

Mapping the Evolution Trends in Cash Holdings Research: Current Status and Future Directions

Maisarah Abd Rahim^{1,2}, Nurhafiza Abdul Kader Malim¹, Sarini Azizan³, Md Harashid Haron¹, Mohd Atef Md Yusof⁴

¹School of Management, Universiti Sains Malaysia, Pulau Pinang, Malaysia, ²Faculty of Accountancy, Universiti Teknologi MARA Cawangan Kedah, Kampus Sungai Petani, Malaysia,

³College of Business and Economics, Australian National University, Canberra, Australia,

⁴Tunku Puteri Intan Safinaz School of Accountancy, University Utara Malaysia, Sintok, Malaysia

Email: maisarahrahim@uitm.edu.my, sarini.azizan@anu.edu.au, harashid@usm.my, atef@uum.my

Corresponding Author Email: fizanur@usm.my

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Abstract

The purpose of this study is to review and assess research metadata on cash holdings from the past decade leading up to the COVID-19 pandemic. The analysis aims to achieve several objectives, including first, determining the state of cash holdings research; second, identifying the key trends and developments that have emerged over time; third, investigating the major contributors and their impact; fourth, uncovering essential keywords and concepts that enable a better understanding of cash holdings, and fifth, pinpointing areas that require further exploration to fill the knowledge gap. Using the Biblioshiny R package, the researchers surveyed global publication metadata on 1637 cash holdings articles extracted from the Web of Science (WoS) database from 1975 to 2022. The findings of this study reveal significant elements in the patterns or trends, including journals, articles, authors, countries, institutions, and themes of the topic to be explored.

Keywords: Cash Holding, Bibliometric Analysis, Biblioshiny, Evolution Theories, Review, Trends

Introduction

Cash or cash equivalent represents the financial health of any-size organization. Cash holding is the heart of organizational policy and the most important financial decision an organization's manager could make. The immense cash holdings are critical for global growth Bates et al (2018); Phan et al (2019); Prescott (2015), and the global financial crisis has highlighted the importance of cash holdings. The 1997 Asian Financial Crisis, the 2007 US Subprime Crisis, the 2008 Global Financial Crisis, the 2009 European Debt Crisis, and the 2011 US Debt Crisis all had a significant impact on the global financial system, which also garnered

much research attention in the cash holding area (Almeida et al., 2014; Chang and Yang, 2022; Gonenc et al., 2022; Mercatanti et al., 2019).

Amidst global growth imperatives, COVID-19 has created international challenges in managing flows of people, information, money, and products Alon (2021) and supply chain relationships (Uddin, 2023). Despite COVID-19 being a health crisis, the adverse effects on economic activity, decreased revenue, and cash flow fluctuations are magnified (He et al., 2022). This crisis drove businesses to respond to unpredictable cash flow changes, underscoring the importance of having sufficient cash reserves to withstand economic shocks (Acharya and Steffen, 2020; Cowling et al., 2020). De Vito and Gómez (2020) investigated data on 14,245 listed firms across 26 countries on cash holdings and predicted that 1/10th of all sample firms would become illiquid within six months, suggesting resorts to the debt market to prevent a cash crunch during COVID-19. Meanwhile, lessons learned in the US showed a positive relationship between corporate cash holdings and the COVID-19 pandemic, (BC and Simpson, 2023) and it reflects that cash is a panacea of the COVID-19 pandemic (Zheng, 2022). As a result, firms have had to adjust their financial strategies for cash holdings policies in a timely manner to weather the storm and protect themselves against unprecedented future events.

One effect of a crisis is that it reveals the critical importance of cash holdings. The majority of the board of management has shifted its focus from earnings before interest and taxes (EBIT) to cash amid the pandemic (Grube et al., 2020). The thriving and survival of any firm facing unprecedented challenges is crucial, and the COVID-19 pandemic has allowed researchers to explore how this crisis in relation to cash holdings has been managed over time. Past research that has been done related to corporate cash holdings includes transaction costs Mulliga, (1997), precautionary motives Bates et al (2018); Han and Qiu (2007); Khieu and Pyles (2012); Opler et al (1999), corporate governance (Dittmar and Mahrt-Smith, 2007; Harford et al., 2008; Kuan et al., 2011), business organization structure Locorotondo et al (2014), and product market competition Fresard (2010)., tax incentives Foley et al (2007); Pinkowitz et al (2013), family firms Moolchandani and Kar (2022) and managerial attributes (Magerakis, 2022).

Previous research has focused on the determinants of cash holdings, challenges, and causes (Opler, 1999; Amess, 2015; Tripathy and Uzma, 2020). Although several studies explain cash holdings, the growing interest in the subject has not yet materialized in broader studies aimed at mapping research in this area during this period. Few studies on the subject have provided bibliometric attributes; hence, it is understood that this research can fill the lacuna in the scientific literature and promote the development of this subject. This study used the Web of Science database for data mining and run analysis using Biblioshiny software, which differs from the previous bibliometric study by Khatib et al (2021) that used the Scopus database and VOSviewer software. This expands on prior work Khatib et al (2021) to reveal the evolution of cash's multifaceted dynamics and theories. This study aimed to map global scientific production on cash holding studies and provide a better foundation for future research. This study explored five intriguing questions in the field:

RQ1: What is the state of the research on cash holdings up to the COVID-19 period? How has this field evolved over time?

RQ2: Who are the major players in shaping this research landscape? Which authors, articles, journals, and institutions have the greatest influence?

RQ3: What are the crucial keywords encapsulating the essence of cash holdings? What are the key terms and concepts researchers should be aware of?

RQ4: What are the prevailing themes or challenges that facilitate progress in research on cash holdings?

RQ5: Which areas within the realm of cash holdings require further investigation? What gaps in knowledge need to be filled?

The research motivation of this study stems from a notable gap in the existing research landscape. Despite the increasing interest in cash holdings, few studies have provided bibliometric analysis. Recognising this gap, this research aims to fill this lacuna and advance the development of the cash holdings research. This study enriches the existing literature by pinpointing several key aspects. These encompass examinations of the current landscape and trends in cash holdings research. These investigations are organised around core themes, main contributors, providing insights into issues and challenges and identifying areas necessitating further investigation to bridge existing knowledge gaps.

This paper is structured as follows. The second section covers the development of theories regarding cash holdings and provides an overview of the relevant literature. The third section explains the bibliometric Biblioshiny method utilized in this study. The fourth section includes the analysis and findings of the research on cash holdings, along with a discussion of the topic. Finally, the fifth section provides conclusions, limitations, and suggestions for future research.

