Cash is King: Speed of Adjustment in Latin American Firms' Cash Holdings During the COVID-19 Pandemic

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This study investigates the speed of cash holdings adjustments in Latin American firms during the tumultuous COVID-19 pandemic. By examining firm-specific details, industry characteristics, and the overarching economic climate, we uncover the intriguing patterns of cash reserve management. Our results show that Latin American firms displayed a swift agility to adjust their cash reserves, with an adjustment speed of 54.9%, compared with the average speed of 31% observed in firms in the developed world. Moreover, during the pandemic's peak in 2020 and 2021, this speed surged to 62.5%. However, we observe that multinational corporations in the region lagged, showing slower cash adjustment speeds than firms with only local operations during the COVID-19 pandemic.

Keywords: cash holdings, adjustment speed, cash reserve management, COVID-19 pandemic, emerging markets

INTRODUCTION

The accumulation and management of corporate cash reserves have become a topic of increasing interest, particularly in the context of recent global events. A striking example is observed in the substantial cash reserves held by a select group of multinational corporations. As of early February 2022, a mere thirteen companies commanded an astonishing total of over $1 trillion in cash and equivalents.[1] Leading the pack were tech giants such as Apple with $202.6 billion, Alphabet holding $169.2 billion, Microsoft at $132.3 billion, and Amazon with $86.2 billion. This phenomenon of cash accumulation is influenced by various factors, including the aftermath of the COVID-19 pandemic, complex global supply chain challenges, tax considerations relating to cash repatriation, and the enduring impacts of the 2008 financial crisis. These factors together pique interest in a deeper analysis of cash management strategies within firms, with a particular focus on Latin American companies and their responsiveness to cash flow adjustments in this complex economic landscape, specifically during the COVID-19 pandemic.

The strategic adjustment of cash reserves is critical for firms navigating the constantly changing global business and economic environments. This strategy becomes especially crucial during periods of systemic upheaval - be it financial turbulence, liquidity crunches, or widespread health emergencies - where quick financial adjustments are vital to sustain operations and stave off fiscal hardship. Latin American corporations are no strangers to such upheavals, having weathered the storm of the 2008 financial meltdown

and the recent COVID-19 health crisis. These events have cast long shadows over their cash management practices.

Latin America, a region of varied economic, societal, and political structures, presents a unique stage where regional traits deeply influence corporate strategies. Despite the impressive strides in economic advancement, with many nations enjoying rapid growth and heightened international investments, the region's reliance on commodity exports and the ingrained socioeconomic disparities make it sensitive to worldwide financial upheavals. Such shocks reverberate through the financial markets, restricting credit options and magnifying business uncertainties. Consequently, these dynamics have heightened the precariousness and unpredictability within these economies and underscored the importance of prudent cash reserve strategies for companies. In light of these considerations, the cash holding patterns in Latin American firms have emerged as a compelling focal point for scholarly research and warrant further investigation.

Several studies have attempted to explain the cash management of firms, but most focus on firms in developed countries such as the United States (Opler et al., 1999; Bates et al., 2009; Dittmar & Mahrt-Smith, 2007; Jiang & Lie, 2016, Orlova & Sun, 2028). There is little empirical research on the cash management of firms in developing countries. As such, we attempt to fill the gap in the literature by looking at Latin American firms' cash holding adjustments. This study explores the factors driving cash holding adjustment speed in Latin American firms during the COVID-19 pandemic. Specifically, we examine the impact of firm-level characteristics, industry characteristics, and macroeconomic conditions on cash holding behavior. More importantly, we examine the cash holdings adjustment speeds for Latin American firms over a period that includes the COVID-19 pandemic and investigate whether there is a difference in adjustment speeds between firms with international operations (MNCs) and firms with only domestic operations. This topic has attracted increasing interest among researchers, as understanding the factors driving the speed of cash holding adjustments in Latin American firms during global systemic shocks can provide valuable insights into their financial decision-making processes and inform policy decisions to promote economic stability and resilience in the region.

This study makes several pertinent contributions to the literature. To the best of our knowledge, this paper is the first to address the level of cash holding adjustments in Latin American firms during the COVID-19 pandemic. Second, although many studies address cash holding adjustments in firms in developed countries, there are very few research studies on the topic for firms in emerging markets such as Latin America. This study shows that the cash adjustment speed for firms in the region is generally higher than that of firms in developed countries. This study also adds to the literature by showing that the cash adjustment speed for Latin American firms was higher during the global shock of the COVID-19 pandemic. Third, this study compares the cash adjustment speed of purely domestic Latin American firms with that of MNCs. In general, we find that the cash adjustment speed is slower for Latin American MNCs than for Latin American firms with only domestic operations. Moreover, this finding persists during the COVID-19 pandemic. Finally, this study adds to the literature by examining the specific firm characteristics that impact the cash adjustment speed of Latin American companies.

The remainder of the paper proceeds as follows. Section 2 reviews the literature, Section 3 describes the data, Section 4 presents the methodology, Section 5 presents the empirical results, and Section 6 presents the conclusions.

