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Peer effects as a determinant of the speculative motive – A component of cash holdings

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ABSTRACT

The objective of this research was to investigate whether peers' investment decision specifically sectoral capital expenditures (CAPEX) influence corporate cash holdings, and to assess the extent to which corporate liquidity is explained by external factors rather than solely by individual company decisions. Although the literature on cash holdings is extensive, the speculative motive remains under-explored, particularly regarding its measurement via a proxy linked to peer investment behavior. This study advances the field by proposing and testing a speculative expectation (SPEC) variable, based on the deviation between a firm's CAPEX and the sectoral median, as a proxy for the speculative motive. The research expands the literature by incorporating peer effects as a determinant of cash policy, highlighting peer influence and broadening understanding of corporate competitive dynamics, a topic rarely integrated into cash-holding models despite its importance in environments characterized by information asymmetry. The findings suggest that managers and analysts should treat cash holdings as a strategic decision adapted to the sector; that is, they should consider factors beyond internal ones alone. Cash-holding levels have implications for financial management, corporate valuation, and policy formulation in contexts of competitive uncertainty. An econometric approach was employed using sectoral and financial data from U.S. companies across industries from 2010 to 2024. The study measures the relationship between sectoral CAPEX (measured by the peer median) and corporate cash holdings, while controlling for institutional and macroeconomic variables. The results reveal a positive, statistically significant coefficient for the SPEC variable across various contemporaneous and lagged specifications, and are robust to sensitivity tests, thereby corroborating the hypothesis that increased relative investment by peers leads to higher cash holdings among U.S. companies.

Keywords: peer effect, speculative model, cash holding.

1. INTRODUCTION

Cash holding is considered a strategic mechanism that provides a competitive advantage during periods of financial constraint, preventing corporate illiquidity or underinvestment (Moritzen & Schandlbauer, 2020). Regarding liquidity, corporate cash is the primary liquidity option, as it is the most accessible source of funds in the short term.

In the finance literature, the seminal paper by Opler et al. (1999) stands as a milestone for further research into the determinants of cash liquidity; in the ensuing decades, there has been a surge in studies seeking to explain the variables influencing corporate cash retention, effectively renewing and expanding the international literature on corporate cash holdings. Much of the research on cash liquidity focuses on organizational structures (Acharya et al., 2007; Almeida et al., 2004; Bates et al., 2009), linking the need to hold cash to the justification of companies' capital structures.

However, other empirical studies focus on different organizational aspects: corporate governance (Dittmar et al., 2003; Pinkowitz et al., 2006), cash levels or determinants (Dahrouge & Saito, 2013; Gao et al., 2013; Graham & Leary, 2018; Ozkan & Ozkan, 2004; Tortoli & da Costa Moraes, 2016), the valuation of cash (Faulkender & Wang, 2006), and the influence of the macro-environment on cash policy (Baum et al., 2006).

Although most studies focus on understanding how corporate determinants and capital structure affect liquidity and cash policy, little attention has been paid to the peer effect as a variable influencing cash levels within organizations. Recently, Chen et al. (2019) examined how cash holding policy behaves in competitive markets. The results show that a company will increase its cash holdings relative to its peers to mitigate competitors' aggressive moves. Thus, cash reserves play a relevant role in investment policy decisions within corporate organizations (Harford et al., 2008).

This article aims to understand how future investment opportunities, treated as a speculative liquidity motive, influence corporate cash management decisions by mimicking cash liquidity levels observed among peer companies in the sector. In this context, the objective is to investigate the influence of peer decisions on corporate cash holdings, specifically focusing on the impact of capital expenditures (sectoral CAPEX); that is, whether an individual firm's increase in cash levels is influenced by the investment decisions of its industry competitors, the so-called peer effect.

Regarding related research, this study offers two key contributions to the literature on cash holdings. The first is contextual: cash management remains one of the most discussed topics in corporate finance, particularly given the rise of intangible-intensive firms and shifts in capital structures. In this regard, a Morgan Stanley report (Mauboussin & Callahan, 2025) highlights a structural increase in cash reserves among publicly traded U.S. companies: the average cash-to-assets ratio rose from 5.8% (1970–2000) to 9.7% (2001–2024), signaling a shift in sectoral profiles and investment strategies.

The second contribution rests on three pillars: (i) addressing the research gap concerning the speculative motive, which has received less attention than other primary liquidity motives; (ii) proposing and testing a proxy for this motive based on the relationship between sectoral CAPEX and firm-level CAPEX, linked to cash accumulation for future investment opportunities (Gill & Shah, 2012; Kim et al., 1998); and (iii) empirically demonstrate the peer effect on cash holdings (Al-Hadi et al., 2020; Chen & Ma, 2017; Chen et al., 2019; Lieber & Skimmyhorn, 2018), a dimension rarely considered in seminal studies on cash holdings (Almeida et al., 2004; Bates et al., 2009; Opler et al., 1999; Ozkan & Ozkan, 2004).

2. THEORETICAL FRAMEWORK

2.1 Cash Holdings and Key Theoretical Perspectives

Cash is considered the most liquid asset, and the ability to meet obligations serves as a measure of an organization's capacity to do so. Thus, the role of cash holdings is to provide liquidity, enabling companies to settle their obligations on time, even during crises (Gill & Shah, 2012). Consequently, cash stands out as a fundamental asset on corporate balance sheets, garnering significant attention from companies, investors, and analysts alike. Cash liquidity is particularly crucial during recessions; therefore, cash is an essential element that allows a company to survive and thrive (Subramaniam et al., 2011).

The determinants of cash liquidity have long been a subject of debate in international financial literature. Proposed explanations range from factors such as leverage, dividends, profitability, growth opportunities, firm size, capital expenditures, and cash flow to the trade-offs among the marginal costs, corporate governance, and the benefits of holding cash.

