Intellectual capital efficiency, institutional ownership and cash holdings: a cross-country study

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Abstract

Purpose – This study aims to investigate the roles of intellectual capital efficiency and institutional ownership on cash holdings and their speed of adjustment.

Design/methodology/approach – Using a sample of 432 firm-year observations of tourism-listed companies, three measures of cash holdings are used as dependent variables and intellectual capital efficiency and institutional ownership as independent variables. The financial data is collected from the S&P Capital IQ database for the period 2015–2020. Two system-generalized methods of moment estimation are used for the robustness checks of the results.

Findings – The study provides evidence that an increase in intellectual capital efficiency in tourism firms results in lower cash holdings. The research findings also report that characteristics such as firm size, age and market-to-book value ratio are associated with cash holdings. Furthermore, institutional ownership in these firms did not affect the cash holdings. The results also confirm the existence of a target cash holding level to which the tourism firms attempt to converge. These results are robust to the alternative proxy of cash holding and endogeneity tests.

Research limitations/implications – The study uses intellectual capital efficiency measured by the model proposed by Pulic. Alternative measures of intellectual capital can be included in future studies. Future research can also investigate the impact on cash holdings before and during the pandemic for tourism companies. The study is limited to the impact of institutional ownership; thus, research can be extended to consider other types of ownership.

Practical implications – The findings of this study indicate that tourism companies should take into account the impact of intellectual capital efficiency on their cash holding decisions. The industry uses a specific financial management strategy in light of better efficiency and possibly values the opportunity cost of holding more cash. Additionally, regulators should re-examine the role of institutional ownership in tourism firms, as it was found to have no impact on cash holdings. The regulators may need to consider other factors, such as firm size and age, when developing policies and regulations to ensure that tourism firms have adequate cash holdings.

Originality/value – This study adds to the body of knowledge on the factors that influence cash management and ideal cash levels for the tourism industry. The examination of the effect of intellectual capital on cash holdings is a novel contribution, filling a gap in the existing literature. The findings on the speed of adjustment towards optimal cash holdings also provide support for the trade-off theory.

Keywords Cash holding, Speed of adjustment, Intellectual capital, Institutional shareholding, Trade-off theory

Paper type Research paper

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1. Introduction

The most important characteristic of the tourism sector is that it supports the three high-priority goals of developing countries: income generation, creation of new jobs and rate of exchange earnings. In this respect, activities related to the tourism sector are important drivers of economic growth (Ahmad and Satrovic, 2023a). This is one of the main reasons why governments support and encourage the development of the tourism sector, not only in developing but also in developed countries. In the past decades, the tourism sector recorded a significant growth pattern and has become one of the rapidly growing branches of economic activity. For instance, international tourist arrivals showed a 59% growth in the last decade (880 million in 2009 vs. 1.5 billion in 2019). All regions witnessed an increase in arrivals, where the Middle East (+8%) has emerged as the fastest-growing region for international tourist arrivals, which motivated us to particularly examine the impact of the pandemic on tourism companies in the inspected region. Globally, international tourist arrivals grew 4% in 2019 compared to the previous year and report a contribution of 10.3% to the global gross domestic product in 2019 (UNWTO, 2020). Based on economic prospects, historical trends and the UNWTO Confidence Index, a growth of 3–4% globally in international tourist arrivals was forecasted in 2020. Economic growth, technological advances and affordable travel costs made the tourism sector a truly global force for economic growth until the world met a pandemic in 2020: coronavirus disease (COVID-19). The COVID-19 pandemic has halted the strong growth of the tourism sector, with exceptional consequences for jobs and businesses. Implemented travel restrictions and airport closures have closed many hotels where the tourism sector was one of the first and most affected sectors by the pandemic.

Many studies have examined the determinants of a firm's cash holding policy because it is one of the most crucial components for the sustainability of modern corporations (Cho *et al.*, 2018). The business belief that "cash is king" reflects the importance of cash holdings to a company's overall financial health. Orlova and Sun (2018) investigated the speed of adjustment of cash holdings and have extended recent findings that emphasize the necessity of accounting for variability in cash holdings adjustment speed. This shows that enterprises with cash deficits, rated companies and companies with financial surpluses are slow with the speed of adjustment, whereas firms with excess cash, non-rated companies and businesses with financial deficits adjust to their targets more rapidly. Large cash resources have two diverging views, one in favour of their requirement to support growth opportunities and the other against them as they lead to inefficiencies that exacerbate the risk of misappropriation of funds (Dittmar *et al.*, 2003; Opler *et al.*, 1999). In the same context, corporate governance is found to have varied impacts on the cash holdings of the firms. For example, excess cash may be distributed to the investors, resulting in low cash balances. Alternatively, it may be retained by the organization for expansion of the firms thus reflecting in high cash balances. Institutional investors are an important corporate governance mechanism that provides robust monitoring due to their substantial equity stakes (Shleifer and Vishny, 1986). While there are other forms of shareholders, institutional shareholders are important due to their sizeable holdings and capability of influencing the management either through a direct voting process or indirectly through selling their shares (Edmans, 2009; Khurshed *et al.*, 2011) and creating financial pressure (Gillan and Starks, 2000).

Knowledge-based resources of the firms are crucial for value-creation activities (Al-Musali and Ku Ismail, 2016). Intellectual capital (IC) is an assimilation of knowledge-based resources such as business ideas, skills and infrastructure (Yang and Lin, 2009) that plays a leading role in the sustainable development of firms (Reed *et al.*, 2006). IC is known to improve a firm's financial and organizational performance (Habib and Dalwai, 2023; Dalwai

and Salehi, 2021; Rehman *et al.*, 2022; Xu *et al.*, 2022), financial health and credit rating (Guimón, 2005; Dalwai and Sewpersadh, 2023) and contribute to the overall economy (Lev and Gu, 2016). High IC efficiency is associated with low financial leverage (D'Amato, 2021). However,
to the best of our knowledge, there have been no studies on the impact of IC on the cash holdings of the firm.

This research aims to investigate the impact of IC efficiency and institutional ownership on the cash holdings and target cash of worldwide tourism companies. Using a sample of 72 firms for six years from 2015 to 2020, data is collected for listed tourism companies. The findings suggest IC efficiency and its component capital employed efficiency are negatively associated with cash holdings. Additionally, the results confirm adjustment to the optimal capital structure, lending support to the trade-off theory (TOT). The results are robust to the alternative proxy of cash holdings and endogeneity tests. The role of IC efficiency is emphasized as an important determinant of cash holding for the travel and tourism sector firms.

This study makes several contributions. To the best of our knowledge, IC efficiency has not been explored as a determinant of cash holding. This study contributes to the literature on cash management by exploring IC efficiency as a determinant. Our research augments the extant literature on cross-country studies that have investigated the determinants of cash holdings (Al-Hadi *et al.*, 2020; Al-Najjar and Clark, 2017; Bugshan *et al.*, 2021; Bagh *et al.*, 2021). There has been limited research on the corporate governance of the tourism industry (Yeh, 2019). Institutional shareholders have an important role for tourism firms as they are highly affected by the changing market and adversities. Thus, the current study contributes to the literature on corporate governance by investigating the role of institutional shareholders. The result of this study suggests that institutional ownership is not a significant determinant of cash holding, which is also consistent with the finding of Elyasiani and Movaghari (2022). The outcomes of this research would support the policymakers in understanding the potency of corporate governance principles, and firms and investors can assess the importance of IC efficiency and the dynamics of institutional shareholding. Lastly, the research findings contribute to TOT as there is evidence that managers will adjust the speed of cash holdings during periods of crisis consistent with the findings of prior studies (Gao *et al.*, 2013; Jiang and Lie, 2016; Bugshan *et al.*, 2021).

The rest of the paper is organized as follows: Section 2 explains the background, theories and hypothesis development. Section 3 provides an overview of the methodology. Section 4 presents briefly the results of empirical research and discusses the obtained findings. Section 5 reveals concluding remarks and policy implications.