LITERATURE REVIEW

The literature on cash holding management is extensive, with many studies examining the factors influencing firms' cash holdings. Specifically, many studies have investigated the impact of firm-specific characteristics, such as size, profitability, and growth opportunities, on cash holding behavior (Al-Najjar, B., 2013; Fernandes & Gonenc, 2016; Foley et al., 2007). For example, smaller, riskier firms may hold more cash as a cushion against financial distress, while larger, less risky firms may have better access to credit and may hold less cash as a result. Opler et al. (1999) and Bates et al. (2009) find that the amount of cash held by firms is positively related to capital expenditures, industry volatility, cash flow, cash flow

volatility, and R&D expenses and negatively related to net working capital, leverage, firm size, dividend payout, and acquisitions.

One of the most cited theories governing cash holding behavior is the trade-off between liquidity and profitability, which infers that firms need to balance the costs of holding cash, such as lower returns and lost investment opportunities, against the benefits of having cash on hand to meet unexpected expenditures or take advantage of new opportunities. In the trade-off theory, if a firm moves from the optimal level of cash, it should return to that optimal cash level fairly quickly. This is referred to as the speed of adjustment. Venkiteshwaran (2011), Dittmar & Duchin (2011), Gao et al. (2013), Bates et al. (2018), and Orlova & Rao (2018) all find that the speed of adjustment changes with firm characteristics. In terms of debt levels and the speed adjustments, studies show that institutional factors influence differences in debt levels and the speed of adjustment, as less risky firms have lower transaction costs associated with changing a firm's debt level (Oztekin & Flannery, 2012 and Oztekin, 2015). This trade-off is particularly relevant during times of economic uncertainty when the benefits of holding cash may outweigh the costs.

The agency theory put forth by Jensen (1986) states that managers prefer holding cash over debt or equity because cash holdings increase their perquisite consumption opportunity. On the other hand, debt and equity are usually characterized by increased external monitoring (Jensen & Meckling, 1976). Orlova & Sun (2018) investigate the institutional determinants of cash holdings' speed of adjustment and find that agency conflicts are a key factor for cash management and speed of adjustment in international spaces. The authors find that the quality of regulatory systems and investor rights have statistically significant effects on cash policies and speed of adjustment back to optimal cash levels. Specifically, firms in countries with superior political and legal systems move from optimal cash levels less frequently and adjust back to optimal faster than firms in countries with substandard political and legal systems. Also, the authors find that cash holdings are adjusted back to optimal levels quicker in countries where investor rights are well-protected. Jiang & Lie (2016) find that firms close about 31% of the gap between actual and target cash levels each year, but the level of entrenchment of the firm directly influences the adjustment speed. The authors find that an increase in entrenchment significantly decreases cash adjustment at high levels, causing such firms to carry higher cash balances.

In the context of global systemic shocks, there is a growing body of literature on the impact of economic and financial crises on cash holding behavior. For example, a study by Batuman et al. (2022), which examined the effect of the global financial crisis on the determinants of corporate cash holdings and adjustments towards optimal cash levels using a sample of Eastern European firms, found lower adjustment speeds to reach optimal cash levels in the post-crisis period. Another study by Song & Lee (2012), which investigated the long-term impact of the Asian financial crisis on corporate cash holdings in 8 East Asian countries, found that Asian firms increased cash holdings by decreasing investment activities after the crisis. The authors conclude that the increase in cash holdings directly resulted from firms systematically changing their cash holding policies. They cite the firms' increased sensitivity to cash flow volatility as one of the main determinants of the higher level of their cash holdings after the Asian financial crisis.

There has been limited research on cash holding behavior in Latin American firms, particularly in the context of financial constraints and access to credit, so there is still much to be explored in terms of the impact of global systemic shocks such as the COVID-19 pandemic on cash holding behavior in the region. Artica et al. (2019) investigate whether the trade-off or the pecking order theories explain cash holding behavior in Latin American firms. The authors find an increasing trend for cash holdings in a sample of Latin American firms between 2000 and 2014. Moreover, they find that net leverage and short-term debt showed a declining trend over the same period. Their findings support the trade-off theory.

Melgarejo Duran & Stephen (2021) examine the determinants of corporate cash holdings for a sample of Latin American domestic and multinational corporations (MNCs) before and after the 2008 financial crisis. The authors find that MNCs have higher cash holdings than domestic firms. Moreover, before the financial crisis, there was no statistical difference between the two groups in terms of cash held in their accounts. However, the authors note that MNCs have higher cash holdings after the financial crisis than domestic firms. As a result, the authors surmise that internationalization appears to mitigate the impact of

global economic shocks in Latin American firms as the negative effect of political risk (which tends to be very high in the region) on cash holdings is less pronounced for MNCs.

