# The impact of geopolitical risk on cash holdings policy: evidence from an emerging market

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## Abstract

**Purpose** – This study aims to examine whether geopolitical risk (GPR) impacts the cash holdings behavior of 210 Turkish firms between 2005 and 2019. The authors choose Turkey as a country of interest because Turkey has an important place in terms of geographical location and serves as a bridge between Europe and Asia. Considering the prominent role that can play in decision-making processes, the authors thought that analyzing the impact of GPR on the cash holdings determinants of Turkish firms would be important and interesting. A widely accepted view is that GPRs play an important role in the economic decisions of emerging countries, such as Turkey.

**Design/methodology/approach** – The authors examine models with fixed effects (FE), random effects (RE) and pooled ordinary least squares (POLS), respectively. First, the authors analyzed whether POLS, FE or RE would be the most appropriate model. According to the *F*-test and the Breusch–Pagan LM test, the FE and the RE models are more suitable than POLS. Then, according to the Hausman test results, the authors found that FE is this study's most appropriate model. After determining the validity of FE, the diagnostics tests of heteroscedasticity, autocorrelation and serial correlation tests are examined. Due to the presence of these problems, Driscoll and Kraay's (1998) test, which is the robust standard error estimator, is used.

**Findings** – The authors find a positive relationship between GPR and cash holdings after controlling firm-level control variables. Firms faced with uncertainty prefer to hoard cash as a precautionary measure. In keeping with real options theory, firms postpone the investments of firms under uncertain conditions. The use of alternative measurements for GPR and cash holdings ensures the validity of our results. The authors' research reveals that investors and politicians should pay more attention to the influence of GPR on the determinants of the cash holdings of firms.

**Research limitations/implications** – There are limitations for this study, but this study may provide opportunities for further studies. First, this study has only data from Turkey. This situation mitigates cross-country effects. In future studies, the number of firms, countries of focus and time span can be expanded. Second, this study does not consider the period of coronavirus disease 2019 (COVID-19) that increased risk and uncertainty worldwide. Further studies may consider the impact of COVID-19 and geographical risks relating to cash holdings. Third, the authors try to choose more relied independent and control variables.

**Practical implications** – The authors' results provide some insights that are relevant to practitioners and policymakers. Managers need to consider GPR in managers' financial decisions based on managers' firm-specific characteristics. Turkish policymakers should target improving policies to alleviate the negative effects of GPRs. Regulators should postulate more encouraging policies to firms in an environment of GPR. Regulators can give firms more time to understand and analyze the GPRs and the impacts of GPRs to adjust regulators' day-to-day activities.

**Originality/value** – There are fewer studies in the literature that analyzed the relationship between GPR and cash holdings. This study aims to full this gap in the literature.

**Keywords** Geopolitical risk index, Emerging market, Cash holdings, Precautionary motive

**Paper type** Research paper

## 1. Introduction

The decision of firms to hold cash stems from four basic motives: the agency motive, tax motive, precautionary motive and transaction cost motive (Bates *et al.*, 2009). According to the agency motive, large free cash flows can generate discretional behaviors from management that are detrimental to shareholder interests (Jensen, 1986). Furthermore, firms in countries with lower

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investor protection tend to hold more cash (Dittmar *et al.*, 2003). The tax motive suggests that holding cash is essential to reduce the tax consequences of repatriating foreign earnings (Fritz Foley *et al.*, 2007). The precautionary motive causes firms facing costly external financing to hold cash as a buffer against negative shocks to their cash flows (Opler *et al.*, 1999). The transaction cost motive implies that cash holdings allow firms to evade transaction costs when accessing external markets (Kim *et al.*, 1998).

Cash is the most valuable strategic asset that helps enterprises capture future investment opportunities and meet unexpected contingencies in times of uncertainty. It allows firms the chance to maintain a buffer against uncertainty and reduce dependency on external funds (Gaio *et al.*, 2022).

Geopolitical and economic uncertainties are vital importance because they change the economic environment and affect the decision-making processes of governments, households, firms and investors. Geopolitical and economic uncertainties heighten the risk levels perceived by market participants, which disrupt firms' planned activities and exacerbate frictions (Khoo and Cheung, 2021). Uncertainty has a direct impact on the financing and investment decisions of firms.

Geopolitical uncertainty is classified as one of the key determinants in economic decision-making process (IMF, 2017), and geopolitical risk (GPR) is a major driver of geopolitical uncertainty. According to Carney (2016), GPR produces in a trinity of uncertainty: unfavorable economic impacts, economic uncertainty and policy uncertainty. International wars, military attacks, trade wars, elections and terrorist acts significantly influence agents' decisions regarding market mechanisms and the wider economy through supply and demand channels and lead to decreases in corporate investments (Triki and Ben Maatoug, 2021). Certain geopolitical events (e.g. the 2008–2009 global financial crisis, the chaos in the Middle East, USA elections, the Brexit referendum and the USA–China trade war) have influenced not only the investment behavior of businesses but also that of governments. Threats to economic, political and military relationships between countries give rise to GPR (Yilanci and Kilci, 2021), which heightens financial volatility and policy uncertainty (Khoo and Cheung, 2021) and causes sudden changes in trade and capital flows (Cheng and Chiu, 2018).

Alsagr and Almazor (2020) consider GPR to be different from other measures of political instability. GPR captures all domestic and international events, which are occasional but threatening over longer time periods. The assessment of GPR results in greater negative effects than the geopolitical acts themselves, probably because they are seen as solutions to uncertainty (Dissanayake and Wu, 2018). Caldara and Iacoviello (2018) define GPR as "the risk associated with wars, terrorist acts, and tensions between states that affect the normal course of international relations" In theory, GPR causes major economic contractions, evidenced by prolonged reductions in industrial production and international trade (Caldara and Iacoviello, 2018). The literature reflects the difficulty of quantifying economic risk. Zhou *et al.* (2020) explains that specific events, such as wars, tensions and terrorist acts, and event periods are proxy variables. These variables are intermittent in time and do not cover the full range of GPRs. To fill this gap, Caldara and Iacoviello (2018) suggested an index to measure GPR. Following the methodology of Baker *et al.* (2016) using the contracting Economic Policy Uncertainty (EPU) Index, they used a matrix of risks based on the media coverage of geopolitical events by corporate media sources (Lu *et al.*, 2020). Caldara and Iacoviello (2018) constructed this index based on articles related to military actions, nuclear tensions, climate change and acts of war and threats of all these potential risk factors. In addition to being a useful and consistent variable in terms of economic modeling, the GPR index expresses the concept of GPR in a broader context (Yilanci and Kilci, 2021).