The Evolution of Influential Theories of Cash Holdings Research

During the 1930s, John Maynard Keynes revolutionized the study of money demand by delving into the various factors that impact it, such as income, interest rates, and economic expectations. His groundbreaking "liquidity preference" theory underscored the importance of holding liquid assets for transactions and precautionary purposes (Keynes, 1936), and has since played a pivotal role in shaping macroeconomic thought and contemporary models (Almeida et al., 2014). This review aims to provide a comprehensive understanding of the development of cash holding theory. We examine the key theories, as illustrated in Figure 1, that have contributed to this area of study.

Trade-off Theory

One of the earliest theories on cash holding is the "transactions motive" theory, which suggests that firms hold cash to meet their daily transactions needs, such as paying bills or making investments. This theory was proposed by Baumol (1952) and later expanded by (Miller and Orr, 1966). According to Baumol (1952), firms face a trade-off between the opportunity cost of holding cash, which is the foregone interest that could have been earned if the funds had been invested elsewhere. The benefit of holding cash is paying unexpected bills or taking advantage of investment opportunities.

Trade-off theory implies that the cash amount is determined by weighing the advantages and disadvantages of holding cash. The primary advantage of keeping cash reserves is that they lower the expenses involved in obtaining funds Al-Najjar and Belghitar (2011); Opler et al (1999), creating a cushion against unforeseen circumstances (Chang and Yang, 2022; Opler et

al., 1999). In addition, it reduces the probability of encountering financial difficulties (Acharya et al (2012); Duchin et al (2010), mitigates the issue of underinvestment Denis and Sibilkov (2010); Harford (1999) and reduces the expense associated with obtaining external financing or selling available assets (Chiu et al., 2016; Erel et al., 2021). Note that the cost of retaining cash is related to the potential loss of income from capital invested in other readily available assets as well as the lower returns from cash holdings (Chan et al., 2011; Lei et al., 2018).

Agency Theory

The next wave of research on cash holdings explores the relationship between such holdings and corporate governance. Agency theory suggests that firms with strong governance systems tend to hold more cash, which helps address issues between managers and shareholders (Jensen and Meckling, 1976). This implies that companies with effective monitoring systems and independent boards of directors may be more inclined to hold onto cash to align the interests of managers and shareholders Hillman and Dalziel (2003) and minimize the risk of opportunistic behavior by managers (Noreen, 1988).

This theory is rooted in conflicts that arise between managers and shareholders. Since cash holdings give managers greater control over a company's resources, they may be tempted to hoard cash for their own benefit rather than the benefit of shareholders (Jensen, 1986). Consequently, shareholders may demand that companies distribute excess cash as dividends or use it to buy back shares to reduce the agency costs associated with hoarding cash (Abuaf, 2012).

Pecking Order Theory

Research theories in cash holdings have also delved into financially constrained companies that may hold more cash as a precautionary measure to ensure that they have enough funds to meet their financial obligations and avoid default. This theory proposes that companies with weaker financial positions may hold more cash to reduce the risk of financial distress (Donker et al., 2009). Additionally, the theory posits that firms have a natural hierarchy of financing sources and prefer to use internal funds such as cash before seeking external financing (Myers and Majluf, 1984). Therefore, companies may hold cash to cushion against future financing needs (Lins et al., 2010). Companies with excess cash typically use it to pay off debt or buy back shares rather than for new projects (Faulkender and Wang, 2006).

Free Cash Flow Theory

As for the free cash flow theory, if a company has more cash than it requires to finance profitable investments, managers may use it for non-value-maximizing projects or engage in activities that benefit themselves rather than shareholders. Jensen (1986) proposed this theory. This theory explains that conflicts can arise between shareholders and managers when managers decide to invest excess cash at a rate lower than the cost of capital, or when they inefficiently manage excess cash rather than distribute it for the benefit of shareholders (Cleary, 2006). To mitigate these conflicts, Jensen (1986) companies should distribute excess cash to shareholders through dividends or share repurchases. By doing so, companies can increase shareholder value and reduce the risk of managers' inefficient use of cash.

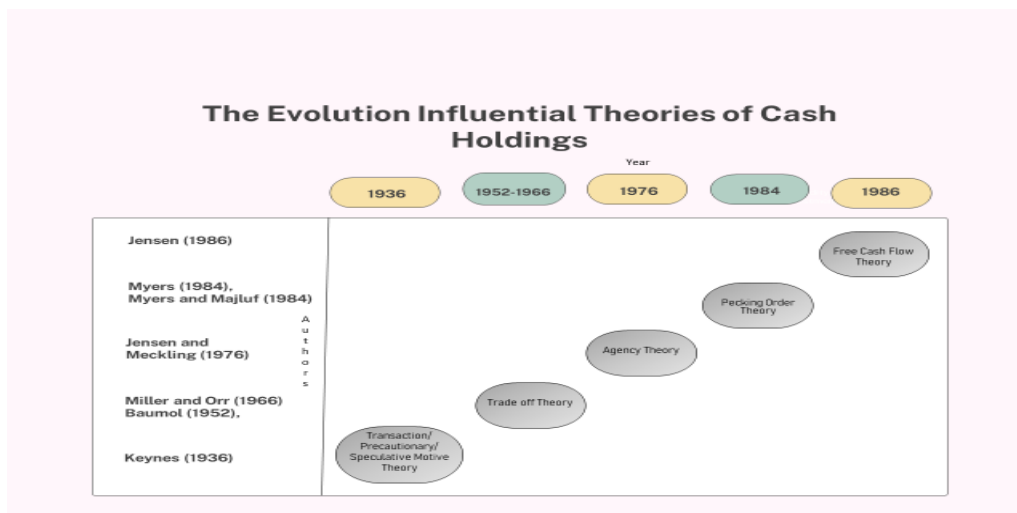


Figure 1: Author's contribution

The evolution of the cash holding theory has been influenced by various theories and perspectives, each offering valuable insights into the motivations and implications of holding cash. Understanding these theories is critical for firms to make informed decisions regarding their cash holdings and optimize their financial performance.

Literature Review of Bibliometric Study

In the field of bibliometrics, Pritchard (1969) coined the term to apply mathematical and statistical techniques for evaluating and measuring books and other communication media. Bibliometric analysis uses quantitative methods, such as citation analysis, to examine bibliometric data, including publication units and citation volumes (Brodus, 1978). This structured research methodology is valuable for identifying patterns and trends in scholarly literature, encompassing publication output, citations, and collaborative efforts (Ellegaard and Wallin, 2015). Traditionally, bibliometric techniques have been used to track academic journal citation relationships (Schaer, 2013).

