# Determinants of Corporate Cash Holdings: Firm Level Evidence from Emerging Markets

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**Abstract** The objective of this chapter is to investigate the factors affecting corporate cash holdings in five emerging markets, namely Brazil, Indonesia, Mexico, Russia, and Turkey. The sample consists of 1991 firms listed on the major stock exchange of their countries and covers the period between 2009 and 2015. The model is estimated by Arellano–Bond dynamic generalized method of moments. Results show that firms which use higher leverage in their capital structure hold more cash. More profitable firms are shown to have higher levels of cash holdings. Another variable which has a positive effect on the level of cash holdings in any given period is the level of cash holdings in the previous period as shown by the positive and significant coefficient of the lagged dependent variable in the model. Liquidity and firm size have a negative and statistically significant impact on the level of corporate cash holdings. Firms with higher level of capital expenditures are also shown to hold less cash. Finally, growth opportunities do not have a significant impact on the level of cash holdings for the firms in the emerging markets analyzed.

## 1 Introduction

The reasons why companies choose to hold cash received growing attention in the finance literature over the last years because holding cash is costly. In a world without information asymmetry, taxes, transaction, and agency costs, the amount of cash holdings would not have an impact on firm value or shareholder wealth since firms can easily borrow from the capital markets any time when they need funds to

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finance their projects (Opler et al. 1999; Stiglitz 1974). Yet, several studies document that firms throughout the world choose to allocate a sizeable amount of their assets to cash and cash equivalents (Saddour 2006). A high level of cash may indicate agency problems between a firm's managers and shareholders. Jensen (1986) argues that excess free cash flow may generate agency costs, in case management does not act in the interest of shareholders because managers may hold excess cash in order to be more flexible to pursue their own objectives. Firms may hold cash to meet future opportunities but meanwhile, they may have to trade off positive NPV projects. Thus, large investment in cash may cause agency problems between a firm's management and shareholders and may decrease firm value (Al-Najjar 2013; Jensen 1986). Therefore, the specific reasons why companies hold cash need close examination.

The majority of the earlier studies on the determinants of cash holdings have focused on developed countries. This chapter attempts to contribute to the literature by investigating the factors affecting cash levels in a sample of companies from five emerging markets, namely, Brazil, Indonesia, Mexico, Russia, and Turkey. Investigating the topic in emerging markets is important because firms' financial decisions depend on their institutional context (Coase 1937). In contrast to developed countries such as USA or UK, emerging market countries suffer from a variety of market failures and inefficiencies which give rise to agency problems or higher bankruptcy costs (Khanna and Palepu 2000). These factors have a significant impact on companies' cash holding decisions; hence, it is important to test the validity of previously obtained empirical findings in the context of emerging markets.

The rest of the chapter continues as follows. Section 2 provides an overview of the theoretical and empirical literature on the factors affecting cash holdings in both developed and developing countries. The estimation methodology is elaborated in Sect. 3. Results are presented in Sect. 4. The final section concludes.

## 2 Literature Review

In this section, we first focus on two theories to explain the determinants of cash holdings, on which we base our research questions in the following section. Next, empirical studies related to the factors affecting cash holdings in several developed and developing countries are discussed.

### *2.1 Theoretical Background*

The theories related to corporate cash holdings are generally traced back to Miller and Orr (1966) who developed "the trade-off theory" which basically suggests that optimal level of cash holdings is determined by a trade-off between the marginal

costs and marginal benefits of holding cash. Liquid assets reduce the risk, minimize the transaction costs, but at the same time they have lower return. The benefits of holding cash basically depend on two motives: minimizing the transaction costs and precautionary motives (Opler et al. 1999). Related to the transaction costs, the theory suggests firms hold cash because raising funds from outside sources and capital markets is costlier compared to the existing cash (Ozkan and Ozkan 2004). Also transaction costs are even higher for the firms that have less access to capital markets and that are not closely monitored (Opler et al. 1999). The precautionary motive suggests that even if companies have an access to capital markets, they still may not choose to raise funds from capital markets because of the market issues and underlines the effect information asymmetry in raising funds (Al-Najjar 2013). Also as an another benefit of holding cash in terms of risk reduction is mentioned by Ferreira and Vilela (2004). They argue that probability of financial distress because of unexpected losses decreases by the increase in cash holdings. The ability of the trade-off theory in explaining the cash holding decision of the companies has been empirically tested in both developed countries and emerging markets (Al-Najjar and Belghitar 2011; Demirgüç-Kunt and Maksimovic 2001; Ferreira and Vilela 2004; Opler et al. 1999; Ozkan and Ozkan 2004). The researchers try to explain the cash holding decisions with the variables of leverage, firm size, dividend policy, liquidity, and risk.

