



THE IMPACT OF UNCERTAINTY SPILLOVER ON CASH HOLDINGS BEHAVIOR OF TURKISH FIRMS

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ABSTRACT

This paper examines the impact of the World Uncertainty Spillover Index-United States (WUSI-USA) on cash holdings policy of 211 Turkish firms between 2005 and 2019, applying unbalanced panel data regression strategy. According to the findings, a positive relationship exists between uncertainty spillovers and cash holdings. When faced with uncertainty, firms prefer to restrain cash reserves for a precautionary motive. From the real options perspective, firms delay or postpone their investments under uncertain conditions. In addition, dividend payments, cash flow, tangibility, non-cash working capital, short-term debt, and capital expenditure are major determinants of cash holdings. Finally, under alternative models, we find robust results.

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1. INTRODUCTION

Economic uncertainties significantly impact financial decisions and corporate performance. In stable periods, firms are encouraged to keep investment activities effective and to reduce cash holdings (Chiu, Wang, and Peña, 2016). As economic uncertainty increases in local and global markets, however, firms will opt to keep more cash to mitigate investment risks (Gulen and Ion, 2016). As Opler et al. (1999) stated, cash holding as a precautionary measure is an effective strategy for managing in internal and external disarray.

In recent years, several difficulties such as the global financial crisis in 2008, the debt crisis in Eurozone, and unclear governmental monetary policies have ultimately changed the economic growth trajectory in many countries, causing uncertainties. According to Baker and Bloom (2013), major factors in uncertainty are increasing role of government spending, political split, and polarization in the overall economy. To quantify this uncertainty, Baker, Bloom, and Davis (2016) created the Economic Policy Uncertainty (EPU) Index, which captures uncertainty over government actions impacting on the economic environment. They used newspaper coverage frequency to measure uncertainty. In addition to the EPU Index, Ahir, Bloom, and Furceri (2018) constructed a new index of uncertainty, the World Uncertainty Index (WUI). They used the frequency of the word uncertainty in the quarterly reports of the Economist Intelligence Unit in 143 individual countries as a measure. WUI is a measure of global uncertainty that actually captures domestic economic uncertainties as well (Canh et al., 2020). Since the influence of uncertainty on economic activity has attracted renewed interest, researchers have also begun to examine the international spillovers of uncertainty shocks and have found that an economy can be harmed by external uncertainties even while domestic uncertainty levels remain stable (Jiang et al., 2019). The International Monetary Fund (2015) also studied the uncertainty shock impact on economic activity of foreign countries. According to the results both U.S. and euro area real shocks have positive spillovers into other countries. Istiak and Alam (2020) examined the effect of U.S. EPU spillover on the stock markets of a group of unconventional economies and revealed that an unanticipated growth in U.S. EPU lowers the stock market index of all the countries in the Gulf Cooperation Council (GCC). Ahir et al. (2021) constructed an index that measures the extent of uncertainty spillovers from key systematic economies (G7 countries and China) to the rest of the world. Many papers have explored the firm level characteristics of corporate cash holdings. Recently a substantial body of literature has concentrated on the relation between EPU and precautionary cash holdings behavior. As the macroeconomic environment changes, so do the firm managerial and strategic decisions. Findings document that once EPU climbs, firms will raise their cash holdings (Demir and Ersan, 2017; Duong et al., 2017,2020; Goodell, Goyal and Urquhart, 2021; Phan et al., 2019; Q. Wang, 2019). Increasing precautionary cash holding is a favorable reaction to EPU because it is difficult for firm managers to correctly assess enterprise capacity to handle unforeseen threats (Baum et al., 2006). When future financing

opportunities are expected to decrease, firms tend to enhance their precautionary cash holdings to diminish negative impacts of external environment uncertainty (Bliss, Cheng, and Denis, 2015).

