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DOES UNCERTAINTY AFFECT CORPORATE INVESTMENT DECISIONS? EVIDENCE FROM TURKISH FIRMS

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ABSTRACT

In this study, we analyse the impact of uncertainty on the corporate investment of 164 Turkish manufacturing firms. The time covers the period from 2005 to 2019. Our results reveal that there is a negative association between corporate investment and uncertainty. Under uncertainty, firms opt to decline their investment. Additionally, financially constrained (non-dividend payers) firms are negatively affected more than financially unconstrained firms. The use of alternative measurements of uncertainty and investment ensures the validity of our results. Policymakers should deal with the uncertainty and implement economic policies to decrease the country's risk premium.

Keywords: Corporate investment, uncertainty, world uncertainty index, Turkey

INTRODUCTION

Various uncertainties occurring in the world economy due to reasons such as political conflicts between countries, intensification of a trade war, create changes in the conditions of doing business and carrying on activities of almost every

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corporation regardless of their size (Oxelheim & Wihlborg, 2008). This uncertainty creates an unknown fear of the future for corporations as well as humans, causing corporations to cancel or postpone their investments and recruitment activities (Bloom et al., 2013). Investment decisions have three important interrelated characteristics with different degrees. The first one is the irreversibility of investments, partly or completely. The second one is the uncertainty of investments about their forthcoming proceeds, and the third one is having time to delay the investment to clarify the timing of the investment or to learn more about the future. Decisions and level of investment of investors are determined by these three features interactively (Dixit & Pindyck, 1994). As it is stated, there may be uncertainty about the future before and about the return on the investment after the investment decisions. Forecasts made with the connection of uncertainty about the future and certainty about the past are effective in the investment decisions of the corporations. In other words, based on past information, investment decisions are made in line with future expectations. Empirical evidence for uncertainty and investment displays that more uncertainty tends to reduce investment expenditures. This indication, in economic theory, is based on the assumption that it is costly to reverse capital expenditures (Broadbent, 2019). The situation of reversing investments being costly, which is valid for most investments, may cause corporations to delay or cancel their investments and recruitments in a high uncertainty environment (Bernanke, 1983).

Policy uncertainty is an unidentified economic risk associated with the government's future policies, and regulatory and supervisory authorities. This phenomenon increases the risk of delaying both corporations and individuals' expenditures and investments and slows down their production and employment investments by making corporations more conservative (Al-Thaqeb & Algharabali, 2019). Therefore, decision-makers need to anticipate the damages that uncertainty can cause in different corporations on different proportions and make decisions accordingly (Gulen & Ion, 2016).

One of the key points about uncertainty is how to measure uncertainty. Especially over the past decade, uncertainty measurement has gained importance with increasing interest in the studies investigating macro and micro-scale effects of uncertainty. Although various indices have been used in the previous studies, Economic Policy Uncertainty (EPU) Index, Global Economic Policy Uncertainty (GEPU) Index and World Uncertainty Index (WUI) stand out as indices used in recent years. The EPU Index is developed by Baker et al. (2016) differs from various previous uncertainty criteria such as volatility index, stock market volatility, geopolitical risks, economic growth and political risks. This distinction stems from the EPU's consideration of the frequency of newspaper articles

containing terms related to economy, policy and uncertainty (Akron et al., 2020; Baker et al., 2016). The EPU Index is publicly available only limited number of countries. The GEPU Index, developed based on EPU, represents the average of GDP-weighted national EPU indices for 21 countries which constitutes two-thirds of global production (Davis, 2016). The World Uncertainty Index (WUI) which is created by Ahir et al. (2018) using the Economist Intelligence Unit (EIU) is an index constituted for the use of 143 countries for the 60 years. EUI is a business intelligence company that provides country reports on a quarterly basis. The index uses a single source for all countries, which allows us to compare the level of uncertainty across countries. The index captures uncertainty about short- and long-term situations related to both economic and political events, using a single resource for all countries. It allows the level of uncertainty between countries to be compared (Ahir et al., 2020). In the study, WUI is used as the uncertainty proxy. First, the data from the EPU Index of Turkey is not publicly available and second, the WUI index use country reports instead of newspapers.