GPR influences economies and politics, leading to significant turbulence in financial markets and business environments, influencing resource allocation and creating friction

in corporate policy (Demir *et al.*, 2019b). The literature confirms that GPR has a considerable impact on the business environment. It is considered an exogenous determinant that influences the cash holdings behavior of firms. There is a limited amount of literature on whether and how GPR influences the cash holdings decisions of firms. Based on the precautionary motive theory, GPR exposure is expected to increase firms' cash holdings to safeguard investments against financing shocks.

In this study, we analyze the impact of GPR on the cash holdings behavior of Turkish firms. We choose Turkey as a country of interest because it has an important geographical location and serves as a bridge between Europe and Asia. Turkey is bordered by Greece to the west, Russia to the north and Armenia, Azerbaijan, Iran, Iraq and Syria to the east and south. There is a long-standing continental shelf problem with Greece in the Aegean Sea, the Cyprus problem in the Mediterranean, a migrant problem with Europe due to the Syrian civil war and the Eastern Mediterranean natural gas conflict that emerged in the West as of 2008. Turkey is holding so-called genocide talks with Armenia, to which its borders to the east are closed. It supports Azerbaijan by being a direct party to the Azerbaijan–Armenia tension as a brother country. The 2003 USA invasion of Iraq to the southeast created tension and uncertainty in the region that increased with the 2011 Arab Spring and the outbreak of civil war in Syria. The direct involvement of the USA and Russia in the Syrian civil war, the Islamic Sate of Iraq and Syria (ISIS) terrorist organization that emerged by taking advantage of the vacuum in the region, the bombing attacks in Istanbul and Ankara and the migration of many people to Turkey as refugees adversely affected Turkey and the region. In addition, the conflict with Iran over Syria, sectarian disputes (Sunni-Shite) and the USA embargo on Iran other regional problems. Turkey's relationship with Russia to that GPR to the north became more volatile and increased tension in the region after Turkey shot down a Russian plane in 2015. Finally, the terrorist organization problem, which has been going on for 30 years in the southeastern region of Turkey, increases tension in the region. Given the prominent role that GPR can play in decision-making processes, we thought it would be interesting to analyze its impact on the cash holdings determinants of Turkish firms. A widely accepted view is that GPR plays an important role in the economic decisions of emerging countries such as Turkey. Turkish firms can be vulnerable to GPR.

To better understand this relationship, we consider 210 Turkish firms listed in the Borsa Istanbul (BIST) and we analyze the effects of GPR on firms' holding decisions from 2005 to 2019. Our key results show that GPR is positively associated with cash holdings. In accordance with the precautionary motive, a rise in risk can influence cash flows, providing an incentive to hoard cash as a precautionary safeguard or to cover cash shortages. As the real options theory suggests, firms delay investments to save more cash, particularly during times of economic uncertainty. The use of alternative measurements for cash holdings and GPR ensures that our results are robust. This study complements the current literature in various ways. It adds to the recent literature that associates GPR with cash holdings. It extends the understanding of geopolitical uncertainty and risk in an emerging country. As an emerging country, Turkey has grown rapidly and integrated with developed countries in terms of international trade and investment. However, Turkey is highly exposed to GPRs because of its fragile economy. GPRs limit the economic performance of the listed firms in Turkey. This study shows that GPRs have a positive impact on the cash holding behaviors of companies in a highly volatile regime. The low participation of firms in investment opportunities reduces the economic development of Turkey. This study provides empirical support for the precautionary motive and real options theory. Our findings may benefit the government and business world in coping with GPR. The remainder of this paper is organized as follows. Section 2 explains the literature review and Section 3 shows data, sample and models. Section 4 indicates the empirical results and discussions and Section 5 shows robustness checks. Finally, Section 6 is the conclusion part.

## 2. Literature review

Since Caldara and Iacoviello's construction of the GPR index (2018), several studies have provided evidence that GPR influences on financial markets. Antonakakis *et al.* (2017) find that GPRs affect the oil market index significantly in terms of return and variability. The relationship between GPR and the stock volatility of global defense firms is confirmed by (Apergis *et al.*, 2018). Using BRICS (Brazil, Russia, India, China, South Africa) stock market data, Balcilar *et al.* (2018) provide evidence showing that GPR is a more significant determinant of market volatility than returns. Das *et al.* (2019) show the effects of Economic Policy Uncertainty (EPU) and GPR on the stock returns of emerging economies and demonstrate that EPU has a more significant impact on stock returns than GPR. Hoque and Zaidi (2020) examine the nonlinear impact of domestic and global GPR uncertainty on stock returns in fragile emerging countries. They document that GPR uncertainty affects stock performance positively and negatively, depending on volatility regimes and the stock market.

Parallel to the aforementioned studies, numerous empirical studies have been conducted on the firm-specific effects of GPR. Dissanayake and Wu (2018) investigate whether GPR affects the capital investment of firms and conclude that firms decrease capital investment as a response to GPRs. Wang *et al.* (2019) assess the relationship between corporate investment and GPR and find that GPR adversely affects corporate investment.

Pan (2019) examines the impact of GPR on research and development (R&D) investment and finds that it decreases when GPR rises. Le and Tran (2021) document a negative association between GPR and corporate investment. Demir and Danisman (2021) compare the effects of economic uncertainty and GPR on bank credit growth. Their results reveal that economic uncertainty decreases bank credit growth, but that GPR does not affect it. Alsagr and Almazor (2020) report that GPR negatively affects the banking sector profitability in emerging markets. Hao *et al.* (2019) show that in the context of merger and acquisitions (M&A), there is a negative association between GPR and firm-level M&A activity. However, Shen *et al.* (2021) claims that GPR significantly promotes M&A activity through a combination of real options theory and prospect synergy effects. Oanh and Hoang (2020) find that Chinese firms use corporate social responsibility (CSR) investment as an insurance mechanism during rising geopolitical uncertainty by Chinese firms.

From another perspective, Kotcharin and Maneenop (2020b) study the role of GPR in the financial leverage choices of shipping firms. Their empirical results, obtained using a panel data methodology, reveal a negative relationship between GPR and the financial leverage choices of shipping firms in Belt and Road Initiative (BRI) countries. Since GPR destabilizes economies and creates frictions in corporate policies, it affects the corporate financing behavior. Khoo and Cheung (2021) investigate particularly the impact of GPR on the leverage ratio, debt maturity and choice of debt source and claim that when GPR rises, firms tend to shorten their debt maturity structure and increase market leverage. Lee and Wang (2021) examine GPR that is included as an aspect of policy-related risk and analyzed the effect of policy-related risks on corporate financing activities. Their results suggest that firms facing high policy-related risks are less likely to use external financing. GPR plays an important role in explaining the dynamics of business performance. While navigating geopolitical uncertainty, managers make different strategic choices that influences on cash holding behavior.

