

WHY DO VIETNAMESE FIRMS HOLD CASH?

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Abstract

This research aims at exploring the current state and the reasons for holding cash of Vietnamese firms. Using a dataset of 199 companies listed on the Ho Chi Minh City Stock Exchange in the period from 2011 to 2018, statistical analyses indicate that the median level of cash holding by net assets of Vietnamese firms is about 5.9%, which is lower than firms in many countries in the region. High levels of cash holding only appear among small firms. In addition, the cash holding ratios of firms in all four size quantiles have shrunk since 2016, especially for firms in the smallest size quantile. Regression results show that Vietnamese firms tend to hoard cash when business conditions improve, when they have low growth opportunities, or when business risks increase. On the other hand, Vietnamese firms tend to reduce holding cash when other internal sources of cash substitutes are in abundance or when external fund accessibility improves. These characteristics support the trade-off theory of cash holding, meaning that Vietnamese firms hold cash mainly for transactional and precautionary purposes. Additional analyses show that the rate of adjustment of cash holding toward the target level is about 30% a year. Taken together, the results confirm the hypothesis that Vietnamese firms hold cash for transactional and precautionary purposes, and they constantly reconsider the benefits and costs of adjusting cash holding ratios to the target levels. The research results have two main implications. Firstly, the fact that firms with low growth opportunities have higher cash holding ratios indicates that these firms' board of directors may have been inefficient in monitoring and disciplining the behavior of firms' executives toward shareholder interests. Secondly, the fact that Vietnamese firms have low and dwindling cash holdings in recent years and use their cash stock mainly for transactional and precautionary purposes may be a sign of internal resource deficiency. Given that internal resources are vital to investments in research and development, which in turn contribute to firms' future growth and competitiveness, the current low level cash holding is a bad sign for the future growth as well as the long-term competitiveness of Vietnamese firms.

Keywords: Cash holdings; Free cash flow theory; Pecking order theory; Trade-off theory; Vietnamese listed companies.

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TẠI SAO DOANH NGHIỆP VIỆT NAM GIỮ TIỀN MẶT?

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Nghiên cứu này hướng đến khám phá thực trạng và lý do nắm giữ tiền mặt của doanh nghiệp Việt Nam. Dựa trên tập dữ liệu gồm 199 doanh nghiệp niêm yết trên sàn chứng khoán Thành phố Hồ Chí Minh trong giai đoạn 2011 đến 2018, kết quả phân tích thống kê cho thấy mức nắm giữ tiền mặt phổ biến của doanh nghiệp Việt Nam là khoảng 5.9%. Tỷ lệ nắm giữ tiền mặt cao chỉ xuất hiện ở các doanh nghiệp có quy mô nhỏ. Ngoài ra, tỷ lệ nắm giữ tiền mặt của các doanh nghiệp ở tất cả bốn nhóm phân vị theo quy mô đều có xu hướng giảm kể từ năm 2016, mà mạnh nhất là ở nhóm doanh nghiệp quy mô nhỏ. Phân tích hồi quy cho thấy các doanh nghiệp Việt Nam thường tăng tích trữ tiền mặt khi điều kiện kinh doanh của doanh nghiệp thuận lợi hay rủi ro kinh doanh gia tăng và giảm tích trữ tiền mặt khi có các nguồn vốn nội bộ khác hay khả năng tiếp cận nguồn vốn ngân hàng trở nên dễ dàng hơn. Các đặc trưng này ủng hộ lý thuyết cân bằng lợi ích và chi phí (Trade-off theory) trong nắm giữ tiền mặt. Các kiểm định tăng cho thấy tốc độ điều chỉnh tỷ lệ tiền mặt nắm giữ là khoảng 30% mỗi năm; Qua đó, cũng ủng hộ kết luận các doanh nghiệp Việt Nam nắm giữ tiền mặt nhằm mục đích thanh toán và dự phòng rủi ro và có tính toán cân bằng giữa lợi ích và chi phí khi quyết định lượng tiền mặt nắm giữ tối ưu. Kết quả nghiên cứu chỉ ra hai hàm ý chính sách đối với nhà nghiên cứu và nhà đầu tư. Thứ nhất, kết quả phân tích cho thấy ban điều hành của nhóm doanh nghiệp có khả năng tăng trưởng thấp và ít cơ hội đầu tư trong tương lai đã có những quyết định giữ tiền mặt phi kinh tế và có thể ban quản trị doanh nghiệp đã không làm tròn chức năng giám sát và điều chỉnh hành vi của ban điều hành theo lợi ích của cổ đông. Thứ hai, việc các doanh nghiệp Việt Nam có tỷ lệ nắm giữ tiền mặt khá thấp và chủ yếu phục vụ mục đích giao dịch cũng có thể là một dấu hiệu cho thấy năng lực đầu tư nội bộ là thấp. Điều này sẽ hạn chế khả năng đầu tư vào nghiên cứu và phát triển, ảnh hưởng đến khả năng tăng trưởng và cạnh tranh lâu dài của doanh nghiệp.

Từ khóa: Doanh nghiệp niêm yết tại Việt Nam; Lý thuyết cân bằng lợi ích và chi phí; Lý thuyết dòng tiền tự do; Lý thuyết thứ tự ưu tiên; Tiền mặt.

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1. INTRODUCTION

There is a maxim in the business world, “Cash is King”, to signify the importance of holding cash. While holding cash has many benefits, holding too much cash is not necessarily a good thing. The tendency of businesses in many countries to increase cash holdings in recent years has attracted the attention of researchers and business executives (Bates, Kahle, & Stulz, 2009; Ferreira & Vilela, 2004). In Vietnam, according to the data as of June 30, 2017, there were at least 30 firms listed on the stock exchanges with cash holdings over VND 1,000 billion (approximately USD 40 million). For some firms, cash holdings were even greater than their debts, so that, in principle, these businesses can be considered to have no loans (Kinh, 2018). The fact that some companies in Vietnam hold large amounts of cash raises two important questions for researchers and investors: Are the high levels of cash holdings in some companies, as commented by some financial analysts, universal or just local and temporary? And why do Vietnamese firms hold cash? The answers to these two questions have major implications for investors and business executives in evaluating the effectiveness of firms’ cash holding policies.

Empirical results on firms' motivation to hold cash are not conclusive. Based on data from US listed companies from 1971 to 1994, Opler, Pinkowitz, Stulz, and Williamson (1999) find that small firms, and firms with high growth potential and high business risks, often hoard more cash than others. In contrast, firms with access to external financial sources, such as large firms or firms with high credit ratings, usually hold less cash. These findings seem to support the trade-off theory of cash holding, implying that firms consider the benefits and costs when deciding the optimal level of cash holdings and that firms hold cash in anticipation of unexpected investment opportunities. Similar results were found for small businesses in the US (Faulkender, 2002) and businesses in the UK (Okzan & Okzan, 2004). Recent research by Bates et al. (2009) and Orlova and Rao (2018) on American industrial companies also seems to support the trade-off theory.

From another point of view, studies of the impact of financial constraints on corporate financial decisions seem to support the pecking order theory of cash holding. In particular, businesses that have difficulty accessing finance (such as small firms, firms with low credit ratings, or firms with high KZ (Kaplan-Zingales) financial constraint index) often hold more cash (Almeida, Campello, & Weisbach, 2004). The reason for this may be that these companies want to accumulate internal capital to replace external capital (Almeida et al., 2004; Fazzari, Hubbard, & Petersen, 1988). However, Acharya, Almeida, and Campello (2007) find evidence that firms do not consider cash to be a perfect substitute for debt financing. In particular, the authors argue that firms accumulate cash to serve the purpose of balancing future investment risks rather than making investment capital.

In contrast, Harford (1999) finds evidence from the US market that supports the hypothesis that managers hoard cash to serve their own benefits, and they often make inefficient investment decisions. Similarly, research by Malmendier and Tate (2005)

also shows that cash accumulation is for the benefit of managers. However, this conclusion is not robust because data from the US market also shows that businesses with lots of cash are still profitable and, in some cases, even more profitable than businesses with less cash. In detail, the research results show that high cash flows are often accompanied by increased investments, especially investments in Research and Development (R&D), and investments in assets. This shows that the accumulation of cash does not necessarily serve the interests of managers or harm shareholders. However, in a study on the relationship between the quality of corporate governance and the decision to hoard cash by American firms, Harford, Mansi, and Maxwell (2008) find that firms with lower corporate governance quality usually hold less cash. The authors explain that this phenomenon may be due to the fact that the firms' executives choose to quickly invest the excess cash before being supervised by the board directors.