The existing literature explores the impact of EPU on corporate cash holdings in countries such as the U.S., EU countries, and BRIC countries. However, none of these studies explore the impact of world uncertainty spillover on cash holdings. We fill this gap in the literature by examining whether the World Uncertainty Spillover Index affects firms' cash holdings in Turkey as an emerging market between 2005 and 2019. Turkey differs from other traditional economies in many aspects because of its strategic location between Eastern Europe and the Middle East. Turkey has tremendous trade and investment links with each of these areas (Yaprak, Yosun, and Cetindamar, 2018). Currently Turkey is one of the 20 major economies in the world (as of 2020) in terms of gross domestic product and still provides an attractive area for foreign direct investment (FDI) inflows. Turkey has experienced several economic crises, and those experiences show that the Turkish economy is still sensitive to foreign shocks and financial crises. Foreign exchange hikes, in particular, have had a remarkable influence on the Turkish economy in recent years (Toparlı, Çatık, and Balçılar, 2019). Economic development conditions might play an essential role in the relationship between uncertainty spillovers and the cash holdings of Turkish firms.

As Ahir et al. (2021) mentioned "only the U.S. and the U.K. have a significant uncertainty spillovers effect, while other economic systems have little effect". The FED launched a quantitative easing policy in response to the global financial crisis in 2008, resulting in a capital influx from developed to emerging markets. With the end of the quantitative easing program, the FED began steadily raising interest rates, putting downward pressure on emerging markets. The election environment and Trump's victory in 2016 created uncertainty and the U.S. economy has moved to a more cautious position. Furthermore, trade wars with China threw the global economy into disarray.

When political and economic relations between Turkey and the U.S. are taken together, the economy of Turkey is also influenced by uncertainty in the U.S. Turkey has been directly influenced by political uncertainty in the Middle East since the Iraq war in 2002. As a result of the Arab Spring in 2011, the immigrant problem began due to the civil war in Syria. Then 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 into a politically uncertain environment. All these events also affected the Turkish economic development and policies. From an economic perspective, the U.S. and Turkey have had a long-standing trade alliance. The U.S. is one of Turkey's top exporting countries. The quantitative easing policy after the global crisis contributed to the inflow of FDI in Turkey. On the other hand, the FED tapering policy negatively affected the FDI inflow and currency rate in Turkey. The case of Pastor Brunson heightened tensions between the two nations. As a result, the Turkish lira fell, and Turkey experienced a currency crisis in August 2018. All these issues suggest that management policy of the firms operating in Turkey is directly affected by uncertainty spillovers from the U.S. In this study, we try to analyze the influence of uncertainty spillovers on Turkish firm cash holdings from 2005 to 2019. The U.S. World Uncertainty Spillover Index (WUSI-USA) is considered as the uncertainty spillover proxy. We want to fill this gap in our study, which, to the best of our knowledge, is the first to analyze the influence of the WUSI-USA on cash holdings policy. Our main findings are as follows. The uncertainty spillovers have a positive effect on the cash holdings of the listed firms. Managers tend to hold onto cash against uncertainty out of precaution. In terms of real options perspective, uncertainty causes firms to postpone their investments to keep more cash on hand. Firms postpone their investment to keep more cash, especially during times of uncertainty. Alternative models yield robust results. The rest of this paper is laid out as follows. Section 2 reviews the related literature on uncertainty about cash holdings and presents the hypotheses. Section 3 describes the data, sample, and model. Section 4 shows the empirical findings and Section 5 displays the robustness check. Finally, Section 6 gives the conclusion.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Firms' cash holdings have received increasing attention from investors and academic researchers. In particular, firms are eager to hold more cash to minimize transaction costs to cover unexpected contingencies, to fund the firms' activities and investments if other alternative sources are excessively costly, and avoid liquidating assets to make payouts (Opler et al., 1999). Cash holding is also a way to reduce tax consequences of repatriating foreign earnings (Fritz et al., 2007) and to prevent agency conflicts (Dittmar, Mahrt-Smith, and Servaes, 2003). In the past few years, a substantial body of literature has sprung up

around the theory of holding cash on a precautionary basis. According to the precautionary motive theory, corporations are willing to retain more cash in order to finance possible future investments, to pay contractual obligations and to avoid raising funds through costly external financing (Lozano and Yaman, 2020). Economic risks related to unclear future regulatory frameworks, government policies, and unexpected changes affecting the economic ecosystem, which are defined as uncertainty, also create precautionary motives for firms to hold more cash as insurance (Al-Thaqeb and Algharabali, 2019). Acting on precautionary motives, firms prefer to increase their cash savings, while changes in political or policy uncertainty pose investment risks (Gulen and Ion, 2016). During financial crises or times of growing concern about uncertain policies, the external financial constraints of firms increase and their financial capacity is reduced, so firms prefer to retain cash to lessen the negative effects on firm economic activities (Q. Wang, 2019). According to Huang, Luo, and Peng (2021), changes in governmental economic policies stimulate the macroeconomy, resulting in great uncertainty for the real economy, forcing firms to change their financial asset holding positions.