The literature provides two theories for firms to hold cash: trade-off theory and financial hierarchy theory. The trade-off theory posits that the amount of cash is determined by balancing the marginal costs and marginal benefits associated with holding cash (Gaio *et al.*, 2022). In the presence of cash reserves, firms can meet the needs arising from normal activities, take advantage of future investment opportunities and deal with unpredictable events like GPRs (Martínez-Sola *et al.*, 2013). The financial hierarchy theory suggests that firms with high investment opportunities that cannot find external sources should keep as much cash as possible (Chen, 2008). It posits that the main objective of firms is to rely on

the cheapest source of funds in the presence of asymmetric information between firms and potential lenders (Myers and Majluf, 1984). This paper builds on the precautionary motive and real options theory, which derives from the trade-off theory.

Based on the real options theory of irreversibility of investment, firms prefer to delay investment by increasing the value of waiting to invest in risky environments (Bernanke, 1983). Bloom (2009) claims that heightened uncertainty triggers decline in investment and can lead to an accumulation of cash. The dynamic nature of GPR makes it difficult for firms to invest so that firms can increase their cash holdings in response to higher GPR. According to the precautionary motive theory, precautionary cash holding is an effective way for firms to deal with uncertainty in the internal and external environment (Opler *et al.*, 1999). Geopolitical uncertainty is also a significant concern for the economy and business environment (Caldara and Iacoviello, 2018). Uncertainty avoidance affects precautionary motives for holding cash (Goodell *et al.*, 2021). When external finance is costly and the environment is uncertain due to GPRs, precautionary cash holding can mitigate the shocks to future financing needs (Favara *et al.*, 2021).

Both theories are employed to describe the relationship between uncertainty and cash holding. Prior studies suggest that firms reserve cash as a safe haven for daily transactions (Opler *et al.*, 1999) to better respond to future shocks (Bates *et al.*, 2009; Phan *et al.*, 2019) and mitigate the negative impacts of uncertainty (Demir and Ersan, 2017).

To the best of our knowledge, few studies have considered impact of GPR on cash holdings. Kotcharin and Maneenop (2020a, b) investigate the effect of GPR on the shipping industry and reveal that shipping firms prefer to hoard cash during uncertain times. Wang *et al.* (2021) find that GPR has a positive effect on the cash holding behavior of Chinese firms engaged in oil exploration, exploitation, and equipment provision. Lee and Wang (2021) analyze the impact of GPRs on Chinese firms and also find a positive relationship as well. In contrast, Demir *et al.* (2019a, b) find that the cash holding behavior of hospitality firms in emerging market is negatively related to GPRs, implying that these firms tend to use their cash to cope with their ongoing costs. Turkey serves as a bridge between Europa and Asia. It has a highly stable political system and has experienced tremendous economic development since 2002. However, constantly changing laws, low investor protection and a low level of accountability compared to developed countries raise doubts concerning the capabilities of firms in Turkey.

When GPR increases, firms tend to increase their cash holdings to avoid the fluctuations in economic development. Given this vulnerability to GPR, Turkish firms can hoard cash to protect themselves when faced with high GPR. Based on the above rationales, we propose the following hypothesis.

*H1*. There is a positive relationship between GPR and cash holdings for Turkish firms.

## 3. Data, sample and models

This study considers firms listed in the BIST from 2005 to 2019. Firm-level data variables are taken from Thomson Reuters DataStream. The GPR indices data are taken from their own website [1]. The original sample is subjected to several sample selection parameters. Firms are included in or excluded from the sample based on the following factors: (1) firms in the financial sector, such as banks, insurance firms, leasing firms and factoring firms, and other firms related to financial institutions are not included, because their financial statement items are different, and this situation is valid also for sport teams, utilities and real estate investment trusts firms, which are not included; (2) firms are included if they have at least four years of consecutive data available to implement panel data methodology; (3) all variables are winsorized at 1 and 99% percentiles to reduce the effect of outliers; (4) all firm-level data are US$ denominated. After data processing, we have unbalanced data from 210

firms representing 2,692 firm-year observations. Since the listed firms have different initial public offerings (IPO), we use an unbalanced panel regression method to test the H1.

Table 1 displays the sector classification and the number of observations for each sector. The Statistical Classification of Economic Activities in the European Community [2], referred to as NACE [3], is used.

Examining the effects of GPR on a firm's cash holdings, we follow related studies, such as Demir *et al.* (2019a, b); Kotcharin and Maneenop (2020a); Lee and Wang (2021) and Wang *et al.* (2021).

$$CASH_{i,t} = \beta_o + \beta_1 GPR_{i,t-1} + YEAR + \mathfrak{z}_{it}; \quad (1)$$

$$CASH_{i,t} = \beta_o + \beta_1 GPR_{t-1+}\beta_2 DIV_{i,t} + \beta_3 TAN_{i,t+}\beta_4 SALES_{i,t} + \beta_5 NWC_{i,t} + \beta_6 STD_{i,t+}\beta_7 CF_{i,t} + \beta_8 CAPEX_{i,t} + SECTOR + YEAR + \mathfrak{z}_{it}; \quad (2)$$

| Division | Sectors | Obs | % |
|---|---|---|---|
| A1 | Crop and animal production, hunting and related service activities | 7 | 0.26 |
| B6 | Extraction of crude petroleum and natural gas | 15 | 0.56 |
| B7 | Mining of metal ores | 10 | 0.37 |
| 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 | 217 | 9.95 |
| C21 | Manufacture of basic pharmaceutical products and pharmaceutical preparations | 15 | 0.71 |
| C23 | Manufacture of other non-metallic mineral products | 328 | 15.28 |
| C24 | Manufacture of basic metals | 155 | 7.29 |
| C25 | Manufacture of fabricated metal products, except machinery and equipment | 106 | 4.70 |
| C27 | Manufacture of electrical equipment | 125 | 6.54 |
| C28 | Manufacture of machinery and equipment n.e.c | 30 | 1.41 |
| C29 | Manufacture of motor vehicles, trailers and semi-trailers | 236 | 11.1 |
| C31 | Manufacture of furniture | 30 | 1.41 |
| C32 | Other manufacturing | 11 | 0.52 |
| D35 | Electricity, gas, steam, and air conditioning supply | 13 | 0.48 |
| F41 | Construction | 24 | 0.89 |
| G45 | Wholesale and retail trade and repair of motor vehicles and motorcycles | 15 | 0.56 |
| G46 | Wholesale trade, except of motor vehicles and motorcycles | 145 | 5.39 |
| G47 | Retail trade, except of motor vehicles and motorcycles | 15 | 0.56 |
| H49 | Land transport and transport via pipelines | 41 | 1.52 |
| H51 | Air transport | 22 | 0.82 |
| I55 | Accommodation | 96 | 3.57 |
| J59 | Motion picture, video, and television production | 15 | 0.56 |
| J61 | Telecommunications | 52 | 1.93 |
| J62 | Computer programming, consultancy and related activities | 78 | 2.90 |
| N77 | Rental and leasing activities | 8 | 0.30 |
| Q86 | Human health activities | 9 | 0.33 |
| | *Total* | *2,692* | *100* |

