19 pandemic period was included in the analysis as a dummy variable. For the founding and disbanding statistics and the RPPI and HSS data, the study focused on the period between January 2017 and December 2020; the dummy variable, i.e. the COVID-19 period, was defined as the period between March 2020 and December 2020. It should also be underlined that the reason for not examining more variables except the RPPI and HSS is to prevent the degrees of freedom from falling below 30. Since the data used in the analyses have different scale structures, they were included in the analysis by taking their natural logarithms. Descriptive statistics of the data set are presented in Appendix A - Table A1.

The Autoregressive Distributed Lag (ARDL) bound testing approach developed by Pesaran and Shin (1999) and Pesaran et al. (2001) was used to examine the relationship between the number of foundings and disbandings of joint-stock, limited and cooperative companies in the construction sector and the RPPI and HSS variables. It was also used to evaluate the effects of the COVID-19 pandemic on these numbers. ARDL bound testing is an approach used in examining long- and short-run effects between variables, or more importantly, in testing whether there is cointegration between variables. In this approach, the stationary levels of variables do not have to be the same. It is sufficient for some variables to be stationary at the level, i.e. integrated I(0), or for other variables to be stationary at the first difference level, i.e. integrated I(1). However, this approach cannot be used for variables with integrated level I(2). At the same time, the condition that the dependent variable must be at the level of I(1) proposed by Pesaran et al. (2001) was loosened with a generalized ARDL bound testing approach upgraded by McNown et al. (2018). In this context, McNown et al. (2018) calculated new t and F critical values for the degenerated dependent variable problem that emerged when the probability value corresponding to the t-statistic, showing the significance of the dependent variable, is not consistent with the t-distribution. Generalized Dickey-Fuller (ADF) and Phillips-Perron (PP) stationary test results of the variables used in this study were given in Appendix A - Table A2. According to the results, it is determined that none of the variables are I(2). The equation of ARDL bound testing used for cointegration between variables is as follows:

$$\Delta Y_t = \alpha_0 + \sum_{i=0}^{p} \alpha_{1i} \Delta Y_{t-i} + \sum_{i=0}^{q} \alpha_{2i} \Delta ln(hss)_{t-i} + \sum_{i=0}^{q} \alpha_{3i} \Delta ln(rppi)_{t-i} + \sum_{i=0}^{q} \alpha_{4i} \Delta Dcov_{t-i} + \beta_1 Y_{t-1} + \beta_2 ln(hss)_{t-i_{t-1}} + \beta_3 ln(rppi)_{t-1} + \beta_4 Dcov_{t-1} + e_t \quad (1)$$

In equation (1), Y_t is a dependent variable that shows the foundings and disbandings of joint-stock company (JSC), limited company (LC), cooperation company (KOOP) and total (TOT), respectively, while $Dcov_t$ is the dummy variable identifying the COVID-19 period, hss_t and $rppi_t$ are independent variables indicating HSS and the RPPI, respectively. The long-run relationship or the existence of cointegration between variables is inferred by testing the hypothesis of $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$. In testing this hypothesis, Pesaran et al. (2001) used the critical values calculated for I(0) and I(1) instead of using Wald testing. If the calculated value of the F-statistic is more than the critical value for I(1) calculated at the confidence levels of 10%, 5% and 1%, the existence of cointegration between variables is accepted. For critical values calculated by Pesaran et al. (2001), the sample size is asymptotically 1000. But Narayan (2005) calculated new critical values for sample sizes ranging from 30 to 80 observations. Therefore, in this study with a sample of size n=48, Narayan's (2005) critical values were used, and when the problem of degenerated dependent variables was encountered, t-critical values were used.

Generally, if the dummy variables are included in the model, the non-zero components of the dummy variable should asymptotically disappear. Otherwise, the critical values obtained from the study of Pesaran et al. (2001) may be invalid. Nevertheless, the prediction has still been stable and valid. The variation caused by the existence of dummy variables should not exceed the variations of cointegrating relationships. In other words, the ratio of the period in which the dummy variables are not zero to the sample size should approach zero; otherwise, their critical values must be changed. This situation was clarified by footnote 17 in the study of Pesaran et al. (2001). Since in this study the ratio of the period in which the dummy variable is not zero to the sample size is 0.208, $Dcov_t$ was not added to the model as an exogenous variable in order to see the long- and short-run effects of the dummy variable. The short-run dynamics in the study are revealed by the Error Correction Model (ECM):

$$\Delta Y_t = \alpha_0 + \sum_{i=0}^{p} \alpha_{1i} \Delta Y_{t-i} + \sum_{i=0}^{q} \alpha_{2i} \Delta ln(hss)_{t-i} + \sum_{i=0}^{q} \alpha_{3i} \Delta ln(rppi)_{t-i} + \sum_{i=0}^{q} \alpha_{4i} \Delta Dcov_{t-i} + \delta ECT_{t-1} \quad (2)$$