The corporate finance literature has developed several theories to explain the determinants of corporate cash holdings, including the pecking order, trade-off, and free

cash flow theories. The pecking order theory proposes that, in the presence of information asymmetry, organizations choose to finance their projects according to a specific hierarchy to mitigate the associated costs: starting with internal cash sources, followed by debt, and finally using equity (David et al., 2009; Loncan & Caldeira, 2014; Myers & Majluf, 1984). Cash holdings can be viewed as an outcome of the various financing and investment decisions dictated by this hierarchical financing pattern (Dittmar et al., 2003). In this context, cash is considered a low-cost source of financing for financially constrained firms.

The trade-off theory, in turn, shows that firms have a target cash level determined by a balance between the costs and benefits of holding liquid assets. In other words, a firm is assumed to set a target and gradually move toward it (Correa et al., 2013; Loncan & Caldeira, 2014; Martínez-Sola et al., 2018; Riddick & Whited, 2009). Finally, the free cash flow theory posits that cash liquidity exceeding what is necessary to fund all projects with positive net present value creates conflicts of interest between shareholders and managers in corporate decision-making (Dutra et al., 2018; Martínez-Sola et al., 2018; Tortoli & da Costa Moraes, 2016).

The general idea underlying liquidity management theories is that liquid assets can ensure funding (cash) when firms lack the resources for investments or obligations (Almeida et al., 2004; Ames et al., 2022; Ferreira et al., 2025). However, in recent decades, the debate regarding liquidity motives has gained significant prominence, leading to an increase in studies investigating the reasons for holding cash. Research has focused on the primary motives and how they influence cash holdings, particularly precautionary and transaction motives, and, more recently, the speculative motive (investment opportunities).

2.2 Speculative Motive

This section presents the speculative motive as a strategy companies use to retain capital for investment, aiming to capitalize on profitable future opportunities. Table 1 outlines key studies and the definitions of the speculative motive provided by various authors.

Table 1
Definitions regarding the speculative motive

Author (year)	Definition
Keynes (1937)	It refers to an investor's reluctance to tie up investment capital for fear of missing out on a better opportunity in the future; in other words, the goal is to secure a profit by anticipating the future better than the market does.
Kim et al. (1998)	Companies maintain excess liquidity to take advantage of profitable future investment opportunities.
Baum et al. (2012)	A company will accumulate cash to take advantage of potential profit opportunities.
Gill & Shah (2012)	Companies maintain cash balances to take advantage of any opportunities that may arise.
Tortoli & da Costa Moraes (2016)	It arises from capitalizing on speculative opportunities regarding non-monetary items.
Dutra et al. (2018)	It is related to the idea that companies retain liquidity to take advantage of growth opportunities.

Alves et al. (2022)

A strategy used by companies to retain cash and make the most of any investment opportunity that arises later.

Source: *Prepared by the authors.*

The speculative motive relates to investors' reluctance to commit capital due to the fear of missing out on a better future opportunity (Alves et al., 2022; Dutra et al., 2018; Manoel et al., 2018; Tortoli & da Costa Moraes, 2016). This strategy aims to generate above-market returns by leveraging privileged (asymmetric) information about the future. By maintaining high cash balances, companies can capitalize on potential opportunities and make advantageous investments when market conditions are more profitable.

Such opportunities may arise from fluctuations in asset prices, changes in the economic environment, or sector-specific events (such as crises). By building cash reserves, companies position themselves to act quickly and capitalize on emerging opportunities, thereby increasing their chances of generating significant profits. Maintaining high cash holdings affords organizations financial flexibility to acquire assets at reduced prices, whether by purchasing struggling competitors or buying undervalued market assets.

The liquidity speculation motive is based on the premise that a company's investment options and cash management strategies are interconnected; retaining cash enables increased investment, allowing the firm to seize future opportunities that might otherwise be missed due to a lack of funds (Artica et al., 2019; Denis & Sibilkov, 2010). Therefore, adopting this strategy requires careful analysis of the associated risks and benefits, as well as a precise understanding of the future market outlook and the specific sector in which the company operates.

2.3 The Speculative Motive drives the Relationship Between Peer Effects and Cash Holdings

In the business environment, it is appropriate to raise and discuss financial decisions, given their crucial role in organizational growth and economic expansion. From this perspective, it has been shown that financial decision-making must consider the impact that competitors' information and decisions have on a firm's own financial choices.

The peer effect is widely documented in finance literature and, in a corporate context, manifests as the industry's influence on firm behavior. A recurring explanation involves externalities linked to industry performance and characteristics; these prompt companies to monitor sectoral investment and adjust their liquidity decisions, whether through imitation or as a defensive measure (Mura, 2025). Put simply, this refers to changes in corporate behavior driven primarily by peers' decisions (Anwar et al., 2019).

Such externalities can be understood as factors exogenous to the firm that shape corporate choices within a sector. Consequently, companies tend to consider past decisions and competitors' performance when formulating their strategies (He & Wang, 2020), particularly when facing information asymmetry and competitive pressures, which intensify the propensity to imitate (Lieberman & Asaba, 2006).

Information asymmetry occurs when one party possesses more complete information than the other, creating a competitive advantage and the potential for opportunism (Drobtz et al., 2010). This imbalance contributes to market failures and reinforces the logic of imperfect markets, where externalities and incomplete information distort decisions and prices. In this context, the Myers and Majluf (1984) hypothesis that external financing is costly, thereby making cash holdings a financial buffer, is supported.

Almeida et al. (2004) demonstrate that financially constrained firms tend to systematically retain cash, whereas unconstrained companies have less incentive to do so. Thus, accumulated liquidity can facilitate future investments, aligning with the speculative motive.