**Table 1.**
Sector classification

**Source(s):** Authors work

Following the literature, we measure cash as the ratio of cash and cash equivalents to the book value of total assets. We label the variable as *CASH* (Demir and Ersan, 2017; Feng *et al.*, 2019; Lee and Wang, 2021; Wang *et al.*, 2021). In our model, GPR index is the main independent variable, which is constructed by Caldara and Iacoviello (2018) and represents the natural logarithm of GPR_TURKEY, GPR, GPR_THREAT, GPR_ACT, GPR_BROAD and GPR_NARROW, respectively. GPR indices are updated monthly. Since the financial data are annual, indices are calculated as the annual average. We start by calculating the impact using an initial reduced model. In equation (1), we do not use any control variables to examine the potential impact of GPR on cash holding behavior. In the augmented equation (2), based on the literature, we include firm-specific control variables, namely dividends, tangibility, sales, non-cash working capital, short-term debt, cash flow and capital expenditures (Boubakri *et al.*, 2013; Demir, Díez-Esteban *et al.*, 2019; Drobetz and Grüninger, 2007; Kotcharin and Maneenop, 2020a; Lee and Wang, 2021; Ozkan and Ozkan, 2004; Wang *et al.*, 2021). Table 2 exhibits the definition of each variable. To mitigate any endogeneity issues, we use a lagged one period of GPR indices (Lee and Wang, 2021; Phan *et al.*, 2019).

## 4. Empirical findings and discussions

Table 3 indicates the descriptive statistics of the variables. The average cash ratio for firms is approximately 10%. Studies in the literature also find the average ratio between 10 and 15%, such as 10% for Turkish firms (Arslan *et al.*, 2006; Uyar and Kuzey, 2014), UK (Ozkan and Ozkan, 2004), Italian (Bigelli and Sánchez-Vidal, 2012) and Taiwanese firms (Lin, 2007); 8% for Spanish firms (García-Teruel and Martínez-Solano, 2008); 11% for Brazilian firms

| Explanatory variables | Definitions | Source |
|---|---|---|
| CASH | Cash and cash equivalents to the book value of total assets | Thomson Reuters |
| DIV | Total dividend payments to the book value of total assets | Thomson Reuters |
| TAN | Net fixed assets to the book value of total assets | As Above |
| SALES | Total annual sales to the book value of total assets | As Above |
| NCWC | Non-cash net working capital to the book value of total assets | As Above |
| STD | Short-term debt to the book value of total assets | As Above |
| CF | Pretax income + depreciation to the book value of total assets | As Above |
| CAPEX | Capital expenditure to the book value of total assets | As Above |
| GPR_TURKEY | Natural Logarithm of the Annual Average of Country-Specific GPR | https://www.matteoiacoviello.com/gpr.htm |
| GPR | Natural Logarithm of the Annual Average of overall GPR | As Above |
| GPR_THREAT | Natural Logarithm of the Annual Average of GPR Threat | As Above |
| GPR_ACT | Natural Logarithm of the Annual Average of GPR Act | As Above |
| GPR_BROAD | Natural Logarithm of the Annual Average of GPR Broad | As Above |
| GPR_NARROW | Natural Logarithm of the Annual Average of GPR Narrow | As Above |

**Source(s):** Authors work

**Table 2.**
Definition of variables

| Variables | Obs | Mean | Median | P25 | P75 | Std. Dev |
|---|---|---|---|---|---|---|
| CASH | 2,692 | 0.098 | 0.057 | 0.015 | 0.143 | 0.115 |
| DIV | 2,692 | 0.021 | 0.00 | 0.00 | 0.023 | 0.046 |
| TAN | 2,692 | 0.345 | 0.334 | 0.192 | 0.483 | 0.204 |
| SALES | 2,692 | 0.984 | 0.824 | 0.571 | 1.201 | 0.705 |
| NCWC | 2,692 | 0.063 | 0.079 | −0.043 | 0.202 | 0.309 |
| STD | 2,692 | 0.138 | 0.099 | 0.026 | 0.199 | 0.219 |
| CF | 2,692 | 0.077 | 0.072 | 0.018 | 0.135 | 0.197 |
| CAPEX | 2,692 | 0.054 | 0.033 | 0.012 | 0.066 | 0.080 |
| GPR_TURKEY | 2,692 | 4.808 | 4.873 | 4.583 | 4.946 | 0.233 |
| GPR | 2,692 | 4.536 | 4.495 | 4.150 | 4.782 | 0.376 |
| GPR_THREAT | 2,692 | 4.577 | 4.482 | 4.175 | 4.852 | 0.416 |
| GPR_ACT | 2,692 | 4.180 | 4.266 | 3.895 | 4.441 | 0.260 |
| GPR_BROAD | 2,692 | 4.495 | 4.427 | 4.291 | 4.653 | 0.252 |
| GPR_NARROW | 2,692 | 4.564 | 4.514 | 4.157 | 4.841 | 0.401 |

**Note(s):** CASH is cash and cash equivalents; DIV is total dividend payments; TAN is net fixed assets; SALES is annual sales; NWC is a non-cash net working capital; STD is short-term debts; CASHFLOW is a pretax income + depreciation; CAPEX is capital expenditures. All values are divided by the total assets. GPR_TURKEY is the natural logarithm of the annual average of the country-specific GPR index; GPR is the natural logarithm of the annual average of the overall GPR index; GPR_THREAT is the natural logarithm of the annual average of the GPR Threat index; GPR_ACT is the natural logarithm of the annual average of the GPR Act index; GPR_BROAD is the natural logarithm of the annual average of the GPR Broad index; GPR_NARROW is the natural logarithm of the annual average of the GPR Narrow index

**Source(s):** Authors work

**Table 3.**
Descriptive statistics

(Manoel *et al.*, 2018); 14% for Chinese (Feng *et al.*, 2019) and Saudi Arabian firms (Guizani, 2017). The average dividend payment is around 2% and cash flow is 8%. The average net fixed assets for Turkish firms are 34%. Firms have about 14% short-term debts, and finally, the average non-cash net working capital is 6% and the capital expenditure is 5%. Among the indices, the GPR_TURKEY has the highest mean.