The main purpose of our study is to test whether uncertainty has an impact on corporate investment in the emerging market of Turkey. We consider Turkey in this study because of the high prevalence of uncertainty that can be observed in the country and region. After the 2001 economic crisis, the Justice and Development (AK Party) government alone came to power. Several events led to the political uncertainty in Turkey, including the e-memorandum and presidential elections in 2007, the closure case against the AK Party, Gezi Park protests in June 2013, and corruption investigations on 17 to 25 December 2013, the failed coup attempt in 2016, the transition from the parliamentary system to the presidential system with the 2017 referendum, the first presidential election in 2018, the currency crisis in August 2018, and the cancellation and repetition of local elections in Istanbul caused political and political uncertainties in 2019.

Turkey has also been directly influenced by political uncertainty in the Middle East since the Iraq war in 2002. The immigration problem began because of the Arab Spring in 2011 and the civil war in Syria. Furthermore, the overt intervention of the U.S. and Russia in the Syrian problem, the emergence of ISIS terrorist groups, and the sharp increase in terrorist attacks in Istanbul and Ankara pushed Turkey even further into an uncertain political environment. All these events affected the economic development and policies of Turkey. In response to the global financial crisis in 2008, The Federal Reserve System (or the FED) launched a quantitative easing policy to expand economic activity, which resulted in a capital influx from developed to emerging markets. However, with the end of the quantitative easing program, the Fed began raising interest rates steadily, putting pressure on emerging markets. The election environment and Trump's

victory in 2016 also increased uncertainty, and the U.S. economy took a more cautious stance. The case of Pastor Brunson[1] heightened tensions between the two nations, causing the Turkish lira to fall, and Turkey experienced a currency crisis in August 2018.

All these events and their resulting issues illustrate how the management policies of the firms in Turkey are directly affected by uncertainty. In this study, we aim to analyse the influence of uncertainty on corporate investment from 2005 to 2019 in Turkey. There are few studies that consider the uncertainty on firm variables in Turkey. Sahinoz and Erdogan Cosar (2018) develop the Economic Policy Uncertainty Index of Turkey using six most read newspapers in Turkey to create EPU Index for Turkey. They try to analyze the effect of uncertainty on macroeconomic variables. Topçu and Oran (2021) build a monthly EPU Index for Turkey. They find that local and global events affect the Turkish EPU index. Different from previous studies, we want to analyse the uncertainty on manufacturing firms. Previous studies do not consider the impact of uncertainty on firm-level variables, so we want to fulfil this gap in the literature. Our key results are as follows. The uncertainty has a negative effect on the corporate investment. Unlike the Turkey WUI, which increases in times of uncertainty, firms' investment activities decrease that cause uncertainty such as the events in the Middle East and Central Asia. The negative impact of uncertainty on corporate investment is greater for financially constrained (non-dividend payers) firms because of the increased cost of external financing during uncertain times. Finally, the use of alternative measurements for uncertainty and corporate investment allows us to produce robust results. Our results may be useful to the government and business worlds in coping with the uncertainty and supporting the economy.

LITERATURE REVIEW

The results of some studies on the effects of uncertainty on investments have important findings and offer remarkable results. Bloom et al. (2007) conclude that uncertainty makes firms more cautious about investment or pulling back investment and employment decisions. Baum et al. (2008) state that managers who will make capital investment decisions should be careful about different types of uncertainty and revealed that some types of uncertainty measures (Tobin's Q and CAPM-based uncertainty) that consider different factors have a negative effect on capital investments, while market-based uncertainty have a positive effect. To gain competitive advantage or secure market shares for both uncertainty and post-uncertainty period, firms may want to invest more when uncertainty is high. Moreover, incentives provided as government policy to reduce

the negative effects of uncertainty can also increase investments. Therefore, it can be easily said that uncertainty can have a positive effect on investments.