For the case of Vietnamese firms, there are few studies on the motivation to hold cash. Existing studies focus on two directions: The first direction is to study the relationship between cash holding and firm performance. Research by Nguyễn and Từ (2015) shows that holding cash does not affect the value of companies. However, having a lot of cash can be related to financing and dividend decisions. The second research direction is the study of factors affecting the amount of cash holding. Studies show that firms listed on the Ho Chi Minh City Stock Exchange accumulate more cash when facing financial access restrictions (Phạm & Đình, 2018).

Recently, a number of studies on liquidity management policy show that Vietnamese firms tend to manage working capital (including cash) mainly for daily activities rather than as a capital source and holding abundant liquidity seems to improve firms' financial performance (Nguyen & Nguyen, 2018a, 2018b).

Although there have been a number of studies on cash holding decisions of businesses in Vietnam, these studies focus on determining the impact of cash holding on firms' financial performance and on identifying a number of basic factors affecting the amount of cash held (Nguyễn & Từ, 2017). There is no research exploring the current situation or the trend of cash holding, and the existing research has not provided an answer to the question of why firms hold cash. This is the research gap that this study addresses.

This study contributes to the research history of firms' decisions to hold cash, particularly in the Vietnamese context, in two ways. Firstly, this study outlines a general picture of the current situation as well as cash holding trends of Vietnamese firms in recent years. Secondly, this research aims to answer the question of why Vietnamese companies hold cash.

The statistical analyses on a sample of 199 businesses listed on the Ho Chi Minh City Stock Exchange (HOSE) from 2011 to 2018 show that the average amount of cash held by Vietnamese enterprises was 13.4%, lower than the average holding ratio of companies in other countries, such as 17.0% in the US (Opler et al., 1999) or 14.8% in EMU (European Economic and Monetary Union) countries (Ferreira & Vilela, 2004). In

addition, the median value of 5.9% shows that the majority of companies have very low cash reserves. The high proportion of cash reserves is observed mainly in small firms. Thus, high cash holding is not a common characteristic of Vietnamese firms. Furthermore, Vietnamese firms seem to have reduced their cash holdings over the past three years, from 11.8% in 2016 to 9.0% in 2018. This trend occurred simultaneously among firms in all size quantiles.

The regression results show that Vietnamese firms often accumulate more cash when their business prospers and when their financial and business risks increase. On the other hand, Vietnamese firms often reduce cash accumulation when alternative sources of internal capital become more abundant and when the ability to access external capital sources becomes easier. This type of behavior is compatible with the prediction of the trade-off theory; that is, companies tend to balance the costs and benefits when deciding the optimal amount of cash to hold, and the purpose of holding cash is usually to serve trading needs and as a reserve for future risks. Apart from the main results, the regression analyses also indicate that companies with low growth opportunities tend to increase cash holdings.

Robust tests show that Vietnamese firms adjust cash holding rates upward when the previous year's cash holdings are too low and downward when the previous year's cash holdings are too high. This behavior implies that Vietnamese firms do have an optimal ratio of cash holding and adjust their cash holdings toward this target level. This conclusion is additional evidence supporting the trade-off theory of cash holding in the Vietnamese market context.

The empirical research results have two implications for researchers and investors. Firstly, the analysis results show that businesses with low growth rates and less investment opportunities tend to increase cash reserves. This is a negative sign, showing that the executives of these firms have made inefficient cash holding decisions, and that the board of directors have not fulfilled the function of supervising and disciplining management's behavior in shareholders' best interests. Secondly, the fact that Vietnamese firms have relatively low cash holding ratios and use cash mainly for transaction purposes could also be a negative sign. Pecking order theory postulates that cash is sometimes used as an additional source of corporate internal capital, especially for investments in R&D. The fact that Vietnamese companies hold so little cash may be an indication of low internal investment capacity, which, in turn, affects their long-term growth and competitiveness.

The rest of the study is organized as follows: Part two summarizes theories and proposes corresponding hypotheses on the firms' cash holding decisions. Part three illustrates the methods of data collection and analysis. The next section presents the results of the data analyses. The conclusions are presented in the final section.

2. THEORIES AND HYPOTHESES

Under the conditions of perfect financial markets described by Modigliani and Miller (1958), firms have no incentive to hold cash. If companies need cash, they can always borrow from external capital markets at an interest rate equal to the opportunity costs of holding cash. Because there are no extra costs, borrowing or hoarding makes no difference.

In reality, financial markets are not perfect as defined by Modigliani and Miller (1958). Firstly, financial transactions involve transaction costs. According to Baumol (1952), businesses accessing outside capital have to pay a “brokerage fee”. In the case of a business liquidating assets for cash, they also incur costs in the form of having to sell assets at lower prices than their actual values (Opler et al., 1999). In addition, due to asymmetric information, some types of firms may find it difficult to access external capital and may have to pay higher costs to raise capital when needed (Myers & Majluf, 1984). Finally, holding cash also involves other indirect expenses because executives are likely to use firms’ cash for personal gains rather than for the best interest of shareholders (Jensen, 1986).

In this section, we discuss in detail the role of transaction costs, asymmetric information, and agency costs in determining the level of cash holdings and related hypotheses.

2.1. The trade-off theory

Models that explain the decision to hold cash on the basis of balancing the benefits and costs suggest that firms need cash for short term transactions and weigh the benefits and costs of holding cash for such purposes to decide the optimal level of their cash reserves. In terms of benefits, cash reduces the risk of a financial crisis because it acts as a buffer to absorb unexpected losses or as a reserve for unexpected situations in which firms cannot access external capital (Keynes, 1936). In addition, in terms of transaction costs, available cash helps businesses reduce borrowing from outside sources or reduces the need to liquidate assets at low prices, thereby reducing operating costs (Miller & Orr, 1966).

In these models, the cost curve of cash shortages is downward sloping. The less cash a business holds, the higher it costs to raise additional cash when needed. Assuming the opportunity cost of holding cash is fixed, Opler et al. (1999) suggest that an optimal level of cash holding exists. Companies tend to reduce cash holdings if the costs of lacking cash are lower than the costs of holding it. Conversely, companies are expected to increase their cash holdings if the costs of lacking cash are higher than the opportunity costs of holding it.

According to this theory, some firm’s characteristics would affect the benefits and costs of holding cash that it incurs, thereby dictating the amount of cash that the firm holds.

- *Profitability*: According to the trade-off theory, companies increase their cash holdings when the costs of keeping cash go down. When a company is profitable, its cash flow is more abundant and therefore the costs of cash accumulation decrease. Therefore, the trade-off theory predicts that there is a positive correlation between firm profitability and the amount of cash held;
- *Cash flow*: Similar to the case of profitability, when the cash flow of companies becomes more abundant, the costs of hoarding cash decrease. As the costs of holding cash decrease, the trade-off theory predicts that companies would hoard more cash;
- *Liquid asset substitutes*: In addition to cash, companies may hold other liquid assets, such as bonds, accounts receivables from customers, and inventories. These highly liquid assets can be exchanged for cash at low costs when needed. In addition, the trade-off theory postulates that companies have an optimal cash reserve. Therefore, when there are many liquid asset substitutes, the trade-off theory predicts that firms would reduce their holdings of cash;
- *Firm size*: As firms get larger in size, they tend to have more sources of revenue and spending. Thus, it is easier for larger firms to implement cash management and revenue management strategies, taking advantage of the economy of scale to reduce cash reserves;
- *Cash flow uncertainty*: Companies with unstable cash flows are more likely to face the risk of cash shortage. Accordingly, the costs due to lack of cash would increase when cash flow uncertainty increases. Therefore, the trade-off theory predicts that as the volatility of cash flows increases, cash holdings would increase as well;
- *Relationship with the bank*: Companies with good relationships with banks would have better access to bank credits when needed. This reduces costs due to the lack of cash and reduces the need to hold excess cash. Therefore, the trade-off theory predicts that companies would hold less cash when they have a good relationship with the bank;
- *Leverage*: Companies with high leverage usually face higher financial crisis risk. Because cash reduces the risk of a financial crisis, the trade-off theory predicts that businesses with high leverage would also hold higher amounts of cash;
- *Cash dividend policy*: For companies, a cash dividend transaction is a cash outflow. In addition, once companies have decided to pay cash dividends, they usually try to keep this policy stable because changes in dividend policy, especially reductions, tend to signal bad information to the financial markets (Lintner, 1956; Miller & Modigliani, 1961). Therefore,

the trade-off theory predicts that firms paying cash dividends tend to reserve more cash.