Bibliometric studies aim to identify and map the intellectual structure of a specific area of study or to detect intellectual networks among scholars (Linnenluecke et al., 2020; Noyons et al., 1999). Recently, various scholars have discussed the growing interest in bibliometric analysis in business, management, accounting, economics, econometrics, finance, and social sciences (Donthu et al., 2021). Mukherjee et al (2022) provided a comprehensive guideline on how bibliometric research can contribute to theory and practice. Furthermore, it has been widely employed in academic research to evaluate the impact and influence of scholarly publications, authors, and institutions (Abramo and D'Angelo, 2011; Moed, 2005). It has also been used to identify emerging research trends and support evidence-based decision-making in various fields (van Eck and Waltman, 2014).

Moreover, bibliometric analysis is an applicable method for systematically performing scientific mapping to obtain a comprehensive overview of specific areas, allowing for visual and analytical representation and determination of clusters of investigation from previous studies (Cobo et al., 2011). Using bibliometric analysis, researchers can perform a network

analysis of keywords and titles, leading to the development of the study area of the cluster in the field (Waltman et al., 2010).

Materials and Methods

As the most extensively used list of high-quality peer-reviewed articles and acknowledged search engines for analyzing the scientific publications base Khan et al (2022); Merigó et al (2015); Yan and Zhiping, (2023), we chose the WoS database as the search engine for its data . The selection of the WoS database is supported by the fact that it produces papers with the highest calibre(Caputo et al., 2023). In addition, it is one of the most widely used databases Li et al (2018); Zhu and Liu (2020) and a dependable resource for indexing prestigious journals(Arezoo et al., 2013). In addition, the WoS database offers thorough, multidisciplinary citation data, and has steadily developed into one of the key data sources for bibliometric analysis, as noted by other researchers(Tomaszewski, 2023). The Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) methodology in the current study for identifying relevant articles is outlined in Figure 2.

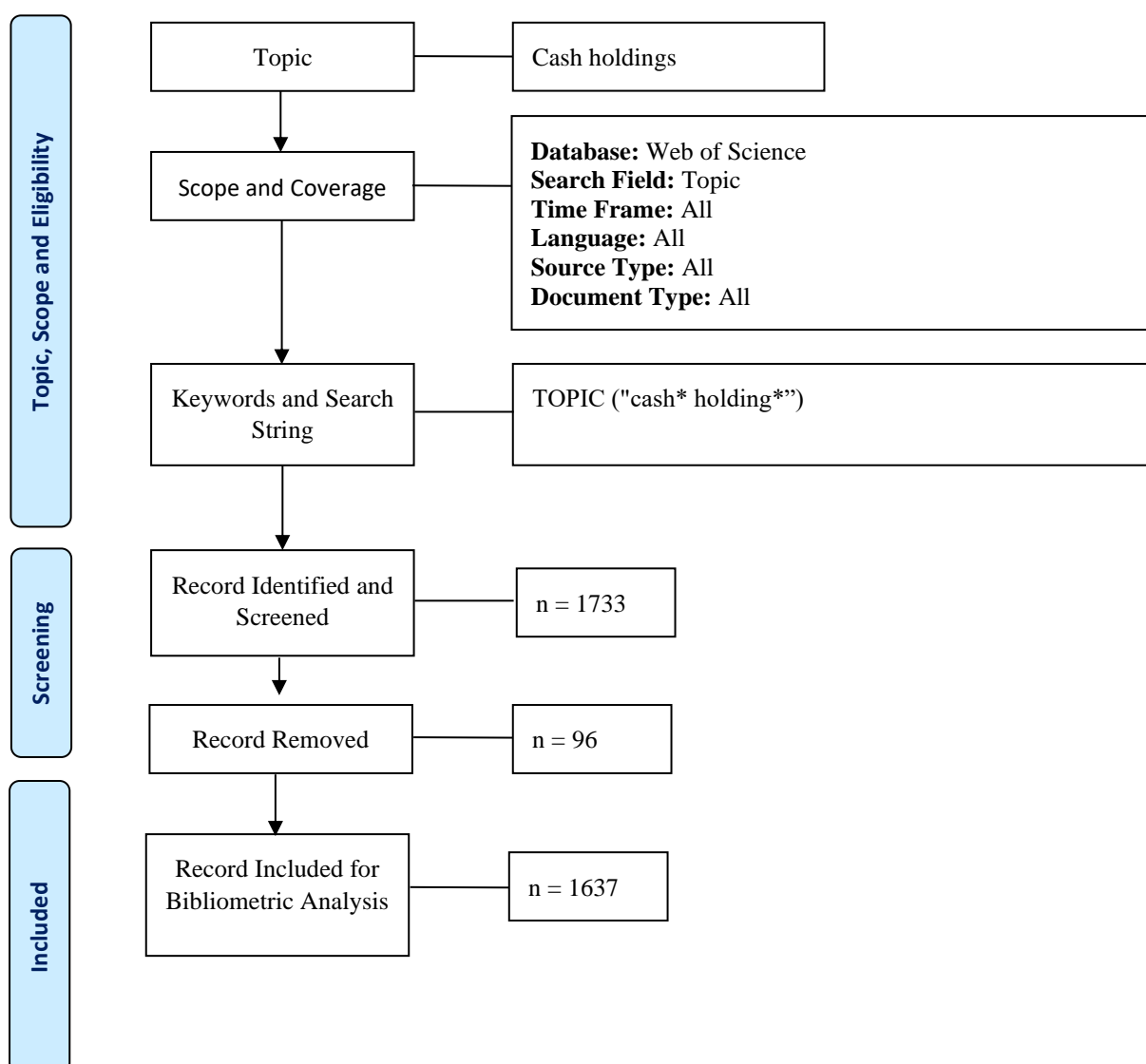


Figure 2. PRISMA Flow Diagram.
Source: Adapted from (Moher et al., 2009)

Subsequently, this study applied relevant keywords were used to extract related literature. Specifically, the keyword string includes “cash* holding*,” which uses wildcard (*) to broaden the search. Consequently, we searched them in the TOPIC menu (search title, abstract, author keywords, and Keywords Plus) of the WoS database. The TOPIC menu was chosen to provide a more comprehensive view of cash-holding concerns. Note that this study excludes 2023 as it was not covered under the coverage of research that focuses until the COVID-19 pandemic movement restriction. This exercise yielded a total of 1637 documents published from 1975 to 2022. The study used an open-source R package called Biblioshiny to analyze the bibliographic data extracted from its sources. It provides a user-friendly graphical interface for non-coders to perform a bibliometric analysis(Aria and Cuccurullo, 2017).