The trade-off model of cash holdings (Miller and Orr 1966) is typically opposed to the pecking order theory by Myers and Majluf (1984), which argues that there is no optimal level of cash holdings for the company (Myers 1984; Myers and Majluf 1984). The theory suggests that firms finance their new investments first with internal cash, then debt and lastly with equity in order to minimize costs related to asymmetric information (Myers and Majluf 1984). In this theory, cash is considered as a low cost financing for the companies. Different variables have been used by researchers as determinants of cash holdings to test this theory. Al-Najjar and Belghitar (2011) use leverage and profitability whereas Ferreira and Vilela (2004) use size and cash flow to empirically test this theory.

## *2.2 Empirical Studies*

The amount and determinants of cash holdings have been one of the mostly researched topics in the empirical finance literature especially after 1990s. The majority of previous studies consider the data from developed countries. Most of the studies are conducted by using the USA data (Bates et al. 2009; Dittmar and Mahrt-Smith 2007; Foley et al. 2007; Martinez-Sola et al. 2013; Opler et al. 1999; Tong 2011).

Opler et al. (1999) by using the US publicly traded firms' data between 1971 and 1994 investigate the determinants and implications of cash holdings of cash and marketable securities by using the time-series and cross-section tests. They find

evidence supportive of a static tradeoff model of cash holdings. Dittmar and Mahrt-Smith (2007), by using the data of US publicly traded firms from 1990 to 2003, investigate the effect of corporate governance on firm value through its impact on cash policy. They find that corporate governance has an important impact on firm value through its impact on cash policy. Foley et al. (2007) with the sample of firms over the period 1982–2004 find a negative relationship between the firm's tax rate and its cash holdings. Tong (2011) studies the effect of firm diversification on the value of corporate cash holdings. Bates et al. (2009) argue that the US firms average cash ratio doubled from 1980 to 2006. They find a positive relationship between the riskiness of cash flows and the cash ratios, whereas they find no evidence supporting that an agency conflict leads to an increase in the cash balances.

Ozkan and Ozkan (2004) examine the determinants of cash holdings, and Al-Najjar and Belghitar (2011) investigate the relationship between dividend policy and cash holdings by using the UK data, whereas Ferreira and Vilela (2004) conducted their study within an EMU data. Garcia-Teruel and Martinez-Solano (2008) in their study related to the cash holdings use Spanish SMEs data.

The studies which use data from multiple countries include those by Dittmar et al. (2003), Guney et al. (2003), and Ramirez and Tadesse (2009). Dittmar et al. (2003) use an international sample of 45 countries. They include Brazil and India but not China or Russia in their sample in analyzing the corporate governance impact on cash holdings. Ramirez and Tadesse (2009) aim to develop a cross-sectional times series model across 49 countries to investigate the extent to which culture impacts cash holdings. Guney et al. (2003) examine cash holdings in different countries including Japan, France, Germany, and the USA. They show that firms with strong shareholder protection are in a better position to hold lower levels of cash.

Determinants of the corporate cash holdings are one of the mostly discussed subjects in these empirical studies and the independent variables that are used in these studies are mainly:

*Firm Size* Miller and Orr (1966) argue that economies of scale in cash management lead larger firms to hold less cash than smaller firms. Researchers generally find a negative relationship between the firm size and cash holdings (D'Mello et al. 2008; Fazzari and Petersen 1993; Ferreira and Vilela 2004; Kim et al. 1998; Opler et al. 1999; Ozkan and Ozkan 2004; Rajan and Zingales 1995). The explanation for this negative relationship in the literature is either the better access of larger firms to capital markets (Fazzari and Petersen 1993; Kim et al. 1998; Ozkan and Ozkan 2004) or the diversification of larger firms making them less vulnerable to financial distress (Rajan and Zingales 1995; Titman and Wessels 1988).