2.2. Pecking order theory

When executives have more information about the financial situation of the firms than outside investors, the investors tend to be very cautious when financing the firms (Jensen & Meckling, 1976). The greater the level of information asymmetry, the lower the ability of firms to access external capital and the higher the costs of external capital. Therefore, firms with profitable projects often tend to rely on internal capital first since it has the lowest costs, then borrow capital at higher costs, and finally raise shareholder capital at still higher costs (Myers & Majluf, 1984). According to this theory, companies accumulate cash whenever possible to serve long-term investment projects because this is the cheapest source of capital. However, this theory also predicts that there is no optimal level of cash holdings.

The predictions of this theory about the relationship between a number of firms' characteristics and the level of cash holdings are as follows:

- *Future investment opportunities*: The more investment opportunities a firm has in the future, the more capital it needs. Since cash is the cheapest internal capital source, the pecking order theory predicts that as the demand for investment capital increases, companies would increase their cash accumulation to finance future projects;
- *Profitability*: According to the pecking order theory, internal capital is the cheapest capital source. Thus, companies would try to accumulate this source of capital whenever it is possible to do so. As profits rise, the pecking order theory predicts an increase in cash reserves. In addition, businesses with high profits often have more investment opportunities in the future. In the same way, the pecking order theory also predicts that businesses would increase cash reserves as profits increase;
- *Cash flow*: Similar to the profitability case, the pecking order theory predicts that as cash flows into a firm become more abundant, cash reserves would also rise;
- *Firm size*: The larger the size of a firm, the easier it is to access the capital markets and the lower the costs of external borrowing. It follows that large companies do not need to hold much cash to serve future investment needs. Therefore, the pecking order theory predicts a negative correlation between firm size and the amount of cash held;
- *Relationship with the bank*: A good relationship with the bank allows firms to get easy access to bank credit for investment projects. Therefore, the

pecking order theory predicts that companies would hold less cash when they have a good relationship with the bank;

- *Long-term debts*: According to the pecking order theory, the amount of long-term debt increases when the demand for investment capital exceeds the internal capital of the business. Therefore, the amount of cash holdings is expected to have a negative relationship with long-term debt.

2.3. The free cash flow theory

The free cash flow theory assumes that business executives do not have the same interests as shareholders. Therefore, the executives, when possible, are likely to make decisions that are in their best interests rather than shareholders'. According to this theory, cash is a type of business asset that executives can easily manipulate for personal gains. First of all, when accumulating a lot of cash in hand, executives can evade the supervision pressure from the markets and related parties. In addition, when cash is abundant, executives can make investment decisions that serve their interests, such as over-investing to increase their power (entrenchment), which often harms shareholders (Jensen, 1986).

The predictions of this theory about the relationship between a number of firms' characteristics and the amount of cash held are as follows:

- *Future investment opportunities*: If firms' executives make a decision for the benefits of shareholders, they would hold less cash or refund the excess cash to the shareholders when the business has few investment opportunities in the future. The free cash flow theory predicts that if firms' executives are self-interested, they would find ways to retain cash instead of returning it to shareholders because holding a lot of cash may bring many personal benefits to the executives. As a result, the fewer investment opportunities a firm has, the more cash it holds;
- *Profitability*: For personal gains, firms' executives tend to accumulate cash whenever it is possible to do so. Therefore, the free cash flow theory predicts that firms with self-interested executives would increase cash reserves as profits increase;
- *Cash flow*: Similar to the case of profits, firms' executives with self-interested intentions would also hoard cash when opportunities arise. As cash flows of the business increase, the free cash flow theory predicts that firms would hoard more cash;
- *Firm size*: Larger firms usually have more complex business structures. Therefore, it is more difficult to monitor the behavior of the executives. In addition, when the size of the business increases, the number of shareholders may increase as well and, as a result, the ability of the

shareholders to supervise executives inevitably decreases. This creates an environment that encourages the executives to become even more self-interested. Therefore, the theory of free cash flow predicts that as the size of firms increases, the level of cash holding would increase;

- *Relationship with the bank:* In general, companies with good relationships with banks are assumed to have better access to bank credit. However, when this relationship becomes close, the level of supervision from the bank would also increase, limiting the self-interested behavior of the executives. Therefore, free cash flow theory predicts that self-interested executives may not want to borrow from banks as much as economic considerations suggest. Thus, they tend to prefer high cash holdings and low bank borrowings;
- *Cash dividend policy:* In companies with little supervision from the board of directors, the executives may not want to return the excess cash flow to shareholders even if the companies do not have good investment opportunities to justify the cash accumulation decisions (Bates et al., 2009). Therefore, the free cash flow theory predicts that companies that do not pay cash dividends would often accumulate more cash.

In summary, these three theories all predict that businesses would increase cash reserves when their business conditions are favourable (profits and cash flows increase) and when the relationship with the bank improves. However, the three theories also have fundamentally different predictions in certain aspects that can help tell them apart. The theory of free cash flow explains a firm's decision to hold cash on purely executives' personal interest basis. Therefore, business executives would be more likely to make cash hoarding decisions and restrict the return of excess cash to shareholders when they are not under the discipline of the board of directors or other outside parties. In addition, previous studies have shown that businesses that have excess money due to the self-interested behaviour of executives often squander money on inefficient projects. Accordingly, from the free cash flow perspective, only the factors of firm size, cash dividend policy, and investment opportunities are relevant to the firm's decision to hold cash.

The remaining two theories, the trade-off theory and the pecking order theory, both assume that firms' executives make decisions to maximize the interests of the firms, not their self-interests. However, from the trade-off theory perspective, the firm's decision to hold cash is made to serve short-term transactions and for precautionary purposes. Therefore, factors such as long-term investment opportunities are not relevant. In contrast, the pecking order theory explains the firm's decision to hold cash on the basis of long term investment. Therefore, short-term considerations such as liquid asset substitutes, cash flow risks, or financial crisis risks are not relevant factors. In addition, because the pecking order theory does not project an optimal level of cash reserves as in the trade-off theory, it is not possible to make predictions about the impact of other internal funds (in this case, cash dividends) on the decision to hold cash.

Companies can accumulate cash and other liquid asset substitutes at the same time to serve investment purposes in the future. Table 1 summarises the hypotheses about the factors that affect the amount of cash held by firms according to the three theories.

Table 1. Theories and related hypotheses

Firm characteristics	Trade off theory	Pecking order theory	Free cash flow theory
Future investment opportunities		Positive	Negative
Cash flow	Positive	Positive	Positive
Cash flow uncertainty	Positive		
Cash dividend policy	Positive		Negative
Firm size	Negative	Negative	Positive
Leverage	Positive		
Long-term debts		Negative	
Profitability	Positive	Positive	Positive
Relationship with the bank	Negative	Negative	Negative
Liquid assets substitutes	Negative		

3. DATA DESCRIPTIONS

To conduct the empirical analysis, we collected data on a sample of companies listed on the Ho Chi Minh City Stock Exchange (HOSE). Banking and financial services companies are excluded from the sample. The reason is that these companies have to comply with additional regulations on holding cash. Thus, their decisions to hold cash are not entirely based on economic considerations.

