Does IFRS-9 affect cash holdings? Evidence from non-financial institutions

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Abstract

Purpose – This paper aims to test whether the implementation of IFRS-9 financial instrument affects a firm's cash holdings.

Design/methodology/approach – Consistent with prior studies, this paper uses difference-in-difference estimation on a sample of 37,328-year observations of non-financial listed firms.

Findings – This study finds robust and consistent evidence of an increase in cash holding following the implementation of IFRS 9. The increase in cash holding can be attributed to the increase in bad debt provisions, which have curtailed trade receivables. The results remain similar under different assumptions and firm characteristics.

Originality/value – This study extends the literature on the consequences of IFRS 9 to working capital in non-financial institutions, a less conspicuous area but relevant in the corporate environment.

Keywords Expected credit loss, IFRS- 9, Non-financial firms, Cash holdings, Trade receivables

Paper type Research paper

1. Introduction

Prior studies demonstrate that IFRS decreases a firm's cash holdings because it increases transparency and creditworthiness, which in turn increases a firm's access to external capital (Ozkan *et al.*, 2021). However, the revolutionary nature of impairment recognition in new IFRS-9 – *Financial instruments* is likely to change how IFRS affect working capital, including cash holdings in non-financial institutions (Ernst and Young, 2016; KPMG, 2020b). The forward-looking impairment recognition of IFRS-9 causes high volatility in earnings, and firms may have to change their working capital policies (Deloitte, 2019), including restricting credit sales and buying on a cash basis. However, the forward-looking impairment may also increase transparency and better disclosure, further increasing firm credibility and access to external capital and credit.

Although IFRS-9 is expected to hit financial institutions the hardest, it also affects firms that hold financial instruments, including trade receivables (KPMG, 2020a). The expected credit loss provision is likely to cause large and more volatility in bad debt provisions on trade receivables (KPMG, 2020a). These significant changes in bad debt recognition in its concomitant volatility in earnings imply that firms will have to adopt new strategies and controls on credit sales (KPMG, 2020b). Furthermore, as the credit sales of one firm are likely to be the credit purchases of another firm, changes in one firm's trade receivables policies will affect another firm trade payable. Given that cash and cash equivalent remain central in working capital management, changes in trade receivables and payables will

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trickle down the firm's cash holding (Akgün and Memiş Karataş, 2020; Morshed, 2020). Therefore, in this paper, we examine the effect of IFRS on cash holdings. Arguably, given that the expected credit loss provision increases transparency and causes significant earnings volatility, cash holdings could either increase or decrease post-IFRS-9 implementation.

While IFRS-9 affects the overall working capital management of the firm, we focus on cash holdings for the following reasons. Firstly, the net effect of changes in working capital policies (trade receivables and payables) remains in cash holdings. Cash is the most significant component of working capital management and total assets of a firm (Deb *et al.*, 2017; Kieschnick *et al.*, 2013; La Rocca and Cambrea, 2019; Opler *et al.*, 1999; Seifert and Gonenc, 2016). For instance, Seifert and Gonenc (2016) report that cash holdings are about 17% of firms' total assets across 47 countries. After all, the primary objective of efficient working capital management is to keep the firm liquid. Secondly, existing literature suggests that IFRS adoption is associated with low cash holdings (Ozkan *et al.*, 2021). Hence, we aim to extend this line of argument and test whether implementing a new standard changes this established relationship. Thirdly, the effect of IFRS on trade receivables appears intuitive and obvious without any empirical research. However, the effect on cash holding as a second-order effect provides new insights into the unintended consequences of IFRS-9.

Consistent with prior studies (Albrahimi, 2020; Li *et al.*, 2021), we use the difference in difference (DiD) econometric identification strategy to explore the possible changes in a firm's cash holding post-IFRS implementation. We use a sample of 37,323 non-financial firm-year observations from 24 countries between 2016 and 2019. We classify IFRS-9-adopting countries as the treatment group and non-IFRS-9-adopting countries as the control group. We adopt the near neighbour matching approach to select the control firms against the treatment group.