The explanations regarding the importance and underlying causes of the peer effect are corroborated by evidence that sector-related aspects can drive individual corporate decisions, such as financial choices, where results show that companies rely on decisions made by their industry peers (Grieser et al., 2022; Mackay & Phillips, 2005; Seo, 2021).

Given the concept of the peer effect, it is important to identify the corporate decisions in which it manifests, particularly because it can reflect competitor-specific and/or idiosyncratic shocks. Machokoto et al. (2021) indicate that this influence extends to a wide range of choices, including executive compensation, capital structure, liquidity, trade credit, dividends, earnings management, initial public offerings (IPOs), social responsibility, risk aversion, research and development (R&D), taxation, and investment. In particular, capital structure and investment decisions tend to be sensitive to peer behavior (Valta, 2012). According to Frank and Goyal (2009), firms within the same sector are exposed to common forces that shape their decisions, reinforcing the peer effect as the outcome of a cluster of correlated factors.

Regarding capital structure and its connection to peer effects, a key study is that of MacKay and Phillips (2005), who demonstrate that firm characteristics, such as financial structure, technology, and risk, are influenced by the behavior of other firms in the industry. Meanwhile, Leary and Roberts (2014) show that institutions' financial policies and decisions, specifically regarding leverage, are influenced by their peers, and that this relationship is far stronger than other effects previously studied in finance.

Many organizations view investment decisions aimed at capitalizing on growth opportunities as linked to liquidity levels and, thus, to operational survival strategies (Mohammadi et al., 2018), given that some firms employ competitive pricing strategies to eliminate rivals (Haushalter et al., 2007). This competition can lead to changes in cash liquidity as firms utilize funds for operational activities (Fresard, 2010) or, indirectly, through factors such as idiosyncratic volatility (Irvine & Pontiff, 2009).

Denis and Sibilkov (2010) argue that peer decisions influence cash holdings, as higher liquidity enables financially constrained firms to invest in value-generating projects when their unconstrained competitors expand their investments. Chen et al. (2019) reinforce this logic by showing that cash retention is particularly critical for constrained firms and/or those with high R&D spending; such firms are more vulnerable if peers ramp up CAPEX, creating an incentive to maintain cash reserves to keep pace with this competitive dynamic.

This mechanism is amplified by the information asymmetry inherent in investments: firms continuously monitor the productivity of their own assets, whereas the industry observes only aggregate and incomplete signals (Aboody & Lev, 2000). Consequently, the peer effect emerges as a self-preservation strategy that enables adaptation and competitive survival in imperfect markets.

In summary, this mechanism expands the use of liquidity retention as an instrument of discretionary power and flexibility amid uncertainty. Corporate liquidity policy is dynamic and adaptive; during periods of political and economic instability, firms tend to accumulate more cash, thereby heightening the precautionary and speculative nature of this decision (Floros et al., 2024). Consequently, managers utilize cash not merely as an operational reserve but also as a strategic investment asset (Wang & Zhang, 2025).

The studies presented offer insights suggesting that firms do not make decisions in isolation from their sector, as peers' investment decisions influence the market in which

they operate. Thus, the aim is to explain the rationale behind cash retention, particularly regarding speculation. Accordingly, this study proposes the following hypothesis:

H₁: The speculative model, which is proxied by peers' growth opportunities, increases companies' cash levels.

Thus, H₁ seeks to determine whether companies, upon observing increased capital investment by their peers, strategically adjust their liquidity levels to preserve financial flexibility and capacity to respond to future investment opportunities. Consequently, the coefficient for the SPEC variable is expected to be positive and statistically significant, indicating that the higher the peers' CAPEX compared to the firm's, the greater the firm's propensity to retain cash. In this way, the study aims to demonstrate that cash retention stems not only from internal factors but also from the observation and strategic imitation of industry practices, reinforcing the notion that liquidity functions as a real investment option and a mechanism for competitive protection in markets characterized by uncertainty and information asymmetry.

3. METHODOLOGY

3.1 Sample

For the period spanning the first quarter of 2010 through the fourth quarter of 2024, this study utilizes a sample of publicly traded U.S. companies listed on the major stock exchanges—the New York Stock Exchange (NYSE) and NASDAQ. Data were obtained from the Capital IQ database, selected for its reliability in facilitating a comprehensive discussion of the data, sample construction, and variable definitions. The starting point of 2010 was chosen because it marked the year the U.S. economy returned to Gross Domestic Product (GDP) growth, while the end date of 2024 allows for the inclusion of the COVID-19 effect (an exogenous variable) on the U.S. market.

The selection of companies for the study sample involved filtering for non-financial U.S. firms; that is, all financial-sector companies were excluded. This exclusion is justified by the specific characteristics of financial firms' financial statements and business models, particularly the nature of their cash holdings. One such characteristic is the composition of cash, which includes customer deposits intended to cover potential withdrawals.

The sectoral classification established by the study is based on the types and uses of the products or services developed by the companies. Accordingly, the classification relies on the Global Industry Classification Standard, a taxonomy developed for companies worldwide, across both developed and developing economies. This classification features a four-level hierarchical structure that currently comprises 13 sectors, 26 industry groups, 73 industries, and 154 sub-industries.

3.2 Econometric Model and the Variables

This research employs linear regression models estimated by ordinary least squares. A key feature is that the intercept and slope coefficients are determined by minimizing the sum of squared residuals. The data is structured as an unbalanced short panel. As this is a static panel model, the decision was made to exclude the lagged cash balance variable (a time-varying stochastic effect) to focus on the effect of the time-varying stochastic independent variable.