Table 2. Sample structure by industry

Industry	Number of companies	Number of observations	Percentage	Cumulative observations	Cumulative percentage
Wholesale	16	128	8.04	128	8.04
Retail	09	72	4.52	200	12.56
Information Technology	03	24	1.51	224	14.07
Accommodation and Catering	03	24	1.51	248	15.58
Mining	06	48	3.02	296	18.59
Production	76	608	38.19	904	56.78
Agriculture	04	32	2.01	936	58.79
Utilities	13	104	6.53	1,040	65.33
Transportation and Warehousing	16	128	8.04	1,168	73.37
Construction and Real Estate	53	424	26.63	1,592	100.00
Total	199	1,592	100.00	1,592	100.00

Notes: Companies are classified by their first registered type of business. Industries are classified in accordance with NAICS (North American Industry Classification System) 2007.

In addition, we also chose companies listed from 2010 or earlier and that have financial information released continuously until the time of data collection to ensure the collection of adequate and reliable data, which help ensure the reliability of the statistical analysis results. As a result, 199 enterprises in 10 industries were selected for the survey, corresponding to 1,592 observations from 2011 to 2018. The relatively large number of observations and the structure of the sample covering businesses in many industries help ensure the sample representativeness. Table 2 presents information on sample structure, classified by major business activities.

Tables 3 and 4 describe in detail the definitions and basic descriptive statistics of the variables used in this study. As in Opler et al. (1999) and Ferreira and Vilela (2004), we define the cash holding ratio as the amount of cash and cash equivalents divided by net assets, where net assets are book values of assets minus the amount of cash and cash equivalents.

Table 3. Definition of research variables

Variable	Code	Formula
The ratio of cash holdings over net assets	CASH	$\frac{\text{Cash and cash equivalents}}{\text{Total assets} - \text{Cash and cash equivalents}}$
Market to book value	MTB	$\frac{\text{Total assets} - \text{Equity} + \text{Market value of equity}}{\text{Total assets}}$
The ratio of cash flows over net assets	CFRATIO	$\frac{\text{Net operating cash flows}}{\text{Total assets} - \text{Cash and cash equivalents}}$
Cash flows uncertainty	CFUNCERTAINTY	$ \text{CFRATIO}_{it} - \overline{\text{CFRATIO}_i} $
Cash dividend	DIV	Equal 1 if the company pay cash dividend and 0 otherwise
Firm size	LSIZE	$\text{Log}(\text{Total assets})$
The ratio of total debts over net assets	LEVERAGE	$\frac{\text{Total debts}}{\text{Total assets} - \text{Cash and cash equivalents}}$
The ratio of long term debts over net assets	MATURITY	$\frac{\text{Long term debts}}{\text{Total assets} - \text{Cash and cash equivalents}}$
Profitability	ROA	$\frac{\text{Net profit after tax}}{\text{Total asset}}$
The ratio of bank borrowings over Total assets	BORROWRATIO	$\frac{\text{Bank borrowings}}{\text{Total assets}}$
The ratio of net working capital over net assets	NWC	$\frac{\text{Net working capital} - \text{Cash and cash equivalents}}{\text{Total assets} - \text{Cash and cash equivalents}}$

Table 4. Descriptive statistics

Variable	N	Mean	Median	Std. dev.	Min	Max
CASH	1,592	0.133731	0.059342	0.297952	0.000188	6.405646
MTB	1,592	1.288252	0.875000	3.601632	0.100000	121.340000
CFRATIO	1,592	0.071180	0.049837	0.164695	-0.749780	2.188948
CFUNCERTAINTY	1,592	0.081639	0.056605	0.097923	8.15E-06	1.199334
DIV	1,592	0.781407	1.000000	0.413422	0.000000	1.000000
LSIZE	1,592	9.163826	9.114875	0.536265	8.106911	11.459350
LEVERAGE	1,592	0.543082	0.555187	0.235398	0.030426	2.384434
MATURITY	1,592	0.138233	0.063652	0.199298	0.000000	4.490146
ROA	1,592	0.060375	0.047797	0.083371	-0.852590	0.783700
BORROWRATIO	1,592	0.253434	0.241600	0.189432	0.000000	0.975100
NWC	1,592	0.139682	0.115669	0.238880	-2.049630	0.925818

Notes: The statistics are calculated using 1592 observations from 199 companies listed on HOSE from 2011 to 2018; CASH is the ratio of cash and cash equivalents over net assets; MTB is the ratio of market to book value; CFUNCERTAINTY is the absolute difference between cash flow ratios for two adjacent periods; LSIZE is the logarithm of total assets; LEVERAGE is the ratio of total debts over net assets; MATURITY is the ratio of long term debts over net assets; ROA is the ratio of net profit over total assets; BORROWRATIO is the ratio of bank borrowings over total assets; and NWC is the ratio of net working capital over net assets.

To estimate the impact of cash dividend policy, we define a dummy variable with a value of 1 if the company pays cash dividends in the observed year and 0 otherwise. To measure the performance of the company, we use the ratio of net profit after tax divided by the total value of the company's assets.

Because the book value does not reflect the potential investment opportunities, investors often have to collect market information on companies' investment opportunities and incorporate this information into stock prices. Therefore, we use the market value-to-book ratio to measure the company's potential investment opportunities. The larger the ratio, the more investment opportunities the company has and, accordingly, the higher the likelihood of the company's growth.

To measure the value of highly liquid assets that can be sold when a business needs cash, we calculate the ratio of net working capital to net assets. Leverage is calculated by the ratio of total debt to net assets. The logarithm of a company's book value is used as a measure of its size.

To measure the firm's ability to generate cash, we calculate the ratio of net cash flow from operating activities to the net assets of the corresponding year. Based on this variable, the cash flow variability of each firm is measured by taking the absolute value

of the difference between the net cash flow from business activities on net assets and the average of this figure for the entire survey period.

Long-term liabilities of the company are calculated by subtracting short-term liabilities divided by net assets. In addition, we calculate the bank loan ratio by dividing the business's bank debt by its assets.

4. THE TRENDS OF CASH HOLDINGS OF VIETNAMESE FIRMS

Referring to Table 5, the average ratio of cash to net assets of the companies in the research period is about 13.4%. This is lower than the average cash holding ratio of countries in the European Economic and Monetary Union (EMU) (14.8%) according to a study by Ferreira and Vilela (2004), or the corresponding US number (17.0%) according to research by Opler et al. (1999). The median value of 5.9% indicates that the typical cash holding ratio of firms in the sample is quite low and that high cash holdings occur only in a few companies. Compared to some Asian countries/territories, the median cash holding ratio of Vietnamese companies is higher than that of India (3.4%), Thailand (3.8%), and the Philippines (4.9%); but lower than Malaysia (6.3%), South Korea (8.9%), Indonesia (10.3%), Taiwan-R.O.C (11.6%), Hong Kong-P.R.C (13.1%), and Japan (15.5%) (Dittmar, Mahrt, & Servaes, 2003).

Table 5. Cash holding ratio of Vietnamese firms in the period of 2011-2018

Year	Mean	Median	Max	Min	Std. dev.	Obs.
2011	0.133107	0.053759	1.092636	0.000987	0.185867	199
2012	0.145937	0.059293	5.238572	0.001605	0.398022	199
2013	0.150987	0.068639	3.513244	0.000467	0.292225	199
2014	0.165921	0.070360	6.405646	0.000188	0.488042	199
2015	0.152056	0.067763	2.280095	0.000576	0.289222	199
2016	0.118841	0.055353	2.171203	0.000769	0.210982	199
2017	0.112335	0.052354	2.634409	0.000564	0.223202	199
2018	0.090662	0.054060	0.899218	0.000788	0.120149	199
Total	0.133731	0.059342	6.405646	0.000188	0.297952	1,592

In addition, Table 5 also shows that the trend of holding cash increased gradually after 2011 (13.3%) and peaked in 2014 (16.6%) before continuously declining to 9.1% in 2018, with more than 50.0% of businesses having cash holdings less than 5.5%. Based on the descriptive statistics, we can infer that the cash holding ratio of Vietnamese companies is generally low and has tended to decrease in recent years. The increase in cash holding probably happens only in a few companies. If we look at the median over time, the common cash holding ratio of companies in the sample only fluctuates from 5.2% to 7.0% during the study period.