Uncertainty can arise from both firm characteristics and macro-level factors. Economic policy and political uncertainty are the two types of uncertainty that develop from macro level factors (Zhang, Zhang, and Zhou, 2020). Political uncertainty is defined as the risk of losing existing political connections and firms increase their cash holdings when political uncertainty arises (Cheng, Jia, and Sun, 2018; Xu et al., 2016). Hankins et al. (2020) focused on the impact of political uncertainty on cash holdings and provided evidence that firms increase cash holdings following political uncertainty, which is measured by the partisan conflict index. EPU, on the other hand, captures the portion of overall economic uncertainty that can be attributed to political and regulatory systems (Drobetz et al., 2018). It refers to the unpredictability of monetary, regulatory and fiscal policies (Al-Thaqeb and Algharabali, 2019).

Baker et al. (2016) developed the Economic Policy Uncertainty (EPU) Index, as a measure of economic policy uncertainty; The EPU index captures uncertainty from the news, policies, the market, and economic indicators. Another measure of economic policy uncertainty is the Global Economic Policy Uncertainty (GEPU) Index, which is a GDP weighted average of national EPU indices for 16 countries that account for two thirds of global production (Davis, 2016). The World Uncertainty Index (WUI)

is also an uncertainty measure, based on the frequency of the word “uncertainty” in the Economist Intelligence Unit quarterly country reports (Ahir et al., 2018). The World Uncertainty Spillover Index (WUSI) is a new uncertainty measure, which identifies uncertainty spillovers from systematic economies that influence the global economic system by text mining the Economist Intelligence Unit country reports. It measures the extent of uncertainty spillovers from key systematic economies (G7 Countries and China) to the rest of the world (Ahir et al., 2021).

According to the literature, when the EPU increases, firms hold cash as insurance for precautionary saving motives. While navigating through EPU, businesses tend to mitigate the negative impacts of uncertainty and prefer to hold cash to deal with the external environment (Su et al., 2020). Demir and Ersan (2017) documented how high-level uncertainty is linked with increased cash holdings in BRIC countries. They also show that Besides the country specific EPU levels, an increase in global EPU also has a significant positive impact on corporate cash holdings. Duong et al. (2020) showed that cash holdings increase with policy uncertainty to mitigate the negative impact of policy uncertainty on investments. Feng, Lo, and Chan (2022) confirmed that firms hold more cash in periods of higher EPU and that financial policy changes also affect firm value and capital investment in China. Li (2019) linked corporate internal decisions to external uncertainty and reached the same conclusions as Feng et al. (2022) by documenting that the EPU affects cash policy through precautionary motives. Like Duong et al. (2017), who focused on the relationship between cash holding and EPU, Phan et al. (2019) and Q. Wang (2019) found that cash holding is positively associated with EPU level. Liu and Zhang (2020), however, used quarterly data of non-financial listed firms in China and documented that their cash holdings do not significantly increase as EPU increases. Goodell et al. (2021) investigated the effect of EPU volatility on firms’ cash holdings and found that when EPU volatility increased, firms cash holdings rise. Duong et al. (2020) also observed an increase in cash holdings of US corporations in response to higher EPU values, but this increase is not attributed to a decrease in firms’ investments. Using China’s listed manufacturing companies, Su et al. (2020) reported existence of a U-shaped relationship between the EPU and cash holdings. They also considered firm size while examining the relationship between the two variables and observed that SMEs are more sensitive to economic policy uncertainty.