In equation 2, ECT_{t-1} is the error correction term; δ is the correction coefficient that shows how quickly a deviation from the long-run equilibrium between variables is adjusted. At the same time, the coefficient of δ expressing the percentage of disequilibrium of the current period shock converges back to the long-run equilibrium within the next period. The value of $1/|\delta|$ indicates the speed of adjustment to equilibrium following a shock. In other words, $1/|\delta|$ is the time to reach the long-run equilibrium.

4. Findings

The ARDL bounds testing results of the foundings and disbandings of companies in the construction sector were given in tables 1 to 10. Lagged values of ARDL models were determined according to the Akaike information criterion. For model residuals, heteroscedasticity, autocorrelation and normality were tested with the Breusch-Pagan-Godfrey (BPG) test, the Breusch-Godfrey (BG) test and the Jarque-Bera (JB) test, respectively. The Ramsey Reset (RR) test was applied to test the stability of model coefficients and the results are given in the tables. The diagnostic test results showed that there were no heteroscedasticity and autocorrelation problems in the model residuals. Furthermore, it was seen that the residuals were distributed normally and the model coefficients were found to be stable. The model coefficients were found unstable only in terms of the RR results of the disbandings of joint-stock and cooperative companies. According to the results of ARDL bounds testing, long-run equilibrium relationships existed between the dependent variable related with the foundings and disbandings and the variables of *hss*, *rppi* and D_{COV}, that is, the hypothesis stating that the variables are cointegrated was accepted at the confidence level of 5% for LTD foundings and 1% for the others. Cointegration was tested by comparing critical values and at the same time t-limit values, which are the test statistics of the lagged value of the dependent variable, with Narayan (2005).

Table 1 The ARDL bounds testing results for the foundings of joint-stock company

Model A1 - ARDL (2, 4, 3, 3)							
LRC - ln(JSC)				ECM - Δln(JSC)			
Variable	**Coefficient**	**t-stat**	**P**	**Variable**	**Coefficient**	**t-stat**	**P**
ln(hss)	1.47	4.94	0.00	C	15.90	6.37	0.00
ln(rppi)	-6.82	-8.48	0.00	Δln(JSC)(-1)	-0.29	-2.65	0.01
Dcov	1.41	5.45	0.00	Δln(hss)	0.20	1.58	0.13
				Δln(hss)(-1)	-0.83	-3.97	0.00
				Δln(hss)(-2)	-0.59	-4.66	0.00
				Δln(hss)(-3)	-0.30	-2.91	0.01
R-square	*0.90*			Δln(rppi)	19.17	3.43	0.00
Ad. R-square	*0.84*			Δln(rppi)(-1)	3.26	0.69	0.50
Model F-stat	*16.45*	*(0.000)*		Δln(rppi)(-2)	15.39	3.47	0.00
BPG	*0.55*	*(0.89).*		D(Dcov)	-0.07	-0.32	0.75
BG	*0.25*	*(0.78).*		D(Dcov(-1))	-2.25	-7.49	0.00
JB	*0.53*	*(0.76).*		D(Dcov(-2))	-2.51	-5.44	0.00
RR	*0.87*	*(0.39).*		ECT(-1)	-0.82	-6.41	0.00
Bounds test	*F-stat*	*9.28****	*abs t-stat*	*6.03****			

Source: Authors' own calculation

According to the results of Model A1 given in Table 1, a 1% increase in HSS increases in the long run the foundings of joint-stock companies statistically by 1.47%. In other words, the flexibility of the foundings of joint-stock companies according to HSS is 1.47. A 1% increase in the RPPI decreases the foundings of joint-stock companies by 6.82%. The COVID-19 pandemic has a positive effect of 1.41% on the foundings of joint-stock companies. When the ECM results are examined, it can be seen that the coefficient of the error correction term (ECT) is negative and statistically significant, and 82% of deviations from the long-run equilibrium are adjusted at the end of a period and also reach the equilibrium after 1.22 months.