Table 6 shows the difference in the amount of cash held among firms of different industries. The sector with the highest average cash holdings is Accommodation and Catering Services (86.0%), followed by Retail (25.5%) and Transportation and Warehousing (18.1%). The two industries with the lowest average cash holdings are Construction and Real Estate (7.4%) and Wholesale (10.0%). However, the averages are often strongly influenced by outlier observations. This makes the average trend measurement not accurately reflect the general trend, especially when the number of observations is small. This problem happens with a number of industries, such as Accommodation and Catering Services and Information Technology (with only three companies), Agricultural Production (with four companies), or Mining (with six companies). For a more comprehensive view, we refer to the median cash holding. According to this statistic, the industries with the highest proportion of cash holdings are Mining (12.6%) and Information Technology (12.5%). Meanwhile, Construction and Real Estate, Accommodation and Catering Services, and the Wholesale industry have the lowest proportion of cash holdings, with 3.5%, 3.7%, and 4.6%, respectively.

Table 6. Cash holding ratio by industry

Industry	Mean	Median	Max	Min	Std. dev.
Wholesale	0.099665	0.045674	0.551947	0.002829	0.122727
Retail	0.255419	0.093824	2.634409	0.008216	0.498662
Information Technology	0.145489	0.125234	0.579960	0.029647	0.118543
Accommodation and Catering	0.859166	0.037202	6.405646	0.003146	1.745637
Mining	0.143934	0.120256	0.530283	0.000188	0.125662
Production	0.126660	0.060063	1.136987	0.000446	0.171812
Agriculture	0.104090	0.088507	0.516208	0.002673	0.099536
Utilities	0.153989	0.068390	1.311618	0.000576	0.241806
Transportation and Warehousing	0.181198	0.099092	1.645856	0.004071	0.224938
Construction and Real Estate	0.073545	0.035171	0.917798	0.000904	0.098082
Total	0.133731	0.059342	6.405646	0.000188	0.297952

Notes: Companies are classified by their first registered area of business;
Industries are classified in accordance with NAICS 2007.

When classifying the companies into four quartile groups by size, the results show that companies in the first quartile (i.e., companies in the smallest 25.0% group) have the highest cash holding ratio, with an average holding ratio of 22.7% (median of 8.5%). Larger firms (in the second, third, and fourth quartiles) have lower average cash holding ratios, at 9.6% (median of 4.5%), 10.8% (median of 5.9%), and 10.3% (median of 5.3%). In addition, the decline in the proportion of cash held during 2016-2018 occurred in companies in all four quartiles but the most serious was in the group of small businesses (see Figure 1).

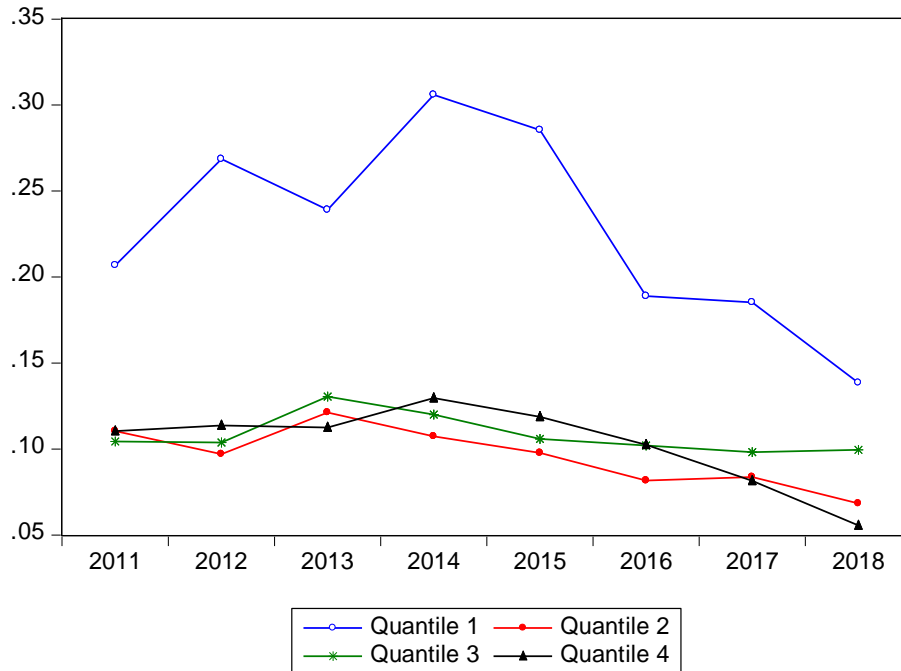


Figure 1. Cash holding ratio by firm size

Referring to Table 7, firm performance seems to have a great impact on cash holding policy. Specifically, companies with positive profits often accumulate more than three times as much cash as loss-making companies (14.0% versus 4.0%). Similarly, enterprises with positive cash flows also accumulate twice as much cash as businesses with negative cash flows (16.0% compared to 8.0%).

Table 7. Cash holding ratio by cash dividend policy, profitability, liquid asset substitutes, and cash flow

Year	Cash dividend		Profit		Liquid assets substitutes		Cash flow	
	Yes	No	Positive	Negative	Positive	Negative	Positive	Negative
2011	0.14	0.06	0.14	0.02	0.11	0.19	0.17	0.07
2012	0.17	0.05	0.16	0.03	0.12	0.23	0.17	0.09
2013	0.17	0.07	0.16	0.05	0.15	0.16	0.17	0.12
2014	0.20	0.05	0.17	0.07	0.16	0.19	0.21	0.07
2015	0.19	0.05	0.16	0.05	0.15	0.17	0.18	0.09
2016	0.14	0.06	0.12	0.04	0.10	0.17	0.13	0.08
2017	0.13	0.05	0.11	0.07	0.10	0.14	0.13	0.08
2018	0.10	0.04	0.09	0.05	0.09	0.10	0.10	0.08
Mean	0.16	0.05	0.14	0.04	0.12	0.17	0.16	0.08

In addition, payment needs can also cause companies to hoard more cash. Businesses with negative liquid asset substitutes (measured by net working capital) often have to reserve more cash than businesses with positive liquid asset substitutes (17.0% versus 12.0%). Businesses that have pledged to pay cash dividends to their shareholders also have cash holding ratios three times higher than businesses that do not pay cash dividends (16.0% versus 5.0%).

As shown in Table 8, we find that firms with better access to external capital often hold less cash. Specifically, firms with a high ratio of long term debt, bank debt, and leverage (both short-term and long-term), which fall into the third and fourth size quantiles, have cash holding ratios of 10.0%, 9.0%, and 12.0%, respectively, compared to 17.0%, 18.0%, and 15.0% for the group with little external borrowing (which fall into the first and second quartiles). Conversely, firms in the group with a lot of future investment opportunities or high cash flow risks often have a higher level of cash holding than businesses with few future investment opportunities or low cash flow risks (18.0% and 17.0% compared to 8.0% and 10.0%).

Table 8. Cash ratio by future investment opportunities, long term debts, bank borrowings, cash flow uncertainty, and leverage

Year	MTB		Long term debts		Bank borrowings		Cash flow uncertainty		Leverage	
	Q3-4	Q1-2	Q3-4	Q1-2	Q3-4	Q1-2	Q3-4	Q1-2	Q3-4	Q1-2
2011	0.19	0.11	0.08	0.18	0.08	0.19	0.16	0.09	0.11	0.16
2012	0.25	0.09	0.07	0.22	0.06	0.24	0.21	0.08	0.10	0.21
2013	0.22	0.09	0.09	0.21	0.10	0.21	0.17	0.13	0.13	0.17
2014	0.23	0.08	0.08	0.24	0.10	0.23	0.24	0.09	0.14	0.19
2015	0.20	0.09	0.13	0.18	0.12	0.19	0.17	0.14	0.16	0.14
2016	0.16	0.07	0.11	0.12	0.09	0.15	0.15	0.09	0.13	0.11
2017	0.14	0.07	0.11	0.12	0.09	0.14	0.12	0.11	0.11	0.11
2018	0.12	0.06	0.08	0.10	0.06	0.12	0.10	0.08	0.07	0.11
Mean	0.18	0.08	0.10	0.17	0.09	0.18	0.17	0.10	0.12	0.15

5. WHY DO VIETNAMESE FIRMS HOLD CASH?

To answer this question, we perform three analysis steps. First, the correlation coefficient for the research variables is calculated to preliminarily evaluate the relationship between the ratio of cash holdings and certain characteristics of firms. Next, we conduct a regression analysis to measure and verify the relationship between the firm-specific variables and the firm's cash holding ratio, thereby identifying potential explanations for the cash holdings of Vietnamese firms. Finally, we conduct a robust test to reinforce the reliability of the conclusions drawn from the regression analysis.