Baum et al. (2010) find that uncertainty affects investments on its own or through cash flow depending on the uncertainty measure (firm-specific-internal, market-specific-external, CAPM-based uncertainty) used. Baum et al. (2012), which shows that uncertainty is handled together with corporate governance and that these two factors can play an important role in the management of liquidity risks of firms, revealed that the liquidity demand and cash holding level of enterprises are sensitive to these two factors. Gulen and Ion (2016) examine the effect of policy uncertainty on investments and determined a strong negative relationship between firms' capital investment and the level of uncertainty. In addition, it is supported by the findings that policy uncertainty may suppress institutional investments by causing precautionary delays due to the irreversibility of investment and this situation may continue to affect up to eight quarters. Baker et al. (2016) find that policy uncertainty is associated with higher stock price volatility and less investment and employment in policy-sensitive sectors such as defense, healthcare, finance and infrastructure construction. Ahir et al. (2018) find that uncertainty increases are more synchronised in developed economies and between economies with intensive commercial and financial connections. In addition, the level of uncertainty is significantly higher in emerging countries. Economic policy uncertainty has a positive relationship with stock market volatility, while it is negatively related to GDP.

Sahinoz and Erdogan Cosar (2018) develop the Economic Policy Uncertainty Index of Turkey using six newspapers, published in Turkey, archives for the period of 1998–2018. In their research about the impact of uncertainty on the economy, they reveal that that political uncertainty had a negative impact on economic growth, consumption, and investments. Topçu and Oran (2021) construct a monthly EPU Index for Turkey from February 2000 to December 2018. General and local elections, coup attempt in 2015, FED policies and central bank related developments and the U.S. presidential elections spike the index.

Arouri et al. (2016), Demir and Ersan (2018) and Ersan et al. (2019) find that the increase in economic policy uncertainty significantly reduce stock returns. Asgharian et al. (2018) analyse the influences of U.S. EPU for 21 countries where the economic policy uncertainty index is calculated. Accordingly, they found that investors from 15 countries should take the shocks of the U.S. EPU into account even when investing in the local stock portfolio. Demir et al. (2018) ascertain that the economic policy uncertainty index has a predictive power over Bitcoin returns.

Bordo et al. (2016), Caglayan and Xu (2019) and Gozgor et al. (2019) determine that EPU has a significant negative impact on credit growth. In addition, Chi and Li (2017) showed that there are significant positive relationships between economic policy uncertainty and non-performing loan ratios, loan concentrations, and normal loan migration rate. Zhang et al. (2015) reveal that as the EPU increases, corporations tend to decrease their leverage rates and change their financing structures by using more commercial loans.

Demir and Ersan (2017) and Im et al. (2017) investigate the effect of the uncertainty on cash holding decisions. They presented that corporations prefer to keep more cash as uncertainty increases. (Xu et al., 2016), on the other hand, argue that the market value of the cash asset is significantly negative during periods of political uncertainty and corporations are hiding their cash through transactions with related parties.

Considering the effects of EPU on tourism, it is stated by Akron et al. (2020) that investment decisions of tourism companies are negatively affected by the uncertainty of economic policy; Madanoglu and Ozdemir (2019) document that EPU has a negative impact on hotels' operational performance; Demir and Gozgor (2018) find that economic policy uncertainty has a negative impact on tourism activities of country citizens abroad.

Bonaime et al. (2018) analyse the impacts of political uncertainty on mergers and acquisitions. They suggest that policy uncertainty has a negative impact on mergers and acquisitions. Moreover, political uncertainty tends to discourage purchases rather than just postpone them.

Glover and Levine (2015) investigated the role of conflict of interests between the manager of a company and shareholders in explaining the relationship between uncertainty and investment. Consequently, they determine that the incentives received by the managers have a significant effect on the reduction of investments.

Julio and Yook (2012) examine corporate investment cycles corresponding to the timing of a total of 248 national elections in 48 different countries between 1980–2005. They determine that countries, although varied according to different countries and election characteristics during the election years, reduce their capital investment by an average of 4.8% compared to non-election years. Akbar et al. (2021), X. Chen et al. (2020), Dejuán and Ghirelli (2018), Gulen and Ion (2016), Kang et al. (2014), Sahinoz and Erdogan Cosar (2018), Tran (2014) and Wang et

al. (2014) analyse the impact of EPU on corporate investments. It is determined that there is a negative relationship between EPU and investments. Based on the literature, we create following hypothesis:

H1: There is a negative relationship between uncertainty and corporate investment in Turkey.