We examine models with fixed effects (FE), random effects (RE) and pooled OLS (POLS), respectively, in Table 4. First, it is analyzed whether POLS, FE or RE would be the most appropriate model. According to the *F*-test and the Breusch–Pagan LM test, the FE and the RE models are more suitable than POLS. Then, according to the Hausman test results, it is found that FE is our most appropriate model. After determining the validity of FE, the diagnostics tests of heteroscedasticity, autocorrelation and serial correlation tests are examined. Due to the presence of these problems, Driscoll and Kraay's (1998) test, which is the robust standard error estimator, is used. The findings are displayed in Table 4, where column (1) reports the results of the initial model. Columns (2), (3) and (4) show the results of the extended equation, including the results indicating that the relationship between cash holdings and GPR is significantly positive at the 1% level for all model specifications. In other words, in column (1), we find that a standard deviation increases in GPR_TURKEY above its sample mean is equivalent to 3.91% of the sample mean. Firms prefer to hold their cash reserves to protect themselves against geopolitical uncertainty and to sustain ongoing operations. In accordance with the precautionary motive perspective, as a rise in risk can influence cash flows, it provides an incentive to hoard cash as a precautionary safeguard or to cover cash shortages (Bates *et al.*, 2009; Kotcharin and Maneenop, 2020a; Opler *et al.*, 1999). As the real options theory suggests, firms put off investments to save more cash, particularly during times of economic uncertainty (Gulen and Ion, 2016). The results confirm our H1 and are congruent with the findings in the literature (Kotcharin and Maneenop, 2020a; Lee and Wang, 2021; Wang *et al.*, 2021). The findings provide the evidence of a precautionary motive

| | FE 1 | FE 2 | RE 3 | POLS 4 |
|---|---|---|---|---|
| L.GPR_TURKEY | 0.01646*** | 0.05541*** | 0.03417*** | 0.02442*** |
| | (0.000) | (0.004) | (0.003) | (0.006) |
| DIV | | 0.20350** | 0.25646*** | 0.49340*** |
| | | (0.070) | (0.069) | (0.080) |
| TAN | | −0.27937*** | −0.26069*** | −0.19756*** |
| | | (0.034) | (0.026) | (0.009) |
| SALES | | −0.03851*** | −0.03017*** | −0.01411* |
| | | (0.006) | (0.008) | (0.006) |
| NCWC | | −0.19033*** | −0.17779*** | −0.12909*** |
| | | (0.028) | (0.022) | (0.009) |
| STD | | −0.19854*** | −0.19072*** | −0.17010*** |
| | | (0.031) | (0.025) | (0.016) |
| CF | | 0.02427 | 0.02807 | 0.05072 |
| | | (0.028) | (0.034) | (0.043) |
| CAPEX | | −0.02778* | −0.01807 | 0.02566 |
| | | (0.015) | (0.015) | (0.015) |
| Constant | YES | YES | YES | YES |
| Year | YES | YES | YES | YES |
| Sector | NO | NO | YES | YES |
| Observations | 2,481 | 2,481 | 2,481 | 2,481 |
| Prob > F | 0.000 | 0.000 | | 0.000 |
| Prob > $\chi^2$ | | | 0.000 | |
| Hausman | | 0.000 | | |
| *R*-squared | 0.0141 | 0.2267 | 0.3801 | 0.4123 |

**Note(s):** CASH is cash and cash equivalents; DIV is total dividend payments; TAN is net fixed assets; SALES is annual sales; NWC is a non-cash net working capital; STD is short-term debts; CASHFLOW is a pretax income + depreciation; CAPEX is capital expenditures. All values are divided by the total assets. GPR_TURKEY is the natural logarithm of the annual average of the country-specific GPR index. The standard errors in parenthesis are robust Driscoll and Kraay (1998) estimators. ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$
**Source(s):** Authors work

**Table 4.**
GPR Turkey and cash holdings

in the listed Turkish firms, which balance their risk-taking ability and future earnings and holding more cash to protect themselves against GPR. We also find that dividend payment has a positively and significantly effects on cash holdings. Firms may prefer to hold less cash to pay dividends (Opler *et al.*, 1999; Ozkan and Ozkan, 2004) or paying a high dividend can be attributed to a firm's performance, resulting in a greater amount of cash holdings as well (Boubakri *et al.*, 2013). Our results reflect the findings in the previous literature (Boubakri *et al.*, 2013; Demir and Ersan, 2017). Tangibility is statistically significant and negative at the 1% level. Drobetz and Grüninger (2007) state that if a firm has more tangible assets, it prefers to retain less cash, as tangible assets can be sold if cash is needed. Jebran *et al.* (2019) and Uyar and Kuzey (2014) find a negative relationship in their studies. Sales negatively and significantly affect cash holdings. From this study, it can be potentially inferred that firms do not want to hold cash when increasing their sales and they may prefer to make investments. Non-cash net working capital is statistically significant and negative, indicating that the working capital is a substitute for cash holdings (Bigelli and Sánchez-Vidal, 2012; Boubakri *et al.*, 2013; Demir and Ersan, 2017). Short-term debt is statistically significant and negative at the 1% level. Firms prefer to use their cash to pay their debts instead of regarding short-term debt as cash and cash equivalents (Koo and Maeng, 2018; Pál and Ferrando, 2010). Capital expenditure has a negative and significant relationship with cash holding at the 10% level (Guizani, 2017; Uyar and Kuzey, 2014). The relationship between cash flow and cash holding is positive but insignificant.

Table 5 indicates the results of the cash holdings and other GPR indices. Column (1) indicates results according to the overall GPR indices and other columns have GPR_THREAT, GPPR_ACT, GPR_BROAD and GPR_NARROW, respectively. The coefficients vary from 0.05094 to 0.05909. GPR_BROAD and GPR_ACT have the highest coefficients, respectively. As explained by Kotcharin and Maneenop (2020a), *"GPR_BROAD results from search criteria that doubles the number of articles mentioning GPR in the process of collection and GPR_ACT is inferred as the realization of adverse geopolitical events that could increase geopolitical risks"* (p. 4).

## 5. Robustness checks

In the following tables, we only apply FE with Driscoll and Kraay standard errors. Following Le and Tran (2021), we use an alternative measure of GPR in Table 6. We use the average of each quarter (Q1, Q2, Q3 and Q4) individually instead of taking the annual average of the quarters. Second, we take the average of the Q1 and Q2 and the average of the Q3 and Q4 and the GPR in December. Third, the Political Risk Index of the International Country Risk Guide (ICRG), which is developed by Political Risk Services (PRS) Group, is used. The overall political risk measure has 12 subsections: (1) government stability, (2) bureaucracy quality, (3) democratic accountability, (4) ethnic tensions, (5) law and order, (6) religious tensions, (7) military in politics, (8) corruption, (9) external conflict, (10) internal conflict, (12) investment profile and (11) socio-economic conditions. The political risk has 0 and 100 that are the minimum and maximum values. From 0 to 100, the political risk level decreases. The data are calculated monthly, but in keeping with Bilgin *et al.* (2018), we use December as the benchmark political risk measure. Finally, the Global Economic Policy Uncertainty (GEPU) Index , created by Davis (2016), is used