2. Literature review

2.1 Importance of the tourism sector for the economies

Tourism is the industry that enables the temporary relocation of people to destinations outside their routine location for private, occupational or commercial intentions. Due to globalization and urbanization, the tourism industry has recorded fast growth at the global level. Consequently, tourism represents one of the most important economic sectors and is the largest service sector (Satrovic and Adedoyin, 2023). Rising incomes in developing economies increase the demand for leisure activities. Tourism industry represents the largest service sector, and it has a substantial influence on economic growth. Both developing and developed countries perceive tourism as an approach to benefit from their natural and other resources (Damrah *et al.*, 2022a; Satrovic *et al.*, 2023). The local economy has severe benefits from tourism, e.g. foreign exchange is generated, new jobs are created and tax revenues are increased. The tourism sector not only contributes to economic growth

but also improves the political, cultural and social environment. Due to its high dependence on other sectors, tourism incorporates various factors. In other words, when visitors come to see a certain destination, they make use of different facilities, e.g. accommodation, transport, restaurants and entertainment services (Damrah *et al.*, 2022b). In this manner, tourists create the tourism market and support the development of the domestic economy. The increased tourism demand also stimulates investments in infrastructure (Ahmad and Satrovic, 2023b). As opposed to industry and manufacturing, tourism attracts high levels of investment but demands less capital. Consequently, tourism encourages employment, economic development and advancement of small- and medium-sized enterprises. It is also worth mentioning that tourism impacts the currency offered and increases public income. The increased tourism demands new investments in restaurants, transport and entertainment facilities (Satrovic *et al.*, 2022). Herein, tourism creates new jobs indirectly. Our regions under examination recognized the importance of the tourism sector. For instance, a hot, arid climate and cultural history have attracted tourists worldwide to visit the tourist attractions in the Middle East. Enormous investments in facilities have placed the Middle East as a top tourist destination. For instance, Dubai was the fourth-most visited city in 2018. In these countries, tourism is considered a prominent tax-raising alternative for oil production. This is of critical importance since oil-producing revenues decreased in recent years. Notwithstanding the importance of the tourism sector in the Middle East, it is also essential to mention that tourism is among the essential sectors in the majority of Asia/Pacific countries. The region reports a dynamic growth in tourism that aids in the development of infrastructure and workplace creation. Reporting among the fastest growth of the tourism sector globally, Asia/Pacific economies' growth prospect is fuelled by the tourism sector opening an opportunity to reach the targets of sustainable development. Considering the European market, tourism industry is critical to popularizing European values as it incentivizes sharing ideas, traditions and knowledge among cultures as well as social cohesion. Notwithstanding its socio-cultural impact, it is vital to mention that nearly one in eight people are employed in tourism sector with the expectation of generating up to eight million workplaces in the coming decade (WTTC, 2022). Furthermore, the tourism sector is a vital source of revenue in Latin America and the Caribbean. In addition, tourism sector has the potential to pave the way to achieve the sustainable development of the region. As reported in WTTC (2022), the Caribbean region is the most dependent on tourism sector, which contributes to around 15% of all jobs. The importance of the tourism sector can be understood from the fact that it has the potential to generate around seven million new jobs until 2032 in Latin America and the Caribbean (WTTC, 2022). The travel and tourism sector contributed to 9.9% of gross domestic product in 2021 in the USA and Canada. The vitality of tourism sector can be justified by 2.7 million new jobs in 2021 and divulging that around 8.3% of all jobs were supported by the tourism sector (WTTC, 2022) in the USA and Canada.

The value chain of tourism includes the advanced connection between various supporters, functions and policies at both local and global levels. Outbound countries provide international flights and tourism arrangements, whereas inbound countries provide infrastructure, restaurants, hotels, entertainment services, etc. The Internet has introduced some innovations in the tourism industry. It has empowered flexibility, access to real-time information and reduced distribution costs, which have significantly increased tourism demand.

Over the last decade, the role of tourism in economic development has become the focus of intensive attention among the research community. Many studies reveal a positive linkage between tourism development and economic growth (Chou, 2013; Khan *et al.*, 2021). Despite the positive economic impacts, international tourism can also provoke negative ecological consequences. The tourism value chain includes the advanced connection

between different parties and supports and intensive use of various facilities, thus having a great potential to create environmental challenges (Bese *et al.*, 2020; Khan and Hou, 2021; Verbič *et al.*, 2022).

2.2 Theories of cash holdings

2.2.1 Trade off theory. Researchers have used three key dominant theories for explaining corporate cash holdings (Guariglia and Yang, 2018). Opler *et al.* (1999) found significant empirical evidence for the trade-off model, according to which companies evaluate the cost and advantages of holding cash and adjust their cash reserves in compliance with their objective. The TOT that has gained substantial empirical support indicates that companies tend to restructure their cash holdings towards an objective level to maximize shareholder wealth given the cost and benefit of holding liquid assets (Opler *et al.*, 1999; Lee and Powell, 2011; Venkiteshwaran, 2011). The TOT predicts that companies will be able to maintain less cash when other sources of liquidity are available since liquid assets can be liquidated where cash is needed. This shows the cash holdings' transaction motive (Ferreira and Vilela, 2004; D'Mello *et al.*, 2008).

2.2.2 Pecking order theory. In a global economy with imperfect capital markets, Myers and Majluf (1984) suggest a pecking order theory in which organizations finance themselves first with retained earnings, then with debt and last with equity. When a company's cash flow is low compared to its investment, this concept predicts that it will revert to its cash holdings before seeking expensive external funding. As a result, keeping a large quantity of cash on hand can help stockholders by lowering the cost of raising financing from outside sources. According to this theory, if a firm's internal funds increase, it will accumulate cash and pay back its debt on time; however, if internal funds decrease, it will diminish cash reserves and increase debt. Cash can usually be considered a negative debt. In short, the cash holdings of a company would rise and fall according to its profitability (Opler *et al.*, 1999). According to the pecking order theory, firms with higher capital expenditure or investments will deplete cash/liquid assets for this purpose, resulting in fewer internal resources and less cash accumulation (Opler *et al.*, 1999). The prior studies have either argued in favour of TOT or pecking order theory (Ozkan and Ozkan, 2004; Ferreira and Vilela, 2004; D'Mello *et al.*, 2008). If the TOT is appropriate, a company with greater growth prospects will store more cash to avoid financial trouble, which corresponds to the precautionary motive for cash holding. The pecking order theory forecasts that a corporation with huge investment potential will require more capital to prevent cash shortages or expensive external funding. This reflects the transactional motive for keeping cash on hand.

2.2.3 Free cash flow theory. The concept of free cash flow postulates that the interests of managers may not always align with those of shareholders (Guariglia and Yang, 2016). This is due to their desire to establish or consolidate power, which may lead them to prioritize their own objectives over those of the shareholders. Specifically, managers may be incentivized to accumulate excess cash reserves, which can provide them with greater leverage in running the company but can come at the expense of shareholders. Unlike the financial hierarchy theory, the free cash flow theory does not suggest an optimal level of corporate liquidity. Dittmar and Mahrt-Smith (2007) discovered that firms that lack proper governance exhibit a diminished marginal value of cash reserves and demonstrate a subpar operational performance that is linked to superfluous cash reserves. These results are in line with the conjectures posited by the free cash flow hypothesis.

This research is centred on the degree to which the cash holdings of tourism firms can be explained by the theories for retaining cash. In the initial step, the existence of a cash target is investigated. If there is compelling evidence of the presence of such a target, the research

will explore the pace at which firms readjust their cash ratios towards the optimal level in the face of adjustment expenses.

2.3 Hypothesis development

2.3.1 Intellectual capital, cash holding, speed of adjustment. Intangible assets like patents, branding and staff training have grown to be essential components of IC in modern knowledge-based economies and are increasingly being incorporated in the balance sheets of businesses (Syverson, 2011; Kogan *et al.*, 2017). Almeida *et al.* (2011) examined the connection between corporate intangible investment choices and cash holdings in their theoretical research. Research and development-related intangibles have been proven to positively correlate with cash holdings in empirical investigations. While fixed investment did not use precautionary cash reserves during the financial crisis, companies did so to stabilize R&D (Brown and Petersen, 2015).