Table 2 The ARDL bounds testing results for the foundings of limited companies

Model A2 - ARDL (2, 3, 3, 4)							
LRC - ln(LTD)				ECM - Δln(LTD)			
Variable	**Coefficient**	**t-stat**	**P**	**Variable**	**Coefficient**	**t-stat**	**P**
ln(hss)	1.00	3.41	0.00	C	8.49	4.42	0.00
ln(rppi)	-3.91	-4.26	0.00	Δln(ltd)(-1)	-0.26	-2.21	0.04
Dcov	0.78	2.37	0.02	Δln(hss)	0.05	0.47	0.65
				Δln(hss)(-1)	-0.35	-2.11	0.04
				Δln(hss)(-2)	-0.19	-1.73	0.10
				Δln(rppi)	13.88	2.84	0.01
R-square	*0.85*			Δln(rppi)(-1)	-5.28	-0.90	0.37
Ad. R-square	*0.77*			Δln(rppi)(-2)	14.57	3.41	0.00
Model F-stat	*10.69*	*(0.000).*		D(Dcov)	0.18	1.00	0.33
BPG	*1.15*	*(0.36).*		D(Dcov)(-1)	-1.39	-6.45	0.00
BG	*0.5*	*(0.61).*		D(Dcov)(-2))	-1.25	-3.25	0.00
JB	*2.46*	*(0.29).*		D(Dcov)(-3))	0.99	2.62	0.01
RR	*1.6*	*(0.12).*		ECT(-1)	-0.66	-4.44	0.00
Bounds test	*F-stat*	*4.81***	*abs t-stat*	*3.92***			

Source: Authors' own calculation

According to the results of Model A2, a 1% increase in HSS increases the foundings of limited companies by 1%. On the other hand, a 1% increase in the RPPI decreases the foundings of limited companies by 3.91%. Moreover, the COVID-19 period has a positive effect of 0.78% on the foundings of limited companies. A significant ECT shows that a deviation from the long-run equilibrium is adjusted 1.51 months later with a 66% adjustment rate.

Table 3 The ARDL bounds testing results for the foundings of cooperative companies

Model A3 - ARDL (1, 1, 0, 3)							
LRC - ln(COOP)				ECM - Δln(COOP)			
Variable	Coefficient	t-stat	P	Variable	Coefficient	t-stat	P
ln(hss)	0.54	3.67	0.00	C	-3.88	-7.42	0.00
ln(rppi)	0.22	0.41	0.68	Δln(hss)	0.33	3.40	0.00
Dcov	0.08	0.42	0.68	D(Dcov)	0.21	1.08	0.29
				D(Dcov(-1))	-0.37	-1.70	0.10
				D(Dcov(-2))	-0.56	-2.86	0.01
				ECT(-1)	-0.92	-7.46	0.00
R-square	*0.60*						
Ad. R-square	*0.51*						
Model F-stat	*6.78*	*(0.000).*					
BPG	*0.22*	*(0.98).*					
BG	*0.29*	*(0.75).*					
JB	*1.97*	*(0.37).*					
RR	*0.28*	*(0.59).*					
Bounds test	*F-stat*	*12.84****	*abs t-stat*	*7.02****			

Source: Authors' own calculation

According to the results of Model A3 given in Table 3, a 1% increase in HSS increases the foundings of cooperative companies by 0.54%. The RPPI and the COVID-19 period do not have a statistically significant effect on the foundings of cooperative companies. The ECT indicates a 92% deviation from long-run equilibrium that is adjusted at the end of a period and the equilibrium is reached after 1.08 months.