DATA, SAMPLE AND MODELS

Listed firms in the Borsa Istanbul (BIST) are analysed from 2005 to 2019. Firm-level data and macroeconomic variables are taken from Thomson Reuters DataStream. If there is a missing value at the firm level data, it is taken from the annual reports of the firms. The WUI data is obtained from its own website.[2] Firms are included in or excluded from the sample based on the following factors:

1. Manufacturing firms are analysed because their physical capital investment intensity is high.
2. Firms with missing data or negative leverage, sales and tangibility in the sample are not included.
3. Firms are included if they have at least four years of consecutive data available to implement panel data methodology.
4. All variables are winsorized at 1% and 99th% percentiles to reduce the effect of outliers.

We have unbalanced data from 164 manufacturing firms, representing 2,127 firm-year observations, after data processing. It is employed an unbalanced panel regression method to test the hypotheses because the listed firms have different listing dates. Finally, firms are classified based on their sub-industry classification to capture the industry effect. The Statistical Classification of Economic Activities in the European Community,[3] referred to as NACE, is used, and Table 1 displays the industry classification.

Table 1
Industry classification

Division	Industry	Obs.	%
C10	Manufacture of food products	288	13.54
C11	Manufacture of beverages	89	4.18
C13	Manufacture of textiles	254	11.94
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	15	0.71
C17	Manufacture of paper and paper products	120	5.64
C18	Printing and reproduction of recorded media	78	3.67
C19	Manufacture of coke and refined petroleum products	30	1.41
C20	Manufacture of chemicals and chemical products	212	9.95
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	15	0.71
C23	Manufacture of other non-metallic mineral products	325	15.28
C24	Manufacture of basic metals	155	7.29
C25	Manufacture of fabricated metal products, except machinery and equipment	100	4.70
C27	Manufacture of electrical equipment	139	6.54
C28	Manufacture of machinery and equipment	30	1.41
C29	Manufacture of motor vehicles, trailers and semi-trailers	236	11.10
C31	Manufacture of furniture	30	1.41
C32	Other manufacturing	11	0.52
	Total	2,127	100

Following literature, our baseline regression model as follow:

$$INV_{i,t} = \beta_o + \beta_1 WUI_{,t} + \beta_2 CF_{i,t} + \beta_3 SALES_{i,t} + \beta_4 PPE_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 LTD_{i,t} + \beta_7 Z_{i,t} + YEAR + SUBINDUSTRY + э_{it}; \quad (1)$$

In this model, the WUI is our primary independent variable, and it represents the annual average of quarterly Turkey's WUI. INV is a capital expenditure and dependent variable in the model. We include five control variables to control firm-level characteristics. Cash flow (CF) is the sum of the pretax income plus depreciation. Annual sales are represented by SALES. PPE refers to plant, property, and equipment. SIZE is the natural logarithm of total assets, and LTD refers to long-term debt. To prevent spurious regression, an independent variable and control variables are scaled by the total assets (Akron et al., 2020; Gulen &

Ion, 2016; Wang et al., 2014). *Z* represents the macroeconomic variables in our model; the growth rate of the Gross Domestic Products (GDP), annual change in crude oil prices and investment freedom in Turkey. Finally, we include year and sub-industry effects to captures any changes based on these variables. Table 2 presents the definition of each variable.