Alvarez et al. (2012) examine the effect of adverse liquidity shocks on cash holdings by analyzing Chilean firms. They find that liquidity crises negatively and significantly affect cash holdings for small firms but not for medium-sized and large firms. Moreover, the authors document that liquidity crises prevent firms from fully adjusting to target cash holdings, and medium-sized firms find it more challenging to change their cash holdings compared to small and large firms. Arata et al. (2015) investigate cash holdings and their determinants by looking at the relationship between the degree of internationalization and the level of corporate cash holdings in Brazilian and Mexican firms. The authors find that the firms in their sample had fewer cash holdings before the 2008 financial crisis, and the degree of internationalization had an effect on the level of Latin American firms' cash holdings.

Overall, the literature asserts that cash holding behavior in Latin American firms during global financial/liquidity shocks is influenced by several factors, including the trade-off between liquidity and profitability, firm-specific determinants, macroeconomic conditions, financial constraints, access to credit, government policies, and other risk factors. By understanding these factors, management, governments, and policymakers can make more informed decisions about cash management strategies during times of economic uncertainty. However, more research is needed to fully understand the complex relationships between these factors and cash holding behavior in Latin American firms.

Our study adds to the body of research by exploring cash holdings adjustments in Latin American firms during the COVID-19 pandemic. In addition, it explores the differences in cash adjustment speed between MNCs and firms with purely domestic operations. This study is warranted as there is a lack of research on cash holdings adjustment speed in developing countries during the COVID-19 pandemic.

DATA

We collect firm-year observations from Economatica over the sample period from 2017 to 2021. Three years of observations constitute the pre-covid sample (2017 to 2019), and two years of observations correspond to the Covid period (2020 and 2021). Our analysis includes public firms from Argentina, Brazil, Chile, Mexico, and Peru. We require firms to have positive assets and sales. Financial firms and utilities are excluded from the sample because their cash holdings can be subject to country-specific regulatory supervision. Our final sample includes 2,515 firm-year observations that correspond to 561 firms. In addition to collecting financial information, five MBA students from a renowned Latin American business school, under the guidance and supervision of one of the authors, thoroughly examined each company using their websites, annual reports, and archival data to determine whether the firms have international operations and, if it is the case, the year in which firms started international operations.

Table 1 presents the distribution of the firm-year observations by country and industry. Almost 46% of our observations are from Brazil, which is reasonable given the size of the Brazilian stock market compared to the size of the other stock markets in Latin America. Our sample has a comparatively fair representation of all the relevant industries in the region.

METHODOLOGY

We begin our empirical analysis with contemporaneous (by year and country) cash ratio regressions against variables used in previous literature to study the determinants of cash holdings. These form the first-stage regressions for our later estimates of adjustment speeds. Specifically, we use the predicted values from the contemporaneous regressions by year and country (Base Model) as firms' target ratios.

Base Model:

$$Cash\ Holding_{i,t} = \alpha_0 + \alpha_1 Size_{i,t} + \alpha_2 Age_{i,t} + \alpha_3 Capex_{i,t} + \alpha_4 Dividend + \alpha_5 TobinQ$$
$$+ \alpha_6 Cash\ Flow_{i,t} + \alpha_7 NWC_{i,t} + \alpha_8 Leverage_{i,t} + \alpha_9 IndCfVol_{i,t} + e_{i,t} \qquad (1)$$

We follow previous studies (Opler et al.,1999; Bates et al., 2009; and Dittmar and Duchin, 2011) to determine the independent variables of our Base Model, which include firm size, age, dividend dummy, Tobin's Q, cash flow, net working capital, capital expenditure, and leverage ratio. Table 2 presents the definition of the main variables used in this study.

Table 4 presents pooled regressions with the Base Model's year-fixed effects and industry-fixed effects. It is important to note that we estimate five regressions by country, one for each year in our sample, for the first stage to allow for changes in cash determinants and target ratios over time. The primary benefit of regressions by year and country is to allow time and country-specific varying determinants for a target level of cash holdings.

We use the predicted values from the Base Model to determine each firm's cash target following the methodology described in Jiang & Lie (2016). We define the variable *Deviation from target* $_{i,t}$ as the difference between firm i's target cash holding level in year t, proxied by the predicted values from the regressions in Table 4 (Base Model) and the firm i's cash holding in year t-1.

In the second step of the analysis, we estimate the following model:

$$Cash_{i,t} - Cash_{i,t-1} = \alpha_1 \text{ Deviation from target }_{i,t} + e_{i,t-1} \qquad (2)$$

The coefficient α_1 measures the cash adjustment speed. To explore whether the firm cash adjustment speed differs for firms with international operations, we include the variable *International* $_{i,t}$, which is a dummy variable that equals one if firm i has international operations in year t, zero otherwise. Finally, to test if the cash adjustment speed is different during the COVID-19 pandemic, we include a dummy variable *Covid* $_{i,t}$, which takes the value of 1 if the observation corresponds to years 2020 and 2021 and zero otherwise. Also, to evaluate whether the effects of international operations and the COVID-19 pandemic differ depending on their cash levels, we rerun the analysis for two samples: firms with cash levels above their targets and firms with cash below their targets.