Table 4 The ARDL bounds testing results for the total foundings of companies

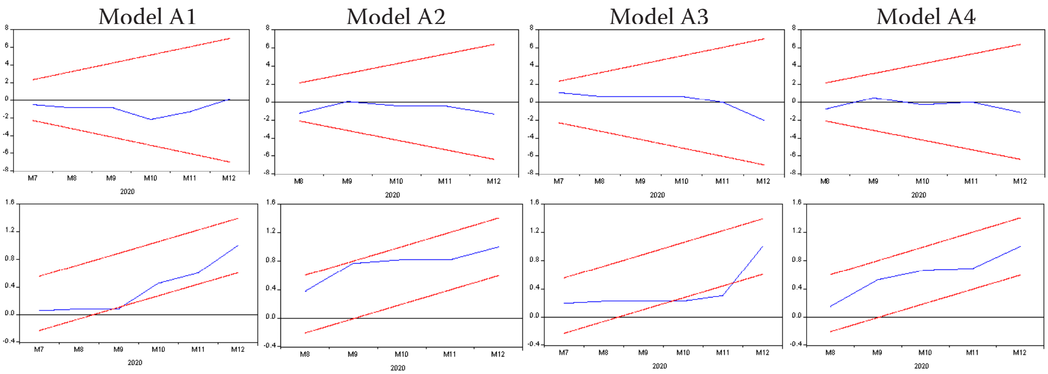
Model A4 - ARDL (2, 2, 4, 4)							
LRC - ln(TOT)				ECM - Δln(TOT)			
Variable	Coefficient	t-stat	P	Variable	Coefficient	t-stat	P
ln(hss)	1.07	2.93	0.01	C	7.30	4.30	0.00
ln(rppi)	-4.20	-3.90	0.00	Δln(TOT)	-0.36	-3.40	0.00
Dcov	0.93	2.44	0.02	Δln(hss)	0.04	0.38	0.71
				Δln(hss)(-1)	-0.24	-1.78	0.09
				Δln(rppi)	15.42	3.20	0.00
				Δln(rppi)(-1)	-8.21	-1.44	0.16
R-square	*0.87*			Δln(rppi)(-2)	14.76	3.46	0.00
Ad. R-square	*0.79*			Δln(rppi)(-3)	-6.52	-2.18	0.04
Model F-stat	*12.17*	*(0.000).*		D(Dcov)	0.28	1.63	0.11
BPG	*0.84*	*(0.63).*		D(Dcov(-1))	-1.40	-6.82	0.00
BG	*0.99*	*(0.38).*		D(Dcov(-2))	-1.26	-3.59	0.00
JB	*2.56*	*(0.28).*		D(Dcov(-3))	1.30	3.65	0.00
RR	*2.45*	*(0.13).*		ECT(-1)	-0.53	-4.33	0.00
Bounds test	*F-stat*	*4.23***	*abs t-stat*	*3..51****			

Source: Authors' own calculation

According to the results of Model A4 given in Table 4, a 1% increase in HSS increases the foundings of TOT by 1.07%. A 1% increase in the RPPI decreases the foundings of TOT by 4.2%. The COVID-19 period has a positive effect of 0.93% on the foundings of TOT. The long-run disequilibrium improves in 1.89 months according to the ECT.

It can be seen that the lagged values of the dummy variable, which shows the COVID-19 period, have a negative and statistically significant effect on the number of foundings of all company types. In other words, COVID-19 affects the future periods, not the instant period in the short run.

Table 5 CUSUM vs CUSUMSQ plots for foundings



Source: Authors' own calculation

The cumulative sum of consecutive error terms (CUSUM) test and the cumulative sum of squares of consecutive error terms (CUSUMSQ) test are model stability tests that give information on whether there is a break in the data set. The CUSUM test does not clearly inform which period has a structural break, but the CUSUMSQ test can detect this period. According to the graphs in Table 5, the CUSUM and CUSUMSQ values of the foundings of each model are at the confidence level of 5%, and it is observed that there is only a structural break in the founding of COOP that includes October and November 2020.

Table 6 The ARDL bounds testing results for the disbandings of joint-stock companies

Model B1 - ARDL (1, 0, 1, 0)							
LRC - ln(JSC)				**ECM - Δln(JSC)**			
Variable	**Coefficient**	**t-stat**	**P**	**Variable**	**Coefficient**	**t-stat**	**P**
ln(hss)	0.38	1.29	0.20	C	-14.89	-6.72	0.00
ln(rppi)	3.67	2.90	0.01	Δln(rppi)	-11.35	-2.12	0.04
Dcov	-0.63	-1.60	0.12	ECT(-1)	-0.81	-6.75	0.00
R-square	*0.38*						
Ad. R-square	*0.31*						
Model F-stat	*4.94*	*(0.000)*					
BPG	*0.55*	*(0.74).*					
BG	*0.24*	*(0.79).*					
JB	*0.62*	*(0.24).*					
RR	*3.51*	*(0.07).*					
Bounds test	*F-stat*	*10.61****	*abs t-stat*	*5.62****			

Source: Authors' own calculation

According to Model B1 results given in Table 6, a 1% increase in the RPPI increases in the long run the JSC disbanding by 3.67%. There is no significant effect of HSS and the COVID-19 period on the JSC disbanding. The long-run disequilibrium rebalancing rate is 81% according to the ECT and the equilibrium is reached after 1.23 months.