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| GPR | 0.05313*** | | | | |
| | (0.003) | | | | |
| GPR_THREAT | | 0.05094*** | | | |
| | | (0.003) | | | |
| GPR_ACT | | | 0.05721*** | | |
| | | | (0.004) | | |
| GPR_BROAD | | | | 0.05909*** | |
| | | | | (0.005) | |
| GPR_NARROW | | | | | 0.05140*** |
| | | | | | (0.003) |
| Control variables | YES | YES | YES | YES | YES |
| Constant | YES | YES | YES | YES | YES |
| Year | YES | YES | YES | YES | YES |
| Observations | 2,481 | 2,481 | 2,481 | 2,481 | 2,481 |
| Prob > F | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| *R*-squared | 0.2268 | 0.2267 | 0.2268 | 0.2265 | 0.2267 |

**Note(s):** CASH is cash and cash equivalents; DIV is total dividend payments; TAN is net fixed assets; SALES is annual sales; NWC is a non-cash net working capital; STD is short-term debt; CASHFLOW is a pretax income + depreciation; CAPEX is capital expenditures. All values are divided by the total assets. GPR is the natural logarithm of the annual average of the overall GPR index; GPR_THREAT is the natural logarithm of the annual average of the GPR Threat index; GPR_ACT is the natural logarithm of the annual average of the GPR Act index; GPR_BROAD is the natural logarithm of the annual average of the GPR Broad index; GPR_NARROW is the natural logarithm of the annual average of the GPR Narrow index. The standard errors in parenthesis are robust Driscoll and Kraay (1998) estimators. ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

**Source(s):** Authors work

**Table 5.** Overall GPR and cash holdings

**Table 6.** Alternative measurement of geopolitical risk index

| | 1 | 2 | 3 | 4 | 5 | 6 | 8 | 7 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| L.GPR_Q1 | 0.05626*** | | | | | | | | |
| | (0.004) | | | | | | | | |
| L.GPR_Q2 | | 0.05439*** | | | | | | | |
| | | (0.004) | | | | | | | |
| L.GPR_Q3 | | | 0.05513*** | | | | | | |
| | | | (0.004) | | | | | | |
| L.GPR_Q4 | | | | 0.05313*** | | | | | |
| | | | | (0.004) | | | | | |
| L.GPR_Q1Q2 | | | | | 0.05641*** | | | | |
| | | | | | (0.004) | | | | |
| L.GPR_Q3Q4 | | | | | | 0.05407*** | | | |
| | | | | | | (0.004) | | | |
| L.GPR_December | | | | | | | 0.05586*** | | |
| | | | | | | | (0.004) | | |
| L.ICRG | | | | | | | | 0.06658*** | |
| | | | | | | | | (0.005) | |
| L.GEPU | | | | | | | | | 0.05576*** |
| | | | | | | | | | (0.004) |
| Control Variables | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Constant | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Year | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 2,481 | 2,841 | 2,481 | 2,481 | 2,481 | 2,481 | 2,481 | 2,481 | 2,481 |
| *R*-squared | 0.2268 | 0.2268 | 0.2269 | 0.2267 | 0.2268 | 0.2267 | 0.2268 | 0.2269 | 0.2265 |

**Note(s):** CASH is cash and cash equivalents; DIV is total dividend payments; TAN is net fixed assets; SALES is annual sales; NWC is a non-cash net working capital; STD is short-term debt; CASHFLOW is a pretax income + depreciation; CAPEX is capital expenditures. All values are divided by the total assets. GPR_TURKEY is the natural logarithm of the annual average of the country-specific GPR index; Q1 is the natural logarithm of the quarterly (January-February-March) average of the country-specific GPR index; Q2 is the natural logarithm of the quarterly (April-May-June) average of the country-specific GPR index; Q3 is the natural logarithm of the quarterly (July-August-September) average of the country-specific GPR index; Q4 is the natural logarithm of the quarterly (October-November-December) average of the country-specific GPR index. The political risk index is employed by the International Country Risk Guide (ICRG) published by the Political Risk Service Group. GEPU is a Global Economic Policy Uncertainty Index. The standard errors in parenthesis are robust Driscoll and Kraay (1998) estimators. ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

**Source(s):** Authors work

as a risk proxy. The GEPU Index represents the average of Gross Domestic Product (GDP)-weighted national EPU indices for 22 countries accounting for two-thirds of global production. According to the results, all alternative measurement indices indicate positive and significant results. Furthermore, the Political Risk Index has a higher coefficient than GPR; in other words, uncertainty induced by political risk has a higher effect than geopolitical-based uncertainty.

Table 7 indicates the alternative measurements of cash holdings. In our baseline model, we use the ratio of cash and cash equivalents to the total assets. To test robustness, the natural logarithm of cash, as well as the ratio of cash and cash equivalents to the net assets, was used as dependent variables. We repeat our baseline models and present the results in Table 7. Both coefficients of GPR remain unchanged and statistically highly significant, showing that GPR encourages corporate cash holdings.

In Table 8, we divide the firms into manufacturing and non-manufacturing subgroups. Among the 210 firms, 164 belong in the manufacturing subgroup and 46 in the non-manufacturing sectors. Within both manufacturing and non-manufacturing firms, we find that GPR has positively effects on the cash holding behavior of the firms.

In Table 9, we analyze the impact of GPRs on sectors. We include 14 sectors with sufficient data to be included in the analysis. All sectors display positive and significant cash holding

| | log(CASH) | | CASH/NA | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| L.GPR_TURKEY | 1.74854*** | 2.19082*** | 0.01973*** | 0.09582*** |
| | (0.007) | (0.073) | (0.000) | (0.007) |
| DIV | | 1.92658** | | 0.29313* |
| | | (0.687) | | (0.138) |
| PPE | | −2.98859*** | | −0.55862*** |
| | | (0.558) | | (0.063) |
| SALES | | −0.66119*** | | −0.07953*** |
| | | (0.095) | | (0.011) |
| NCWC | | −1.55367*** | | −0.35030*** |
| | | (0.440) | | (0.051) |
| STD | | −1.96871*** | | −0.36037*** |
| | | (0.439) | | (0.055) |
| CF | | 0.26948 | | 0.05686 |
| | | (0.338) | | (0.057) |
| CAPEX | | 0.70562* | | −0.06281* |
| | | (0.375) | | (0.029) |
| Constant | YES | YES | YES | YES |
| Year | YES | YES | YES | YES |
| Observations | 2,481 | 2,481 | 2,481 | 2,481 |
| Prob > F | 0.000 | 0.000 | 0.000 | 0.000 |
| *R*-squared | 0.013 | 0.122 | 0.015 | 0.166 |