Opler *et al.* (1999) posit that information asymmetries play a pivotal role in the presence of R&D expenses. A lack of cash flow can compel firms to reduce their investment, thereby increasing the financial distress costs in situations where knowledge asymmetry is significant. Firms that incur higher R&D expenses are likely to possess more cash reserves, owing to the higher cost of financial hardship. Companies with substantial intangible investments tend to have significant cash balances due to the size and risk of their intangible investments, as cited by Brown *et al.* (2012) and Lyandres and Palazzo (2016). As collateral for loans, large intangibles are challenging to use, leading to companies with significant intangibles keeping more cash, as noted by Falato *et al.* (2013). Theoretically, investment in intangible assets may lead to an increase in a company's cash reserves, given the unexpected returns and the non-eligibility of such assets as loan collateral. Homayoun and Seifzadeh (2022) suggest that social capital is negatively correlated with cash reserves. The significance of organizational capital has increased over time, as it has become a critical element of production and a considerable portion of global capital stocks (Eisfeldt and Papanikolaou, 2014; Peters and Taylor, 2017). Corrado *et al.* (2009) indicate that organizational capital constitutes the majority of firm intangible capital, accounting for roughly 30%. Organizational capital, like other intangible assets, has limited redeployment capacity, significant information asymmetry and higher uncertainty regarding its liquidation value (Holthausen and Watts, 2001).

When a company possesses a more robust IC, its monetary requirements are relatively lower compared to those of a company with a weaker IC. Our hypothesis suggests that the value of a firm's IC has a substantial influence on its cash reserves, in that a more valuable IC translates to a lower need for cash. Essentially, a firm's IC serves as a buffer against cash requirements. The above discussion has been made in light of the components of IC efficiency, such as intangibles, R&D and organizational capital. Thus, the following relationship is hypothesized:

H1. Firms hold less cash when they have high IC efficiency.

H2. Firms adjust faster to their target cash holding level when they have high IC efficiency.

2.3.2 Institutional ownership, cash holding, speed of adjustment. Over the past few decades, financial economists have experienced a clear and significant increase in institutional ownership. In earlier research, institutional ownership was commonly referred to as the portion of a company's shares held by institutional investors, as noted by Brown *et al.* (2012). Companies with cash reserves are more likely to expand, as indicated by Opler *et al.* (1999). In light of the cautious reasons for holding cash, it presents an excellent source of

investment for companies seeking growth opportunities during times of economic volatility, according to Ahrends *et al.* (2018). Gillan and Starks (2000) suggest that corporate governance is an effective strategy for improving a corporation's cash monitoring. The significance of institutional ownership promotes good corporate governance and enhances the value and effectiveness of various firms, as observed by Farooqi *et al.* (2017).

There exists a multitude of empirical evidence that highlights the influence of institutional ownership on corporate values. Although a few studies (Johnson and Mitton, 2003; Thomsen and Pedersen, 2000) indicate that institutional ownership diminishes business value, the majority of research presents a positive effect. The correlation between cash holdings and institutional ownership is paradoxical. Al-Najjar and Clark (2017) conducted an assessment of the impact of institutional investors on the cash holdings of middle east and north Africa firms. The findings of the study suggest that institutional ownership has a noteworthy and beneficial impact on cash holdings, implying that these shareholders strive to amplify their personal benefits and maintain their cash levels high.

The trade-off hypothesis posits that a company engages in a careful assessment of the advantages and drawbacks of retaining cash to achieve a specific objective or optimize its assets. If a company's cash reserves are below the desired level, it will endeavor to reach the ideal cash level as soon as possible. Previous research has demonstrated the existence of such target cash holdings (Bates *et al.*, 2018; Gao *et al.*, 2013; Opler *et al.*, 1999; Orlova and Rao, 2018; Cho *et al.*, 2018). According to earlier studies (Chen *et al.*, 2012; Lian *et al.*, 2012; Gao *et al.*, 2013; Martínez-Sola *et al.*, 2018; Orlova and Rao, 2018; Orlova and Sun, 2018; Ozkan and Ozkan, 2004; Venkiteshwaran, 2011), different organizations adjust to the optimal cash holdings at varying rates. It is also noticed that the speed of adjustment was faster for private enterprises and was influenced by agency costs and information asymmetry (Gao *et al.*, 2013). Corporate governance and investor rights have a major impact on how quickly corporations modify their cash holdings (Orlova and Sun, 2018). Cash holdings adapt more swiftly to the desired levels of organizations in countries with substantial legal protection compared to nations that have minimal protection.

In accordance with the principles of agency theory, it has been observed that long-term institutional investors have a detrimental effect on cash, while short-term institutional investors have a positive impact on cash reserves (Brown *et al.*, 2012). Previous research has demonstrated that institutional ownership has a significant and favorable influence on cash holdings (Brown *et al.*, 2012; Belghitar and Khan, 2013; Al-Najjar and Clark, 2017), and based on this, the following relationship is postulated:

H3. Firms hold more cash when they have high institutional ownership.

H4. Firms adjust faster to their target cash holding level when they have high institutional ownership.

3. Methodology

3.1 Sample selection

The sample of this study includes worldwide listed companies working in the travel and tourism sector. These companies are classified as scenic operators, tour operators and travel agencies, which have been most negatively affected by the pandemic. The annual financial and institutional ownership data is extracted from the S&P Capital IQ database. The data was collected over six years from 2015 to 2020. Our initial sample consisted of 203 firm; however, after eliminating firms due to incomplete accounting data throughout the study, the final sample included 72 firms. The region-wise 432 firm-year observations were split as

follows: Africa/Middle East – 42, Asia/Pacific – 288, Europe – 78, Latin America and the Caribbean – 6 and the USA and Canada – 18.

3.2 Model specification

Following prior studies, this study models equation (1) and (3) for estimating the cash holdings (Bates *et al.*, 2009; Cho *et al.*, 2018). Further, the research follows studies of Jiang and Lie (2016), Martínez-Sola *et al.* (2018) and Cho *et al.* (2018) for modelling equations (2) and (4) to gauge the adjustment speed of cash holdings. To empirically test our hypotheses, the following models are investigated:

$$\begin{aligned}\text{CashHolding}_{i,t} = {} & \beta_0 + \beta_1\text{VAIC}_{i,t} + \beta_2\text{InstOwn}_{i,t} + \beta_3\text{FirmSize}_{i,t} + \beta_4\text{CF}_{i,t} + \beta_5\text{MTB}_{i,t} \\ & + \beta_6\text{LOSS}_{i,t} + \beta_7\text{Age}_{i,t} + \beta_8\text{ROA}_{i,t} + \beta_9\text{CAPEX}_{i,t} + \beta_{10}\text{NWC}_{i,t} \\ & + \beta_{11}\text{Sgrowth}_{i,t} + \beta_{12}\text{Year} + \beta_{13}\text{Region} + \varepsilon_{i,t} \end{aligned} \tag{1}$$

$$\begin{aligned}\text{CashHolding}_{i,t} = {} & \beta_0 + \beta_1\text{CashHolding}_{i,t-1} + \beta_2\text{VAIC}_{i,t} + \beta_3\text{InstOwn}_{i,t} + \beta_4\text{FirmSize}_{i,t} \\ & + \beta_5\text{CF}_{i,t} + \beta_6\text{MTB}_{i,t} + \beta_7\text{LOSS}_{i,t} + \beta_8\text{Age}_{i,t} + \beta_9\text{ROA}_{i,t} \\ & + \beta_{10}\text{CAPEX}_{i,t} + \beta_{11}\text{NWC}_{i,t} + \beta_{12}\text{Sgrowth}_{i,t} + \beta_{13}\text{Year} \\ & + \beta_{14}\text{Region} + \varepsilon_{i,t} \end{aligned} \tag{2}$$

$$\begin{aligned}\text{CashHolding}_{i,t} = {} & \beta_0 + \beta_1\text{HCE}_{i,t} + \beta_2\text{CEE}_{i,t} + \beta_3\text{SCE}_{i,t} + \beta_4\text{InstOwn}_{i,t} + \beta_5\text{FirmSize}_{i,t} \\ & + \beta_6\text{CF}_{i,t} + \beta_7\text{MTB}_{i,t} + \beta_7\text{LOSS}_{i,t} + \beta_8\text{Age}_{i,t} + \beta_9\text{ROA}_{i,t} \\ & + \beta_{10}\text{CAPEX}_{i,t} + \beta_{11}\text{NWC}_{i,t} + \beta_{12}\text{Sgrowth}_{i,t} + \beta_{13}\text{Year} \\ & + \beta_{14}\text{Region} + \varepsilon_{i,t} \end{aligned} \tag{3}$$