Table 2
Definition of variables

Explanatory Variables	Definitions	Source
INV	Capital Expenditure	Thomson Reuters
CF	Pretax Income + Depreciation	Thomson Reuters
SALES	Annual sales	Thomson Reuters
PPE	Plant, property, and equipment	Thomson Reuters
SIZE	Natural logarithm of total assets in current USD	Thomson Reuters
LTD	Long-term debt	Thomson Reuters
GDP GROWTH	Growth rate of gross domestic product (%)	Thomson Reuters
WUI_TURKEY	Annual average of quarterly WUI	https://worlduncertaintyindex.com/
CRUDE OIL PRICES	Annual change in oil prices	https://www.macrotrends.net/1369/crude-oil-price-history-chart
INVESTMENT FREEDOM SUB-INDUSTRY	It measures constraints on the flow of investment capital. Such an ideal country would receive a score of 100 on the investment Industry Classification	Heritage Foundation

EMPIRICAL FINDINGS AND DISCUSSIONS

Table 3 displays the descriptive statistics of the variables. The average investment rate is roughly 5%. The average of uncertainty nears 11%. The cash flow is approximately 8%. The average PPE and LTD are about 36% and 11%, respectively. The growth rate of Turkey is 5%, and finally, the investment freedom score is 65.

Table 3
Descriptive statistics

Variable	Obs.	Mean	S.D.	Median	P25	P75
INV	2,127	0.0545	0.0799	0.0356	0.1621	0.0678
WUI_TURKEY	2,127	11.543	0.4260	11.585	11.194	11.842
CF	2,127	0.0788	0.1907	0.0736	0.01870	0.1363
SALES	2,127	0.9397	0.4924	0.8508	0.6178	1.1744
PPE	2,127	0.3684	0.1808	0.3597	0.2269	0.4882
SIZE	2,127	11.696	1.6007	11.652	10.562	12.624
LTD	2,127	0.1048	0.1810	0.0495	0.000	0.1587
GDP Growth	2,127	5.07	3.7526	5.3	3.1	7.4
Crude Oil	2,127	0.0584	0.3725	0.0815	-0.3053	0.3541
Investment Freedom	2,127	65.20	10.0659	70	50	75

Notes: INV is the ratio of capital expenditure to the book value of assets. WUI_TURKEY is the annual average of quarterly WUI. CF is the pretax income plus depreciation to the book value of total assets. SALES is the ratio of the annual sales to the total assets. PPE is the ratio of the net fixed assets to the total assets. SIZE is the natural logarithm of total assets. LTD is the ratio of the long-term debt to the total assets. GDP is the annual growth rate. Crude Oil is the annual change in oil prices Investment Freedom measures constraints on the flow of investment capital. Such an ideal country would receive a score of 100 on the investment.

The findings are demonstrated in Table 4, where columns (1), (2) and (3) report the results based on the pooled OLS, fixed effects (FE), and random effects (RE), respectively. Based on all diagnostic tests, our model is suitable for the fixed effects (FE). In the following tables, we apply both pooled OLS and the fixed effects (FE). The uncertainty, the main independent variable, is found to have a negative significant relationship with investment. Put differently, a higher degree of uncertainty is associated with less investment (Makosa et al., 2021). According to the real options theory and investment irreversibility, uncertainty impairs firm investment, and firms "wait and see" until uncertainty subsides (Bernanke, 1983; Dixit & Pindyck, 1994; McDonald & Siegel, 1986; Pindyck, 1988). Our results confirm the H1*,* and during uncertain times, manufacturing firms decrease their physical investment in Turkey. Uncertainty prevents firms from making capital-intensive investments, and firms postpone their investment to more certain period. It can be stated that the "wait and see" approach plays an important role in this delay, based on factors decisions taken by regulatory authorities, purchasing tendencies, consumer behaviour and possible interventions in the market during periods of uncertainty. Especially in this period, firms postpone their investments due to the irreversible of their investments (Pindyck, 1988) and decide on the timing of these investments according to situations that may cause the uncertainty

to decrease or increase. Our results are consistent with the previous findings (Akron et al., 2020; Chen et al., 2020; Gulen & Ion, 2016; Julio & Yook, 2012; Kang et al., 2014; Madanoglu & Ozdemir, 2019; Wang et al., 2014).