The nexus between cash holding and uncertainty is also analyzed using different proxies for policy uncertainty. Opler et al. (1999) examined determinants of cash holdings among the U.S. firms and found that uncertainty is positively related to cash holdings. Pinkowitz, Stulz, and Williamson (2003) used the stock exchange volatility as a proxy of uncertainty and documented that uncertainty and cash holding are positively related. Baum et al. (2006, 2008) concluded that volatility in macroeconomic or idiosyncratic conditions as a proxy of uncertainty has an impact on manager's decisions on cash holding levels. Chen et al. (2016) noted that managers tend to hold cash when they expect economic worsening.

According to the literature, the EPU is the index most used as a proxy of uncertainty. The association between cash holding and the World Uncertainty Spillover Index, however, has not been studied in the existing literature. Since the Turkish economy is still sensitive to external shocks and financial crises, it is decided to analyze the association between the World Uncertainty Spillover Index (WUSI-US) and the cash holdings of Turkish firms. Considering the tendency in the literature, our hypothesis is formed as follows.

H1a: There is a positive relationship between the World Uncertainty Spillovers Index -USA and cash holdings for Turkish firms.

3. DATA, SAMPLE AND MODELS

This study considers firms listed in the Borsa Istanbul (BIST) from 2005 to 2019. Firm-level data variables are acquired from Thomson Reuters DataStream. The World Uncertainty Spillovers Index (WUSI) data is taken from its own website. The original sample is subjected to a number of sample selection parameters. Firms are included in or excluded from the sample based on the following factors: (a) firms in the financial sector, such as banks, insurance firms, leasing firms, factoring firms, and other firms related to financial institutions, are excluded; (b) sport teams, utilities, and real estate investment trusts firms are not involved; (c) firms with missing data or negative leverage and tangibility in the sample are not included (d) firms are included if they have at least four years of consecutive data available to implement panel data methodology, and both active and inactive firms are included so as not to reflect a survivorship bias; (e) all variables are truncated at 1% and 99% percentiles to reduce outlier effects. After data processing, we have unbalanced data from 211 firms representing 2,702 firm-year observations. Since the listed firms have different

initial public offerings (IPO), an unbalanced panel regression method was used for hypothesis testing.

Examining the effects of uncertainty spillovers on a firm's cash holdings, we follow associated studies (such as Boubakri, Ghoul, and Saffar, 2013; Demir and Ersan, 2017; Hankins et al., 2020). First, we assess the effects using an initial reduced model. In equation (1), no control variables were included to investigate potential impact of uncertainty on cash holding behavior. In the augmented equation (2), firm-specific control variables, namely, dividends, cash flow, Tobin's Q, tangibility, short-term debts, non-cash net working capital and capital expenditures are included. Time and industry dummies are also added to control variations based on them. Control variables are added to improve result accuracy (Yilmaz and Acar, 2019).

$$(1) \quad CASH_{i,t} = \beta_0 + \beta_1 WUSI_USA_{i,t-1} + YEAR + INDUSTRY + \varepsilon_{it}$$

$$(2) \quad CASH_{i,t} = \beta_0 + \beta_1 WUSI_USA_{i,t-1} + \beta_2 DIV_{i,t-1} + \beta_3 CF_{i,t-1} + \beta_4 Q_{i,t-1} + \beta_5 TAN_{i,t-1} + \beta_6 STD_{i,t-1} + \beta_7 NWC_{i,t-1} + \beta_8 CAPEX_{i,t-1} + YEAR + INDUSTRY + \varepsilon_{it}$$

We use one lagged period of the WUSI-USA and all control variables to alleviate the problem of endogeneity (Phan et al., 2019). When past values are used, the likelihood of observed relations reflecting the impact of cash holdings on firm-specific variables is decreased (Guney, Ozkan, and Ozkan, 2007). We use the lagged value of the WUSI-USA in the study because firms can determine their cash holding positions in the current period against the uncertainty that occurred in the previous periods.