Finally, to evaluate the impact of the cash determinants on the cash adjustment speed before and after the COVID-19 pandemic, we estimate the coefficient of the following model:

$$Cash_{i,t} - Cash_{i,t-1} = \alpha_0 \text{ Deviation from target }_{i,t} + \alpha_1 Size_{i,t} + \alpha_2 Age_{i,t} + \alpha_3 Capex_{i,t}$$
$$+ \alpha_4 Dividend_{i,t} + \alpha_5 TobinQ_{i,t} + \alpha_6 Cash Flow_{i,t} + \alpha_7 NWC_{i,t} + \alpha_8 Leverage_{i,t}$$
$$+ \alpha_9 IndCfVol_{i,t} + \alpha_{10} \text{Deviation from target }_{i,t} * Size_{i,t}$$
$$+ \alpha_{11} \text{Deviation from target}_{i,t} * Age_{i,t} + \alpha_{12} \text{Deviation from target }_{i,t} * Capex_{i,t}$$
$$+ \alpha_{13} \text{Deviation from target}_{i,t} * Dividend_{i,t} + \alpha_{14} \text{Deviation from target }_{i,t} * TobinQ_{i,t}$$
$$+ \alpha_{15} \text{Deviation from target}_{i,t} * Cash Flow_{i,t} + \alpha_{16} \text{Deviation from target }_{i,t} * NWC_{i,t} + \alpha_{17} \text{Deviation from}$$
$$target_{i,t} * Leverage_{i,t} + \alpha_{18} \text{Deviation from target}_{i,t} * IndCfVol_{i,t}$$
$$+ \alpha_{19} \text{Deviation from target}_{i,t} * \text{Deviation from target}_{i,t} + e_{i,t-1} \qquad (3)$$

The interaction variables between *Deviation from target* $_{i,t}$ and the determinants of cash holdings show the effect of each cash determinant on the firm's cash adjustment speed. We run the analysis for the entire sample and then for the periods before and during the COVID-19 pandemic.

EMPIRICAL RESULTS

Table 3 shows the descriptive statistics of the main variables included in the analysis. The mean (median) cash and cash equivalents scaled by assets across all our firm-year observations is 4.9% (1.8%). Almost 51.3% of our sample have international operations, and 36.9% correspond to the Covid sample.

Table 4 presents the regression results of the determinants of cash holding in our sample (Base Model). The results are consistent with those reported in earlier studies (Bates *et al.*, 2009). In Latin America, younger firms with more capital expenditures and leverage ratios retain less cash. The coefficients of the variables Dividends, TobinQ, Cash Flow, and IndCfVol are positive and statistically significant. Firms with higher levels of investment opportunities and firms with more industry risk hold larger cash balances.

Estimation of Target and Overall Speed of Adjustment

Table 5 presents the regression results of the change in cash holding between year t and t-1 and the deviation between the cash target in year t and cash levels at year t-1. The coefficient on the *Deviation from the target $_{i,t}$* is 0.549 (p-value<0.01), implying that the cash ratio's estimated adjustment speed is, on average, 54.9% each year. It is higher than the cash level adjustment speed of 31% found in developed economies (Jiang & Lie, 2016).

We start our analysis by evaluating whether Latin American MNCs have different adjustment speeds than firms with only local operations. Table 5 shows that the adjustment speed is faster for Latin American MNCs. The interaction coefficient between *Deviation from Target $_{i,t,}$* and *International $_{i,t}$* is positive and statistically significant: 0.093, p-value<0.05 (Model 2) and 0.174, p-value<0.01 (Model 4). Generally, firms with international operations can adjust their cash levels to targets over the entire sample period faster. We surmise that MNCs may have more financial flexibility, credit access, and investment opportunities, allowing them to adjust their cash to target levels faster. In addition, MNCs are better at diversifying their risk, which gives them the financial flexibility to adjust to target levels faster.

We then evaluate whether the cash adjustment speed differs during the COVID-19 pandemic. Our results (Table 5) show that the adjustment speed is faster during that period. The coefficient of the variable *Deviation from Target $_{i,t}$* and *Covid$_t$* is positive and statistically significant: 0.136, p-value <0.01(Model 3) and 0.241, p-value<0.01 (Model 4). We find that Latin American firms increased their adjustment speeds substantially to 62.5% during the pandemic[2]. This is not surprising as the pandemic brought with it an unexpected level and type of risk, and Latin American firms may have felt more comfortable operating at optimal cash levels during this highly uncertain period to mitigate risk.

Interestingly, we find that the faster adjustment speed during the COVID-19 pandemic is only significant for firms with domestic operations. Notably, Latin American MNCs had lower cash adjustment speeds during the COVID-19 pandemic when compared with purely domestic firms. The interaction of the variables *Deviation from Target $_{i,t}$*, *Covid$_t$, and International $_{i,t}$* is negative and statistically significant (-0.164, p-value<0.05). We conclude that Latin American MNCs had slower adjustment speeds during the COVID-19 pandemic for the following reasons: (1) They have operations that include more complex financial structures, including intercompany transfers, tax considerations, and regulatory compliance across multiple jurisdictions. This added complexity can slow the ability to respond promptly to cash imbalances; (2) Many Latin American countries impose capital controls, restrictions on currency conversion, or repatriation limits. These regulations can delay the movement of cash across borders and slow the adjustment to optimal cash levels; (3) MNCs incur higher transaction costs when moving money between countries. These costs might make firms less inclined to adjust cash balances frequently, leading to slower adjustment speeds; and (4) MNCs usually have diversified revenue streams from multiple markets, which can create variability in cash inflows. As a result, the need for immediate cash adjustments (even during the COVID-19 pandemic) may have been perceived as less urgent compared to a domestic firm dependent on a single market.