Analysis and Results

Source

Main information

The data span from 1975 to 2022, covering almost five decades of research (Figure 3). The fact that it includes such a wide timespan indicates a comprehensive analysis of the subject matter. With 511 sources, including journals and books, the dataset appears to have a diverse range of references, which can contribute to the reliability and breadth of the analysis.

The dataset consisted of 1637 documents. Although not exceptionally large, this is a respectable number, suggesting that a reasonable amount of research has been aggregated. The average age of the documents, at 5.55 years from publication, suggests that the analysis incorporates relatively recent research. This can be advantageous in relevance because it will likely capture more up-to-date information. An average of 22 citations per document indicates that the collected documents received significant attention within the academic community. This indicates the relevance and importance of this topic. With this average number of citations, we can infer that research in this field is receiving consistent attention over time. This metric also supports the notion that the subject matter is of continued interest and relevance.



Figure 3. Main information regarding dataset.

The dataset comprises an impressive collection of 3,169 distinct author keywords, showcasing the depth of scholarly exploration. Additionally, the presence of 1,648 keywords suggested by WoS highlights the richness of interconnected concepts, underscoring the depth and breadth of the research landscape. Most documents in the dataset were classified as articles,

with a count of 1411 (Table 1). This suggests that scholarly articles were the dominant form of contribution within the analyzed subject area. Articles are typically more in-depth and thorough than other document types, making them reliable sources of detailed information.

Table 1

Main information regarding dataset.

DOCUMENT CONTENTS	
Author's Keywords (DE)	3,169
Keywords Plus (ID)	1,648
DOCUMENT TYPES	
article	1,411
article; book chapter	12
article; early access	63
article; proceedings paper	19
correction	4
editorial material	1
editorial material; book chapter	1
note	1
proceedings paper	107
reprint	2
review	16

Annual publication trends

Figure 4 illustrates data representing the number of articles published annually from 1975 to 2022, and the pattern of the graph shows an upward trend. Starting in 2011 (n=47 articles), the significant increase was almost double that of the previous year (2010=26 articles). Following the 2008 financial crisis, there has been a pronounced shift toward understanding how organizations manage their financial Lucey et al (2018) and liquidity (Batten and Vo, 2014; Brunnermeier, 2009; Dash et al., 2019). The persistently low interest rate environment has led to research on how firms strategically hold cash to navigate limited investment opportunities (Denis and Sibilkov, 2009; Koo and Maeng, 2019). Additionally, the intersection of behavioral finance and corporate finance has provided insights into the psychological drivers of cash holding behaviors (Hassanein and Kokel, 2019; Thaler, 1999).

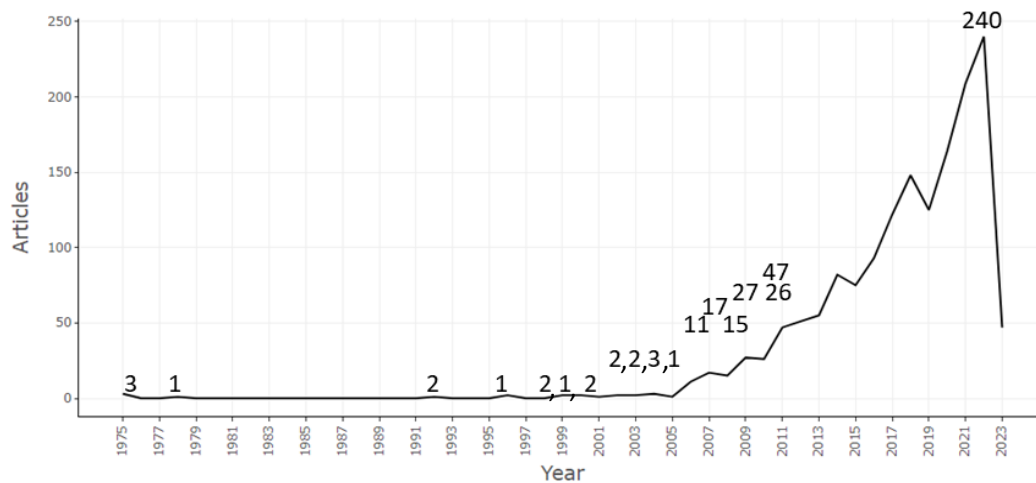


Figure 4. Annual publication trends

The topic of cash holdings has gained considerable attention, with 240 articles published on the subject in 2022 (Figure 4). This trend has been particularly evident since the outbreak of the COVID-19 pandemic, which has forced managers to prioritize liquidity levels to stay afloat (Qin et al., 2020). As a result, researchers have explored the impact of new technologies on cash management practices, including using fintech solutions for small and medium enterprises (Karim et al., 2022). The developments are essential for helping businesses adapt to the ever-changing landscape of today's economy and stay ahead of the curve.

Most cited papers

As presented in Figure 5, the most cited paper in the field of cash holding studies is the study by (Opler et al., 1999), "The determinants and implications of corporate cash holdings," with a total citation number of 1,557 from the Journal of Financial Economics, offering the most impactful article to refer to under cash holding study. The basic discussion of why holding cash is mainly being discussed by researchers, and the article focuses on the reasons for holding liquid assets in a firm, including the impact of transaction costs, information asymmetries, and agency costs.