The model described below is used to examine the preference for cash liquidity. Thus, to evaluate the speculative model and test the hypothesis, this study employs the following baseline regression model estimated via the generalized method of moments:

$$\text{CashHold}_{i,t} = \alpha + \beta_1 \text{SPEC}_{-i,j,t-1} + \gamma X_{i,t} + e_{i,t} \quad (1)$$

where the indices *i*, *j*, and *t* correspond to the company, the sector, and the year, respectively.

The speculative expectation (SPEC) variable is a construct, that is, a way of attempting to measure the influence of an effect using a proxy (an approximate variable). This speculation variable is constructed by calculating the median CAPEX for sector *j* in period *t*-1 (excluding firm *i* itself) and subtracting firm *i*'s CAPEX; thus, the influence of peers is accounted for in the variable's construction. The capital expenditure (CAPEX) indicator is calculated by dividing capital expenditures by total assets (Bates et al., 2009); consequently, increases or decreases in CAPEX outlays send a signal, positive or negative, relative rather than absolute, to the firm's peers regarding the decision to invest.

The use of CAPEX as a proxy for investment expectations stems from the indicator's own composition, as capital expenditures are categorized into two groups: maintenance or replacement expenditures and growth-driven investments. Maintenance capital expenditures are those related to preserving a firm's or business's existing size and capacity. These expenditures do not include outlays related to new capacity for an existing product line, a new product line, or other similar growth initiatives. Growth capital expenditures, in turn, refer to outlays that expand production capacity.

In addition to this variable, the analysis incorporates control variables (*X*: a vector of control variables) to isolate their effects on the key coefficients analyzed in relation to the hypotheses. Table 2 details these control variables.

Table 2

Definition of control variables

Variables	Abbreviation	Definition	Authors
Cash holdings	CashHold	Sum of cash and cash equivalents divided by total assets	Bates et al. (2009)
Cash flow	CF	Sum of EBITDA divided by total assets	Bates et al. (2009)
Net working capital	NWC	Current assets minus cash and cash equivalents, less current liabilities, subsequently divided by total assets.	Bates et al. (2009), Manoel et al. (2018), Opler et al. (1999), Tortoli & da Costa Moraes (2016)
Research and development	RD	Ratio of research and development expenses to total assets	Bates et al. (2009), Dittmar et al. (2003)
Tobin's Q	Q	The difference between total assets and shareholders' equity, plus the company's market value, divided by total assets.	Bates et al. (2009), Dittmar et al. (2003), Harford et al. (2008)
Leverage	Lev	Ratio of total debt to total assets	Almeida et al. (2004), Bates et al. (2009),

			Dahrouge & Saito (2013), Manoel et al. (2018)
Size	Size	Natural logarithm (Ln) of total assets	Bates et al. (2009), Dittmar et al. (2003), Kim et al. (1998), Opler et al. (1999), Ozkan & Ozkan (2004), Pinkowitz et al. (2006), Tortoli & da Costa Moraes (2016)
Tangibility	Tangibility	Sum of fixed assets divided by total assets	Bates et al. (2009)
Dividend	Dividend	Dummy variable that takes the value of 1 in quarters when the company paid dividends, and 0 otherwise.	Dahrouge & Saito (2013), Harford et al. (2008)
Sector	Sector	Dummy variable (SIC codes) taking the value 1 if the observation belongs to a specific sector and 0 otherwise.	Almeida et al. (2004)
Covid-19	Covid-19	Dummy variable that takes the value of 1 in quarters when US GDP was negative, and 0 otherwise.	Tawiah & Keefe (2024)

EBITDA = earnings before interest, taxes, depreciation, and amortization; GDP = gross domestic product; SIC = Standard Industrial Classification.

Source: Prepared by the authors.

To test hypothesis H₁ of this study, two OLS econometric models are estimated. The first model, represented by Eq. 2, and the second model, represented by Eq. 3, which includes lagged variables, are presented below.

$$\text{CashHold}_{i,t} = \alpha + \beta_1 \text{SPEC}_{-i,j,t-1} + \beta_2 \text{CF}_{i,t} + \beta_3 \text{NWC}_{i,t} + \beta_4 \text{RD}_{i,t} + \beta_5 \text{Q}_{i,t} + \beta_6 \text{Lev}_{i,t} + \beta_7 \text{Size}_{i,t} + \beta_8 \text{Tangibility}_{i,t} + \beta_9 \text{Dividend}_{i,t} + \beta_{10} \text{Covid}_t + e_{i,t} \quad (2)$$

$$\text{CashHold}_{i,t} = \alpha + \beta_1 \text{SPEC}_{-i,j,t-1} + \beta_2 \text{CF}_{i,t-1} + \beta_3 \text{NWC}_{i,t-1} + \beta_4 \text{RD}_{i,t-1} + \beta_5 \text{Q}_{i,t-1} + \beta_6 \text{Lev}_{i,t-1} + \beta_7 \text{Size}_{i,t-1} + \beta_8 \text{Tangibility}_{i,t-1} + \beta_9 \text{Dividend}_{i,t-1} + \beta_{10} \text{Covid}_{t-1} + e_{i,t} \quad (3)$$

Table 3 presents the expected results for these variables and the authors who used them.

Table 3
Summary of regression signs

Variables	Expected signal	Authors
CashHold	N/A	Bates et al. (2009)
CF	+	Opler et al. (1999)
NWC	-	Bates et al. (2009), Opler et al. (1999)
RD	-	Brown & Petersen (2011)
Q	+	Bates et al. (2009), Dittmar et al. (2003), Harford et al. (2008)

Lev	-	Almeida et al. (2004), Bates et al. (2009)
Size	-	Bates et al. (2009), Dittmar et al. (2003), Kim et al. (1998), Opler et al. (1999), Ozkan & Ozkan (2004), Pinkowitz et al. (2006)
Tangibility	-	Bates et al. (2009)
Dividend	+	Harford et al. (2008)
Covid-19	+	Tawiah & Keefe (2024)
Sector	+/-	Almeida et al. (2004)

Note: The variables are described in Table 2.