To evaluate whether the impact of internationalization or the COVID-19 pandemic on the cash adjustment speed is the same for firms with cash levels above or below their target levels, we rerun the analysis of these two subsets of firms. Table 6 presents the analysis for firms with cash levels above their target levels. The results show that the cash adjustment speed is not statistically significant for MNCs, but the cash adjustment speed is faster during the COVID-19 pandemic. When analyzing the entire sample, the coefficient of the interaction between *Covid$_t$* and *Deviation from target$_{i,t}$* variables is positive and statistically significant (0.424, p-value>0.01), supporting the faster adjustment speed. However, the cash adjustment speed is slower for MNCs during the COVID-19 pandemic. The coefficient of the interaction of the variables *Deviation from target$_{i,t}$*, *Covid$_t$, and International $_{i,t}$* is negative and statistically significant (-0.152, p-value<0.05). MNCs with high cash levels found it more difficult to adjust their cash levels during the COVID-19 pandemic. We surmise that MNCs prefer to retain higher levels of cash as a precautionary measure in periods of high risk and uncertainty. It is also possible that MNCs could not find profitable investment opportunities given the high level of uncertainty during the pandemic.

Table 7 presents the analysis for firms with cash levels below their target. The cash adjustment speed is slower for the entire sample of firms with below target cash levels during the COVID-19 pandemic. The

interaction of the variables *Deviation from Target* $_{i,t}$ and *Covid$_t$* is negative and statistically significant (-0.108, p-value<0.05). We conclude that, overall, firms with low cash levels found it more challenging to adjust their cash levels during the COVID-19 pandemic. However, the results show that the cash adjustment speed is faster and statistically significant for MNCs with cash levels below their target. The coefficient of the interaction between *Deviation from target* $_{i,t}$ and *International$_{i,t}$* is positive and statistically significant (0.146, p-value<0.01). We surmise that Latin American MNCs can generally increase cash levels to meet target levels, compared to firms with only domestic operations, as they have greater access to international capital markets and can leverage internal capital markets by reallocating cash and other resources.

Estimation of Target and Speed of Adjustment for Cash Holdings Determinants

Table 8 presents the effects of the cash holdings determinants on cash adjustment speed during the COVID-19 pandemic. The first column presents the results for the entire sample. The coefficients on the interaction variables between *Deviation from target* $_{I,t}$ and *Size, Age, leverage, and InfCfVol* are positive and statistically significant. Consistent with previous conjectures, larger and older firms and firms with higher volatility of industry cash flows have higher adjustment speeds. Interestingly, the adjustment speed for firms with more financial risk (higher leverage ratios and more industry cash flow volatility) is higher only during the COVID-19 pandemic. It is also interesting to evaluate whether the distance between the actual cash level and the target level plays a role in the speed of adjustment. To test this, we include the squared cash deviation in the model. The coefficient is positive and statistically significant (1.899, p-value<0.001) only for the sample during the COVID-19 pandemic. The higher the difference between the cash level and the cash target level, the faster Latin American firms adjust their cash holdings during the pandemic.

Robustness

We run some robustness checks to test the validity of our findings. First, we use other measures of Cash Holding $_{i,t}$, such as cash as a percentage of non-cash assets, obtaining similar results as those presented in our main results. We note that observations from Brazil represent almost 46% of the sample; therefore, we run the analysis without Brazilian firms, and the primary results of the paper persist. Finally, we estimate the model using one period-lagged independent variable to verify that our model does not have simultaneity and reverse causality problems (Leszczensky & Wolbring, 2019). The results are consistent with the main conclusions of the paper.

CONCLUSION

Many studies have examined firms' cash management policies by estimating cash balances and their cross-sectional determinants for firms in developed countries. This study examines the speed of cash holding adjustments in Latin American firms, with a particular focus on the effects of internationalization and the COVID-19 pandemic. Our findings highlight several key insights into the determinants and dynamics of cash adjustment behavior in this region.

First, Latin American firms, on average, exhibit a higher cash adjustment speed (54.9%) compared to developed economies (31%). The faster adjustment rate may reflect the higher economic volatility in Latin America, which necessitates a more agile response to deviations from optimal cash levels. Firms with international operations (MNCs) further accelerate this adjustment process, benefiting from greater financial flexibility, credit access, and risk diversification.