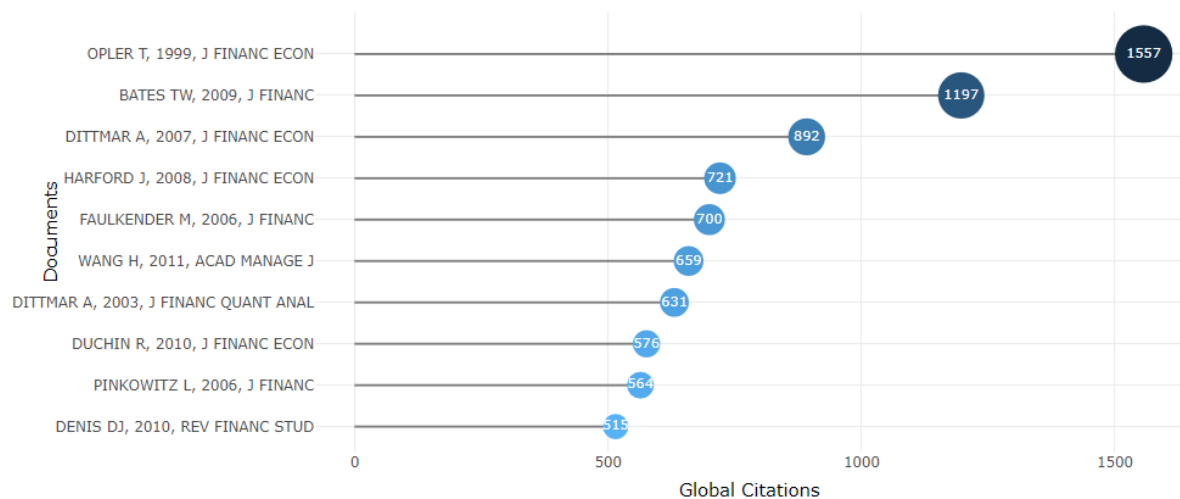


Figure 5: Most Global Cited Documents

Most frequent journals

The top ten journals with more than 25 articles published related to cash holdings in that specific journal are illustrated in Figure 6. Most of the publications on cash holding studies are from the Journal of Corporate Finance (n=102 documents), a well-known journal in this field. All the most frequent journals are from Elsevier Publisher except the remaining journals, such as Accounting and Finance and Journal of Business Finance and Accounting, which are from Wiley, Review of Financial Studies is from Oxford University Press, and Review of Quantitative Finance and Accounting is from Springer.

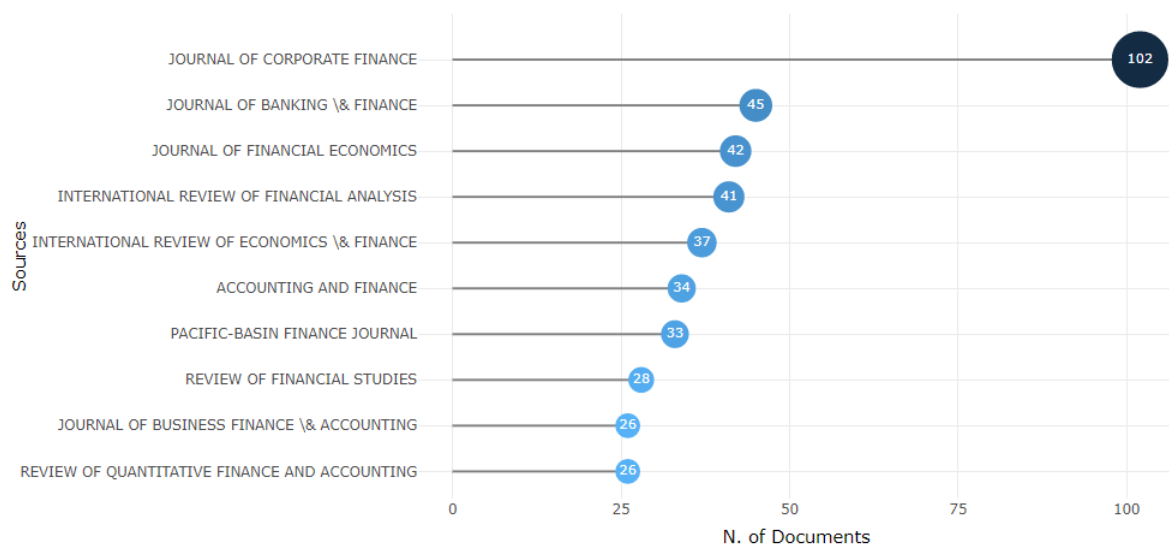


Figure 6: Most frequent journals

Most productive countries

A country-based analysis of the number of publications on cash holdings studies was conducted, and citations to these publications were compared. Accordingly, Figure 7 illustrates that the USA is at the forefront and is the dominant cited country with the highest

number of publications (n=20,128 citations) for its influential role in shaping the discourse. This dominant position can be attributed to advanced research infrastructure, robust financial institutions, and rich research traditions. Understanding the USA's substantial contributions provides insights into its leading role and encourages researchers to explore its methodologies and insights. Their approaches enrich the global scholarly community and encourage collaboration, ultimately advancing the field of cash holding studies.

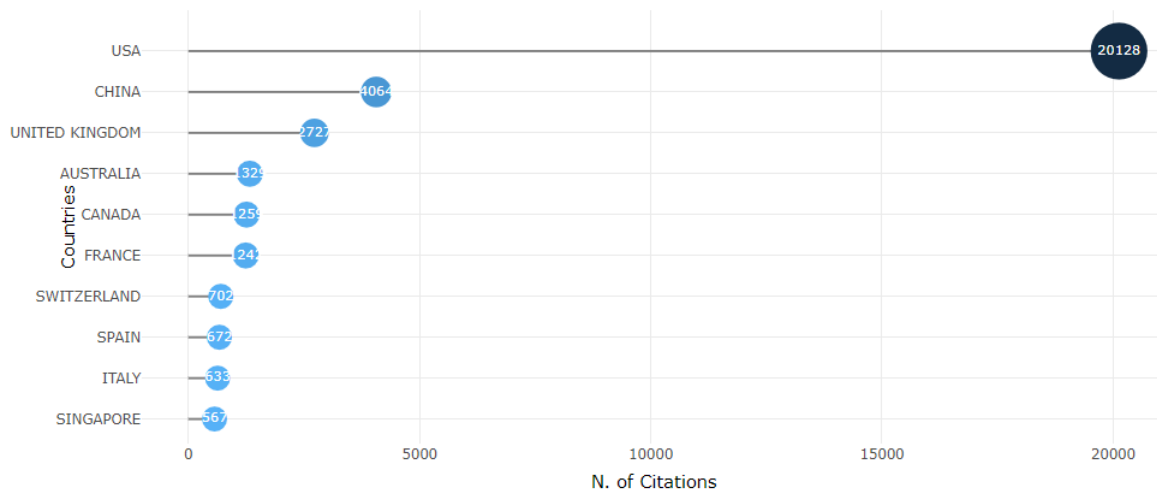


Figure 7: Most cited countries

Most productive affiliations

The top ten most productive affiliations are summarized in Figure 8. Most of the most productive institutions and organizations were from China. Xiamen University was ranked first with 41 publications on cash holding research. This was followed by five institutions/organizations in China (Dongbei University of Finance and Economics, Central University of Finance and Economics, Renmin University of China, Sun Yat-Sen University, and Chongqing University) and one institution or organization in Vietnam (Foreign Trade University), Brazil (University of São Paulo), Iran (Islamic Azad University), and the United States (Old Dominion University).