Our baseline analysis provides evidence that the implementation of IFRS is associated with an increase in cash holding. The results suggest that firms adjusted their working capital policies, mainly trade receivables, to mitigate the large volatility in earnings caused by large bad debt provisions under IFRS-9. Our results are contrary to Ozkan *et al.* (2021) findings that IFRS adoption is associated with a decrease in cash holdings.

Given the relevancy of cash holdings in a firm's operation (Deb *et al.*, 2017; Kieschnick *et al.*, 2013; Opler *et al.*, 1999), there are both internal and external factors that may cause the differences in cash holdings among firms, of which single econometric modelling might not capture all. Therefore, we perform different sensitivity analyses to test the robustness of our results under different assumptions and firm characteristics. Consistent with prior studies, we consider differential impact based on firm size, industry classification and market power. The results remain qualitatively similar to the main finding that cash holdings increase post-IFRS-9 implementation. However, the increase in cash holdings is more pronounced in small firms than in large firms.

In further analyses, we demonstrate that the increase in cash holdings post-IFRS-9 can be attributed to the increase in bad provisions and its concomitant decrease in trade receivables. Despite the increase in cash holdings post-IFRS-9, we did not find any evidence that the changes in cash holdings significantly affect the overall financial performance of the firm. This is probably due to the short sample period of the study.

This paper sheds light on the IFRS-9 on non-financial institutions, the not-so-obvious areas. Although IFRS-9 primarily targets financial institutions, its effect on non-financial institutions cannot be underestimated (Ernst and Young, 2016). As stated by KPMG (2020b), the changes that IFRS-9 brings will require firms to implement new controls for monitoring trade receivables and payables. Consistently, our findings imply that some of the controls may include cutting down credit sales and increasing cash holding.

This paper makes several significant contributions to the existing literature on corporate finance and accounting standards, particularly focusing on the impact of IFRS 9 on cash holdings. Firstly, this paper differs from Ozkan *et al.* (2021), because we look at how a specific standard instead of the whole set of IFRS affects cash holdings. Arguably, each standard is likely to affect a firm's activities differently. Hence, it is unsurprising that we found IFRS-9 to increase cash holdings, contrary to Ozkan *et al.* (2021) findings of a decrease in cash holdings after implementing the whole set of IFRS. By investigating the relationship between IFRS 9 implementation and cash holdings, it addresses a gap in the literature concerning the less conspicuous effects of accounting standards on working capital management.

Secondly, the paper identifies the underlying mechanism driving this increase in cash holdings: a strategic reduction in trade receivables aimed at mitigating bad debt provisions and the resultant earnings volatility. This finding highlights how firms adapt their working capital strategies in response to new accounting standards, offering practical insights for managers on liquidity management under IFRS 9. Thirdly, the study's further analyses reveal that the observed increase in cash holdings post-IFRS 9 is consistent across different firm characteristics, such as market power, size and industry of operations. This broad applicability underscores the pervasive impact of IFRS 9 across various contexts, reinforcing the generalisability of the findings.

Finally, despite the significant increase in cash holdings, the study does not find a notable impact on firm value. This suggests that while firms adjust their liquidity positions in response to IFRS 9, these changes do not necessarily translate into immediate changes in market valuation. This insight is critical for policymakers and standard setters, indicating that while IFRS 9 influences internal financial strategies, its effect on external perceptions of firm value may be more nuanced.

In summary, this paper contributes to our understanding of the indirect effects of accounting standards on corporate behaviour, offers practical implications for liquidity management and provides a comprehensive analysis that can inform both managerial practices and regulatory policies. These insights can facilitate the revision and amendments of the standard.

The paper is structured as follows. In Section 2, we argue why IFRS is likely to increase or decrease cash holdings. The research design is presented in Section 3. Section 4 contains the main results and sensitivity analyses. We perform further analyses in Section 5. Conclusion, policy implications and suggestions for future research are presented in Section 6.