Second, the COVID-19 pandemic significantly influenced cash adjustment dynamics. During the pandemic, the overall adjustment speed increased to 62.5%, reflecting firms' prioritization of maintaining optimal cash levels amid heightened uncertainty. Notably, firms with domestic operations exhibited faster cash adjustments during the pandemic, while MNCs experienced slower adjustment speeds. The complexity of international operations, including regulatory constraints, transaction costs, and diversified revenue streams, likely contributed to this divergence.

Third, the analysis of firms with cash levels above and below their targets during the pandemic revealed nuanced differences. Firms with above-target cash levels generally adjusted more slowly, especially MNCs, due to the challenges of reallocating excess cash. Conversely, MNCs with below-target cash levels exhibited faster adjustments, leveraging international capital markets and internal resource reallocations to address deficits. However, firms with below-target cash levels across the board faced difficulties in adjusting during the pandemic, underscoring the challenges of liquidity management in times of crisis.

Finally, the study finds that specific firm characteristics influence cash adjustment speeds during the pandemic. Larger and older firms, as well as those with higher financial risk (e.g., elevated leverage and industry cash flow volatility), adjusted cash levels more rapidly. The degree of deviation from target cash levels also played a significant role, with greater deviations prompting faster adjustments.

In summary, this research underscores the dynamic nature of cash management in Latin America, particularly during periods of heightened uncertainty such as the COVID-19 pandemic. The findings emphasize the critical role of firm characteristics, internationalization, and external shocks in shaping cash adjustment behavior. Policymakers and practitioners should consider these factors when designing strategies to enhance corporate financial resilience, particularly in emerging markets.

ENDNOTES

[1.] https://www.investors.com/etfs-and-funds/sectors/sp500-companies-stockpile-1-trillion-cash-investors-want-it/

[2.] This number is obtained by adding the coeffceints of Deviation from Target I,t and the interaction variable Deviation from Target I,t * Covid t (0.489 + 0.136).

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APPENDIX

TABLE 1
DISTRIBUTION OF THE OBSERVATIONS BY COUNTRY OF ORIGIN AND INDUSTRY

Country of Origin	N	%
Argentina	276	10.97
Brazil	1,021	40.60
Chile	502	19.96
Mexico	461	18.33
Peru	255	10.14
Total	2,515	

Industry	N	%
Agri & Fisheries	162	6.44
Basic & Fab Metal	143	5.69
Chemical	76	3.02
Construction	196	7.79
Electric Electron	19	0.76
Electric Power	251	9.98
Food & Beverage	204	8.11
Industrial Machin	44	1.75
Mining	124	4.93
Nonmetallic Min	109	4.33
Oil & Gas	91	3.62
Other Service	529	21.03
Pulp & Paper	20	0.80
Software & Data	19	0.76
Telecommunication	60	2.39
Textile	101	4.02
Trade	175	6.96
Transportation	114	4.53
Vehicle & Parts	78	3.10
Total	2,515	

TABLE 2
DESCRIPTION OF VARIABLES

Variable	Definition
Cash Holding $_{i,t}$	Firm i's cash and short-term investments divided by net assets (total assets minus cash) in year t
International $_{i,t}$	Dummy variable that equals one if firm i has international operations in year t
Covid $_t$	Dummy variable that equals one if the observation corresponds to the Covid years 2020 and 2021
Size $_{i,t}$	Firm i's log of total assets in US$ in year t
Age $_{i,t}$	The log of the number of years since the firm i's IPO
Leverage $_{i,t}$	Firm i's long-term debt plus short-term debt scaled by total assets in year t
NWC $_{i,t}$	Firm i's net working capital, total current assets in year t (not including cash) minus current liabilities in year t, scaled by the book value total assets in year t
IndCfVol $_{i,t}$	Cash flow uncertainty is measured as the average of the standard deviation of industry-country cash flow computed over the last five years.
Capex $_{i,t}$	Firm i's capital expenditures in year t divided by the book value of assets in year t
Cash Flow $_{i,t}$	Firm i's EBITDA scaled by the book value of assets in year t
Dividend $_{i,t}$	Dummy variable that takes the value of 1 if firm i paid dividends in year t
Tobin's Q $_{i,t}$	Firm i's market value of equity plus debt value divided by the book value of assets in year t
Deviation from Target $_{i,t}$	Difference between firm i's target cash holding level in year t, proxied by the predicted values from the regressions in Table 4 and firm i's cash holding in year t-1

TABLE 3
DESCRIPTIVE STATISTICS

Variable	Mean	Median	Std	Lower Quartile	Upper Quartile
Cash Holding	0.049	0.018	0.064	0.009	0.074
International	0.513	1.000	0.500	0.000	1.000
Covid	0.369	0.000	0.482	0.000	1.000
Size	13.44	13.48	1.697	12.29	14.68
Age	3.828	3.912	0.650	3.332	4.304
Capex	0.038	0.030	0.037	0.008	0.058
Dividend	0.559	1.000	0.496	0.000	1.000
TobinQ	1.800	1.156	1.800	0.889	1.685
Cash Flow	0.092	0.094	0.085	0.037	0.141
NWC	0.052	0.044	0.184	0.002	0.169
Leverage	0.271	0.275	0.175	0.133	0.393
IndCfVol	0.037	0.032	0.020	0.022	0.048