5.1. Correlation analysis

The correlation coefficients and corresponding statistical significance levels are shown in Table 9. Specifically, the correlation coefficients between the cash holding ratio (CASH) and cash flow (CFRATIO) and the cash holding ratio (CASH) and firm performance (ROA) are positive and statistically significant, showing that firms with favourable conditions for accumulating cash often hoard more cash. In contrast, the negative and statistically significant correlation coefficients between the cash holding ratio (CASH) and net working capital (NWC), the cash holding ratio (CASH) and the ratio of bank loans (BORROWRATIO), the cash holding ratio (CASH) and the ratio of long term borrowings (MATURITY), and the cash holding ratio (CASH) and the size of the firm (LSIZE) show that firms with abundant cash replacement resources or those in a good position to access external capital often have lower amounts of cash. In addition, the positive correlation coefficients between cash ratio (CASH) and the change of cash flow (CFUNCERTAINTY) and between cash ratio (CASH) and the leverage ratio (LEVERAGE) indicate that companies with higher levels of financial risk often hold more cash. Finally, Table 9 also shows that firms paying cash dividends often hold a higher amount of cash than firms that do not pay dividends, and the firm's investment prospects do not seem to be related to the amount of cash held.

Table 9. Correlation coefficients between research variables

	CASH	MTB	ROA	CFRATIO	CFUN- CERTAINTY	DIV
CASH	1.000000					
MTB	0.018134	1.000000				
ROA	0.309230***	0.064337**	1.000000			
CFRATIO	0.536636***	0.021469	0.349558***	1.000000		
CFUNCERTAINTY	0.371144***	-0.006400	0.045956*	0.347767***	1.000000	
DIV	0.143828***	-0.050720**	0.299470***	0.122890***	-0.022010	1.000000
LSIZE	-0.139780***	0.094052***	-0.058580**	-0.129810***	-0.180540***	0.065471***
LEVERAGE	0.093301***	0.014309	-0.364080***	-0.140770***	0.045740*	-0.034040
MATURITY	-0.063880**	-0.031240	-0.152400***	-0.023890	-0.134850***	0.018585
BORROWRATIO	-0.212970***	-0.000890	-0.387700***	-0.248590***	-0.032160	-0.104450***
NWC	-0.205230***	0.014549	0.210194***	-0.071380***	-0.020350	-0.021040
	LSIZE	LEVERAGE	MATURITY	BORROWRATIO	NWC	
LSIZE	1.000000					
LEVERAGE	0.229393***	1.000000				
MATURITY	0.244207***	0.294988***	1.000000			
BORROWRATIO	0.272129***	0.568452***	0.255953***	1.000000		
NWC	-0.067950***	-0.552140***	-0.081990***	-0.375470***	1.000000	

Notes: *, **, and *** correspond to the 10%, 5%, and 1% levels of significance, respectively.

The results of the above correlation analysis seem to show that Vietnamese companies hold money primarily for transactional and precautionary purposes rather than for long term investment or for the benefit of the executives. They increase cash holdings when business conditions are favourable, but also consider cash substitutes, such as net working capital or bank loans. This view is underpinned by the very low average cash holding ratio of most companies and the decreasing trend of cash holdings in recent years.

While the correlation analysis reveals much interesting information, the result is not conclusive. The reason is because correlation analysis only describes the relationship between two variables without taking into account the interaction between them and other variables. Furthermore, correlation analysis does not take into account the causality of the relationships. Ignoring these two characteristics may cause the interpretation of the statistical analysis results to be misleading. In order to have a more comprehensive and accurate view of the impact of factors on the company's cash holding ratio, regression analysis is performed in the next section.

5.2. Regression analysis

To analyze the impact of the research variables on the ratio of cash holding, we perform a regression analysis as follows. First, the usual regression model with the pooled data (denoted as POLS (Pooled Ordinary Least Squares)) is estimated:

$$\begin{aligned} CASH_{it} = & \beta_1 + \beta_2 MTB_{it} + \beta_3 CFRATIO_{it} + \beta_4 CFUNCERTAINTY_{it} + \beta_5 DIV_{it} \\ & + \beta_6 LSIZE_{it} + \beta_7 LEVERAGE_{it} + \beta_8 MATURITY_{it} + \beta_9 ROA_{it} \\ & + \beta_{10} BORROWRATIO_{it} + \beta_{11} NWC_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

However, the ordinary least squares regression model with pooled data can produce inconsistent results as it ignores the impact of unobserved factors at the firm level. The estimation results of Model (1) are presented in Column A of Table 10.

To compare and select a more effective model, we modify the structure of Model (1) to include unobserved factors at the firm level:

$$\begin{aligned} CASH_{it} = & \beta_1 + \beta_2 MTB_{it} + \beta_3 CFRATIO_{it} + \beta_4 CFUNCERTAINTY_{it} + \beta_5 DIV_{it} \\ & + \beta_6 LSIZE_{it} + \beta_7 LEVERAGE_{it} + \beta_8 MATURITY_{it} + \beta_9 ROA_{it} \\ & + \beta_{10} BORROWRATIO_{it} + \beta_{11} NWC_{it} + \mu_i + \varepsilon_{it} \end{aligned} \quad (2)$$

Model (2) is estimated by two methods. First, Model (2) is estimated using the GLS (Generalized Least Squares) method with the assumption that the unobserved factors at the firm level are random with zero average and are independent of the explanatory variables in the model. This model is denoted as REM (Random Effects Model) and the estimation results are presented in Column B of Table 10. Model (2) is re-estimated with the assumption that the unobserved firm-level factors are not random and possibly correlated with the explanatory variables in the model. This model is

denoted as FEM (Fixed Effects Model) and the estimation results are presented in Column C of Table 10

To choose between the three models (POLS, REM, and FEM), we perform the Breusch-Pagan LM (Lagrange multiplier) test to choose between the POLS model and the REM model and the Hausman test to choose between the REM model and the FEM model.

One of the issues that can affect the test results is the distribution properties of the error term of Model (2). Previous studies have also shown that because the proportion of cash held is always positive, the regression results of Model (2) can produce errors that have a distribution which is different from the normal distribution, thereby affecting the validity of the tests (Bates et al., 2009). To remedy, we regress Model (2) using the logarithm of CASH (denoted LCASH) as the dependent variable. This approach is deemed to help the estimates achieve distribution properties that are closer to the normal distribution. Therefore, we estimate Model (3) and the estimation results are presented in Column D of Table 10:

$$\begin{aligned} LCASH_{it} = & \beta_1 + \beta_2 MTB_{it} + \beta_3 CFRATIO_{it} + \beta_4 CFUNCERTAINTY_{it} + \beta_5 DIV_{it} \\ & + \beta_6 LSIZE_{it} + \beta_7 LEVERAGE_{it} + \beta_8 MATURITY_{it} + \beta_9 ROA_{it} \\ & + \beta_{10} BORROWRATIO_{it} + \beta_{11} NWC_{it} + \mu_i + \varepsilon_{it} \end{aligned} \quad (3)$$

To account for the change in the amount of cash holdings over the years, dummy variables that encapsulate the impact of the time factor are included in the structure of the three models (not presented in the formulae). In addition, the estimated standard errors of the models are adjusted for heterogeneity and serial correlation using the method presented in Arellano (1987).

To test for the existence of a multi-collinearity problem, the variance inflation factors (VIF)'s of the independent variables in the models are calculated. The results (not presented) show that the average of the VIF's is 1.57 and no VIF of any variable exceeds the value of 3. Referring to Table 9, the correlation coefficients between the independent variables are also very low. The statistical evidence mentioned above shows that multi-collinearity is not a serious problem.