Based on the literature, we measure the firm's cash as the ratio of cash and cash equivalents to the book value of assets for firm i in year t . This variable is identified as *CASH* (Feng et al., 2022; Guney et al., 2007; Kotcharin and Maneenop, 2020; Ozkan and Ozkan, 2004; K.-H. Wang et al., 2021). *WUSI_USA* is the natural logarithm of the annual average of quarterly data for the World Spillovers Index-USA created by Ahir et al. (2021). The lagged WUSI-USA as the explanatory variable is used. Closely following the prior research on cash holdings (Bigelli and Sánchez-Vidal, 2012; Boubakri et al., 2013; Dittmar et al., 2003; Drobetz and Grüninger, 2007; García-Teruel and Martínez-Solano, 2008; Guizani, 2017; Hankins et al., 2020; Jebran et al., 2019; Koo and Maeng, 2019; Opler et al., 1999; Ozkan and Ozkan, 2004; Uyar and Kuzey, 2014; Y. Wang et al., 2014), eight control variables were included to control for firm level characteristics as follows: dividend, cash flow, Tobin's Q, tangibility, net working

capital, Short-term debt , tangibility and capital expenditure. The following Table 1 displays the definition of each variable.

TABLE 1
Definition of Variables

Explanatory Variables	Definitions	Data Source
CASH	Cash and cash equivalents	DataStream
WUSI_USA	Natural logarithm of the annual average of quarterly data for the World Uncertainty Spillovers Index-United States	https://worlduncertaintyindex.com/data/
DIV	Total dividend payments	DataStream
CF	Income before tax, interest, and depreciation/ amortization	DataStream
Q	Market value of equity + book value of total assets to the book value of total assets	DataStream
TAN	Net fixed assets	DataStream
STD	Short-term debt	DataStream
NCWC	Non-cash working capital	DataStream
CAPEX	Capital expenditure	DataStream

4. EMPIRICAL FINDINGS AND DISCUSSIONS

Table 2 indicates the descriptive statistics of the variables. The average cash ratio for firms is approximately 10%. The average dividend payment is around 2% and cash flow is 12%. The average net fixed asset for Turkish firms is 34% and Tobin's Q is around 55%. Firms have about 14% short-term debt and finally, the average non-cash net working capital is 6% and the capital expenditure is 5% with the highest standard deviation of 80%. For brevity, results of the pairwise correlation matrix and variance inflation factor (VIF) are not reported. Cash holding has a positive correlation with WUSI_USA, DIV, Q and CF. VIF shows the multicollinearity problem among the independent variables. Multicollinearity is considered high in the regression model if the VIF is greater than five or ten (Guizani, 2017; Haron and Ibrahim, 2021). The mean VIF is 1.64, indicating the variables show no multicollinearity in our model.

TABLE 2
Descriptive Statistics

	Obs.	Mean	Std. Dev.	Median	P25	P75
CASH	2702	0.098	0.115	0.057	0.147	0.141
WUSI_USA	2702	9.911	0.303	9.868	9.703	10.125
DIV	2702	0.022	0.047	0.000	0.000	0.024
CF	2702	0.118	0.464	0.063	0.020	0.126
Q	2702	0.545	0.447	0.514	0.319	0.690
TAN	2702	0.342	0.205	0.337	0.193	0.484
STD	2702	0.138	0.219	0.990	0.026	0.199
NCWC	2702	0.063	0.307	0.079	-0.044	0.202
CAPEX	2702	0.052	0.800	0.033	0.012	0.066

The empirical findings are displayed in Table 3, where columns (1) and (3) report the findings of the initial model. Columns (2) and (4) show the results of the extended equation, including the control variables. The positive and significant (1% level) coefficient of the WUSI-USA reveals that an increase in uncertainty spillovers has a positive impact on the Turkish firm cash holding behavior. Put differently, 1% increase in the WUSI-USA leads to a rise of around 2% in cash holdings. Firms aim at enhancing their cash to protect themselves from financial shocks and sustain smooth operations. From the precautionary motive perspective, a rise in uncertainty can affect cash flows, providing an inducement to hold cash as a precautionary buffer or to meet cash shortages (Bates, Kahle and Stulz, 2009; Kotcharin and Maneenop, 2020; Opler et al., 1999). From the real option standpoints, firms put off investments to save more cash, particularly during economic uncertainty (Bernanke, 1983; Gulen and Ion, 2016). Our results confirm our *Hypothesis 1a* and align with results in the literature (Feng et al., 2022; Hankins et al., 2020; Phan et al., 2019; Demir and Ersan, 2017). As previously discussed, political and economic interactions between the U.S. and Turkey directly affect managerial decisions of Turkish firms. The findings indicate that the spread of uncertainty stemming from the U.S. has a significant impact on Turkish firms' cash holdings strategy.