$$\begin{aligned}\text{CashHolding}_{i,t} = {} & \beta_0 + \beta_1\text{CashHolding}_{i,t-1} + \beta_2\text{HCE}_{i,t} + \beta_3\text{CEE}_{i,t} + \beta_4\text{SCE}_{i,t} \\ & + \beta_5\text{InstOwn}_{i,t} + \beta_6\text{FirmSize}_{i,t} + \beta_7\text{CF}_{i,t} + \beta_8\text{MTB}_{i,t} + \beta_9\text{LOSS}_{i,t} \\ & + \beta_{10}\text{Age}_{i,t} + \beta_{11}\text{ROA}_{i,t} + \beta_{12}\text{CAPEX}_{i,t} + \beta_{13}\text{NWC}_{i,t} + \beta_{14}\text{Sgrowth}_{i,t} \\ & + \beta_{15}\text{Year} + \beta_{16}\text{Region} + \varepsilon_{i,t} \end{aligned} \tag{4}$$

where:

CashHolding is proxied by three different measures CashHolding, CashHolding1 and CashHolding2 (refer to Appendix for definitions); *VAIC* refers to value-added IC, measured as the sum of human capital efficiency, structural capital efficiency and capital employed efficiency; *HCE* refers to human capital efficiency; *SCE* refers to structural capital efficiency; *CEE* refer so capital employed efficiency; *InstOwn* refers to institutional ownership and is measured as the total number of shares held by institutions; *FirmSize* refers to the firm size measured as the natural logarithm if total assets; *CF* refers to operating cash flow measured as the operating cash flow divided by total assets; *MTB* measured as the market value of the share to book value of share; *LOSS* is measured 1 if a loss is posted by the firm or else 0; *Age*

refers to the natural logarithm of a firm's age; *ROA* refers to return on asset measured as profit or loss before taxation divided by total assets; CAPEX is measured as the ratio of capital expenditure to total assets; *NWC* refers to net working capital and is measured as current asset minus current liabilities dividend by total assets; *Sgrowth* refers to sales growth and is measured as the year-on-year percentage change in sales; *Year* is the year dummy; and *Region* is the region dummy.

3.3 Variables measurement

3.3.1 Dependent variables. Our study uses three measures of cash holdings. The first variable of CashHolding is measured as the natural logarithm of one plus cash and cash equivalents (Dalwai, 2023; Deshmukh *et al.*, 2021; Foley *et al.*, 2007). This measure is considered the most efficient to alleviate the problem of large outliers. Following prior studies (Zhou *et al.*, 2021; Dittmar *et al.*, 2003; Bugshan *et al.*, 2021), CashHolding1 is measured as the ratio of cash and cash equivalents to total assets minus cash and cash equivalents. As part of the robustness check, CashHolding2 is measured as the natural log of one plus the ratio of cash and cash equivalents to net assets (total assets less cash and cash equivalents) (Marwick *et al.*, 2020; Dittmar *et al.*, 2003).

3.3.2 Independent variables.

3.3.2.1 Intellectual capital. The research examines the impact of IC on a firm's cash holdings. To quantify the IC efficiency, we use the value-added intellectual capital (VAIC) coefficient that is widely used in extant literature (Scafarto *et al.*, 2023; Ocak *et al.*, 2023; Dalwai *et al.*, 2018; Dalwai *et al.*, 2021b, Dalwai and Mohammadi, 2020; D'Amato, 2021; Soewarno and Tjahjadi, 2020). Pulic (1998) argues that VAIC is a straightforward measure that helps to compare IC in selected sectors. Nadeem *et al.* (2019) further suggest VAIC as a monetary measure offers the benefits of being relatively similar across departments and industries. The measurement of this variable is as follows:

$$\text{VAIC} = \text{HCE} + \text{SCE} + \text{CEE}$$

where:

VAIC refers to the value-added intellectual capital coefficient;
HCE refers to human capital efficiency;
SCE refers to structural capital efficiency; and
CEE refers to capital employed efficiency.

The sub-components can be calculated as follows:

- Value added (VA) = Net Income (NI) + Personnel Costs (PC) + Interest (I) + Taxes (T) + Depreciation and Amortization (D&A);
- HCE = VA/HC, where HC refers to personnel costs;
- CEE = VA/CE, where CE refers to capital employed; and
- SCE = VA/SC, where SC refers to structural capital and SC = VA−HC.

3.3.2.2 Institutional ownership. This study examines the impact of institutional ownership on a firm's cash holdings. Institutional ownership is measured as the total number of shares held by institutions divided by the total number of outstanding shares held at year-end (Lin and Fu, 2017). Institutional investors have adequate capacity and incentive to monitor the management. Their efficient monitoring may induce a negative relationship between cash

holding and institutional ownership as they may leverage their control to impede the accretion of liquid assets on corporate balance sheets.

3.3.3 Control variables. Following prior studies (Opler *et al.*, 1999; Harford *et al.*, 2008; Gao *et al.*, 2013; Chen *et al.*, 2020, Dalwai *et al.*, 2023), we include various factors that influence the firm's cash holdings. Firm size (FirmSize), measured as the natural logarithm of total assets, is seen as a deterrent for takeovers. Rajan and Zingales (1995) argue that large firms have more cash flows and are thus less likely to face financial distress. Cash flows (CF) are measured as the operating cash flow divided by total assets (Yang *et al.*, 2017). Market-to-book (MTB) value is used as a proxy for investment opportunities. From the information asymmetry point of view, firms with high MTB are expected to hold more cash to counter the cost they might have to incur if financial conditions worsen (Opler *et al.*, 1999). Capital expenditure is measured as the ratio of capital expenditure to total assets. According to the pecking order theory, firms with large investment expenses do not have a surplus from internally generated funds and thus have fewer liquid assets (Guizani, 2017; Opler *et al.*, 1999). Return on assets (ROA) is measured as profit or loss before taxation divided by total assets. Based on the pecking order theory, high financial performance results in firms accumulating cash flow; thus, a positive relationship is expected between ROA and cash holdings. Net working capital (NWC) is a measure of liquidity and is calculated as current assets minus current liabilities divided by total assets. As NWC consists of assets that can be substituted for cash (Bates *et al.*, 2009), an inverse relationship is expected between NWC and cash holding in accordance with TOT. Sales growth (Sgrowth) is measured as the annual growth rate in sales (Martínez-Sola *et al.*, 2018). A high growth rate is associated with firms holding more cash (Kling *et al.*, 2014). LOSS is measured as 1 if a loss is posted by the firm or else 0 (Zhou *et al.*, 2021). Age refers to the natural logarithm of a firm's age (Cho *et al.*, 2018).

4. Results and discussion

4.1 Descriptive statistics

Table 1 presents the descriptive statistics of dependent, independent and control variables used in this study. There are three proxies for cash holdings, and each presents a different average for the tourism firms. The IC efficiency (VAIC) is an average of 1.169 for worldwide tourism firms, of which some firms have an efficiency as high as 14.964. The significant contributor to VAIC comes from structural capital efficiency (SCE). The average institutional ownership for the firms is 13.33%, whereas the minimum ownership is zero for some firms, thus suggesting that some of the tourism firms do not have an institutional ownership composition. The profitability of the firms measured in terms of ROA was an average of 2% over the period of study.