*Leverage* There are different findings related to the relationship leverage and cash holdings in the literature. Some scholars, such as Ferreira and Vilela (2004), who find a positive relationship argue that highly levered companies hold more cash because of the higher default risk. The researchers who find a negative relationship argue that there is a negative relationship between leverage and cash holdings because leverage can be used as a bonding mechanism to decrease the agency

costs caused by the free cash flow problem (Bates et al. 2009; D'Mello et al. 2008; Hardin et al. 2009; Kim et al. 1998; Opler et al. 1999; Ozkan and Ozkan 2004).

*Liquidity* In the literature generally findings suggest a negative relationship between liquidity and firm's cash holdings (Ferreira and Vilela 2004; Hardin et al. 2009; Ozkan and Ozkan 2004). Firms having more noncash liquid assets tend to hold less cash.

*Dividend Policy* There are contradictory findings for the dividend and cash holding relationship. There are results with positive relationship (Opler et al. 1999), negative relationship (Bates et al. 2009), and with no significant relationship (Al-Najjar and Belghitar 2011; Ferreira and Vilela 2004; Ozkan and Ozkan 2004).

*Investment Opportunities* Most previous empirical studies suggest that there is a positive relationship between investment opportunities and cash holdings (Bates et al. 2009; Ferreira and Vilela 2004; Hardin et al. 2009; Kim et al. 1998; Opler et al. 1999; Ozkan and Ozkan 2004). This can be explained by the precautionary motive concept in trade-off theory (Bates et al. 2009; Hardin et al. 2009; Ozkan and Ozkan 2004).

*Capital Expenditures* There are contradictory findings related to the capital expenditure effect on the cash holdings. Bates et al. (2009) found a negative relationship between capital expenditures and cash holdings whereas Opler et al. (1999) and Riddick and Whited (2009) suggest that firms with higher capital expenditure tend to hold more cash.

## 3 Methodology

### *3.1 Sample Selection*

Bloomberg is used as the primary database for the analyses. The countries of interest are the ones classified as "emerging and growth leading economies (EAGLEs)" by the *Banco Bilbao Vizcaya Argentaria (BBVA)* research. This classification is chosen because of its dynamic nature in that countries included in the classification are required to have expected incremental GDPs greater than the average for the G6 economies. China and India are eliminated from the sample since the database contains a disproportionately high number of companies from these countries and results would dominate the entire sample. The remaining countries are Brazil, Indonesia, Mexico, Russia, and Turkey. The period of analysis spans from 2009 to 2015.

The major stock exchanges that we use for these five countries are Bovespa, Jakarta, Mexican, Moscow, and Istanbul stock exchanges. We base our analysis on companies listed on these exchanges, and financial companies are excluded due to the distinct nature of their financial statements. The final dataset includes

**Table 1** Distribution of the companies in the sample

| Year | Brazil | Indonesia | Mexico | Russia | Turkey | Total |
|---|---|---|---|---|---|---|
| 2009 | 252 | 343 | 93 | 597 | 235 | 1521 |
| 2010 | 208 | 361 | 96 | 590 | 253 | 1508 |
| 2011 | 208 | 376 | 98 | 586 | 273 | 1541 |
| 2012 | 211 | 381 | 98 | 598 | 303 | 1591 |
| 2013 | 209 | 381 | 99 | 706 | 306 | 1701 |
| 2014 | 216 | 381 | 101 | 717 | 304 | 1719 |
| 2015 | 210 | 375 | 98 | 599 | 303 | 1585 |

319 companies from Brazil, 386 companies from Indonesia, 114 companies from Mexico, 850 companies from Russia, and 322 companies from Turkey. Due to missing observations for some companies, firms which stop being listed on the major stock exchange of their country, or firms newly becoming public, the data is unbalanced. The distribution of the sample according to the years and countries is summarized on Table 1 below. As can be seen, the highest number of observations was achieved in 2014 with 1719 companies while the lowest number was recorded in 2010 with 1508 companies.

## *3.2 Variables*

Given the objective of the study, cash ratio (CASH) computed as the ratio of a company's cash and cash equivalents to its total assets is employed as the dependent variable in our analyses. Based on previous literature, the following variables are included as potential determinants of cash holdings. First, we include the leverage ratio (LEV) calculated as the ratio of total debt to total assets. Profitability is measured by the return on assets (ROA) computed as the ratio of net income to total assets. We also include a company's liquidity ratio (LIQ) calculated by diving its most liquid assets to its current liabilities. Growth opportunities are captured by the Tobin's Q (TQ) which is measured as the market value of equity plus the book value of debt, divided by the book value of assets. The level of investments is proxied by the ratio of capital expenditures to net sales (CAPEX). The final variable which is included into the analysis is firm size (SIZE) measured by the natural logarithm of total assets.