Table 7 The ARDL bounds testing results for the disbandings of limited companies

Model B2 - ARDL (1, 0, 0, 0)							
LRC - ln(LTD)				ECM - Δln(LTD)			
Variable	Coefficient	t-stat	P	Variable	Coefficient	t-stat	P
ln(hss)	0.75	2.60	0.01	C	-10.62	-6.56	0.00
ln(rppi)	2.27	1.83	0.07	ECT(-1)	-0.72	-6.57	0.00
Dcov	-0.46	-1.21	0.23				
R-square	*0.36*						
Ad. R-square	*0.31*						
Model F-stat	*10.87*	*(0.000*					
BPG	*1.73*	*(0.16).*					
BG	*0.22*	*(0.80).*					
JB	*2.88*	*(0.24).*					
RR	*0.88*	*(0.36).*					
Bounds test	*F-stat*	*10.07****	*abs t-stat*	*5.36****			

Source: Authors' own calculation

Model B2 results show that a 1% increase in HSS and the RPPI increases the disbandings of limited companies by 0.75% and 2.27%, respectively. According to the ECT, a deviation from the long-run equilibrium is adjusted 1.39 months later with a 39% adjustment speed.

Table 8 The ARDL bounds testing results for the disbandings of cooperative companies

Model B3 - ARDL (3, 3, 0, 3)							
LRC - ln(COOP)				ECM - Δln(COOP)			
Variable	Coefficient	t-stat	P	Variable	Coefficient	t-stat	P
ln(hss)	1.19	4.57	0.00	C	0.50	5.57	0.00
ln(rppi)	-2.13	-3.14	0.00	Δln(COOP)(-1)	0.81	5.00	0.00
Dcov	-0.63	-2.82	0.01	Δln(COOP)(-2)	0.51	3.55	0.00
				Δln(hss)	0.03	0.10	0.92
R-square	*0.80*			Δln(hss)(-1)	-1.92	-5.20	0.00
Ad. R-square	*0.73*			Δln(hss)(-2)	-1.43	-4.38	0.00
Model F-stat	*10.87*	*(0.000)*		ΔDcov	-0.26	-0.53	0.60
BPG	*1.12*	*(0.38).*		ΔDcov (-1)	0.63	1.07	0.29
BG	*0.65*	*(0.53).*		ΔDcov (-2)	-0.92	-1.77	0.09
JB	*1.96*	*(0.37).*		ECT(-1)	-2.14	-9.22	0.00
RR	*15.74*	*(0.00)*					
Bounds test	*F-stat*	*19.43****	*abs t-stat*	*8.37****			

Source: Authors' own calculation

In Table 8, it can be seen that a 1% increase in the RPPI decreases the disbandings by 2.13%. Likewise, the COVID-19 period decreases the disbandings by 0.63%. However, a 1% increase in HSS increased the disbandings of cooperative companies by 1.19%. Although the ECT coefficient is negative and statistically significant, it is does not have any meaning in terms of inference and interpretation because it is less than -1.