4.2 Correlation

Table 2 presents Pearson's correlation between independent, dependent and control variables. CashHolding is significantly and negatively correlated with VAIC. This is an expected relationship, as firms with efficient IC are more likely to hold less cash. A higher proportion of institutional shareholding is associated with higher CashHolding. This affirms the argument that institutional shareholders have a better opportunity to monitor and evaluate future growth opportunities, which translates to higher cash holding. FirmSize is strongly and positively correlated with CashHolding which is consistent with the pecking order theory. Hair *et al.* (2006) suggest the correlation matrix is an effective tool to identify collinearity issues between the explanatory variables. The collinearity issue is considered serious if the coefficient between the two variables is more than 0.8. The correlation

Variable	Obs	Mean	SD	Min	Max
CashHolding	432	1.670	0.744	0.000	3.853
CashHolding1	432	0.293	0.312	0.000	1.583
CashHolding2	432	−0.866	0.429	−2.646	−0.206
VAIC	432	1.169	0.934	−6.811	14.964
HCE	432	0.178	0.936	−10.014	8.749
SCE	432	0.822	0.936	−7.749	11.014
CEE	432	0.169	0.934	−7.811	13.964
InstOwn	432	13.333	16.503	0.000	84.610
FirmSize	432	2.536	0.725	0.719	4.604
Lev	432	0.250	0.784	0.000	16.079
CF	432	0.039	0.097	−0.978	0.418
MTB	432	2.941	6.684	−5.842	101.892
LOSS	432	0.262	0.440	0.000	1.000
Age	432	1.539	0.284	0.778	2.418
ROA	432	2.052	4.590	−19.100	21.200
CAPEX	432	0.038	0.052	0.000	0.461
NWC	432	0.051	1.046	−21.294	0.769
Sgrowth	432	5.972	54.608	−87.400	638.900

Source: Table by authors; see Appendix for variable definitions

Table 1.
Descriptive statistics

coefficient for all the explanatory variables is less than 0.8 except for SCE and VAIC. Due to this association, SCE is not included in any of the models.

4.3 Regression analysis

The results of the impact of IC, institutional shareholding and control variables on two proxies of cash holding are presented in Table 3. The Breusch–Langer Multiplier Test addresses the heterogeneity in the panel data by supporting the choice between random effects or pooled ordinary least squares regression for the models. The null hypothesis is rejected, and thus random effects were found to be more appropriate. This was then followed by the Hausman test to choose between random effects and fixed effects. The results concluded that random effects are more appropriate. To counter the effects of possible outliers that can distort the least-squares estimators in regression analysis, Robust M-estimation is used for the models in columns 2 and 6 (Lim *et al.*, 2020). Jann (2010) introduced the robreg m estimation in Stata which is used for deriving results that are not distorted on both the slope and intercept of the observation. There are clear differences in the results presented by random effects and Robust M estimations, which are discussed in the following few paragraphs.

The intellectual capital efficiency (VAIC) is significantly and negatively associated with cash holding (Column 2), lending support to *H1*. The findings are consistent with the prior study by Bharadwaj *et al.* (2020), which reported a negative association between corporate brands and cash holdings, supporting the view that strong brands support lowering downside risk and thus lower cash holdings. However, the result is inconsistent with the precautionary motives of cash holding that suggest firms with high organizational capital tend to hold more cash to avoid relying on external capital to maintain adequate liquidity or cope with underinvestment (Marwick *et al.*, 2020). Baldi and Bodmer (2017) found that intangible investments in the form of R&D expenses were positively associated with higher cash holdings, which is a significantly different finding than the current research. The

Table 2.
Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) CashHolding	1.000																	
(2) CashHolding1	0.358***	1.000																
(3) CashHolding2	0.331***	0.807***	1.000															
(4) VAIC	−0.086*	−0.038	−0.050	1.000														
(5) HCE	0.007	−0.095**	−0.038	0.067	1.000													
(6) SCE	−0.007	0.095**	0.038	−0.067	−1.000	1.000												
(7) CEE	−0.086*	−0.038	−0.050	1.000***	0.067	−0.067	1.000											
(8) InstOwn	0.105**	−0.095**	−0.077*	−0.002	−0.060	0.060	−0.002	1.000										
(9) FirmSize	0.829***	−0.111**	−0.253***	−0.059	0.030	−0.030	−0.059	0.153***	1.000									
(10) Lev	−0.048	−0.087*	−0.079*	0.041	−0.008	0.008	0.041	0.013	−0.002	1.000								
(11) CF	−0.073	−0.028	0.010	−0.023	0.100**	−0.100**	−0.023	0.055	−0.081*	−0.531***	1.000							
(12) MTB	0.006	0.068	0.097**	−0.129***	−0.114**	0.114**	−0.129***	0.123**	−0.051	−0.009	0.087*	1.000						
(13) LOSS	0.030	−0.084*	−0.099**	−0.098**	−0.052	0.052	−0.098**	0.018	0.090*	0.124**	−0.389***	0.056	1.000					
(14) Age	0.020	−0.176***	−0.229***	−0.038	−0.007	0.007	−0.038	0.033	0.156***	0.194***	−0.075	−0.203***	−0.012	1.000				
(15) ROA	−0.138***	0.011	0.033	0.167***	0.113**	−0.113**	0.167***	0.008	−0.161***	−0.100**	0.635***	−0.015	−0.598***	0.001	1.000			
(16) CAPEX	0.004	−0.134***	−0.108**	−0.005	−0.012	0.012	−0.005	0.148***	0.069	0.039	0.092*	−0.036	0.034	0.084*	0.056	1.000		
(17) NWC	0.093*	0.137***	0.119**	−0.058	−0.002	0.002	−0.058	−0.019	0.024	−0.975***	0.500***	0.025	−0.108**	−0.177***	0.077	−0.042	1.000	
(18) Sgrowth	−0.050	−0.008	0.053	0.035	0.038	−0.038	0.035	−0.021	−0.083*	−0.091*	0.205***	0.047	−0.251***	−0.100**	0.273***	−0.052	0.076	1.000

Notes: ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$
Source: Table by authors; *see Appendix for variable definitions*

Table 3.
Results for cash holdings in tourism firms: intellectual capital efficiency, institutional ownership and speed of adjustment

	Cash Holding				Cash Holding1			
	Random effects	Robreg	Random effects	Robreg	Random effects	Robreg	Random effects	Robreg
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Determinants	Determinants	SOA	SOA	Determinants	Determinants	SOA	SOA
VAIC	−0.0161 (0.184)	−0.0396* (0.012)	−0.0157 (0.301)	−0.0214** (0.005)	−0.00939 (0.338)	−0.0160 (0.166)	−0.00901 (0.452)	−0.00502 (0.146)
lcashholding			0.254*** (0.000)	0.507*** (0.000)				
lcashholding1							0.567*** (0.000)	0.775*** (0.000)
InstOwn	0.000228 (0.855)	−0.000104 (0.945)	−0.000159 (0.899)	−0.000280 (0.742)	0.0000631 (0.950)	−0.000218 (0.791)	−0.000216 (0.802)	−0.000397 (0.309)
FirmSize	0.908*** (0.000)	0.860*** (0.000)	0.696*** (0.000)	0.478*** (0.000)	−0.0385 (0.318)	−0.0457 (0.310)	−0.0147 (0.395)	−0.00946 (0.215)
CF	0.0363 (0.854)	−0.582 (0.400)	−0.237 (0.333)	−0.182 (0.426)	−0.0917 (0.563)	−0.386 (0.498)	−0.226 (0.239)	0.163 (0.280)
MTB	0.00645*** (0.001)	0.00447* (0.031)	0.00582* (0.014)	0.00371** (0.008)	0.00163 (0.301)	0.00270 (0.126)	0.00186 (0.311)	0.00127 (0.072)
LOSS	−0.0161 (0.640)	−0.0601 (0.340)	−0.0677 (0.107)	−0.0873* (0.030)	−0.0255 (0.359)	−0.0359 (0.290)	−0.0743* (0.023)	−0.0418* (0.024)
Age	−0.280 (0.052)	−0.263** (0.002)	−0.218** (0.003)	−0.151** (0.003)	−0.191 (0.072)	−0.140** (0.005)	−0.0537 (0.224)	−0.0135 (0.488)
ROA	0.00564 (0.239)	0.00627 (0.649)	0.00448 (0.413)	0.00153 (0.765)	0.00420 (0.275)	0.00435 (0.733)	0.000325 (0.937)	−0.00327 (0.412)
CAPEX	−0.0807 (0.772)	−0.953 (0.297)	−0.457 (0.135)	−0.748* (0.048)	−0.541* (0.016)	−0.509 (0.282)	−0.653** (0.003)	−0.511** (0.006)
NWC	0.0199 (0.142)	0.154 (0.893)	0.0478** (0.004)	0.0556*** (0.000)	0.0177 (0.103)	0.178 (0.827)	0.0297* (0.025)	0.00357 (0.653)
Sgrowth	0.000247 (0.272)	−0.000360 (0.693)	0.000324 (0.252)	0.000285 (0.161)	0.0000187 (0.918)	−0.000313 (0.507)	−0.000219 (0.326)	−0.0000643 (0.454)
Constant	−0.554* (0.041)	−0.356 (0.371)	−0.456** (0.001)	−0.297* (0.024)	0.550** (0.006)	0.486** (0.008)	0.236* (0.010)	0.101 (0.141)
Year	Included	Included	Included	Included	Included	Included	Included	Included
Region	Included	Included	Included	Included	Included	Included	Included	Included
Observations	432	432	431	431	432	432	431	431
R-squared	0.75	0.678	0.823	0.743	0.164	0.137	0.501	0.464
chi2	483.1	1,629.0	1,319.6	4,045.6	46.93	116.1	371.4	1,089.4