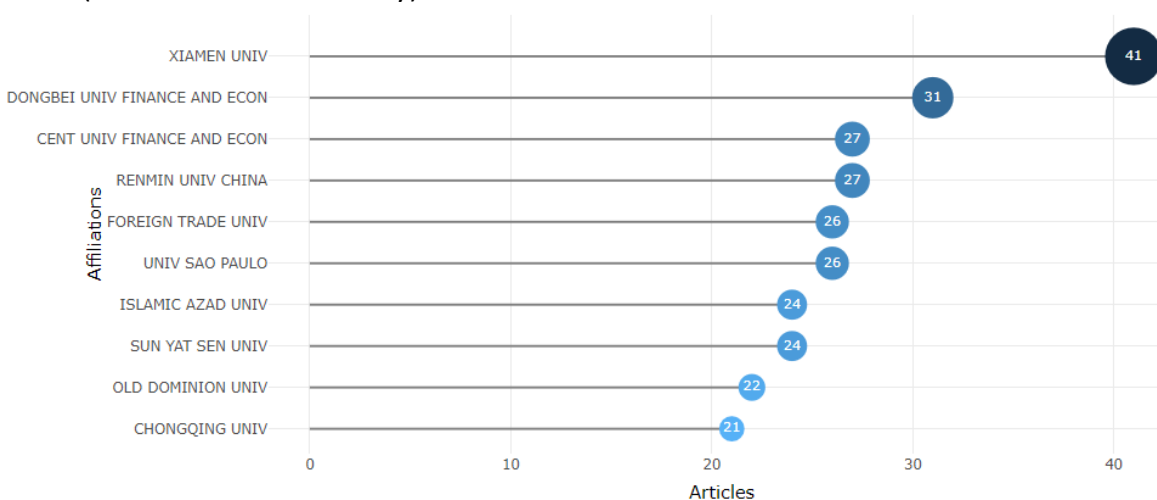


Figure 8: Most Relevant Affiliations

Most frequent keywords

To identify the prevailing themes or keywords, Figure 9 presents a clear picture of the most frequently used terms in cash holdings research. The term "determinant" appears 548 times, followed by "investment" (439) and "governance" (354). These findings reveal the primary focus areas for researchers, which "Determinant" indicates factors influencing cash holdings. Table 2 presents the top ten cited articles on the determinants of cash holdings, and Opler (1999) is the most frequently cited article for the theme. "investment" and "governance" highlight investigations into investment links and decision-making frameworks. The frequent use of such terminology implies that studying cash holdings is an interdisciplinary pursuit involving diverse fields and perspectives. The multidimensional use of the keywords; for example, performance could be considered firm performance, share or stock performance, managerial performance, market performance and alike.



Terms	Frequency
determinants	548
investment	439
governance	354
corporate governance	324
cash holdings	280
agency costs	256
firms	243
performance	238
information	186
capital structure	177

Figure 9: Most frequent words

Table 2

Top ten highest citations from determinants of cash holdings

No	Authors	Article title	Journal	Total citation
1.	Opler et al. (1999)	The determinants and implications of corporate cash holdings	Journal of Financial Economics	1,557
2.	Al-Najjar (2013)	The financial determinants of corporate cash holdings: Evidence from some emerging markets	International Business Review	95
3.	García-Teruel and Martínez-Solano (2008)	On the Determinants of SME Cash Holdings: Evidence from Spain	Journal of Business Finance and Accounting	93
4.	D’Mello et al. (2008)	Determinants of corporate cash holdings: Evidence from the spin-off	Journal of Banking and Finance	74

5.	Hardin III et al. (2009)	The Determinants of REIT Cash Holdings	Journal of Real Estate Finance and Economics	73
6.	Kim et al. (2011)	Determinants of corporate cash holding levels: An empirical examination of the restaurant industry	International Journal of Hospitality Management	51
7.	Uyar and Kuzey (2014)	Determinants of corporate cash holdings: Evidence from the emerging market of Turkey	Applied Economics	51
8.	Gore (2009)	Why Do Cities Hoard Cash? Determinants and Implications of Municipal Cash Holdings	Accounting Review	43
9.	Guizani (2017)	The financial determinants of corporate cash holdings in an oil-rich country: Evidence from the Kingdom of Saudi Arabia	Borsa Istanbul Review	35
10.	Steijvers and Niskanen (2012)	The determinants of cash holdings in private family firms	Accounting and Finance	31

Trend topics

Figure 10 displays a chart showing research trends in cash holdings based on authors' keywords. Notable changes have occurred in these themes since 2020. Islamic banks (Muhmad et al., 2023), CSR disclosure (Hendijani Zadeh, 2023), institutional development (Zhang et al., 2023), internal controls (Choi, 2022), and social capital (Seo and Mun, 2022) have recently become favourite discussion topics among scholars. Other topics that have gained attention from scholars are Shariah-compliant firms (Alnori and Bugshan, 2023; Guizani and Abdalkrim, 2021), policy uncertainty (Su et al., 2020; Zhou and Niu, 2023), economic policy (Duong et al., 2020; Feng et al., 2022), corporate investment (Fujitani et al., 2023; Yang et al., 2017), financial constraints (Lee and Wang, 2021; Nguyen et al., 2016), and corporate governance (Li and Wang, 2021; Manoel and Moraes, 2021). The main reasons for this research shift might reflect global concerns and highlight the timely fusion of cash holdings exploration with pandemic-driven inquiries, emphasizing the need to achieve sustainable development goals and increase awareness of ESG practices.