2. Hypothesis development

IFRS-9 introduces a radical change in recognising impairment on financial instruments, including trade receivables. Under IAS-39, the predecessor of IFRS-9, impairment was calculated using the incurred credit losses approach, which captures only past events. That is, impairment losses are recognised only when objective evidence exists that a loss event happened after initial recognition, such as missed contractual payments by a debtor. However, under IFRS-9, provisions are based on the expected loss model in three stages depending on a significant increase in credit risk (Ernst and Young, 2016; KPMG, 2020b). IAS-39 requires that a financial asset, including trade receivables, is impaired if only there is objective evidence resulting from one or more events that occurred after the initial recognition of the asset (Deloitte, 2019). Thus, provisions are made based on the actual or complete certainty of an event that causes impairment under IAS-39, while under IFRS-9, impairment is based on assessing future events. Impairment losses will be pre-emptively

recognised before actual losses occur; thus, the scope of impairment has increased significantly. IAS-39 has been criticised as being backwards, impairing the transparency and credit rating of firms (KPMG, 2020b). IFRS-9, on the other hand, enhances the timely recognition of losses and increases transparency. Existing commentary suggests that earlier recognition of bad debt creates large impairment expenses, which is likely to influence the working capital policies of the firm (Ernst and Young, 2016; KPMG, 2020b). Consequently, there are two potential competing outcomes of earlier impairment recognition.

On the one hand, the implementation of IFRS 9, which requires the early recognition of credit losses, introduces significant volatility in firms' earnings due to substantial changes in bad debt provisions. This volatility can discourage firms from maintaining large trade receivables. For instance, in 2018, GlaxoSmithKline recognised an additional £15m bad debt allowance under the expected credit loss model of IFRS 9, causing a 0.24% variation in its retained earnings (see page 145 of the annual report). This scenario exemplifies how the new accounting standard affects financial reporting and decision-making. Firms may respond to such earnings volatility by focusing on cash sales and expediting the collection of trade receivables, thereby increasing their cash holdings. The precautionary motive theory supports this behaviour, positing that firms hold cash as a safeguard against future uncertainties and financial distress. The precautionary motive theory posits that firms maintain cash reserves as a safeguard against future uncertainties and potential financial distress. This approach is integral to risk management and financial flexibility, especially in volatile and unpredictable environments (Opler *et al.*, 1999). By reducing exposure to volatile trade receivables and enhancing liquidity, firms mitigate the risk of unexpected financial shocks.

The interconnected nature of business-to-business transactions amplifies this effect. The credit sales of one firm constitute the trade payables of another. When one firm discourages credit sales due to IFRS 9-induced volatility, it forces its trade payables, often other firms, to purchase on a cash basis. Consequently, firms that previously relied on credit purchases are likely to increase their cash holdings to adapt to the changed credit terms imposed by their suppliers. This strategic shift aligns with the precautionary motive theory, which emphasises the importance of liquidity in managing financial risk and ensuring operational stability. By holding more cash, firms can navigate the uncertainties introduced by IFRS 9, maintain financial flexibility and mitigate the impact of earnings volatility on their overall financial health.

On the other hand, early recognition of impairment based on expected credit loss (ECL) under IFRS 9 is perceived to increase transparency and earnings quality (Gebhardt, 2016; Giner and Mora, 2019), thereby enhancing the creditworthiness of firms. According to signalling theory, transparent and high-quality financial reporting signals a firm's reliability and stability to investors and creditors (Spence, 1973). Giner and Mora (2019) argue that the ECL model captures detailed information about a firm's creditworthiness, which reduces information asymmetry arising from agency problems, aligning with agency theory (Jensen and Meckling, 1976). Extant literature demonstrates that high creditworthiness is positively associated with better access to capital, reducing the firm's propensity to hold large cash reserves (Opler *et al.*, 1999; Ozkan *et al.*, 2021). This is consistent with the pecking order theory, which posits that firms prefer internal financing but will turn to external sources if they demonstrate high creditworthiness, minimising the need for large cash buffers (Myers and Majluf, 1984).