Notes: p-values in parentheses *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Refer Appendix for definition of variables
Source: Table by authors

institutional ownership of tourism firms has no significant association with cash holding, which is consistent with the findings for gulf cooperation council (GCC) countries' non-financial firms (Al-Hadi *et al.*, 2020) and lends no support to *H3*. However, the GCC countries reported that the existence of investment committees and their interaction with institutional ownership were positively associated with cash holdings. Whereas, the European countries reported negative association between institutional shareholding and cash holding (Alomran, 2023). The findings of firm size lend support to the pecking order theory that propagates that large firms with more profitability are likely to hold more cash. This is consistent with prior studies that have also reported a similar positive association between firm size and cash holdings (Guizani, 2017; Bagh *et al.*, 2021). The growth opportunities measured through the MTB value ratio are positively associated with cash holding lending support to both trade-off and pecking order theory. The results also show that young tourist firms had higher cash holdings. This result is inconsistent with the findings for China, which reported an insignificant relationship between age and cash holdings (Liu *et al.*, 2021).

Table 3 also presents the relationship between IC efficiency, institutional shareholding, control variables and speed of adjustment. Robust M-estimation is used for the models in columns 4 and 8. The significant and positive coefficient of lagged cash holdings in columns 3 and 4 (lcashholding) and 7 and 8 (lcashholding1) confirm the existence of trade off-theory's postulated target cash holdings that are consistent with prior studies (Gao *et al.*, 2013; Jiang and Lie, 2016; Bugshan *et al.*, 2021). The coefficients of lcashholding and lcashholding1 are 0.507 and 0.775, respectively, as per the Robust M-estimation. This indicates that tourism firms have speeds of adjustment of 49.3% and 22.5%, respectively. Thus, firms seem to reduce the gap between current and optimal cash holdings levels by one-half and about one-fourth in one year using the proxies of Cash holding and Cash holding1, respectively. The speed of adjustment (SOA) is significant for firms with negative IC efficiency and insignificant institutional ownership thereby lending no support to *H2* and *H4*. The SOA is much faster for younger firms, possibly due to financial constraints and precautionary reasons. This result was also reported in China (Lian *et al.*, 2012).

Table 4 presents the random effects and Robust M estimation results for equations (1) and (2). While controlling for outliers, the Robust M estimation results in column 2 suggest capital employed efficiency is significantly and negatively associated with cash holding lending support to *H1*. This suggests that tourism firms with a low level of capital-employed efficiency resort to a higher proportion of liquidity. These models also demonstrate there is no significant association between institutional shareholding and cash holding, thus lending no support to *H3*. This relationship is mediated by the firm size, MTB and age of the firms. The SOA towards optimal cash holding is also confirmed for this model due to the positive and significant coefficient of lagged cash holdings (columns 3, 4, 7, 8) in Table 4. Within a year, the tourist firms show the same speed of adjustments as shown in Table 3.

4.4 Robustness check

4.4.1 Alternative measure of cash holding. As part of the robustness check for the results reported in Tables 3 and 4, we use an alternative measure of cash holding (Cashholding2), which is calculated as the natural logarithm of one plus cash and cash equivalents divided by the difference between total assets and cash and cash equivalents (Marwick *et al.*, 2020; Dittmar *et al.*, 2003). The results for determinants of cash holding are presented in columns 1, 2, 5 and 6 of Table 5. The speed of adjustment for optimal cash holding is presented in columns 3, 4, 7 and 8 of Table 5. All the models are estimated using random effects and Robust M estimation.

Table 4.
Results for cash holdings in tourism firms: human capital efficiency, capital employed efficiency, institutional ownership and speed of adjustment

	Cash Holding				Cash Holding1			
	Random effects (1)	Robreg (2)	Random effects (3)	Robreg (4)	Random effects (5)	Robreg (6)	Random effects (7)	Robreg (8)
Variables	Determinants	Determinants	SOA	SOA	Determinants	Determinants	SOA	SOA
HCE	−0.00198 (0.865)	−0.00286 (0.881)	0.000340 (0.982)	0.00300 (0.854)	−0.0221* (0.019)	−0.0156 (0.596)	−0.0185 (0.114)	−0.00283 (0.806)
CEE	−0.0160 (0.189)	−0.0395* (0.011)	−0.0157 (0.302)	−0.0215** (0.005)	−0.00806 (0.410)	−0.0154 (0.182)	−0.00806 (0.501)	−0.00494 (0.191)
lcashholding			0.253*** (0.000)	0.507*** (0.000)				
lcashholding1							0.561*** (0.000)	0.775*** (0.000)
InstOwn	0.000222 (0.859)	−0.000107 (0.945)	−0.000155 (0.901)	−0.000269 (0.753)	−0.00000947 (0.992)	−0.000224 (0.786)	−0.000277 (0.748)	−0.000402 (0.329)
FirmSize	0.908*** (0.000)	0.860*** (0.000)	0.697*** (0.000)	0.478*** (0.000)	−0.0361 (0.345)	−0.0446 (0.337)	−0.0136 (0.434)	−0.00947 (0.221)
CF	0.0409 (0.837)	−0.586 (0.398)	−0.236 (0.339)	−0.187 (0.419)	−0.0400 (0.802)	−0.372 (0.490)	−0.197 (0.304)	0.163 (0.283)
MTB	0.00642** (0.001)	0.00444* (0.035)	0.00584* (0.014)	0.00376** (0.008)	0.00123 (0.436)	0.00238 (0.201)	0.00150 (0.414)	0.00122 (0.102)
LOSS	−0.0160 (0.642)	−0.0606 (0.344)	−0.0675 (0.109)	−0.0879* (0.032)	−0.0244 (0.377)	−0.0337 (0.315)	−0.0735* (0.024)	−0.0410* (0.033)
Age	−0.281 (0.052)	−0.264** (0.002)	−0.218** (0.003)	−0.151** (0.003)	−0.194 (0.064)	−0.146** (0.006)	−0.0565 (0.202)	−0.0148 (0.478)
ROA	0.00563 (0.241)	0.00644 (0.647)	0.00447 (0.414)	0.00150 (0.771)	0.00410 (0.284)	0.00413 (0.760)	0.000518 (0.899)	−0.00332 (0.416)
CAPEX	−0.0820 (0.769)	−0.955 (0.304)	−0.455 (0.137)	−0.747* (0.049)	−0.553* (0.013)	−0.518 (0.290)	−0.661** (0.003)	−0.514** (0.007)
NWC	0.0197 (0.149)	0.146 (0.901)	0.0477** (0.004)	0.0558*** (0.000)	0.0152 (0.163)	0.178 (0.821)	0.0283* (0.032)	0.00361 (0.652)
Sgrowth	0.000249 (0.269)	−0.000361 (0.695)	0.000324 (0.252)	0.000285 (0.167)	0.0000454 (0.802)	−0.000314 (0.507)	−0.000204 (0.359)	−0.0000658 (0.447)
Constant	−0.569* (0.036)	−0.394 (0.317)	−0.472*** (0.001)	−0.318* (0.015)	0.544** (0.006)	0.482** (0.005)	0.233** (0.010)	0.0984 (0.150)
Year	Included	Included	Included	Included	Included	Included	Included	Included
Region	Included	Included	Included	Included	Included	Included	Included	Included
Observations	432	432	431	431	432	432	431	431
R-squared	0.75	0.679	0.823	0.743	0.167	0.138	0.508	0.465
chi2	482.4	1,517.0	1,311.1	3,462.2	53.10	110.7	370.0	1,048.2