N/A = not applicable.

Source: Prepared by the authors.

Winsorization techniques were applied to all variables (except dummy variables) at both tails to address outliers. This procedure does not exclude outlier observations from the sample but merely reduces their effect on the results (Bates et al., 2009).

To determine the most suitable panel data model for estimating the regressions, pooled ordinary least squares, fixed effects (FE), and random effects models were considered. The Hausman test was used to decide which approach, fixed effects or random effects, to adopt for the regression analysis. Since the p-value of the Hausman test was 0.0000 (at a 1% significance level), the null hypothesis was rejected, indicating that the FE model was the most appropriate. Potential statistical issues arising from heteroskedasticity were addressed by applying a robust estimation method.

The Shapiro-Francia test is applied to assess data normality. The test revealed that the residual distribution is non-normal, as the result was significant at the 1% level ($p = 0.00001$); thus, the null hypothesis that the data follow a normal distribution is rejected. The non-normality of the equation's data is not an issue, given the sample size of 131,355 observations; according to the Central Limit Theorem, when sufficiently large samples are drawn from any population, the sampling distribution of the parameters tends toward normality.

Next, the variance inflation factor is calculated to check for multicollinearity, that is, to determine whether the explanatory variables exhibit very high or perfect correlations. The test indicates no multicollinearity in the data analyzed in this study.

4. ANALYSIS OF RESULTS

4.1 Descriptive Statistics

Descriptive statistics for the data used in the analyses are presented in Table 4. The total number of observations in the sample is 131,355, comprising 3,681 companies across 56 quarters from 2010 to 2024.

Table 4

Descriptive analysis of the variables

Variables	Observations	Mean	Median	Standard Deviation	Minimum	Maximum
CashHold_w	131,355	0.2569	0.1349	0.2841	0.0002	0.9811
CF_w	131,355	-0.0099	0.0201	0.0964	-0.4994	0.1444
NWC_w	131,355	0.0356	0.0187	0.1805	-0.5520	0.5520
RD_w	131,355	0.0194	0.0000	0.0403	0.0000	0.2289
Lev_w	131,355	0.1885	0.1544	0.1843	0.0000	0.6912

Size _w	131,355	19.9539	20.0793	2.5727	13.6972	25.4003
Tangibilit~w	131,355	0.2283	0.1349	0.2397	0.0000	0.9100
Q de Tobin _w	131,355	2.7040	1.6072	3.8085	0.2645	29.7617
Spec	131,355	-0.0032	0.0000	0.0127	-0.0802	0.0347

Note: *The variables are described in Table 2.*

Source: *Prepared by the authors.*

Descriptive statistics show that SPEC has a mean of -0.0032 and a median of 0.0000. In economic terms, this indicates that at the distribution's midpoint, the relative deviation of a firm's CAPEX from the sector norm tends to be small; however, the slight negative bias in the mean suggests that the typical firm invests slightly above the peer median. The SPEC value is close to zero due to the variable's construction. Since SPEC is derived as the difference between the sector's median CAPEX and the firm's CAPEX, half of the firms exhibit positive SPEC values, while the other half exhibit negative values. By design, the mean tends toward zero. This logic applies to all sectors.

Cash holdings vary significantly across sectors. While the overall mean is 25.69%, as shown in Table 4, sectors such as Health Care and Information Technology have high cash balances of 50.9% and 30.2%, respectively. Conversely, the sectors with the lowest cash levels are Materials and Utilities, with 12.7% and 2.6%, respectively. These percentages remain relatively stable over time. Further details are omitted for brevity.

Tobin's Q has a mean of 2.7, indicating significant valuation of the sampled U.S. firms relative to their balance sheets, and that, on average, indebtedness equates to 18.85% of company assets. This is not considered a high level of leverage for analysis in the U.S. market.

As shown in Table 4, following winsorization, the standard deviation of certain variables, Cash holdings (CashHold), Cash flow (CF), Net working capital (NWC), Research and development (RD), Tangibility, and Tobin's Q, exceeds the mean. This demonstrates that the values of these variables fluctuated over time, as the average distance between individual data points and the mean exceeds the mean. Additionally, the data reveals diversity among the sampled firms, given the wide gap between the minimum and maximum values of certain variables.

A correlation matrix was constructed to measure the strength and direction of relationships among variables, focusing on associations rather than specific cause-and-effect links. Dummy variables were excluded from the analysis, and Table 5 presents the calculated Spearman correlation coefficients.

Table 5*Spearman correlation matrix of the variables*

Variables	CashHold	SPEC	CF	NWC	RD	Lev	Size	Tangibility
CashHold	1							
SPEC	0.0145	1						
CF	-0.3641	-0.1614	1					
NWC	-0.2518	0.0300	0.2938	1				
RD	0.5888	-0.0591	-0.4464	-0.2253	1			
Lev	-0.5338	-0.0582	0.2306	0.0032	-0.3204	1		
Size	-0.4144	-0.1559	0.4719	0.0646	-0.3017	0.4937	1	
Tangibility	-0.4586	-0.3206	0.3217	0.0706	-0.4075	0.3244	0.3478	1
Q	0.3278	-0.1309	0.0625	-0.1581	0.2818	-0.1648	-0.0646	-0.2158

Note: The variables are described in Table 2.**Source:** Prepared by the authors.