Furthermore, increased transparency and earnings quality enhance a firm's access to credit. Firms that effectively manage and signal their financial health can secure resources more easily from the external environment (Pfeffer and Salancik, 1978). This reduces the need to hold substantial cash reserves for transactional purposes, as improved credit access provides a reliable alternative (Li *et al.*, 2021; Ozkan *et al.*, 2021). Thus, the shift towards

early impairment recognition under IFRS 9 not only improves the perceived creditworthiness of firms but also aligns with multiple theoretical frameworks explaining corporate financial behaviour. These frameworks highlight how enhanced transparency and reduced information asymmetry foster a more favourable financing environment, thereby decreasing the necessity for large cash holdings.

Following the discussion above, we argue that the implementation of IFRS-9 will significantly impact cash holding. However, given the two competing views, we articulate that IFRS-9 could be associated with increasing or decreasing cash holdings. Therefore, we state a non-directional hypothesis as follows:

H1. The implementation of IFRS-9 is associated with changes in cash holdings.

3. Research methods

3.1 Sample selection

We select our firm-year observations of non-financial firms from 15 IFRS-9 adopting countries and 9 non-IFRS-9 adopting countries. Given the newest of IFRS-9 and in line with prior studies (Albrahimi, 2020; DeFond *et al.*, 2015; Li *et al.*, 2021), we adopt the DID econometric identification strategy. Since IFRS-9 applies only to IFRS-9-adopting countries, we expect its effect to be observed only in those countries. Hence, we classify firms in IFRS-9-adopting countries as treatment firms and non-IFRS-9-adopting countries as control firms. Consistent with prior studies (Albrahimi, 2020; DeFond *et al.*, 2015), we focus on two years before and after the implementation of IFRS-9 so that the pre-adoption period consists of 2016 and 2017, while the post-adoption period consists of 2018 and 2019. Arguably, using a relatively short event window reduces the effect of confounding events such as changes in inflation and interest rate (Defond *et al.*, 2015).

To increase the comparability between the treatment and benchmark sample and in line with (Ahmed *et al.*, 2013; Barth *et al.*, 2012; Li *et al.*, 2021), we match the treatment firms with the control firms based on different variables, including total assets, sales, leverage and lagged of profitability/loss (nearest neighbour) within the same industry. The final sample consists of 37,328 firm-year observations for 9,332 unique firms. See the Appendix for the sample countries. All data was collected from Compustat Fundamentals except for data on provisions, which were hand-collected from the annual report.

3.2 Model specification

Using the DID econometric modelling strategy, we specify our baseline equation as below:

$$Cashholding_{it} = a + \beta_1 Post * IFRS_{it} + \beta_2 Post_{it} + \beta_3 IFRS_{it} + \beta(Controls) + \varepsilon_{it} \quad (1)$$

Consistent with prior studies, we measure *Cash holding* as a ratio of total cash and cash equivalent to total tangible assets (Al-Najjar, 2013; Jebran *et al.*, 2019; Maheshwari and Rao, 2017; Opler *et al.*, 1999; Ozkan *et al.*, 2021; Pinkowitz *et al.*, 2016). *Post* is a dummy variable equal to 1 for the observation year after the implementation of IFRS-9 and 0 otherwise (DeFond *et al.*, 2015; Li *et al.*, 2021). Since IFRS-9 was effective from January 2018, we denote 2016 and 2017 as pre-adoption periods and code them 0. 2018 and 2019 are classified as post-adoption periods and coded as 1. *IFRS-9* is a dummy variable equal to one for all treatment firms and zero for benchmark firms. *Post*IFRS-9* captures the effect of IFRS-9 on trade credit.