For the control variables of firm characteristics, we find that the SALES variable is positive and statistically significant under the model. The SALES variable is an important indicator for firms in enhancing their capital investment (Gulen & Ion, 2016; Jirasavetakul & Spilimbergo, 2018; Kang et al., 2014; Tran, 2014; Wang et al., 2014). The PPE is positive and highly significant. The PPE can serve in indicating financial distress; a higher PPE means lower financial distress. Tangible assets can be used as a collateral to decrease financial distress costs (Keasey et al., 2015). A positive coefficient shows that firms invest more when they have lower financial distress (Wu et al., 2020). The relationship between firm size and corporate investment is positive and significant (Abdoh & Maghyereh, 2020; P.-F. Chen et al., 2019; Wang et al., 2014; 2020; 2017). GDP growth also has a positive and significant relationship with investment (An et al., 2016). Firms aim to boost their investment rate when macroeconomic conditions are favourable (Akbar et al., 2021; Guizani, 2019; Kashefi-Pour et al., 2020). Because of Turkey is an oil importer country, the price of oil is an important indicator of the state of the macroeconomic situations (The International Energy Agency, 2021). Change in crude oil prices in Turkey has a negative and significant relationship with firm investment in Turkey. Dağlı and Sevim (2017) also find a negative relationship between investment activities and oil prices. The increase of 1% on oil price has an effect of 0.29% decrease on corporate investment. Oil is used as an energy source in the manufacturing industry and is also used as raw material and interim goods in different sectors. Finally, investment freedom has a positively significant effect on corporate investment. As the investment environment gains stability in the country, firms become more inclined to invest.

Table 4
Baseline regression model

Variables	Pooled OLS	Fixed effects	Random effects
WUI_TURKEY	–0.01141***	–0.03256***	–0.01472*
	(0.004)	(0.010)	(0.007)
CF	0.01296	0.00062	0.00128
	(0.020)	(0.007)	(0.010)
SALES	0.02297***	0.01416**	0.01212
	(0.006)	(0.006)	(0.008)
PPE	0.07109***	0.08734***	0.07981***
	(0.014)	(0.015)	(0.017)
SIZE	0.00761***	0.02181***	0.01041***
	(0.001)	(0.007)	(0.003)
LTD	–0.00007	0.00518	0.00875
	(0.008)	(0.011)	(0.013)
GDP Growth	0.00095***	0.00091***	0.00099***
	(0.000)	(0.000)	(0.000)
Crude Oil	–0.01499***	–0.02611***	–0.01681***
	(0.002)	(0.005)	(0.003)
Investment Freedom	0.00053***	0.00072***	0.00056***
	(0.000)	(0.000)	(0.000)
Year effects	Yes	Yes	Yes
Industry effects	Yes	No	Yes
Observations	2127	2127	2127
Number of groups	164	164	164
R-squared	0.0900	0.0559	0.0820

Notes: INV is the ratio of capital expenditure to the book value of assets. WUI_TURKEY is the annual average of quarterly WUI. *CF* is the pretax income plus depreciation to the book value of total assets. SALES is the ratio of the annual sales to the total assets. PPE is the ratio of the net fixed assets to the total assets. SIZE is the natural logarithm of total assets. LTD is the ratio of the long-term debt to the total assets. GDP is the annual growth rate. Crude Oil is the annual change in oil prices Investment Freedom measures constraints on the flow of investment capital. Such an ideal country would receive a score of 100 on the investment. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

ROBUSTNESS CHECKS

Table 5 demonstrates the impact of different WUI on firm investment in Turkey. The results of uncertainty of global, advanced, emerging, European, and Middle East and Central Asia (ME&CA) are displayed in Table 5.

According to the results, all indices have a negative relationship, but the coefficient of the WUI ME&CA is the highest. Uncertainties in the Middle East—which started with the Iraq war and continued with the Syrian civil war —and Turkey's neighbouring region may adversely affect the firms' ability to invest.

In the original model, we use the ratio of the capital expenditure to total assets ratio. To check for robustness, we use the natural logarithm of the total capital expenditure and the ratio of the capital expenditure to the PPE ratio as dependent variables. We repeat our baseline model, and the results are displayed in Table 6. Both uncertainty coefficients remain unchanged and highly statistically significant, indicating that uncertainty diminishes firm investment.