As shown in Table 5, correlations between the study variables were identified. A weak, positive relationship is observed between the dependent variable, CashHold, and the independent variable, speculation. However, relationships exist with the control variables: the sign is negative for cash flow, net working capital, leverage, size, and tangibility, and positive for research and development (R&D) and Tobin's Q. Regarding the control variables with positive signs, it is worth noting that only R&D showed a significant correlation greater than 0.50, whereas Tobin's Q fell between 0.30 and 0.35. Furthermore, among the negative correlations, only leverage showed significant linear correlations below -0.50.

Based on the evidence, a preliminary analysis indicates a weak positive relationship between cash holdings and the explanatory variable, speculation. However, the Spearman matrix merely represents an association between the variables. Therefore, to address the research question, regression model analyses were conducted.

4.2 Regression Model Results

The regression results for Eq. 2 are presented and analyzed in Table 6.

Table 6

Estimation of cash holdings regressions (FE)

Variables	FE robust (CashHold) (1)	FE robust (CashHold) (2)	FE robust (CashHold) (3)
Constant (_cons)	1.905*** (0.000)	8.043*** (0.000)	4.273** (0.034)
SPEC	17.563*** (0.000)	10.191*** (0.000)	10.882*** (0.000)
CF		1.675** (0.028)	1.356* (0.075)
NWC		-2.813*** (0.000)	-2.994*** (0.000)
RD		-27.503*** (0.000)	-27.134*** (0.000)
Lev		-2.526*** (0.000)	-2.529*** (0.000)
Size		-0.186** (0.018)	-0.069 (0.434)
Tangibility		-5.941*** (0.000)	-5.717*** (0.000)
Q		0.014 (0.412)	0.009 (0.589)
Dividend			-0.026 (0.643)
Covid-19			0.352*** (0.001)
Sector FE	No	No	Yes
Prob > F	0.000	0.000	0.000
R ²	0.002	0.050	0.054
N	131,156	131,156	131,156

Notes: *t*-statistics are in parentheses. The variables are described in Table 2.

FE = fixed effects.

**** = statistically significant at the 1% level ($p < 0.01$); ** = statistically significant at the 5% level ($p < 0.05$); * = statistically significant at the 10% level ($p < 0.10$).*

Source: Prepared by the authors.

Model 1 shows the results of a simple regression (i.e., using only the main explanatory variable) and a fixed-effects panel-data analysis with robust standard errors. In this model, which includes only the SPEC variable, the coefficient is 17.563 and is significant at the 1% level. The R^2 value is 0.002, representing the proportion of the dependent variable's variance explained by the independent variable(s) in the regression model, indicating that the fixed-effects panel regression explains 0.20% of the model's variation.

Subsequently, Models 2 and 3 present results incorporating control variables, including sector dummy variables (sector fixed effects), estimated stepwise. These models are presented to highlight the estimation bias in the SPEC variable caused by omitted variables. It is important to note that the SPEC coefficient varies significantly with the inclusion of control variables, indicating potential endogeneity issues that could have distorted the results had these control variables not been considered.

Column 2 of Table 6 presents a panel-data regression that includes control variables but excludes dummy variables. In this context, the variables SPEC, NWC, RD, Leverage, and Tangibility are significant at the $p < 0.01$ level; significance at the $p < 0.05$ level is observed for the CF and Size variables; and, finally, Tobin's Q is not significant. This regression shows an explanatory power (R^2) of 5%. Finally, the last column presents the regression including all variables, where the elements significant at the 1% level are SPEC, NWC, RD, Lev, Tangibility, and Covid-19; CF is significant at the 10% level; and the remaining variables, Size, Tobin's Q, and Dividend, are not significant. The regression has an R^2 of 5.4%, representing the model's explanatory power regarding variability.

The main results in Table 6 concern the SPEC variable; its coefficients are positive and statistically significant across all three models, with values of 17.563, 10.191, and 10.882, respectively. These positive and significant coefficients support H_1 , which posits that cash balances increase due to the speculative model. To understand the implications of this result, it is important to recall that the SPEC variable for firm i is defined as the sector's median CAPEX (excluding firm i) minus firm i own CAPEX. Thus, the higher the SPEC value, the lower firm i investment is relative to the sector. SPEC can take positive values if firm i invests less than the sector, or negative values if firm i invests more. The relationship between SPEC and cash balances is expected to be positive, regardless of whether the SPEC value is above or below zero.

First, we argue that firms with positive SPEC (i.e., the sector is investing more than firm i) may, upon observing that their peers are investing more, feel compelled to initially increase their cash balances so they can subsequently invest more and catch up with their peers. The logic underlying this argument is that firms imitate their peers to avoid the risk of underinvestment.

Second, for firms with negative SPEC (i.e., firm i is investing more than the sector), the primary risk is overinvestment. When firm i observes that its peers are investing less, it may scale back its future investment plans. At first glance, one might conclude that, for the group of firms with negative SPEC, cash balances would be high for firms with low SPEC values, leading to a negative relationship between SPEC and cash balances, contrary to our hypothesis. However, from a theoretical standpoint, particularly through the lens of agency theory (Jensen & Meckling, 1976; Jensen, 1986; Stulz, 1990), a mature

firm lacking good investment opportunities should distribute excess cash to shareholders to avoid potential agency costs, such as investing in projects with negative net present value (i.e., empire-building). Therefore, our hypothesis holds for firms with negative SPEC values as well.

Regarding the control variables, the findings are consistent with prior studies: NWC, R&D, Lev, Size, and Tangibility exhibit negative coefficients, as expected. Meanwhile, CF, Tobin's Q, Dividend, and Covid-19 are positively associated with cash holdings.