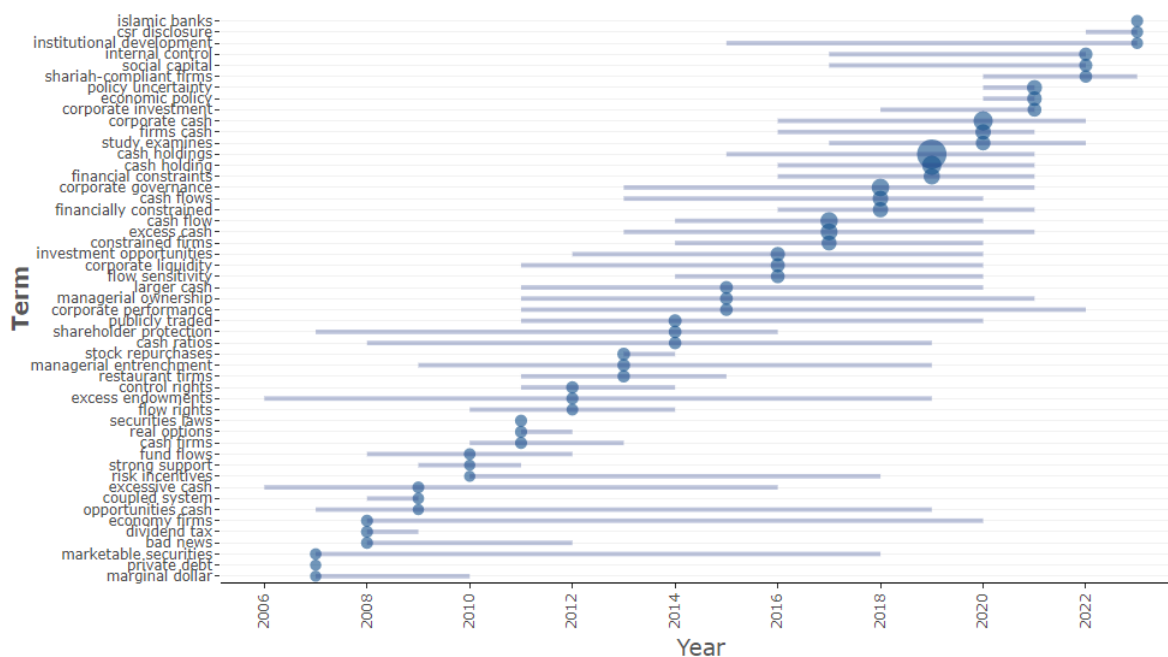


Figure 10: Trend topics

Discussion

Researchers could spot the important points in the field using a bibliometric approach. Such studies have grown in popularity to monitor research trends (Abdul Rahman et al., 2022). However, since 2019, few bibliometric studies have examined cash holdings. Earlier studies by da Cruz et al (2019); Khatib et al (2021) were conducted prior to and at the outset of the COVID-19 pandemic, respectively, and do not reflect the current state of cash-holding research. We used the WoS database to analyze from the beginning (1975) to during-pandemic (2022) data, which complements Khatib et al.'s (2021) study using the Scopus database. WoS is a reliable bibliographical database for scientific literature searches and has been used in numerous academic studies over the past two decades (Li et al., 2018).

Research on cash holdings was scarce until 2010 but has experienced a significant surge. This trend has been observed in various fields of economics and finance, as evidenced by the studies conducted by (Dittmar et al., 2003; Foley et al., 2007; Harford, 1999; Opler et al., 1999; Pinkowitz et al., 2006). This phenomenon can be attributed to the global economic crisis of 2007, which prompted scholars to analyze the financial behavior of companies on a worldwide scale. Recent studies by Zhang et al (2019); Khan et al (2022); Biancone et al (2020); Goodell et al (2023) have delved into this topic, providing valuable insights into the consequences of financial crises, particularly in the context of the ongoing COVID-19 pandemic and their impact on businesses.

Two major events have highlighted the significance of managing corporate cash holdings: the Global Financial Crisis of 2007-2008 and the COVID-19 pandemic. Despite different reasons and causes, both events underscore the importance of effectively managing cash holdings. From 2021 to 2023, academic research has delved into various key concepts related to cash holdings, including investment efficiency Arianpoor and Mehrfard (2022), liquidity management Almeida (2021), corporate governance Jiang et al (2023), financing constraints

(Mehrabanpour, 2020), policy uncertainty Ghoul et al (2023); Javadi et al (2021), trade credit Zhang (2020) capital structure Sun and Xia (2022) and financial reporting Karpuz et al (2020) as Figure 11 provides a visual representation of the key concepts based on the authors' keywords. From this flow, the act of researchers in favour of a multidisciplinary approach is to be encouraged and investment efficiency become prominent in the field. Various frameworks would derive from this research to make internal and external users of information wiser investment decisions and better understand the various areas of cash holdings territory.

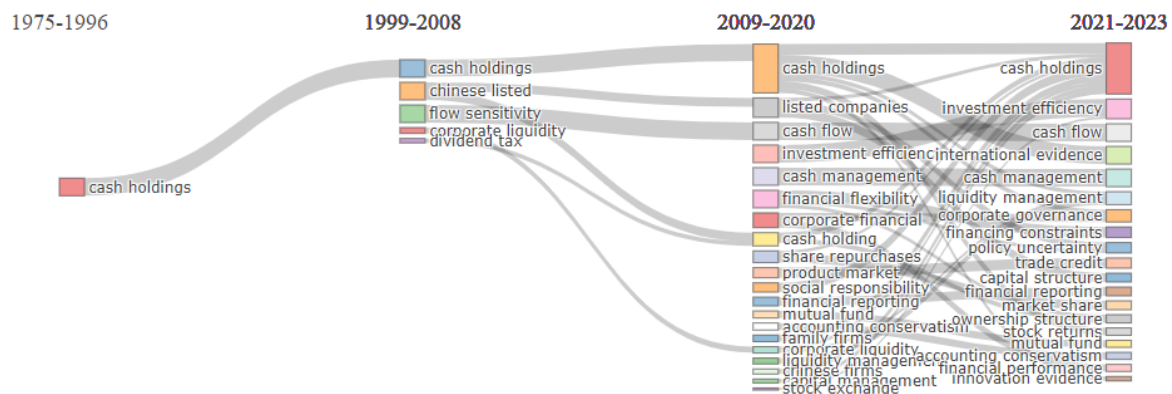


Figure 11: Authors' keywords thematic map.

Additionally, as the research should be aligned towards the necessary consideration of dynamic features, researchers on the cash holdings field also explore the subfield of the market share Mitani (2020), ownership structure Moin et al (2019), stock returns Jensen (2021); Jones et al (2022), and mutual fund (Le, 2020). During the period, research themes also emerged on accounting conservatism (Manoel and Moraes, 2021), financial performance Ozdemir et al (2023) and innovation (Zhang and Zhou, 2022). More specifically, the responses of listed firms in different countries to COVID-19 regarding their cash holdings have been diverse, as shown in Table 3.