Based on the results of Breusch-Pagan LM test from Table 10, the hypothesis that the POLS model is a suitable model is rejected. Between the other two models, the Hausman test shows that the FEM model structure is, indeed, a more suitable one. Therefore, we use the FEM model to perform the next analysis steps to figure out the factors that affect the amount of cash held by the firms.

Based on the FEM model, we find that the regression coefficients of the CFRATIO and ROA variables are both positive and statistically significant at 1%. This shows that businesses tend to hold more cash when business conditions are favourable. The regression coefficients of the BORROWRATIO, LSIZE, and NWC variables are all negative and statistically significant at 5% or higher, suggesting that companies often

reduce the amount of cash held when other sources of cash substitution (excess working capital or loans from banks) become more abundant or more accessible.

Table 10. Regression results

Variable	POLS (A)	REM (B)	FEM (C)	Log(Cash) (D)
C	0.157399	0.354104**	0.451913**	0.2088445*
MTB	0.000023	-0.000164	0.000266	-0.020206***
CFRATIO	0.631320***	0.5335301***	0.472683***	0.732942***
CFUNCERTAINTY	0.634263***	0.305838***	0.190045	0.321758
DIV	0.022486	0.027349**	0.020857*	0.156602***
LSIZE	-0.026103**	-0.051097***	-0.067221**	-0.170040
LEVERAGE	0.335456***	0.448380***	0.579273***	2.175882***
MATURITY	-0.026489	0.004876	-0.005535	-0.142808
ROA	0.728976***	0.600218***	0.477420***	1.918083***
BORROWRATIO	-0.367070***	-0.337246***	-0.320349***	-2.6611105***
NWC	-0.202528***	-0.223244***	-0.221754**	-0.340727*
Year dummies	Yes	Yes	Yes	Yes
N	1,592	1,592	1,592	1,592
R2	0.452096	0.365879	0.733057	0.745819
F	76.39791	53.422020	17.57516	18.77891
Prob(F)	0	0	0	0
Breusch-Pagan LM		1245.090000		
Prob(LM Chi-sqr)		0		
Hausman Chi-sqr			110.685317	
Prob(Chi-sqr)			0	

Notes: *, **, and *** correspond to the 10%, 5%, and 1% levels of significance, respectively; The statistics are calculated using 1592 observations from 199 companies listed on HOSE from 2011 to 2018; CASH is the ratio of cash and cash equivalents over net assets; MTB is the ratio of market to book value; CFUNCERTAINTY is the absolute difference between cash flow ratios of the two adjacent periods; LSIZE is the logarithm of total assets; LEVERAGE is the ratio of total debts over net assets; MATURITY is the ratio of long term debts over net assets; ROA is the ratio of net profit over total assets; BORROWRATIO is the ratio of bank borrowings over total assets; and NWC is the ratio of net working capital over net assets.

On the other hand, the regression coefficient of the LEVERAGE variable has a positive sign, indicating that the more debt a firm has, or the higher its financial risk, the more cash it holds. This result is inconsistent with the results of Bates et al. (2009) for the US market or research results of Chen, Dou, Rhee, Truong, and Veeraraghavan (2015) for a multinational dataset. Unlike the initial observations in the correlation analysis, the CFUNCERTAINTY variable, another variable representing the volatility of financial ability, does not seem to have a significant effect on the business decision to hold cash.

In the same manner, the regression coefficients associated with the MTB variable are not statistically significant, implying that potential future investment opportunities do not matter in the decision-making process about the amount of cash held. Finally, the regression coefficient associated with the DIV variable is only statistically significant at 10%, suggesting that the dividend policy does not seem to have an impact on the decision to hold cash. Reconciling the results of the regression model with CASH as the dependent variable (Column C of Table 10) with the regression model using LCASH as the dependent variable (Column D of Table 10), we can see some noticeable differences. The MTB variable is now statistically significant at 1% and negatively correlated with the dependent variable, meaning that firms with lower prospects of future investment seem to accumulate more cash. This is consistent with the predictions of the free cash flow theory (Ferreira & Vilela, 2004). In contrast, the LSIZE variable is no longer statistically significant, indicating that firm size has no effect on the decision to hold cash. This result is inconsistent with the results from the US market, where large companies often hold less cash (Bates et al., 2009), or evidence from research by Dittmar et al. (2003) for a multinational dataset.

In addition, the DIV variable (cash dividend policy), which is not statistically significant in Model (3), is now statistically significant at 1% in Model (4), implying that companies paying cash dividends tend to hold more cash. This result is inconsistent with Almeida et al. (2004), Ferreira and Vilela (2004), and Opler et al. (1999). In these studies, the researchers argue that firms paying dividends are often considered to have less difficulty accessing external capital and, as a result, there is no need to hoard much cash. Normally, dividend policy is usually kept stable for a long period (Lintner, 1956). Firms are very reluctant to change dividend policy, especially to reduce dividends, because this action may convey negative information about the performance of the company (Miller & Modigliani, 1961). Therefore, for firms that have a cash dividend payment policy, it is likely that they consider this as a spending item that needs to be planned in advance. This statistical result seems to support the trade-off theory of the company's decision to hold cash.

Taking the above results together, we argue that the decision to hold cash is a calculated decision, based on the consideration of costs and benefits to the business. This behaviour is in line with the prediction of the trade-off theory. However, there is also evidence that companies hoard cash for the benefit of the executives. Specifically, the results show that companies with less investment opportunities in the future often accumulate more cash than those with more investment opportunities. The act of

hoarding cash in this situation seems to indicate that firms with less investment opportunities hold cash to serve the interests of the executive rather than the interests of the shareholders.

The simultaneous existence of evidence supporting the three theories on the purposes of holding cash is not surprising. Theoretically, the three most common theories about corporate motivations to hold cash have many overlapping predictions (Opler et al., 1999). In fact, a business can still determine the amount of cash held to serve a variety of purposes. To determine which cash holding motivation is stronger, we carry out the robust test.

5.3. Robust tests

A prediction specific to the trade-off theory that differentiates it from the other two theories is that it predicts an optimal level of cash holdings (Opler et al., 1999; Orlova & Rao, 2018). When the amount of cash holdings is considered too high, companies tend to decrease holdings in the next period. Likewise, when cash holdings are lower than desired, companies tend to increase holdings in the next period. This results in a negative correlation between the change in current cash holding ratio ($\Delta CASH_t$) and changes in the cash holding ratio of the previous period ($\Delta CASH_{t-1}$) (Opler et al., 1999). Thus, if the conclusion in the regression analysis section is correct, i.e., that companies consider the benefits and costs when deciding on the ratio of cash held, we expect to observe a significant negative regression coefficient between the two variables, $\Delta CASH_t$ and $\Delta CASH_{t-1}$, as specified by Model (4):

$$\Delta CASH_{it} = \beta_1 + \beta_2 \Delta CASH_{it-1} + \mu_i + \varepsilon_{it} \quad (4)$$

Technically, we estimate Model (4) using two methods. For the first method, we perform regression Model (4) for each company. A new data set is formed with 199 observations, consisting of the regression coefficients between $\Delta CASH_t$ and $\Delta CASH_{t-1}$ for each enterprise. Then, a univariate test is performed to decide whether the average regression coefficient between $\Delta CASH_t$ and $\Delta CASH_{t-1}$ of the companies is significantly negative or not. This method is also used in Opler et al. (1999).

The results of this method are presented in Figure 2. We can see that the average regression coefficient of 199 companies in the sample is -0.302576 (with standard deviation of 0.535707) and the median is -0.298583. Performing a univariate test to decide whether the average regression coefficient is actually negative or not, we have the test statistic $t = -7.967714$ ($prob(t) = 0.0000$), indicating that the mean of the slope coefficients is negative and statistically significant at the 1% level. Thus, we can conclude that the average regression coefficient between $\Delta CASH_t$ and $\Delta CASH_{t-1}$ of the companies is negative and statistically significant. This shows that the business has adjusted the holding rate of cash to the desired level, which is consistent with the forecast of the trade-off theory.