**Note(s):** CASH is cash and cash equivalents; Log (CASH) is the natural logarithm of the cash and cash equivalents; CASH/NA is the ration of cash and cash equivalents to the net assets; DIV is total dividend payments; TAN is net fixed assets; SALES is annual sales; NWC is a non-cash net working capital; STD is short-term debt; CASHFLOW is a pretax income + depreciation; CAPEX is capital expenditures. All values are divided by the total assets. GPR is the natural logarithm of the annual average of the overall GPR index; GPR_THREAT is the natural logarithm of the annual average of the GPR Threat index; GPR_ACT is the natural logarithm of the annual average of the GPR Act index; GPR_BROAD is the natural logarithm of the annual average of the GPR Broad index; GPR_NARROW is the natural logarithm of the annual average of the GPR Narrow index. The standard errors in parenthesis are robust Driscoll and Kraay (1998) estimators. ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

**Source(s):** Authors work

**Table 7.** Alternative measurement of cash holdings

| | Manufacturing | | Non-manufacturing | |
|---|---|---|---|---|
| L.GPR_TURKEY | 0.01545*** | 0.05388*** | 0.02440*** | 0.05510*** |
| | (0.000) | (0.005) | (0.000) | (0.004) |
| DIV | | 0.22818*** | | 0.12794 |
| | | (0.072) | | (0.130) |
| PPE | | −0.27137*** | | −0.30302*** |
| | | (0.036) | | (0.054) |
| SALES | | −0.03854*** | | −0.02767*** |
| | | (0.010) | | (0.007) |
| NCWC | | −0.17821*** | | −0.28266*** |
| | | (0.028) | | (0.040) |
| STD | | −0.18806*** | | −0.23932*** |
| | | (0.033) | | (0.045) |
| CF | | 0.01419 | | 0.09262*** |
| | | (0.026) | | (0.027) |
| CAPEX | | −0.01808 | | −0.07935 |
| | | (0.018) | | (0.045) |
| Constant | YES | YES | YES | YES |
| Year | YES | YES | YES | YES |
| Observations | 1,963 | 1,963 | 518 | 518 |
| Prob > F | 0.000 | 0.000 | 0.000 | 0.000 |
| *R*-squared | 0.013 | 0.228 | 0.036 | 0.263 |

**Note(s):** CASH is cash and cash equivalents; DIV is total dividend payments; TAN is net fixed assets; SALES is annual sales; NWC is a non-cash net working capital; STD is short-term debts; CASHFLOW is a pretax income + depreciation; CAPEX is capital expenditures. All values are divided by the total assets. GPR_TURKEY is the natural logarithm of the annual average of the country-specific GPR index. The standard errors in parenthesis are robust Driscoll and Kraay (1998) estimators. ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$
**Source(s):** Authors work

**Table 8.** Manufacturing and non-manufacturing industries

behavior. The manufacture of fabricated metal products, with the exceptions of machinery and equipment, has the highest coefficient. In contrast, the manufacture of textiles has the lowest coefficients and is significant at the 5% level. Finally, we test firms based on the financial constraint criteria. We categorize firms by age, sales and dividends. However, we do not find any differences between financially constrained and unconstrained firms. Both groups indicate positive and significant results. Our results are not consistent with the previous findings of Lee and Wang (2021), and they reveal that financially constrained firms hold more cash than unconstrained firms.

## 6. Conclusion

Our findings indicate that uncertainty plays a substantial role in firms' financial policies. Geographical risk is a principal uncertainty indicator and plays a crucial role in the cash holding behavior of firms. This paper examines the impact of the GPR index on the cash holdings of 210 firms listed in the BIST from 2005 to 2019. Using Turkey's listed firms as the research setting, we find a positive relation between GPR and cash holdings policy. We choose to observe the Turkish market for several reasons. Turkey is an emerging country that has undergone extraordinary economic development since 2002. However, risks related to the geopolitical environment induce uncertainties for business operations and financial flexibility by influencing firms' investment capabilities. An imperfectly constructed accountability regulation for listed firms, low investor protection and constantly changing regulations shape the external environment that firms face and

**Table 9.**
Cash holdings and sectors

| | C10 | C11 | C13 | C17 | C18 | C20 | C23 |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| L.GPR_TURKEY | 0.02513*** | 0.07297*** | 0.02376** | 0.07253*** | 0.04317*** | 0.05432*** | 0.06331*** |
| | (0.008) | (0.013) | (0.008) | (0.017) | (0.012) | (0.009) | (0.005) |
| DIV | 0.06649 | −0.26654 | −0.10722 | 0.03296 | 0.26456 | 0.23615 | 0.24010** |
| | (0.064) | (0.231) | (0.454) | (0.128) | (0.669) | (0.199) | (0.110) |
| TAN | −0.12058** | −0.47270*** | −0.09316** | −0.45790*** | 0.29466*** | −0.31061*** | −0.39133*** |
| | (0.044) | (0.099) | (0.036) | (0.081) | (0.078) | (0.066) | (0.034) |
| SALES | −0.02817* | −0.03681 | −0.02960 | −0.06910 | −0.04578 | −0.04905*** | −0.06962*** |
| | (0.014) | (0.044) | (0.021) | (0.040) | (0.055) | (0.013) | (0.020) |
| NWC | −0.09608*** | −0.44046*** | −0.10339** | −0.28099*** | −0.58267*** | −0.27014*** | −0.39102*** |
| | (0.031) | (0.121) | (0.046) | (0.052) | (0.090) | (0.072) | (0.033) |
| STD | −0.10338*** | −0.30225* | 0.02498 | −0.30106*** | −0.39750 | −0.24082** | −0.33529*** |
| | (0.032) | (0.161) | (0.030) | (0.088) | (0.236) | (0.102) | (0.065) |
| CF | −0.01094** | 0.38603*** | 0.12510*** | 0.33101*** | 0.09874 | 0.17266* | 0.25432*** |
| | (0.004) | (0.099) | (0.036) | (0.083) | (0.125) | (0.092) | (0.067) |
| CAPEX | 0.00432 | 0.13971 | −0.05765 | −0.05141 | −0.14924 | −0.07855 | −0.09533 |
| | (0.022) | (0.134) | (0.104) | (0.086) | (0.186) | (0.051) | (0.058) |
| Year | YES | YES | YES | YES | YES | YES | YES |
| Observations | 265 | 83 | 234 | 112 | 71 | 199 | 303 |
| *R*-squared | 0.175 | 0.605 | 0.216 | 0.508 | 0.465 | 0.435 | 0.500 |

| | C24 | C25 | C27 | C29 | G46 | I55 | J62 |
|---|---|---|---|---|---|---|---|
| | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| L.GPR_TURKEY | 0.03609*** | 0.13981*** | 0.10747*** | 0.08438*** | 0.03788*** | 0.03729*** | 0.04603*** |
| | (0.009) | (0.014) | (0.006) | (0.006) | (0.005) | (0.009) | (0.007) |
| DIV | 0.99069*** | 0.15086 | −0.39733*** | 0.20833*** | 0.23025*** | 5.53350 | 0.65642** |
| | (0.200) | (0.169) | (0.127) | (0.066) | (0.067) | (4.945) | (0.236) |
| TAN | −0.15348 | −0.68396*** | −0.81143*** | −0.51272*** | −0.30489** | −0.25841*** | −0.33228 |
| | (0.103) | (0.050) | (0.118) | (0.047) | (0.105) | (0.080) | (0.256) |