Based on previous literature, we expect the independent variables to have the following signs: Regarding the effect of leverage, the pecking order theory suggests a negative relationship between debt levels and cash holdings simply because as firms' internal funds increase, their leverage falls. The prediction of the trade-off theory is inconclusive: On the one hand, the firm's current leverage ratio acts as a proxy for its ability to borrow in the future. Hence, highly leveraged firms will hold less cash. On the other hand, debt increases the probability of bankruptcy, so firms with more debt will have a higher level of cash holdings. Based on these, the

direction of the association between leverage and cash holdings cannot be assessed a priori.

According to pecking order theory, less profitable firms hold less cash and use debt for financing. Hence, we anticipate a positive association between ROA and cash holdings. Firms with more liquid assets can easily convert these assets into cash. This is also in line with the trade-off theory which suggests that other liquid assets are substitutes for cash. Therefore, we expect a negative relationship between liquidity and cash holdings. Regarding growth opportunities, both the trade-off theory and the pecking order theory suggest that firms with more growth opportunities are more likely to hold cash. Hence, we anticipate a positive association between Tobin's Q and CASH variables. The sign of the CAPEX variable cannot be assessed a priori. According to trade-off theory, a positive relationship between cash holdings and investments is expected because firms hold cash to avoid the costs of external borrowing and be able to undertake profitable projects. However, under the pecking order theory, firms use their accumulated cash to finance their investments so that as the level of investments increases cash holdings decrease.

We also do not predict the sign of the association between firm size and cash holdings. The trade-off theory suggests a negative relation between these two variables. Small firms tend to hold more cash because the cost of external borrowing is higher and they face a higher probability of financial distress. Moreover, larger firms need less cash due to economies of scale. On the other hand, the pecking order theory suggests a positive relationship between firm size and cash holdings simply because larger firms have a higher scale of operations and thus have more cash.

## 3.3 Estimation

Using the variables introduced in the previous section, the following model will be estimated to investigate the determinants of corporate cash holdings.

$$\begin{aligned}\mathrm{CASH}_{it} = \beta_0 + \beta_1\mathrm{CASH}_{it-1} + \beta_2\mathrm{LEV}_{it} + \beta_3\mathrm{ROA}_{it} + \beta_4\mathrm{LIQ}_{it} + \beta_5\mathrm{TQ}_{it} \\ + \beta_6\mathrm{CAPEX}_{it} + \beta_7\mathrm{SIZE}_{it} + \varepsilon_{it}\end{aligned} \tag{1}$$

where $\mathrm{CASH}_{it}$, $\mathrm{LEV}_{it}$, $\mathrm{ROA}_{it}$, $\mathrm{LIQ}_{it}$, $\mathrm{TQ}_{it}$, $\mathrm{CAPEX}_{it}$, and $\mathrm{SIZE}_{it}$ denote the cash ratio, leverage ratio, return on assets, liquidity ratio, Tobin's Q, and size for firm $i$ in year $t$, respectively, $\mathrm{CASH}_{it-1}$ denotes the lagged value of the dependent variable, while $\varepsilon_{it}$ denotes the error term.

Since the lagged value of the dependent variable is included among the regressors, ordinary least squares estimates will be inconsistent due to correlation between $\mathrm{CASH}_{it-1}$ and the error term. In addition, potential endoegenity problems may arise if factors which affect cash holdings also affect some of the independent

**Table 2** Correlation matrix

| | LEV | ROA | LIQ | TQ | CAPEX | SIZE |
|---|---|---|---|---|---|---|
| LEV | 1 | | | | | |
| ROA | −0.3286 | 1 | | | | |
| LIQ | −0.4052 | 0.2553 | 1 | | | |
| TQ | −0.1129 | 0.2808 | 0.0879 | 1 | | |
| CAPEX | 0.1044 | −0.0235 | −0.0318 | 0.0036 | 1 | |
| SIZE | 0.0736 | 0.1916 | −0.0789 | 0.0755 | 0.0296 | 1 |

variables. For these reasons, we estimate the model by applying the Arellano–Bond (1991) generalized method of moments (Bigelli and Sánchez-Vidal 2012).