Notes: p-values in parentheses; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Refer Appendix for definition of variables
Source: Table by authors

Table 5. Robustness results for alternative measure of cash holding in tourism firms: intellectual capital efficiency, human capital efficiency, capital employed efficiency, institutional ownership and speed of adjustment

					Cash Holding2			
Variables	Random effects (1) Determinants	Robreg (2) Determinants	Random effects (3) SOA	Robreg (4) SOA	Random effects (5) Determinants	Robreg (6) Determinants	Random effects (7) SOA	Robreg (8) SOA
VAIC	−0.0162 (0.183)	−0.0396* (0.011)	−0.0173 (0.268)	−0.0204*** (0.001)				
HCE					−0.00200 (0.865)	−0.00287 (0.880)	0.00115 (0.940)	−0.00182 (0.925)
CEE					−0.0160 (0.188)	−0.0395* (0.011)	−0.0173 (0.267)	−0.0204*** (0.001)
lcashholding2			0.574*** (0.000)	0.724*** (0.000)			0.570*** (0.000)	0.725*** (0.000)
InstOwn	0.000226 (0.856)	−0.000106 (0.944)	0.000500 (0.655)	−0.00000289 (0.997)	0.000220 (0.861)	−0.000109 (0.943)	0.000500 (0.657)	−0.0000104 (0.988)
FirmSize	−0.0922 (0.073)	−0.140 (0.156)	−0.0608** (0.008)	−0.0409* (0.011)	−0.0921 (0.074)	−0.140 (0.161)	−0.0613** (0.008)	−0.0408* (0.011)
CF	0.0367 (0.852)	−0.581 (0.400)	−0.0345 (0.890)	0.168 (0.468)	0.0413 (0.835)	−0.585 (0.398)	−0.0361 (0.886)	0.169 (0.465)
MTB	0.00645*** (0.001)	0.00447* (0.031)	0.00469* (0.049)	0.00351** (0.003)	0.00642** (0.001)	0.00444* (0.034)	0.00473* (0.049)	0.00347** (0.005)
LOSS	−0.0162 (0.638)	−0.0601 (0.339)	−0.0659 (0.120)	−0.0505 (0.160)	−0.0162 (0.640)	−0.0606 (0.343)	−0.0656 (0.121)	−0.0500 (0.171)
Age	−0.280 (0.052)	−0.263** (0.002)	−0.113 (0.052)	−0.0624 (0.122)	−0.280 (0.052)	−0.264** (0.002)	−0.114 (0.051)	−0.0627 (0.127)
ROA	0.00562 (0.241)	0.00624 (0.650)	0.00133 (0.802)	−0.00327 (0.511)	0.00561 (0.243)	0.00642 (0.648)	0.00135 (0.801)	−0.00327 (0.511)
CAPEX	−0.0802 (0.774)	−0.953 (0.297)	−0.561 (0.051)	−0.602 (0.091)	−0.0814 (0.771)	−0.955 (0.305)	−0.558 (0.053)	−0.605 (0.127)
NWC	0.0198 (0.143)	0.155 (0.892)	0.0266 (0.121)	0.0124 (0.385)	0.0196 (0.150)	0.146 (0.901)	0.0267 (0.121)	0.0123 (0.387)
Sgrowth	0.000247 (0.272)	−0.000359 (0.693)	−0.0000827 (0.775)	−0.0000537 (0.731)	0.000249 (0.269)	−0.000361 (0.695)	−0.0000803 (0.781)	−0.0000539 (0.730)
Constant	−0.554* (0.041)	−0.356 (0.370)	−0.174 (0.139)	−0.0544 (0.651)	−0.569* (0.036)	−0.394 (0.317)	−0.193 (0.095)	−0.0738 (0.538)
Year	Included	Included	Included	Included	Included	Included	Included	Included
Region	Included	Included	Included	Included	Included	Included	Included	Included
Observations	432	432	431	431	432	432	431	431
R-squared	0.238	0.269	0.563	0.547	0.238	0.269	0.562	0.547
chi2	56.61	247.4	468.0	968.4	56.55	231.3	460.5	881.0

Notes: p-values in parentheses; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Refer Appendix for definition of variables
Source: Table by authors

The random effects do not report significant coefficients for VAIC, InstOwn (column 1), HCE and CEE (column 5). The Robust M estimation, however, reports a negative coefficient at 5% significance for VAIC. This suggests that high IC efficiency of tourism firms results in lower cash holdings as an investment in intangibles is higher. This is consistent with the result presented in Table 3 for proxy cash holding. Similarly, capital employed efficiency is negatively associated with Casholding2. The speed of adjustment for optimal cash holding is also confirmed by the significant and positive coefficient of lagged cash holding. This is consistent with the results obtained in Tables 3 and 4. Using Cashholding2 as a proxy for cash holding, the speed of adjustment for firms was 27% (1–0.724) as per the Robust M estimation results.

4.4.2 System generalized methods of moment. This study also uses a two-step system of Generalized Methods of Moment (SGMM) estimation to confirm the robustness of results obtained for random effects and Robust M estimation (Arellano and Bover, 1995; Blundell and Bond, 1998) in Table 6. The system GMM estimation helps to address endogeneity problems that can occur due to measurement errors, omitted variable bias or simultaneity between the independent and dependent variables (Arellano and Bond, 1991). Extant literature on corporate finance has also commonly reported dynamic panel bias due to the correlation between lagged dependent variables and firm-specific fixed effects (Flannery and Hankins, 2013). The lagged values of independent variables are used as instruments. To check the validity of instruments Sargan test and Hansen J test are used for overidentification, whereas AR1 and AR2 tests are for autocorrelation (Dalwai *et al.*, 2021a, Bugshan *et al.*, 2021; Diaw, 2021). AR2 confirms there is no second-order correlation for any of the models in Table 6. The null hypothesis for the Hansen J test could not be rejected for any of the models, thus the exogeneity of the instruments is confirmed.

IC efficiency, its components and institutional shareholding have no significant association with the cash holding in any of the models, thus confirming the results obtained under random effects regression. The speed of adjustment towards optimal capital structure is confirmed for Cashholding1 (columns 2 and 5) and CashHolding2 (columns 3 and 6) due to the significantly lagged cash holding values. These results are similar to those indicated in Tables 3–5. None of the other independent or control variables has a significant association, thereby not providing robustness to the results obtained for them under random effects or robust m estimation.

5. Conclusion

The global financial markets encountered a range of shocks that led to heightened financial volatility due to the pandemic and its corresponding uncertainty. It is noteworthy that the pandemic's influence varied significantly among different nations. Among the various industries comprising a nation's economy, tourism has been observed to experience the most significant negative impacts in the wake of COVID-19. leading to the suboptimal performance of related enterprises. The purpose of this research is to investigate the determinants of cash holdings for listed tourism firms. The present investigation utilizes a sample of 432 firm-year observations from companies listed in the tourism industry. It employs three measures of cash holdings as the dependent variables, along with IC efficiency and institutional ownership as the independent variables, to analyse the data. The financial information used in this investigation was procured from the well-regarded S&P Capital IQ database, encompassing the timeframe from 2015 to 2020. The findings have suggested a high IC efficiency results in reduced cash holdings, thereby lending no support to the precautionary saving theory. Institutional ownership had no impact on the cash holdings of the firms. This suggests that institutional ownership is not able to influence the

Table 6.
System GMM results for cash holdings of tourism firms: intellectual capital efficiency, human capital efficiency, capital employed efficiency, institutional ownership and speed of adjustment