TABLE 4
REGRESSION RESULTS OF THE DETERMINANTS OF CASH HOLDINGS

VARIABLES	Cash Holding
Size	-0.005
	(0.001)
Age	-0.005***
	(0.002)
Capex	-0.057**
	(0.031)
Dividend	0.006***
	(0.025)
TobinQ	0.001**
	(0.001)
Cash Flow	0.118**
	(0.017)
NWC	-0.041*
	(0.007)
Leverage	-0.025**
	(0.004)
IndCfVol	0.037**
	(0.005)
Constant	0.133***
	(0.024)
Observations	2,515
R2	0.37
Country FE	YES
Year FE	YES
Industry FE	YES

Robust standard errors cluster by firm in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4 presents the regression results of the following model:

Cash Holding $_{i,t}$=α₀+ α₁ Size$_{i,t}$+ α₂ Age$_{i,t}$ + α₃ Capex$_{i,t}$ + α₄ Dividend + α₅ TobinQ + α₆ Cash Flow $_{i,t}$ + α₇ NWC$_{i,t}$

$\qquad$ *+ α₈ Leverage $_{i,t}$ + e $_{i,t}$*

The definitions of the variables are presented in Table 2

TABLE 5
ADJUSTMENT SPEEDS FOR CASH HOLDINGS (FULL SAMPLE)

VARIABLES	Model 1	Model2	Model3	Model4
Deviation from target	0.549***	0.496***	0.489***	0.384***
	(0.037)	(0.043)	(0.024)	(0.070)
International		0.0019		0.002
		(0.002)		(0.003)
Deviation from target * International		0.093**		0.174**
		(0.056)		(0.092)
Covid			0.014***	0.012***
			(0.003)	(0.004)
Deviation from target * Covid			0.136***	0.241***
			(0.036)	(0.087)
International * Covid				0.003
				(0.004)
Deviation from target * Covid * International				-0.164**
				(0.082)
Observations	2,515	2,515	2,515	2,515
R2	0.34	0.37	0.37	0.38
Country controls	YES	YES	YES	YES
Year controls	YES	YES	YES	YES
Industry controls	YES	YES	YES	YES

Robust Standard errors cluster by fim in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5 presents the regression results of the following model for the full sample:

$Cash_{i,t} - Cash_{i,t-1} = \alpha_1\, Deviation\ from\ target_{i,t} + \alpha_2\, International_{i,t} + \alpha_3\, Deviation\ from\ target_{i,t} *$
$International_{i,t}$
$\qquad\qquad + \alpha_4\, Covid_{i,t} + \alpha_5\, Deviation\ from\ target_{i,t} * Covid_{i,t} + \alpha_6\, International_{i,t} * Covid_{i,t}$
$\qquad\qquad + \alpha_7\, Deviation\ from\ target_{i,t} * International_{i,t} * Covid_{i,t} + e_{i,t-1}$

The definitions of the variables are presented in Table 2

TABLE 6
ADJUSTMENT SPEEDS FOR CASH HOLDINGS
(FIRMS WITH CASH HOLDINGS ABOVE TARGET LEVELS)

VARIABLES	Model 1	Model2	Model3	Model4
Deviation from target	0.882***	0.849***	0.668***	0.578***
	(0.037)	(0.081)	(0.049)	(0.092)
International		0.002		0.003
		(0.003)		(0.003)
Deviation from target * International		0.055		0.152
		(0.086)		(0.092)
Covid			0.076***	0.007***
			(0.003)	(0.004)
Deviation from target * Covid			0.424***	0.512***
			(0.036)	(0.102)
International * Covid				0.006
				(0.004)
Deviation from target * Covid * International				-0.152**
				(0.104)
Observations	1,050	1,050	1,050	1,050
R2	0.67	0.67	0.70	0.70
Country controls	YES	YES	YES	YES
Year controls	YES	YES	YES	YES
Industry controls	YES	YES	YES	YES

Robust Standard errors cluster by fim in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6 presents the regression results of the following model for the observations with cash holdings above the target levels:

$Cash_{i,t} - Cash_{i,t-1} = \alpha_1$ *Deviation from target* $_{i,t} + \alpha_2$ *International* $_{i,t} + \alpha_3$ *Deviation from target* $_{i,t *}$ *International* $_{i,t}$

$+ \alpha_4$ *Covid* $_{i,t} + \alpha_5$ *Deviation from target* $_{i,t}$ * *Covid* $_{i,t} + \alpha_6$ *International* $_{i,t}$ * *Covid* $_{i,t}$
$+ \alpha_7$ *Deviation from target* $_{i,t *}$ *International* $_{i,t}$ * *Covid* $_{i,t} + e_{i,t-1}$

The definitions of the variables are presented in Table 2

TABLE 7
ADJUSTMENT SPEEDS FOR CASH HOLDINGS
(FIRMS WITH CASH HOLDINGS BELOW TARGET LEVELS)