Table 9 The ARDL bounds testing results for the total disbandings of companies

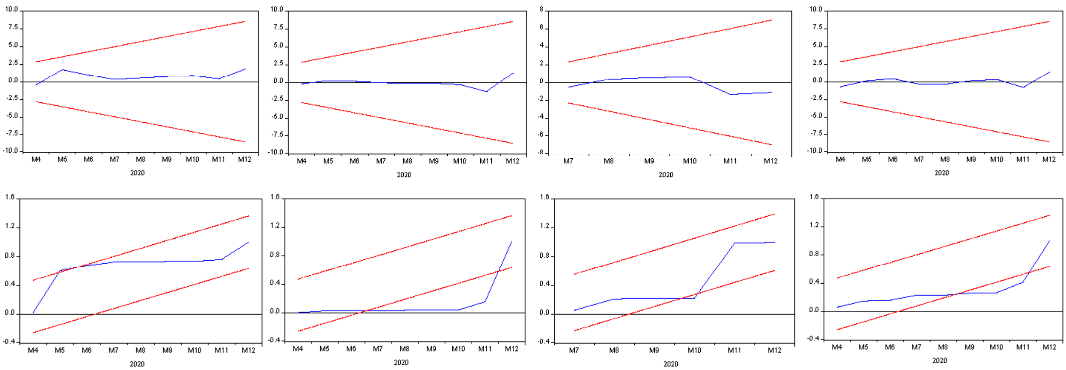
Model B4 - ARDL (1, 1, 0, 0)							
LRC - ln(TOT)				ECM - Δln(TOT)			
Variable	**Coefficient**	**t-stat**	**P**	**Variable**	**Coefficient**	**t-stat**	**P**
ln(hss)	0.95	3.38	0	C	-10.02	-6.49	0
ln(rppi)	1.32	1.23	0.23	Δln(hss)	0.43	2.84	0.01
Dcov	-0.46	-1.41	0.17	ECT(-1)	-0.84	-6.5	0
R-square	*0.36*						
Ad. R-square	*0.29*						
Model F-stat	*4.78*	*(0.001)*					
BPG	*1.03*	*(0.41).*					
BG	*0.31*	*(0.73).*					
JB	*4.66*	*(0.10).*					
RR	*0.06*	*(0.81).*					
Bounds test	*F-stat*	*9.83****	*abs t-stat*	*5.65****			

Source: Authors' own calculation

When looking at the Model B4 outputs regarding total disbandings, a 1% increase that only occurs in HSS in the long run increases the total disbandings by 0.95%. According to the ECT coefficient, a deviation from the long-run equilibrium is adjusted after 1.19 months.

Table 10 CUSUM vs CUSUMSQ plots for disbandings

Model B1 Model B2 Model B3 Model B4



Source: Authors' own calculation

CUSUM graphs show that no structural break was detected, while in the graphs giving the CUSUMSQ test results, it can be seen that there is a structural break in the data set for LTD disbandings and total disbandings.

5. *Conclusion*

According to the findings obtained, HSS positively influences organizational foundings in all three organizational populations and the general organizational community of the construction sector. It must be mentioned that these are predicted results. On the other hand, a positive relationship was also found between HSS and organizational disbandings in populations other than joint-stock companies. It means that although HSS showed a tendency to increase, the disbandings in the populations of limited and cooperative companies also increased. It is anticipated that this situation may be due to the fact that the companies that are under the NACE 2 code *Construction* operate in the field of the "*Construction of non-building structures*" such as highways and railways, airports, bridges, tunnels, transmission and storage facilities. At this point, an insignificant relationship between HSS and disbandings of joint-stock company populations, which can be defined as a *large-scaled and generalist organizational population* (Carroll & Hannan, 1995), and therefore may deal with large-scaled infrastructure constructions other than building constructions, strengthens our prediction.

The findings revealed that there is a long-run and negative relationship between the RPPI and the foundings of organizational populations except the cooperatives. The findings also showed that the relations between the RPPI and organizational disbandings in joint-stock and limited populations are long run and positive, while its relationship with cooperative disbandings is negative. It was also found that the relationship between the RPPI and disbandings in the organizational community of the construction sector (total) is statistically insignificant. With reference to these findings, even though the RPPI increases, the numbers of the organizational foundings decrease in joint-stock and limited populations and generally in the construction organizational community. As supported by empirical studies in the literature, it is thought that a negative relationship between the house price index and home sales statistics and housing demand may be effective in this respect. Likewise, it can be said that a long-run positive relationship obtained with disbandings in the joint-stock and limited organizational populations is a reflection of this situation. On the other hand, a negative relationship between the RPPI and disbandings in the cooperative populations can be evaluated as an expected result since the cooperatives are organizations established on the basis of association to protect the interests of shareholders rather than to gain profit. Indeed, it should be perceived as normal that the numbers of disbandings in the cooperatives established by individuals who want to protect and improve their interests decrease with an increase in house prices.

The findings show that the effect of the COVID-19 period is positive on the organizational foundings in the populations other than a cooperative population, and statistically insignificant on the organizational disbandings. In other words, the findings indicate that although the COVID-19 pandemic is a dramatic process impossible to anticipate, it could not adversely affect organizational foundings in the construction sector that has continued to grow steadily for many years in Turkey. The disbanding of fewer cooperative organizations during the COVID-19 period is also seen as an expected result, as these are organizations established by individuals who want to protect their interests and have a house despite the uncertainties experienced.