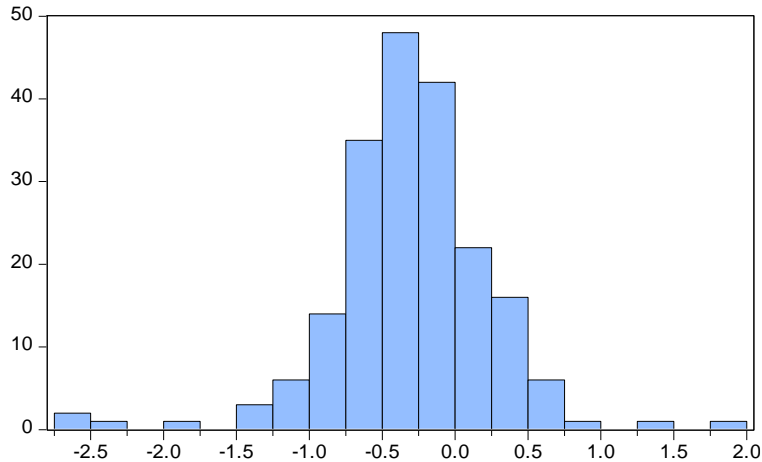


Figure 2. Histogram of the regression coefficients between $\Delta CASH_t$ and $\Delta CASH_{t-1}$

Notes: The regression coefficient of each individual company is estimated using the following model:

$$\Delta CASH_t = \beta_1 + \beta_2 \Delta CASH_{t-1} + \varepsilon_t.$$

However, this method also has the limitation that there are only eight observations (over eight years) for each company. Thus, the estimation of Model (4) at the company level may yield inaccurate results.

To achieve more reliable results, we regress Model (4) with panel data. Although the results are more reliable due to the larger number of observations, this estimate is still biased (unrealistically small) and may be inconsistent due to the endogeneity problem when the lag dependent variable is used as an explanatory variable (Nickell, 1981). To remedy, we use the Dynamic Generalised Method of Moment (DGMM) as presented in Arellano and Bond (1991) to estimate the regression coefficients. Regression results using these two techniques are presented in Table 11.

Table 11. Regression results between $\Delta CASH_t$ and $\Delta CASH_{t-1}$ using DGMM

Variable	POLS	FEM	Dynamic GMM
C	-0.010395**	-0.010452***	-
$\Delta CASH_{t-1}$	-0.341588***	-0.358129***	-0.305148***
Year dummies	Yes	Yes	Yes
N	1,194	1,194	995
R ²	0.155357	0.235195	
F	38.387850	1.490881	
Prob(F)	0	0	
Hansen J			19.623750
Prob(J)			0.142457
AR(2)			-0.874611
Prob(AR2)			0.381800

Notes: *, **, and *** correspond to the 10%, 5%, and 1% levels of significance, respectively.

According to the results in Table 11, we find that the regression coefficient corresponding to the variable $\Delta CASH_{t-1}$ is negative and statistically significant at 1% by all three estimation methods. As expected, the method of estimating POLS and FEM ignores endogenous factors in Model (4), so the impact of $\Delta CASH_{t-1}$ is estimated lower than reality (-0.340 and -0.350 compared with -0.305). The regression coefficient of the $\Delta CASH_{t-1}$ variable has a negative sign, indicating that the enterprise adjusts the amount of cash holdings in the current period downward when the amount of money in the previous period is too high. Conversely, companies would increase their cash holdings in the present period if the amount of cash holdings in the previous period is too low. The absolute value of 0.30 for the regression coefficient also indicates that the change in the cash ratio of the following year is about 30% of the previous year. This also means that the rate of adjustment of the holding rate of the business is about 30% per year, which is higher than the corresponding value of 24.2% for the US market as estimated by Opler et al. (1999).

The regression results with the FEM model and the robust tests support the trade-off theory, implying that listed companies in Vietnam hold cash mainly for transactional and precautionary purposes. This conclusion is also consistent with the recent research results of Chen et al. (2015) for a dataset of businesses from 72 countries. Moreover, the cash holdings of Vietnamese firms are generally low and have been on a downward trend in recent years. This may be a bad signal for the competitiveness and growth of Vietnamese firms in the future. The reason is that, according to the pecking order theory, cash is also used as an additional capital source for corporate investments, especially investments in R&D. Investments in R&D are generally hard to finance by external sources of capital. The fact that Vietnamese enterprises hold too little cash is an indication of low internal investment capacity. This can lead to a lack of investment in research and development. To the extent that this is true, the growth and competitiveness of businesses in the future may be negatively affected.

Last, but not least, the regression results also show that businesses with less investment and growth opportunities in the future (proxied by low MTB values) tend to increase cash holdings. According to free cash flow theory, this is a negative sign. In particular, the executives of these companies may have decided to hoard cash to serve their own interests rather than the shareholders' and the board of directors has not fulfilled their monitoring and disciplining responsibilities.

6. CONCLUSIONS

Based on statistical analysis, this study has shown that the amount of cash held by Vietnamese firms in the period of 2011-2018 is quite low (an average of about 13.4% of net assets), with more than 50.0% of enterprises holding less than 5.9% of net assets. This value is low compared to businesses in western countries, such as 14.8% of businesses in EMU countries (Ferreira & Vilela, 2004) or 17.0% of US businesses in the period before 1999 (Opler et al., 1999) or more than 20% on average between 2000 and 2006 (Bates et al., 2009). Another noteworthy point is that the average amount of cash held by Vietnamese companies has been on a downward trend in the last three

years, with the average amount of cash held decreasing from a peak of 16.6% of net assets in 2014 to below 9.1% of net assets in 2018 (with more than 50.0% of businesses holding less than 5.4% of net assets). The hoarding of large amounts of cash only occurs in a few specific businesses and is not a common feature of listed companies in Vietnam.

Results of regression analysis between the ratio of cash held and a number of business characteristics show that it is likely that Vietnamese firms make decisions on the amount of cash held based on cost and benefit considerations and the main motivation of holding cash is probably to serve transactions and prevent short-term business volatility rather than to accumulate long-term investment or to serve the self-interest of the executives. Analysis of cash adjustments shows that firms often increase the amount of cash held in the next period when the amount of cash in the previous period is lower than desired and vice versa. This is an additional evidence supporting the trade-off theory of corporate cash holdings in the context of Vietnam.

The research results have two implications for researchers and investors. Firstly, the analyses show that for certain businesses, namely firms with low growth potential and limited investment opportunities in the future, managers may have made decisions regarding cash holdings to serve their own self-interest rather than the shareholders'. This also implies that the board of directors of these firms may have failed to fulfil their oversight and disciplinary functions regarding the behaviour of executives toward the best interest of the shareholders. Secondly, the fact that Vietnamese enterprises have a relatively low cash holding rate that mainly serves transactional and precautionary purposes could be a negative sign. It shows that the internal investment capacity of Vietnamese firms is low. This may limit their ability to invest in Research and Development (R&D), which, in turn, negatively affects the long-term growth and competitiveness of Vietnamese firms.

While making contributions to the literature of corporate cash holding decisions, this study cannot avoid limitations. Firstly, this study is limited to the period from 2011 to 2018 and to companies listed for at least nine years on the Ho Chi Minh City Stock Exchange. Further studies may expand the scope of research over a longer period of time and include businesses listed on other stock exchanges in Vietnam. This would help reveal long-term trends and provide more evidence on Vietnamese firms' decisions to hold cash. Secondly, this study shows that Vietnamese firms have reduced their cash holdings in recent years. However, the reasons for this downward trend are still unaccounted for. A number of studies in other countries have shown that changes in the macro background may cause changes in corporate cash holdings over time (Almeida et al., 2004). Therefore, follow-up studies should focus on discovering the causes of this phenomenon to complete the picture of Vietnamese firms' decisions to hold cash. Thirdly, this study finds that the board of directors of firms, especially firms with low growth and few investment opportunities, may have failed to monitor and discipline the executives to the best interest of the shareholders. In order to have a more specific view, further studies may analyse the impact of corporate governance quality or ownership structure on the cash holding decisions of Vietnamese firms. Lastly, and most

importantly, this study shows that Vietnamese firms hold relatively less cash than firms in other countries. This may be a sign of low internal investment capacity. If so, the long-term growth and competitiveness of Vietnamese firms may be negatively affected. For more conclusive evidence, future studies need to investigate the impact of cash holdings on investment spending (especially investments in R&D) of Vietnamese firms.

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