The significant negative relationship between net working capital and cash holdings reflects the inverse relationship inherent in the definition of net working capital itself (Chen et al., 2019). The significant negative coefficient for R&D reinforces the idea that firms smooth R&D spending by using cash as a buffer, reducing cash reserves to sustain R&D during financing shocks or frictions, effectively using cash to finance intangible assets (Brown & Petersen, 2011).

The leverage variable (Lev) and cash holdings (CashHold) are considered substitute sources of financing, as indicated by the negative coefficient. This finding corroborates studies by Griesse et al. (2022), Opler et al. (1999), and Ozkan and Ozkan (2004), confirming that more highly leveraged firms maintain lower cash reserves. The coefficient for firm size (Size) is negative but significant only in column 2; according to Ozkan and Ozkan (2004), this implies that small firms are more vulnerable to capital market imperfections.

Regarding CF, the coefficient is positive and significant, implying that financially constrained firms save cash when cash flow increases (Almeida et al., 2004; Opler et al., 1999). Tobin's Q coefficient is positive, indicating that the market distinguishes between firms with greater investment opportunities; consequently, firms with higher Tobin's Q prefer to retain more cash because external financing is costly. However, the variable is not significant, suggesting that the effect of Tobin's Q is already captured by variables such as RD and SPEC.

Regarding other regression control variables, the results indicate a negative, though statistically insignificant, relationship between dividends and accumulated cash levels. This relationship is plausible because dividend payments are often associated with lower cash holdings (a negative sign) yet lack statistical significance once other financial variables are controlled for; this typically occurs in models that extensively control for industry characteristics (Bates et al., 2009). Conversely, the Covid-19 variable is positive and significant ($p < 0.01$), indicating that companies accumulated more cash during the pandemic, reflecting precautionary behavior in the face of uncertainty and confirming a defensive corporate stance (Keynes, 1937).

Next, we analyze the regression results for Eq. 3 using first-differenced lagged variables, as presented in Table 7.

Table 7

Estimation of cash holdings regressions (lagged variables)

Variables	FE robust (CashHold) (1)	FE robust (CashHold) (2)	FE robust (CashHold) (3)
Constant (_cons)	1.821*** (0.000)	10.603*** (0.000)	8.094*** (0.000)
SPEC L1.	16.023* (0.000)	10.904*** (0.000)	11.169*** (0.000)
CF L1.		1.298	1.139

	(0.113)	(0.166)	
NWC L1.	-2.204*** (0.000)	-2.227*** (0.000)	
RD L1.	-17.354*** (0.000)	-16.791*** (0.000)	
Lev L1.	-1.846*** (0.000)	-1.859*** (0.000)	
Size L1.	-0.348*** (0.000)	-0.309*** (0.000)	
Tangibility L1.	-4.950*** (0.000)	-4.816*** (0.000)	
Q L1.	0.030* (0.092)	0.023 (0.192)	
Dividend L1.		-0.019 (0.747)	
Covid-19		0.291*** (0.002)	
Sector FE	No	No	Yes
Prob > F	0.000	0.000	0.000
R ²	0.002	0.030	0.033
N	91,141	91,141	91,141

Notes: *t*-statistics are in parentheses. The variables are described in Table 2.

FE = fixed effects.

*** = statistically significant at the 1% level ($p < 0.01$); ** = statistically significant at the 5% level ($p < 0.05$); * = statistically significant at the 10% level ($p < 0.10$).

Source: Prepared by the authors.

As shown in Table 7, the results from applying a robust fixed-effects panel data model with a lagged explanatory variable indicated that the lagged variable (SPEC L1) was statistically significant at the 1% level across all scenarios. Furthermore, the coefficient of determination (R^2) was 0.002 in column 1, indicating that only 0.20% of the variance in the dependent variable (CashHold) was explained by the explanatory variable in the regression model. Therefore, it can be concluded that the regression (column 1) has limited explanatory power, accounting for only a small proportion (0.20%) of the variation in the model in question. When comparing this to the regression in column 1 of Table 6, it is evident that the coefficient for the lagged SPEC variable (Table 7) is slightly higher—at 17.563—while the regression R^2 remains the same. This indicates that the regression in column 1 of Table 7 has the same explanatory power for model variability as the regression in column 1 of Table 6.

In column 2 of the regressions, we included lagged independent variables. Of these, only CF was not significant. The SPEC variable remained statistically significant ($p < 0.01$), although its coefficient increased slightly compared to the model in Table 6 (column 2). Once again, with the inclusion of lagged variables, the SPEC coefficient value increased, while the model showed a slight drop in R^2 to 0.030 (3%). Although the expected (positive) sign is confirmed, the lack of significance suggests that variations in past cash flow (in both columns 2 and 3) do not robustly explain current cash holdings after controlling for other sources of liquidity and financial structure (Almeida et al., 2004). The cash flow effect may occur in the same period (contemporaneously) or be absorbed by correlated variables, such as NWC and SPEC.

Tobin's Q is positive and marginally significant in column 2 ($p = 0.092$), but not significant in column 3, suggesting limited statistical robustness. Growth opportunities do not appear to consistently affect cash holdings after controlling for R&D and SPEC. The Dividend and Covid-19 dummy variables show the same signs and significance levels as those in Table 6; therefore, the explanations regarding their behavior and impacts remain the same. Finally, the comparison between the last columns of Tables 6 and 7 reveals that including lagged variables reduces the effect on cash holdings. Nevertheless, H_1 appears supported, as investment expectations, measured via peer effects (SPEC), influence cash retention in the model, even when lagged explanatory and independent variables are used.

4.3 Discussion and Comparison of Results

The results of this study corroborate prior literature on peers' influence on corporate cash-holding decisions. The finding that the speculative model positively affects cash-holding levels aligns with Chen et al. (2019), who emphasize the importance of peers' decisions in formulating corporate liquidity policy. This study reinforces that perspective by demonstrating that the sector's CAPEX level, measured by the peer median, significantly influences the liquidity of the firms analyzed.