To control for industry effects and different macroeconomic conditions, industry dummies and country dummies are included in the model. To control for outliers, we winsorize all the variables at the 5th and 95th percent for their distributions (Campbell et al. 2008). To address potential heteroscedasticity, robust standard errors developed by White (1980) will be reported. Table 2 shows the correlation matrix among the independent variables. As can be seen, all correlations are below 0.7; hence, multicollinearity is not a concern (Lehmann et al. 1988).

## 4 Results

The descriptive statistics on our variables for each country and for the total sample are displayed in Table 3 below. According to these statistics, companies in our sample have relatively low levels of cash holdings as represented by 8 % of total assets in Brazil, 9 % in Indonesia, 7 % in Mexico, 4 % in Russia, and 8 % in Turkey. Cash holdings as a percentage of total assets record a mean value of 7 % for the entire sample.

Estimation results which are displayed in Table 4 below show that several firm-specific factors significantly affect corporate cash holdings. First, firms which use higher leverage in their capital structure hold more cash. Second, the positive and statistically significant coefficient of the ROA variable indicates that more profitable firms have higher levels of cash holdings. Another finding that emerges from our analysis is that firms having higher amounts of alternative liquid assets have less cash and cash equivalents. Investments and firm size also have a negative and statistically significant impact on the level of cash holdings. Finally, the level of cash holdings is positively related to its value in the previous period as given by the positive and statistically significant coefficient of the lagged dependent variable. Growth opportunities measured by Tobin's Q do not have a statistically significant impact on the level of cash holdings.

**Table 3** Descriptive statistics

| Variable | Obs | Mean | Std. dev. | Min | Max | Obs | Mean | Std. dev. | Min | Max |
|---|---|---|---|---|---|---|---|---|---|---|
| | Brazil | | | | | Indonesia | | | | |
| CASH | 1442 | 0.0785 | 0.0770 | 0.0006 | 0.2734 | 2414 | 0.0942 | 0.0872 | 0.0006 | 0.2734 |
| LEV | 1430 | 0.2804 | 0.1833 | 0.0000 | 0.6453 | 2394 | 0.2525 | 0.1972 | 0.0000 | 0.6453 |
| ROA | 1441 | 0.0320 | 0.0752 | −0.1329 | 0.1874 | 2393 | 0.0445 | 0.0751 | −0.1329 | 0.1874 |
| LIQ | 1442 | 1.8305 | 1.3422 | 0.4012 | 7.0955 | 2401 | 1.9603 | 1.6624 | 0.4012 | 7.0955 |
| TQ | 1297 | 1.4893 | 0.8241 | 0.6267 | 3.7432 | 1906 | 1.5911 | 0.9203 | 0.6267 | 3.7432 |
| CAPEX | 1318 | 0.0877 | 0.1062 | 0.0008 | 0.3960 | 2367 | 0.1012 | 0.1202 | 0.0008 | 0.3960 |
| SIZE | 1385 | 7.1641 | 1.8270 | 3.1769 | 12.7286 | 2368 | 11.5873 | 3.7534 | 3.1769 | 14.9788 |
| | Mexico | | | | | Russia | | | | |
| CASH | 678 | 0.0742 | 0.0633 | 0.0006 | 0.2734 | 4078 | 0.0435 | 0.0617 | 0.0006 | 0.2734 |
| LEV | 671 | 0.2593 | 0.1719 | 0.0000 | 0.6453 | 3986 | 0.2239 | 0.2126 | 0.0000 | 0.6453 |
| ROA | 679 | 0.0335 | 0.0609 | −0.1329 | 0.1874 | 4079 | 0.0319 | 0.0773 | −0.1329 | 0.1874 |
| LIQ | 679 | 2.0071 | 1.4054 | 0.4012 | 7.0955 | 4076 | 2.0873 | 1.7872 | 0.4012 | 7.0955 |
| TQ | 581 | 1.5422 | 0.6795 | 0.6267 | 3.7432 | 1154 | 1.1367 | 0.6134 | 0.6267 | 3.7432 |
| CAPEX | 669 | 0.0758 | 0.0924 | 0.0008 | 0.3960 | 3143 | 0.0676 | 0.0877 | 0.0008 | 0.3960 |
| SIZE | 678 | 9.1887 | 1.7923 | 3.1769 | 13.7037 | 4039 | 8.0285 | 2.0513 | 3.1769 | 14.9788 |
| | Turkey | | | | | Total sample | | | | |
| CASH | 1879 | 0.0812 | 0.0850 | 0.0006 | 0.2734 | 10491 | 0.0687 | 0.077683 | 0.0006 | 0.2734 |
| LEV | 1864 | 0.2216 | 0.1898 | 0.0000 | 0.6453 | 10345 | 0.2402 | 0.199776 | 0 | 0.6453 |
| ROA | 1877 | 0.0291 | 0.0768 | −0.1329 | 0.1874 | 10469 | 0.0344 | 0.075655 | −0.133 | 0.1874 |
| LIQ | 1880 | 2.0767 | 1.7030 | 0.4012 | 7.0955 | 10478 | 2.0158 | 1.667089 | 0.4012 | 7.0955 |
| TQ | 1732 | 1.4068 | 0.7429 | 0.6267 | 3.7432 | 6670 | 1.4406 | 0.80407 | 0.6267 | 3.7432 |
| CAPEX | 1758 | 0.0781 | 0.1022 | 0.0008 | 0.3960 | 9255 | 0.0817 | 0.103359 | 0.0008 | 0.396 |
| SIZE | 1861 | 5.3432 | 1.7537 | 3.1769 | 11.1529 | 10331 | 8.3207 | 3.22332 | 3.1769 | 14.979 |