When short-run relationships between the variables are examined, the ECM results indicate that deviations from the long run existing between the numbers of foundings and disbandings and house sale statistics, the RPPI and the COVID-19 period, were adjusted within a period between one and two months. Only the adjustment speed for cooperative disbandings could not be interpreted, even though it is statistically significant and negative. This situation shows that the price and demand-driven deviations in the construction sector during the COVID-19 process do not affect the long-run equilibrium. However, when the CUSUMSQ results are taken into account, it can be seen that structural breaks occurred in the second half of 2020, especially in the last quarter. It is thought that this situation may have arisen due to the fact that the sector-supportive regulations of the state, such as the policy of implementing low interest rates for buying a house in the second half of 2020, were completed by the end of the third quarter of 2020. Additionally, the findings obtained indicate that by the second half of the year, the effect of seasonality may appear depending on loosening the restrictions in both Turkey and all over the world. Thus, this is considered to be a valuable output in terms of its potential to form a basis for future studies.

Within the framework of organizational ecology theory, i.e. a theoretical perspective that has not received enough attention in Europe and Turkey, the results of our study focusing on the Turkish construction sector, in which its relationship with the economy in terms of organizational founding and disbanding in the sector have not been adequately examined, are expected to contribute to both business economics and organizational theory literature, studies on the construction sector, knowledge of the evaluation of socioeconomic effects of the COVID-19 pandemic and future studies.

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Appendix A

Table A1 Descriptive statistics of variables

	ln(hss)	ln(rppi)	$ln(JSC)_f$	$ln(LTD)_f$	$ln(COOP)_f$	$ln(TOT)_f$	$ln(JSC)_d$	$ln(LTD)_d$	$ln(COOP)_d$	$ln(TOT)_d$
Mean	11.63	4.73	4.71	6.55	3.83	6.75	3.09	4.67	3.78	5.20
Median	11.65	4.69	4.77	6.62	3.86	6.83	3.07	4.64	3.90	5.16
Max.	12.34	5.04	5.49	7.03	4.55	7.19	4.19	5.74	5.16	6.06
Min.	10.66	4.56	3.30	5.56	2.94	5.74	2.20	3.85	0.69	4.20
Std. Dev.	0.30	0.13	0.49	0.35	0.28	0.36	0.48	0.44	0.90	0.44
Skewness	-0.72	1.01	-0.67	-0.72	-0.64	-0.78	0.12	0.39	-1.55	0.22
Kurtosis	5.17	3.01	3.43	2.87	4.55	3.02	2.81	2.55	5.97	2.78

Table A2 The output of Philips-Perron (PP) and Augmented Dickey-Fuller (ADF) unit root tests

At Level		ln(hss)	ln(rppi)	$ln(JSC)_f$	$ln(LTD)_f$	$ln(COOP)_f$	$ln(TOT)_f$	$ln(JSC)_d$	$ln(LTD)_d$	$ln(COOP)_d$	$ln(TOT)_d$
PP	t-stat	-4.09	0.50	-0.38	-0.31	-0.19	-0.32	-0.27	0.08	-1.22	-0.21
	p	0.01	0.99	0.54	0.57	0.61	0.56	0.58	0.70	0.20	0.60
ADF	t-stat	-4.64	-1.66	-0.39	-0.28	0.57	-0.26	0.34	0.43	-1.08	0.18
	p	0.0027	0.7455	0.54	0.58	0.84	0.59	0.78	0.80	0.25	0.73
First Difference		Δln(hss)	Δln(rppi)	$\Delta ln(JSC)_f$	$ln(LTD)_f$	$\Delta ln(COOP)_f$	$\Delta ln(TOT)_f$	$\Delta ln(JSC)_d$	$ln(LTD)_d$	$\Delta ln(COOP)_d$	$\Delta ln(TOT)_d$
PP	t-stat	-12.35	-4.459	-9.96	-11.21	-24.59	-10.86	-9.67	-9.30	-13.00	-10.50
	p	0	0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ADF	t-stat	-4.60	-4.50	-6.52	-6.53	-5.71	-6.49	-5.01	-4.82	-6.36	-4.60
	p	0.004	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Authors' own calculation