Furthermore, the research findings complement this view by demonstrating that cash holding is not merely an internal decision (Al-Hadi et al., 2020) but also a direct reflection of external factors (Machokoto et al., 2021) that shape peers' cash-holding decisions. This highlights how firms seek competitiveness by aligning their liquidity policies with prevailing industry practices, not only in response to specific economic conditions but also as a strategic adaptation to competitors' actions (Seo, 2021). More broadly, Grieser et al. (2022) highlight that peer effects are not limited to industry-level decisions but may also be linked to wider corporate relationship networks, underscoring the need for an integrated analysis that considers both internal and external factors.

The results of this study can be interpreted in an integrated manner in light of key financial theories. According to trade-off theory, firms seek an optimal cash level that balances the costs and benefits of liquidity; the positive effect of SPEC indicates that increased investment by peers prompts firms to adjust their reserves, reinforcing the strategic and adaptive nature of this decision in the face of competitive pressure (Bates et al., 2009). In line with pecking order theory, this behavior also reflects a preference for internal financing amidst information asymmetry, as cash serves as a financial buffer and a safeguard against credit constraints, consistent with evidence from Riddick and Whited (2009). Conversely, from the perspective of free cash flow theory, increasing liquidity in response to peers' actions may represent either a rational flexibility strategy or speculative behavior driven by the discretionary use of resources (Pinkowitz et al., 2006). Thus, the proxy captures a mixed dynamic between financial rationality and managerial opportunism, demonstrating that the peer effect on cash holdings encompasses various liquidity motives.

The SPEC proxy represents a significant methodological advancement in capturing the sectoral speculative effect, as it reflects the extent to which a firm adjusts its cash policy in response to its peers' investment behavior. Consequently, the variable reflects strategic imitation under uncertainty, in which the firm adopts defensive or opportunistic behavior, increasing its cash holdings to maintain flexibility in response to competitors' actions.

Conceptually, this proxy captures the interconnection among investment expectations, sectoral competition, and corporate liquidity decisions. The variable's

robust, positive results across all estimated models suggest that cash retention is partially explained by external factors rather than solely by internal capital structure or profitability fundamentals. In other words, corporate liquidity behavior is endogenous to sectoral dynamics, aligning the discussion with the fields of behavioral economics and real options theory. In this context, cash is understood not merely as a speculative reserve but as a real investment option amid competitive uncertainty, reinforcing the arguments of Baum et al. (2012), Gill and Shah (2012), and Mauboussin and Callahan (2025).

In summary, the empirical results of this study support H_1 , demonstrating that peers' investment decisions influence corporate liquidity and that the speculative model stands as a significant determinant of cash holdings. Thus, the peer effect emerges as a new hybrid determinant, simultaneously strategic and behavioral, of cash policy, broadening the understanding that the interplay of internal factors, managerial incentives, and external sectoral pressures shapes corporate liquidity decisions.

5. FINAL CONSIDERATIONS

The objective of this study was to investigate the influence of peer decisions on corporate cash holdings, with an emphasis on the impact of sectoral CAPEX on companies listed in the United States. The literature on peer effects indicates that industry practices strongly influence investment and liquidity decisions (Machokoto et al., 2021; Seo, 2021; Zhuang et al., 2022). These studies corroborate this article's findings, revealing a positive, statistically significant relationship between sectoral investment expectations and organizational cash-holding levels.

These findings confirm H_1 , demonstrating that U.S. companies adjust their cash reserves in line with their peers' investment behavior. This positive relationship can be attributed to managers' perception of cash as an indicator of future opportunities and a low-cost source of internal financing (Mohammadi et al., 2018). Thus, maintaining cash liquidity takes on a strategic and speculative nature, enabling the capture of investment opportunities and mitigating external financing costs.

First, these results indicate that variables associated with corporate liquidity should be analyzed from relational and contextual perspectives rather than purely individual one. Firm cash behavior should be understood as the outcome of sectoral interactions, in which peer investment serves as a benchmark for strategic adjustments; SPEC is an innovative measure of the peer effect sensitive to the competitive dynamics of corporate cash holdings, thereby aligning with behavioral and real options approaches.

Thus, this study identifies a peer effect that varies across institutional contexts and levels of capital market development. This effect is more evident in economies like that of the United States, characterized by high transparency, competition, and access to credit, and potentially less intense, or even inverse, in emerging markets, where information asymmetry, financial constraints, and concentrated governance prevail.

Consequently, future research should adopt a contextualized approach to analyzing cash holdings, refine the measurement of the SPEC variable, and incorporate alternative metrics (such as cash-to-net-assets and cash-flow sensitivity) to distinguish between operational and speculative liquidity. Furthermore, it is advisable to investigate differences between financially constrained and unconstrained firms, as companies with limited access to credit tend to respond more strongly to peer behavior. Testing new populations, contexts, and measurement methods is therefore essential to determine whether the speculative motive represents a global regularity or a phenomenon specific to developed economies, thereby broadening theoretical and empirical understanding of the relationship between corporate liquidity, competitive behavior, and market structure.

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Conceptualization: lead;
 Formal analysis: lead;
 Investigation: equal;
 Methodology: lead;
 Project administration: equal;
 Resources: equal;
 Software: lead;
 Supervision: support;
 Validation: equal;
 Writing – original draft: lead;
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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

DATA AVAILABILITY STATEMENT

The entire dataset supporting the results of this study was published in the article itself.

GENERATIVE AI DISCLOSURE

The authors declare that no generative artificial intelligence was used in any stage of the production of this manuscript (including research, writing, data analysis, formula generation, or the creation of graphic elements).

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