Table 3

State-of-the-art cash holdings research in relation to multinational geographic and COVID-19 implications

Authors	Article Title	Source Title	Outcome measured	Multinational Geographic Findings
Ntantamis and Zhou (2022)	Corporate payout, cash holdings, and the COVID-19 crisis: Evidence from the G-7 countries	Finance Research Letters	-Adjustments of dividends -Share repurchases of publicly listed firms	G-7 nations such as the UK, Germany, France, and Italy, companies have reduced dividends, while in the US and Canada, cash

				payouts through repurchases have decreased. Japanese firms fall somewhere in between these two extremes
BC and Simpson (2023)	How do firms learn? Evidence from corporate cash holdings during the COVID-19 pandemic	Accounting and Finance	-Corporate cash holdings	US companies exposed to the pandemic hold more cash and have learned from past events.
Qin et al. (2020)	COVID-19 Pandemic and Firm-level Cash Holding- Moderating Effect of Goodwill and Goodwill Impairment	Emerging Markets Finance and Trade	-Firm-level cash holdings	Industries heavily affected by COVID-19 have seen an increase in cash reserves, although this effect could be counteracted by goodwill and risk factors.
Nguyen et al. (2023)	Cash Holding and Financial Stability during a Crisis: A Case Study of Vietnamese Firms in Covid-19 Pandemic	Forum for Social Economics	-Financial stability	COVID-19 had mixed effects on firm financial stability in Vietnam.
Bae and Kang (2023)	The Role of labor in cash holdings: Evidence from the supply-side impact of COVID-19	Economics Letters	-Corporate cash holdings	In China, it has been highlighted the importance of cash holding during the COVID-19 shock in order to maintain labor workforce.
Le and Nguyen (2022)	Impact of the COVID-19 Pandemic on the Risk-taking Behavior of Non-financial Firms Listed in Vietnam with Cash Holdings as a	Journal of Eastern European and Central Asian Research	-Risk-taking behavior of non-financial firms	In Vietnam, risk-taking behavior , with higher cash holdings amplifies risk-taking of non-financial firms

	Moderating Variable			
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The COVID-19 pandemic has important economic consequences. It offers valuable insights into how businesses make decisions and how various internal and external factors affect their finances, especially considering different countries. Early in the pandemic, Mirza et al. (2020) highlighted how it affects a company's financial stability. This emphasizes the importance of this study for policymakers, business leaders, and creditors who need to manage financial stability during crises. Understanding how the pandemic affects a company's cash reserves can help policymakers, business leaders, and creditors work together more effectively. It is also worth exploring specific aspects of cash reserves in relation to Sustainable Development Goals (SDGs), as suggested by Hopper (2020). Hopper's work discusses the pandemic's impact on society, the environment, species preservation, democratic processes, and the need for policies and systems that align with the United Nations' sustainable development goals. Table 4 suggests future research direction.

Table 4

Future research directions

Research Theme	Potential Research Questions	Theoretical supports	SDG / ESG Alignment	Initial research links
1. Cash Holdings and Decent Work (SDG 8)	<ul style="list-style-type: none"> - How do cash holdings impact job creation and security? - Can cash holdings be used to promote fair wages and labor practices? 	<ul style="list-style-type: none"> - Agency theory - Stakeholder theory 	SDG 8: Decent Work and Economic Growth ESG: Social Responsibility	Devos and Rahman (2017), Han and Kim (2021), Karpuz et al. (2020)
2. Cash Holdings and Innovation (SDG 9)	<ul style="list-style-type: none"> - What is the relationship between cash holdings and innovation investment? - Do cash holdings support sustainable infrastructure development? 	<ul style="list-style-type: none"> - Real options theory - Resource-based view 	SDG 9: Industry, Innovation, and Infrastructure ESG: Innovation and Sustainability	Baldi and Bodmer (2017), Firdausi (2018), Lyandres and Palazzo (2016)

3. Cash Holdings and Responsible Consumption (SDG 12)	<ul style="list-style-type: none"> - How can cash holdings contribute to responsible consumption and production? - Can cash holdings optimization reduce waste and promote resource efficiency? 	<ul style="list-style-type: none"> - Sustainability accounting - Circular economy principles 	SDG 12: Responsible Consumption and Production ESG: Responsible Consumption and Production	Higson et al. (2009), Sarkar et al. (2019), Zhang et al. (2020)
4. Cash Holdings and Strong Institutions (SDG 16)	<ul style="list-style-type: none"> - How do cash holdings policies align with principles of corporate governance? - Can cash holdings enhance transparency and accountability? 	<ul style="list-style-type: none"> - Corporate governance theory - Stewardship theory 	SDG 16: Peace, Justice, and Strong Institutions ESG: Governance and Ethical Conduct	Bolivar et al. (2015), Chen and Chuang (2009), Dittmar et al (2003)
5. Cash Holdings and ESG Performance	<ul style="list-style-type: none"> - How do cash holdings practices affect ESG ratings and investor preferences? 	<ul style="list-style-type: none"> - ESG integration models 	ESG: Overall ESG Alignment	Amel-Zadeh (2018), Cornell (2020), Hamdi et al. (2022)

Conclusion

This bird's eye review revealed that cash holding studies have grown tremendously in the past. It has scientifically mapped the evolution and the current state-of-the-art cash holdings research pattern and trend via bibliometric analysis. The study has answered five research questions related to the current state and trends of publications, influential channels, important keywords, issues in cash holdings research related to COVID-19, and areas needing further study. Utilizing Biblioshiny to analyze over 1,600 documents published between 1975 and 2022 on cash holdings, underscores the significance of comprehending and gaining knowledge in this field to enhance research and understanding of the subject. Holding cash is a crucial financial decision for any organization as it ensures the preservation of assets and determines various business activities.

It is worth noting that holding cash can support businesses in achieving social and environmental progress, contributing to Sustainable Development Goals (SDGs). Having adequate cash reserves enhances resilience during economic uncertainty, enabling sustained contributions to SDGs. Liquidity facilitates timely investments in eco-friendly technologies, fair labor practices, and community engagement, thereby aligning with SDGs such as Decent Work and Economic Growth (SDG 8), Climate Action (SDG 13), and Partnerships for Goals (SDG 17).

There is considerable concern about the effects of the post-COVID-19 pandemic on cash holdings, and policymakers, investors, lenders, and scholars alike understand the reasons behind such holdings. This knowledge is critical for making informed decisions regarding macroeconomic policies, investments, financing, and microeconomic policies. Cash holdings have far-reaching societal implications, including economics, environment, technology, and social issues. Further research is imperative to gain a deeper understanding and provide valuable insights.

Declaration of Generative Ai And Ai-Assisted Technologies in The Writing Process

During the preparation of this work, the author(s) used ChatGpt in order to improve language and readability with caution. After using this tool, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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