The seminal paper by Fazzari et al. (1988) analyses the investment-cash flow sensitivity for financially constrained (non-dividend payers) and financially unconstrained (dividend payers) firms and reveals that financially constrained firms exhibit higher investment-cash flow sensitivity. In the study, we aim to test whether both financially constrained and unconstrained firms behave differently during uncertain times. The results (see Table 7) show that investment of financially constrained firms is negatively associated with uncertainty. Because of the increased cost and inaccessibility of external financing during uncertain times, financially constrained firms decrease their corporate investment to a greater degree than their unconstrained counterpart (Gulen & Ion, 2016).

Table 5
Overall WUI and corporate investment

Variables	Pooled OLS									
	1	2	3	4	5	6	7	8	9	10
WUI_GLOBAL	–0.01137***					–0.02706**				
	(0.004)					(0.010)				
WUI_ADVANCED		–0.01073***					–0.03064***			
		(0.003)					(0.010)			
WUI_EM			-0.00672*					–0.02520**		
			(0.003)					(0.009)		
WUI_EUROPE				–0.0116***					–0.03333***	
				(0.004)					(0.011)	
WUI_ME & CA					–0.01256***					–0.03585***
					(0.004)					(0.011)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Observations	2127	2127	2127	2127	2127	2127	2127	2127	2127	2127
R-squared	0.0903	0.0902	0.0902	0.0902	0.0903	0.0558	0.0559	0.0559	0.0558	0.0559

Notes: INV is the ratio of capital expenditure to the book value of assets. WUI_GLOBAL is the annual average of quarterly WUI for global. WUI_ADVANCED is the annual average of quarterly WUI for advanced countries. WUI_EM is the annual average of quarterly WUI for emerging countries. WUI_Europe is the annual average of quarterly WUI for European countries. WUI_ME&CA is the annual average of quarterly WUI for Middle East and Central Asian countries. CF is the pretax income plus depreciation to the book value of total assets. SALES is the ratio of the annual sales to the total assets. PPE is the ratio of the net fixed assets to the total assets. SIZE is the natural logarithm of total assets. LTD is the ratio of the long-term debt to the total assets. GDP is the annual growth rate. Crude Oil is the annual change in oil prices. Investment Freedom measures constraints on the flow of investment capital. Such an ideal country would receive a score of 100 on the investment. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6
Alternative measurement of corporate investment

Variables	log(INV)		Variables	*INV/PPE*	
	POLS	Fixed effects		POLS	Fixed effects
	1	2		1	2
WUI_TURKEY	–0.92985*** (0.085)	–0.57638*** (0.015)	WUI_TURKEY	–0.01184** (0.005)	–0.12638*** (0.039)
CF/TA	0.06014 (0.161)	0.46085 (0.441)	CF/PPE	–0.00732 (0.007)	–0.00684 (0.008)
SALES/TA	0.56146*** (0.049)	0.44146*** (0.061)	SALES/PPE	0.01040** (0.004)	0.01830** (0.009)
PPE/TA	0.88892*** (0.223)	0.94724*** (0.175)			
SIZE	1.49297*** (0.084)	1.21758*** (0.009)	SIZE	0.01545*** (0.002)	0.12110*** (0.039)
LTD/TA	0.21555 (0.216)	0.15717 (0.164)	LTD/PPE	–0.01710 (0.013)	–0.04765** (0.022)
GDP Growth	0.03029*** (0.001)	0.02742*** (0.001)	GDP Growth	0.00307*** (0.000)	0.00384*** (0.001)
Crude Oil	–0.72739*** (0.048)	–0.57739*** (0.017)	Crude Oil	–0.03455*** (0.003)	–0.08795*** (0.016)
Investment Freedom	0.00487*** (0.001)	0.00496*** (0.001)	Investment Freedom	0.00185** (0.001)	0.00198** (0.001)
Year effects	Yes	Yes	Year effects	Yes	Yes
Industry effects	Yes	No	Industry effects	Yes	No
Observations	2,127	2,127	Observations	2,127	2,127
R-squared	0.2540	0.759	R-squared	0.089	0.1084