**Table 4** Empirical results

| | Coef. | Std. err. | *z* | Sign. | [95 % conf. interval] | |
|---|---|---|---|---|---|---|
| $CASH_{t-1}$ | 0.3752 | 0.0361 | 10.39 | *** | 0.3044 | 0.4460 |
| LEV | 0.0444 | 0.0131 | 3.4 | *** | 0.0188 | 0.0700 |
| ROA | 0.0630 | 0.0197 | 3.2 | *** | 0.0244 | 0.1016 |
| LIQ | −0.0130 | 0.0012 | −11.08 | *** | −0.0153 | −0.0107 |
| TQ | 0.0014 | 0.0024 | 0.59 | | −0.0033 | 0.0061 |
| CAPEX | −0.0586 | 0.0141 | −4.17 | *** | −0.0861 | −0.0311 |
| SIZE | −0.0050 | 0.0031 | −1.64 | * | −0.0110 | 0.0010 |
| Constant | 0.0599 | 0.0284 | 2.11 | ** | 0.0042 | 0.1157 |
| *N* | 4156 | | | | | |
| Wald $chi^2(7)$ | 304.09 | | | | | |
| Prob > $chi^2$ | 0 | | | | | |

***, **, and * denote significance at 1, 5, and 10 %, respectively

## 5 Conclusion

The objective of this chapter was to investigate the determinants of corporate cash holdings five emerging markets, namely Brazil, Indonesia, Mexico, Russia, and Turkey. We used data from 1991 public firms for the period between 2009 and 2015. The model was estimated by Arellano–Bond dynamic generalized method of moments, and estimations results showed that several firm-specific factors significantly affect corporate cash holdings and that both the trade-off and pecking order theories play a significant role in explaining the cash holdings for firms in emerging markets.

First, firms which use higher leverage in their capital structure hold more cash. This is in line with the trade-off theory and suggests that highly leveraged firms may choose to hold high amounts of cash in order to avoid potential bankruptcy costs which are even higher in the case of emerging markets. Second, in line with pecking order theory, more profitable firms are shown to have higher levels of cash holdings. As anticipated, another finding that emerges from our analysis is that firms having higher amounts of alternative liquid assets have less cash and cash equivalents. Investments have a negative effect on cash holdings. In line with pecking order theory, this finding suggest that firms use their accumulated cash to finance their investments so that as the level of investments increases cash holdings decrease. Our results also point to a negative association between firm size and cash levels. This is consistent with the trade-off theory which suggests that small firms tend to hold more cash because the cost of external borrowing is higher and they face a higher probability of financial distress. Finally, the level of cash holdings is positively related to its value in the previous period as given by the positive and statistically significant coefficient of the lagged dependent variable. Growth opportunities measured by Tobin's Q do not have a statistically significant impact on the level of cash holdings, contrary to the majority of previous studies in the literature.

Although this study provided insight about the factors affecting cash holdings in emerging markets, it also suffers from a number of limitations. First, it considered only internal firm-specific determinants of cash holdings. Second, some variables including dividends, taxes, or ownership could not be incorporated due to data or scope limitations. In addition to addressing those limitations, future studies could also investigate the issue in a larger sample and a longer period of a time.

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