VARIABLES	Model 1	Model2	Model3	Model4
Deviation from target	0.752***	0.667***	0.801***	0.705***
	(0.023)	(0.038)	(0.029)	(0.049)
International		0.0005		0.007**
		(0.002)		(0.003)
Deviation from target * International		0.146***		0.153**
		(0.051)		(0.059)
Covid			0.003***	0.003***
			(0.003)	(0.004)
Deviation from target * Covid			-0.108**	-0.056**
			(0.046)	(0.087)
International * Covid				0.007
				(0.004)
Deviation from target * Covid * International				-0.006
				(0.082)
Observations	1,465	1,465	1,465	1,465
R2	0.54	0.55	0.54	0.58
Country controls	YES	YES	YES	YES
Year controls	YES	YES	YES	YES
Industry controls	YES	YES	YES	YES

Robust Standard errors cluster by fim in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7 presents the regression results of the following model for the observations with cash holdings below the target levels:

$$Cash_{i,t} - Cash_{i,t-1} = \alpha_1 \, Deviation \, from \, target_{i,t} + \alpha_2 \, International_{i,t} + \alpha_3 \, Deviation \, from \, target_{i,t} * International_{i,t}$$
$$+ \alpha_4 \, Covid_{i,t} + \alpha_5 \, Deviation \, from \, target_{i,t} * Covid_{i,t} + \alpha_6 \, International_{i,t} * Covid_{i,t}$$
$$+ \alpha_7 \, Deviation \, from \, target_{i,t} * International_{i,t} * Covid_{i,t} + e_{i,t-1}$$

The definitions of the variables are presented in Table 2

TABLE 8
EFFECTS OF CASH HOLDING DETERMINANTS ON CASH ADJUSTMENT SPEEDS
BEFORE AND DURING COVID

VARIABLES	Full Sample	Pre-Covid	During-Covid
Deviation from target	0.136*	-0.352	0.532*
	(0.151)	(0.294)	(0.359)
Deviation from target * Size	0.004**	0.007***	-0.032
	(0.012)	(0.021)	(0.026)
Deviation from target * Age	0.002***	0.002***	0.001
	(0.001)	(0.001)	(0.001)
Deviation from target * Capex	-0.784*	-1.398*	-0.081
	(0.439)	(0.858)	(1.124)
Deviation from target * Dividend	-0.081	-0.061	0.089
	(0.038)	(0.067)	(0.089)
Deviation from target * TobinQ	-0.015	-0.024	0.034
	(0.010)	(0.016)	(0.027)
Deviation from target * Cash Flow	0.134	-0.002	0.307
	(0.220)	(0.388)	(0.543)
Deviation from target * NWC	0.192*	0.107	0.218
	(0.105)	(0.229)	(0.234)
Deviation from target * Leverage	0.336***	0.139	0.443**
	(0.108)	(0.204)	(0.243)
Deviation from target * IndCfVol	0.875***	1.12***	0.732***
	(0.251)	(0.871)	(0.204)
Deviation from target * Deviation from target	0.797***	-0.188	1.899***
	(0.238)	(0.382)	(0.54)
Observations	2,515	1,588	927
R2	0.36	0.32	0.44
Country controls	YES	YES	YES
Year controls	YES	YES	YES
Industry controls	YES	YES	YES

Robust Standard errors cluster by fim in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8 presents the results of the following model:

$$Cash_{i,t} - Cash_{i,t-1} = \alpha_0 \, Deviation \, from \, target_{i,t} + \alpha_1 \, Size_{i,t} + \alpha_2 \, Age_{i,t} + \alpha_3 \, Capex_{i,t} + \alpha_4 \, Dividend + \alpha_5 \, TobinQ$$

$$+ \alpha_6 \, Cash \, Flow_{i,t} + \alpha_7 \, NWC_{i,t} + \alpha_8 \, Leverage_{i,t} + \alpha_9 \, IndCfVol_{i,t}$$
$$+ \alpha_{10} \, Deviation \, from \, target_{i,t} *Size_{i,t} + \alpha_{11} \, Deviation \, from \, target_{i,t} *Age_{i,t}$$
$$+ \alpha_{12} \, Deviation \, from \, target_{i,t} *Capex_{i,t} + \alpha_{13} \, Deviation \, from \, target_{i,t} *Dividend$$
$$+ \alpha_{14} \, Deviation \, from \, target_{i,t} *TobinQ + \alpha_{15} \, Deviation \, from \, target_{i,t} *Cash \, Flow_{i,t}$$
$$+ \alpha_{16} Deviation \, from \, target_{i,t} *NWC_{i,t} + \alpha_{17} Deviation \, from \, target_{i,t} *Leverage_{i,t}$$
$$+ \alpha_{18} Deviation \, from \, target_{i,t} *IndCfVol_{i,t} + \alpha_{19} Deviation \, from \, target_{i,t} *Deviation \, from \, target_{i,t} + e_{i,t-1}$$

The definitions of the variables are presented in Table 2.

The coefficients of the cash-holding determinants are not reported for simplicity.