Notes: INV is the ratio of capital expenditure to the book value of assets. WUI_TURKEY is the annual average of quarterly WUI. CF is the pretax income plus depreciation to the book value of total assets. SALES is the ratio of the annual sales to the total assets. PPE is the ratio of the net fixed assets to the total assets. SIZE is the natural logarithm of total assets. LTD is the ratio of the long-term debt to the total assets. GDP is the annual growth rate. Crude Oil is the annual change in oil prices. Investment Freedom measures constraints on the flow of investment capital. Such an ideal country would receive a score of 100 on the investment. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7
Financial constraints and WUI

Variables	Pooled OLS		Fixed effects	
	NFC	FC	NFC	FC
WUI_TURKEY	0.00344 (0.002)	–0.02252*** (0.006)	0.00422 (0.008)	–0.02834** (0.010)
CF	0.04695** (0.020)	0.01334 (0.023)	0.03216 (0.022)	–0.00217 (0.004)
SALES	0.01120** (0.004)	0.03286*** (0.007)	–0.00664 (0.006)	0.01796** (0.008)
TAN	0.10914*** (0.009)	0.05087** (0.021)	0.16121*** (0.028)	0.04995*** (0.013)
SIZE	–0.00066 (0.002)	0.01601*** (0.005)	–0.00331 (0.006)	0.02470** (0.010)
LTD	0.12987*** (0.028)	–0.02205* (0.010)	0.09352*** (0.019)	–0.00244 (0.011)
GDP Growth	0.00100*** (0.000)	0.00121*** (0.000)	0.00122*** (0.000)	0.00086*** (0.000)
Crude Oil	–0.00900*** (0.001)	–0.01737*** (0.004)	–0.01146** (0.004)	–0.02706*** (0.006)
Investment Freedom	–0.00039*** (0.000)	0.00131*** (0.000)	–0.00032** (0.000)	0.00104*** (0.000)
Year effects	Yes	Yes	Yes	Yes
Industry effects	Yes	Yes	No	No
Observations	940	1,187	940	1,187
R-squared	0.228	0.117	0.162	0.048

Note: FC is the financially constrained. NFC is the financially unconstrained. INV is the ratio of capital expenditure to the book value of assets. WUI_TURKEY is the annual average of quarterly WUI. CF is the pretax income plus depreciation to the book value of total assets. SALES is the ratio of the annual sales to the total assets. PPE is the ratio of the net fixed assets to the total assets. SIZE is the natural logarithm of total assets. LTD is the ratio of the long-term debt to the total assets. GDP is the annual growth rate. Crude Oil is the annual change in oil prices Investment Freedom measures constraints on the flow of investment capital. Such an ideal country would receive a score of 100 on the investment. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

CONCLUSION

Previous literature indicates that uncertainty plays a significant role in the investment decisions of firms. The WUI is a prominent uncertainty proxy for analysing the relationship between uncertainty and investment. In this paper, we try to examine the impact of the WUI of Turkey on manufacturing firms in Borsa Istanbul from 2005 to 2019. Our results demonstrate that uncertainty has a negative impact on the corporate investment. As the real options theory and

investment irreversibility suggest, firms prefer to take a "wait and see" position until uncertainty risks vanish. Further analysis shows that aside from country-specific causes of uncertainty, the WUI observed in the Middle East and Central Asia has the greatest effect on corporate investment in Turkey. Additionally, our results attain an added degree of reliability through using alternative measurements of both investment and uncertainty.

Finally, because of increased cost of external financing in uncertain times, financially constrained (non-dividend payers) firms are influenced to a greater extent by uncertainty. According to our results, investors and policymakers should pay more attention to the impact of uncertainty on corporate investment policy. Uncertainty increases the country risk premium (Topçu & Oran, 2021). Therefore, policymakers in Turkey can use our empirical findings to develop suitable policies to cope with uncertainty. In this study, we consider only manufacturing firms and an emerging market. Further studies could consider both manufacturing and non-manufacturing firms and included databases from other countries. Uncertainty caused by COVID-19 can be analysed in further research, and its effects can be compared with another global financial crisis.

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NOTES

1. https://www.aljazeera.com/news/2018/8/22/bolton-turkey-can-end-lira-crisis-instantly-by-freeing-pastor
2. https://worlduncertaintyindex.com/
3. For detailed information: https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF

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