A firm's characteristics, namely, dividends, cash flows, Tobin's Q, tangibility, short-term debts, net working capital and capital expenditures, significantly explain the firm cash holding decisions. The DIV has a positive influence on firm cash holdings. Firms may choose to award less cash to pay their dividends (Opler et al., 1999; Ozkan and Ozkan, 2004). In contrast, if a firm pays a high

dividend this can be attributed to its strong performance, resulting in a higher amount of cash holding as well (Boubakri et al., 2013). Boubakri et al. (2013); Demir and Ersan (2017) and Opler et al. (1999) find a positive effect of dividend payments on cash holdings.

CF has a positive and significant effect on cash holdings; in other words, firms that create larger cash flows retain greater cash holdings (García-Teruel and Martínez-Solano, 2008). A negative and significant relationship was found between Tobin’s Q and cash holdings. Firms with growth opportunities prefer to hold less cash. Our finding differs from that of previous studies (Demir and Ersan, 2017; Hankins et al., 2020; Opler et al., 1999) but is consistent with the finding of Raghibi, Thanh, and Oubdi (2021). The effect of TAN on cash holding is negative at the 1% level. According to Drobetz and Grüninger (2007), if a firm has more fixed assets it is likely to retain less cash since fixed assets can be sold when cash is required. Uyar and Kuzey (2014) and Jebran et al. (2019) show the negative relationship between tangibility and cash holdings. STD has a negative and significant relationship with cash holdings. Firms prefer to use their cash to pay their debts instead of regarding STD as cash and cash equivalents and benefit from the external financing for liquidity management (Koo and Maeng, 2019). Moreover, NCWC has a negative and significant relationship with cash holdings, implying that the working capital is a substitute for cash holdings (Ashhari and Faizal, 2018; Bigelli and Sánchez-Vidal, 2012; Boubakri et al., 2013; Demir and Ersan, 2017). Finally, CAPEX has a significant and negative influence on cash holdings in line with the literature (Ashhari and Faizal, 2018; Dittmar et al., 2003; Guizani, 2017; Uyar and Kuzey, 2014; Y. Wang et al., 2014).

TABLE 3
Empirical Results

	FE		RE	
	1	2	3	4
L.WUSI_USA	0.0104*** (0.0004)	0.0225*** (0.0020)	0.00961*** (0.0001)	0.02176*** (0.0016)
L.DIV		0.05716 (0.049)		0.14598** (0.063)
L.CF		0.01535* (0.007)		0.01234* (0.005)
L.Q		-0.06702*** (0.012)		-0.05771*** (0.023)
L.TAN		-0.18755***		-0.18137***

TABLE 3 (continued)

	FE		RE	
	1	2	3	4
L.STD		(0.032) -0.0801***		(0.019) -0.10013***
L.NCWC		(0.019) -0.12047***		(0.017) -0.12501***
L.CAPEX		(0.017) -0.08861*		(0.016) -0.07389*
		(0.043)		(0.035)
Constant	YES	YES	YES	YES
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Observations	2488	2488	2488	2488
R-squared	0.0128	0.1080	0.0931	0.2170

Note: *** p<0.01, ** p<0.05, * p<0.1

5. ROBUSTNESS CHECKS

Table 4 demonstrates the empirical findings that are robust when using a dynamic model with diagnostic tests that affirm the validity of the one-and two-step system- GMM dynamic model. The results support the findings in Table 3; put differently, firms opt to raise their cash holdings as spillover uncertainty increases.