(*continued*)

Table 9.

| | C24<br>8 | C25<br>9 | C27<br>10 | C29<br>11 | G46<br>12 | I55<br>13 | J62<br>14 |
|---|---|---|---|---|---|---|---|
| SALES | 0.00324 | −0.24040*** | 0.00985 | −0.05466** | −0.02214* | −0.07461 | 0.05236 |
| | (0.024) | (0.041) | (0.026) | (0.022) | (0.012) | (0.072) | (0.033) |
| NWC | −0.35531** | −0.08116 | −0.77981*** | −0.45887*** | −0.58419*** | −0.08988 | −0.19834* |
| | (0.135) | (0.078) | (0.091) | (0.066) | (0.048) | (0.052) | (0.107) |
| STD | −0.19686** | −0.26682*** | −0.81724*** | −0.45195*** | −0.14698* | 0.03088 | −0.21494* |
| | (0.077) | (0.054) | (0.108) | (0.087) | (0.074) | (0.126) | (0.120) |
| CF | 0.47100*** | 0.19867* | 0.01576 | 0.20198*** | 0.27937 | 0.09429 | −0.12783 |
| | (0.142) | (0.110) | (0.078) | (0.043) | (0.261) | (0.080) | (0.113) |
| CAPEX | −0.00388 | 0.08285 | −0.60291* | −0.19650 | −0.19825 | −0.01989 | −0.79706 |
| | (0.072) | (0.068) | (0.328) | (0.131) | (0.211) | (0.082) | (0.550) |
| Year | YES | YES | YES | YES | YES | YES | YES |
| Observations | 141 | 97 | 116 | 218 | 133 | 88 | 72 |
| *R*-squared | 0.492 | 0.741 | 0.756 | 0.521 | 0.670 | 0.362 | 0.318 |

**Note(s):** CASH is cash and cash equivalents; DIV is total dividend payments; TAN is net fixed assets; SALES is annual sales; NWC is a non-cash net working capital; STD is short-term debts. CASHFLOW is a pretax income + depreciation; CAPEX is capital expenditures. All values are divided by the total assets. GPR_TURKEY is the natural logarithm of the annual average of the country-specific GPR index. C10: Manufacture of food products; C11: Manufacture of beverages; C13: Manufacture of textiles; C17: Manufacture of paper and paper products; C18: Printing and reproduction of recorded media; C20: Manufacture of chemicals and chemical products; C23: Manufacture of other non-metallic mineral products; C24: Manufacture of basic materials; C25: Manufacture of fabricated metal products, except machinery and equipment; C27: Manufacture of electrical equipment; C29: Manufacture of motor, vehicles, trailers and semi-trailers; G46: Wholesale trade, except XX motor vehicles and motorcycles; I55: Accommodation; J62: Computer programming, consultancy and related activities. The standard errors in parenthesis are robust Driscoll and Kraay (1998) estimators. ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$

**Source(s):** Authors work

impact GPR's influence on firm-level decisions. The findings illustrate that Turkey's listed firms are sensitive to GPR and use cash as a substitute for external financing to avoid financial distress and protect against risk spillovers. Second, this study contributes to the literature on the role of GPR in firms' financial decision-making processes in an emerging economy. According to the pecking order theory (Myers and Majluf, 1984), an increase in GPRs has a negative effect on firms' cash holdings (Demir *et al.*, 2019a, b). Low information disclosure, a weak regulatory environment (Uyar and Kuzey, 2014) and inadequate corporate governance in countries with emerging economies raise the cost of external financing. Firms in these countries rely mainly on internally generated funds rather than external financing (Arslan *et al.*, 2006). Understanding the relationship between GPRs and cash holding is strategically important because firms can take advantage of investment opportunities, ensure their innovativeness, increase their competitiveness and contribute to Turkey's economic development. According to the real options theory, firms take a "wait and see" position when faced with uncertainties caused by GPRs. They may keep their cash reserves to capitalize on investment opportunities after eliminating risks. As the precautionary motive perspective suggests, uncertainty in cash flows leads to cash hoarding cash as a precautionary safeguard. We also find consistent results when we divide the firms into sectors. Among both manufacturing and non-manufacturing firms, higher GPR leads to an increase in cash holdings. Under alternative measurements of the GPR index and cash holdings, we find robust results. According to our findings, authorities and investors should be more mindful of GPR and its impact on their cash holdings policies. In doing so, politicians in Turkey can use our empirical outcomes to advance appropriate regulations to deal with GPR and boost economic growth. A firm's cash holding decision is strongly related to the firm's investment and dividend policy. Our results provide some insights that are relevant to practitioners and policy makers. Managers should consider GPR in their financial decisions based on their firm-specific characteristics. Turkish policy makers should aim to improve policies to alleviate the negative effects of GPRs. Regulators should postulate more encouraging policies to firms in a geopolitically risky environment. They can give firms more time to understand and analyze the GPRs and their impacts to adjust their day-to-day activities. When liquidity decreases, firms can be given a chance to use different kinds of credit channels with lower funding rates and longer terms for credit repayments. Governments can provide tax reductions.

To decrease GPRs, governments should establish a transparent decision-making process and a reliable information-sharing mechanism. Managers should be aware of the changes in the economic environment. Based on firm characteristics, when GPR arises, firms should have well-planned investment and dividend policies, which are strongly related to cash holding decisions. Although there is no difference between the cash holding decisions of financially constrained and unconstrained Turkish firms, the government should be more mindful of financially constrained firms when GPR arises. By documenting these findings, this study extends the current understanding of the impact of GPR on cash holdings behavior. To the best of the authors' knowledge, this study is the first to examine the impact of GPR on cash holdings in Turkey. We aim to fill this gap in the literature.

There are limitations to this study, but they may provide opportunities for further studies. First, this study uses data only from Turkey. This situation mitigates cross-country effects. In future studies, the number of firms, countries of focus and time span can be expanded. Second, we opt for more reliable independent and control variables. Future studies can test different variables, such as the ownership and board dimensions of firms. For dependent variables, we use different robustness checks to test alternative proxies for cash holdings.

## Notes

1. Detailed information https://www.matteoiacoviello.com/gpr.htm
2. For detailed information https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF
3. The French version is "Nomenclature statistique des activités économiques dans la Communauté européenne".

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