Variables	(1) CashHolding	(2) CashHolding1	(3) CashHolding2	(4) CashHolding	(5) CashHolding1	(6) CashHolding2
lcashholding	0.258 (0.490)			0.258 (0.486)		
lcashholding1		0.370** (0.001)			0.342** (0.003)	
lcashholding2			0.358*** (0.000)			0.329** (0.002)
lvaic	0.00883 (0.822)	0.00284 (0.876)	0.00729 (0.731)			
lhce				0.0126 (0.534)	0.00154 (0.963)	0.00518 (0.895)
lcee				0.0111 (0.768)	0.000542 (0.977)	0.00271 (0.898)
VAIC	0.0161 (0.877)	−0.0442 (0.762)	0.0827 (0.677)			
HCE				−0.00837 (0.887)	0.0216 (0.766)	0.0580 (0.536)
CEE				−0.000148 (0.999)	−0.0566 (0.728)	0.0762 (0.717)
InstOwn	0.00123 (0.838)	−0.00140 (0.669)	−0.00317 (0.367)	0.00102 (0.862)	−0.00210 (0.515)	−0.00330 (0.342)
FirmSize	0.705 (0.356)	−0.384 (0.250)	−0.375 (0.249)	0.690 (0.359)	−0.407 (0.247)	−0.405 (0.245)
CF	−1.815 (0.195)	−1.350 (0.275)	−1.715 (0.290)	−2.030 (0.300)	−2.137 (0.253)	−2.987 (0.184)
MTB	0.00356 (0.418)	0.00693 (0.493)	0.0144 (0.326)	0.00380 (0.501)	0.00728 (0.469)	0.0156 (0.291)
LOSS	0.0143 (0.914)	−0.0126 (0.865)	−0.0302 (0.785)	0.0114 (0.937)	−0.0256 (0.790)	−0.0246 (0.842)
Age	−0.142 (0.671)	0.0476 (0.840)	0.0247 (0.921)	−0.110 (0.774)	−0.0193 (0.947)	0.0552 (0.858)
ROA	0.0243 (0.314)	0.00600 (0.820)	0.00102 (0.979)	0.0251 (0.377)	0.0148 (0.678)	0.0111 (0.800)
CAPEX	−2.318 (0.468)	2.875 (0.486)	3.864 (0.348)	−1.191 (0.756)	4.492 (0.340)	3.777 (0.443)
NWC	0.293 (0.074)	0.203 (0.096)	0.277 (0.061)	0.307 (0.203)	0.259 (0.306)	0.415 (0.115)
Sgrowth	−0.000651 (0.660)	−0.0000434 (0.973)	0.000715 (0.626)	−0.000411 (0.801)	−0.0000762 (0.964)	0.000665 (0.717)
Constant	−0.287 (0.725)	1.054 (0.168)	0.158 (0.836)	−0.309 (0.719)	1.135 (0.154)	0.263 (0.744)
Year	Included	Included	Included	Included	Included	Included
Region	Included	Included	Included	Included	Included	Included
Observations	431	431	431	431	431	431
Instruments	21	21	21	22	22	22
chi2	354.1	40.19	73.63	265.1	38.95	71.73
p	1.08e−67	0.000129	1.71e−10	9.53e−48	0.000651	2.20e−09
AR1	0.063	0.181	0.008	0.243	0.08	0.011
AR2	0.259	0.961	0.495	0.866	0.185	0.309
sargan	1.975	1.576	1.005	1.812	1.412	1.078
sarganp	0.961	0.980	0.995	0.936	0.965	0.982
hansen	3.794	2.089	1.896	3.593	1.871	1.459
hansenp	0.803	0.955	0.965	0.731	0.931	0.962

Notes: p-values in parentheses; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Refer Appendix for definition of variables
Source: Table by authors

decision of tourism firms about cash holdings. Consistent with the pecking order theory, this study finds that large-size firms hold more cash. Younger firms prefer more financial flexibility and thus hold more cash to explore growth opportunities and face risks. The speed of adjustment towards optimal cash holdings is also confirmed, thus indicating managers are quick to remedy the cash shortfall in times of adversity, supporting the TOT. The robustness of results for IC and speed of adjustment is confirmed by the alternative measure of cash holding.

5.1 Practical implications

The results have implications for the financial management strategies of tourism firms, as they may need to re-evaluate their approach to cash holdings to maximize efficiency. The managers need to consider the role of IC efficiency in managing the cash of the firms. Smaller tourism firms may need to consider alternative financing options to meet their cash needs. Younger firms hold more cash to explore growth opportunities and face risks, which could be valuable insight for firms in their early stages. The study also confirms that managers are quick to remedy the cash shortfall in times of adversity, supporting the TOT. This may be useful insight for managers looking to improve their financial resilience in the face of adversity. The findings that institutional ownership has no impact on cash holdings suggest that institutional investors may not be able to influence the financial decision-making of tourism firms. Regulators have to revisit the institutional shareholding patterns and their involvement in the firm's decision-making. The investors and stakeholders can assess the various firm characteristics such as firm size, MTB value and age of the firms that affect the decisions on cash holdings.

5.2 Theoretical implication

The theoretical implications of the findings in this study suggest that the precautionary saving theory may not be applicable to tourism firms with high IC efficiency. This suggests that researchers may need to re-evaluate the applicability of the precautionary saving theory to different types of firms and consider alternative theories that may better explain the relationship between IC efficiency and cash holdings.

Additionally, the results that institutional ownership has no impact on cash holdings lend support to the idea that institutional investors may not play a significant role in the financial decision-making of tourism firms and are consistent with the findings of Al-Hadi *et al.* (2020) and Elyasiani and Movaghari (2022). This could have implications for theories that focus on the role of institutional investors in corporate finance and may require further research to understand the factors that do influence the decision of tourism firms about cash holdings.

The findings on firm size are consistent with the European countries listed companies (Alomran, 2023). It supports the pecking order theory, which finds that large-size firms hold more cash. This could have implications for researchers as they may need to explore other factors that affect cash holdings for smaller tourism firms. The finding that younger firms prefer more financial flexibility and thus hold more cash to explore growth opportunities and face risks could be valuable insight for researchers to investigate the role of firm age in cash holdings. Additionally, the study confirms that managers are quick to remedy the cash shortfall in times of adversity, supporting the TOT. This suggests that researchers may need to investigate the TOT of cash holdings in more detail and explore how different factors, such as IC efficiency, affect the trade-off between cash holdings and other financial decisions. The robustness of results for IC and speed of adjustment is confirmed by the

alternative measure of cash holding, which lends strong support for the findings, and researchers can use the findings to develop theoretical models.

5.3 Limitations and scope for future research

The study suffers from certain limitations which give scope for future research. The association between IC and institutional ownership was examined for a five-year period that also included the one year of COVID-19 effects. It would be useful to examine the pandemic effect on cash holdings using quarterly data for 2020 and 2021. IC efficiency is measured using the quantitative estimation proposed by Pulic (2004). Future studies can include alternative measures of IC using a questionnaire methodology. Only one corporate governance variable was included in the study. Other corporate governance mechanisms, such as the board of directors, audit committees and a broader group of shareholders, may have some effect on the determination of cash holding.

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Appendix

Table A1.
Variables definition

Variable	Acronym	Definition
Cash holding	CashHolding	Natural logarithm of one plus cash and cash equivalents
	CashHolding1	Cash and cash equivalents/(total assets−cash and cash equivalents)
	CashHolding2	Natural logarithm of one plus cash and cash equivalents/ (total assets - cash and cash equivalents)
Intellectual capital	VAIC	VAIC = human capital efficiency (HCE) + structural capital efficiency (SCE) + capital employed efficiency (CEE) where: HCE = value added (VA)/total personnel costs (HC) VA = Net income (NI) + personnel costs (PC) + interest (I) + taxes (T) + depreciation and amortization (D&A) SCE = VA/structural capital (SC), where SC = VA−HC CEE = VA/capital employed (CE)
Institutional ownership	InstOwn	Total percentage of shares held by institutions
Firm size	FirmSize	Natural logarithm of total assets
Cash flow	CF	Operating cash flow divided by total assets
Market to book value ratio	MTB	The ratio of market value of equities and liabilities to book value of assets
Loss	LOSS	If the firm posted a loss in year *t*, equal to 1 and otherwise 0
Firm age	Age	Natural logarithm of firms age
Return on asset	ROA	Net income divided by total assets
Capital expenditure	CAPEX	The ratio of total capital expenditures to total assets
Net working capital	NWC	(Current assets−current liabilities)/net total assets
Sales growth	Sgrowth	Annual change in sales/lagged sales

Source: Table by authors