TABLE 4
WUSI and System GMM

	one-step system GMM		two-step system GMM	
	1	2	1	2
L.CASH	0.593*** (0.0555)	0.534*** (0.0635)	0.603*** (0.0541)	0.543*** (0.0583)
L.WUSI_USA	0.0035*** (0.0007)	0.0074*** (0.0008)	0.0046*** (0.0007)	0.0085*** (0.0008)
Control Variables	NO	YES	NO	YES
Constant	YES	YES	YES	YES
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Observations	2488	2488	2488	2488
AR(1)	0.000	0.000	0.000	0.000
AR(2)	0.067	0.145	0.080	0.158
AR(3)	0.403		0.382	
Hansen	0.208	0.293	0.209	0.293

Note: *** p<0.01, ** p<0.05, * p<0.1

In keeping with Demir and Ersan (2017), we use substitute measures of uncertainty spillovers, such as robustness checks in Table 5. Instead of taking the average of the quarters, we tried to analyze the effect on cash holdings by taking the average of each quarter individually namely Q1, Q2, Q3 and Q4. The findings are still consistent with the previous ones.

TABLE 5
Alternative Measurement of Uncertainty Spillovers

	1	2	3	4
L.WUSI_USA (Q1)	0.0096*** (0.000)			
L.WUSI_USA (Q2)		0.0092*** (0.000)		
L.WUSI_USA (Q3)			0.0084*** (0.000)	
L.WUSI_USA (Q4)				0.0095*** (0.000)
Control Variables	NO	NO	NO	NO
Constant	YES	YES	YES	YES
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Observations	2488	2488	2488	2488
R-squared	0.0931	0.0931	0.0931	0.0931
L.WUSI_USA (Q1)	0.0207*** (0.002)			
L.WUSI_USA (Q2)		0.0216*** (0.002)		
L.WUSI_USA (Q3)			0.0174*** (0.001)	
L.WUSI_USA (Q4)				0.0218*** (0.001)

TABLE 5 (continued)

	5	6	7	8
Control Variables	YES	YES	YES	YES
Constant	YES	YES	YES	YES
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Observations	2488	2488	24888	2488
R-squared	0.2170	0.2170	0.2170	0.2170

Note: *** p<0.01, ** p<0.05, * p<0.1

Under the alternative model, we define the firm's cash ratio as cash and cash equivalents to the book value of net assets (NA) in Table 6 (Boubakri et al., 2013; Demir and Ersan, 2017; Dittmar et al., 2003; Kim et al., 1998; Opler et al., 1999). We divided all variables by the book value of net assets and found the same results.

TABLE 6
Alternative Measurement of Cash Holding

	FE		RE	
	1	2	1	2
L.WUSI_USA	0.0140*** (0.0005)	0.0270*** (0.0013)	0.0122*** (0.0035)	0.0232*** (0.0032)
CONTROL VARIABLES	NO	YES	NO	YES
Constant	YES	YES	YES	UES
Year	YES	YES	YES	YES
Industry	YES	YES	YES	YES
Observations	2488	2488	2488	2488
R-squared	0.0139	0.0518	0.118	0.180

Note: *** p<0.01, ** p<0.05, * p<0.1

In Table 7, firms are divided into manufacturing and non-manufacturing. Among 211 firms, 165 firms are in the manufacturing and 46 in the non-manufacturing sectors. Within both manufacturing and non-manufacturing sub-groups, it is found that uncertainty spillovers have a positive effect on firm cash holdings behavior.

TABLE 7
Empirical Results for Manufacturing and Other Firms

Variables	Manufacturing Firms		Non-Manufacturing Firms	
	1	2	1	2
L.WUSI_USA	0.0096*** (0.0002)	0.0217*** (0.0014)	0.0117*** (0.0027)	0.0174*** (0.0048)
CONTROL VARIABLES				
Constant	YES	YES	YES	YES
Year	YES	YES	YES	YES
Industry	NO	NO	NO	NO
Observations	1976	1976	512	512
R-squared	0.0041	0.1532	0.2592	0.3746

Note: *** p<0.01, ** p<0.05, * p<0.1

Following Kotcharin and Maneenop (2020), the impact of second and further lagged spillover uncertainty on cash holding behaviors is analyzed in the following Table 8. Results of the analysis suggest that while firms continue to hold cash due to spillover uncertainty in the second and third lagged times, this situation is not statistically significant for the fourth and subsequent lagged time; in other words, the influence of uncertainty disappears.

TABLE 8
Lagged WUSI and Cash Holding

Variables	1	2	3
L2.WUSI_USA	0.0177** (0.0068)		
L3.WUSI_USA		0.0203* (0.0100)	
L4.WUSI_USA			0.0022 (0.1212)
L.DIV			
L.CF			
L.Q			
L.PPE			
L.STD			
L.NWC			
L.CAPEX			
Constant	YES	YES	YES
Year	NO	NO	NO
Industry	YES	YES	YES
Observations	2278	2068	1860
R-squared	0.0891	0.838	0.0820

TABLE 8 (continued)

Variables	4	5	6
L2.WUSI_USA	0.0410** (0.0160)		
L3.WUSI_USA		0.0377*** (0.0127)	
L4.WUSI_USA			0.0233 (0.0172)
L.DIV	0.19255*** (0.048)	0.18524*** (0.051)	0.20441*** (0.056)
L.CF	0.01218** (0.006)	0.01017* (0.006)	0.01021 (0.006)
L.Q	-0.05366*** (0.010)	-0.04635*** (0.011)	-0.04098*** (0.011)
L.PPE	-0.17771*** (0.015)	-0.17301*** (0.016)	-0.15508*** (0.017)
L.STD	-0.09252*** (0.016)	-0.09017*** (0.016)	-0.09051*** (0.017)
L.NWC	-0.11527*** (0.014)	-0.10869*** (0.014)	-0.10199*** (0.015)
L.CAPEX	-0.03002 (0.026)	-0.02481 (0.027)	-0.02468 (0.028)
Constant	YES	YES	YES
Year	YES	YES	YES
Industry	YES	YES	YES
Observations	2278	2068	1860
R-squared	0.2243	0.2242	0.2303

Note: *** p<0.01, ** p<0.05, * p<0.1

6. CONCLUSION

Literature review shows that uncertainty plays a vital role in companies' cash holding policies. In periods of external fund shortage,

concerns about the negative effects of policy uncertainty on firm investments or production outputs will motivate firms to save more cash. Even though numerous previous studies have concentrated on the relationship between policy uncertainty and cash holdings, the link between uncertainty spillovers and firm cash holdings remain debatable. The cross-country spillovers of EPU and their effects on financial decisions are important issues. The U.S. political and economic environment has a direct impact on Turkey's political and economic policies. The uncertainty in the U.S. is not limited to within its borders but affects financial performance and financial decisions of Turkish firms. This study is especially relevant considering current U.S. uncertainty spillovers and their effects on the cash holdings policies of Turkish firms. In this study, we analyze the impact of uncertainty spillovers on 211 Turkish firms listed in the Borsa Istanbul from 2005 to 2019. The World Uncertainty Spillovers Index-USA (WUSI-USA) created by Ahir et al. (2021) was used as a proxy for uncertainty. To the best of our knowledge, this study is the first one to use the WUSI-USA as a proxy. Our results show a positive relationship between uncertainty spillovers and cash holdings for Turkish firms. When uncertainty spillovers increase, firms elevate their cash holdings as a precautionary mechanism to buffer against potential future shocks, forgoing current investment opportunities. They keep their excess cash as a hedging mechanism for protection or to capture future investment opportunities. Our findings are relevant to policymakers, academics, and practitioners. Turkish firms need to consider uncertainty spillovers in their financial decisions and reshape their strategies in times of high uncertainty spillovers based on firm specific characteristics. Turkish policy makers should aim at developing strategies to mitigate the negative effects of U.S. uncertainty spillovers. Regulators should provide more supportive policies to companies during uncertainty.

This study examines only firms in Turkey. We focus on the main independent variable and control variables. Macro and other related variables can be used for further studies; the number of countries can be expanded, and further analyzed by dividing them into developed and emerging markets; future studies can also use the spillover index of the United Kingdom as an uncertainty proxy. Another interesting extension would be to test the relationship between uncertainty spillover and cash holdings for financially constrained firms in Turkey. Given that board characteristics and ownership structure play important roles in company financial

decisions, how these affect the cash holding policy-uncertainty spillover relationship can be investigated.

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