We control for factors likely to drive a firm's cash holdings (Al-Najjar, 2013; Jebran *et al.*, 2019; Maheshwari and Rao, 2017; Opler *et al.*, 1999; Ozkan *et al.*, 2021). Opler *et al.* (1999) report a significant difference between small and large firms. Large firms hold less cash due to their easy access to capital and credit. We use the natural logarithm of total assets (*Firm size)* and sales (*Sales)* to control for firm size (*Size)*. As a central part of working capital management, cash holding is significantly influenced by the level of trade credit in the firm (Ozkan *et al.*, 2021). Firms with high trade credit need less cash than firms with low trade credit. Therefore, we include *Trade receivables* and *Trade payables* as control variables. Prior studies suggest that firms with growth opportunities hold large cash for investment. We include *Growth opportunities* measured as percentage changes in total assets (Jebran *et al.*, 2019). High-leverage firms have limited access to capital but need more cash to make regular demand payments on interest and principal amounts (Opler *et al.*, 1999; Ozkan *et al.*, 2021). These payments affect a firm's cash holdings. We use leverage and finance cost to control these factors (*Leverage and Finance cost)*. Following Ozkan *et al.* (2021), we also control firm performance with gross profit (*Profitability)*.

Finally, we control for country-level factors that are likely to influence cash holdings and capture the characteristics of the economy in which the firm operates. Specifically, we include the domestic credit provided by banks to the private sector as the ratio of Gross Domestic Product (*Credit*), the Gross Domestic Product per capita (*GDPCapita*) and the annual rate of growth of GDP (*GDPGrowth*) and real interest rate (*Real interest*). The definition and source of the variables are presented in Table 1.

4. Results and discussion

4.1 Summary statistics

Table 2 presents the summary statistics of the variables used in the analyses. The statistics include the mean, standard deviation, 25th percentile, median and 75th percentile of the

Table 1. Variable description and measurement

Variable name	Measurement
Cash holding	Cash and cash equivalent scaled by total tangible assets
Post	Dummy variable equals one for observation quarters in 2018 and 2019. Zero for observation quarters in 2016 and 2017
IFRS-9	Dummy variable equals one for treatment firms and zero for benchmark firms
Trade receivables	Trade receivable divided by net sales/revenue
Trade payable	Trade payables divided by cost of sales
Growth opportunities	Percentage change in total assets
Sales	Net sales/revenue scaled by total assets
Profitability	Gross profit scaled by net sales/revenue
Finance cost	Total interest expenses scaled by total long term debt
Leverage	Total debt scaled by total assets
Size	Natural logarithm of total assets
Domestic credit (credit)	The sum of financial resources provided to the private sector by financial institutions domiciled in the country as a percentage of GDP
Real interest rate (RIR)	Annualised inflation-adjusted lending rate
GDP growth rate (GDPGrowth)	Annualised GDP growth rate
GDP per capita (GDP capita)	GDP per capita

Source(s): Created by author

Table 2. Summary statistics

Variables	Mean	p25	p50	p95	Sd
Cash holding	0.176	0.039	0.082	0.614	0.191
Trade payables	0.541	0.213	0.412	2.066	2.150
Trade receivables	0.635	0.268	0.404	0.929	3.645
Sales	0.471	0.130	0.237	1.013	0.823
Growth opportunities	0.093	0.005	0.067	0.280	0.837
Leverage	0.367	0.159	0.236	0.830	0.964
Profitability	0.134	0.053	0.172	0.816	3.315
Finance cost	0.083	0.002	0.038	0.110	2.786
Firm size	6.316	3.875	5.669	11.140	7.403
Domestic credit (credit)	79.53	36.87	71.78	90.32	51.47
Real interest rate (RIR)	5.08	2.08	4.46	7.48	8.21
GDP growth rate (GDPGrowth)	3.51	0.91	3.89	6.23	5.12
GDP per capita (GDP capita)	23888.60	19859.32	13097.30	27799.97	39268.60

Note(s): This table presents the summary statistics of the main variables use to examine the relationship between the implementation of IFRS-9 and firms' cash holding. *Cash holding* is a ratio of total cash and cash equivalent to total tangible assets
Source(s): Created by author

variables used in the estimations. The mean of the *Cash holding* is 0.176, indicating that about 18% of the total assets are made up of cash and cash equivalent. This is consistent with Seifert and Gonenc's (2016) findings, who reported 17% across 47 countries. We also observed large holdings in trade credit, as evidenced in the trade payables and receivables, indicating the significance of credit sales to firms. These figures suggest the significance of working capital to firms.

To mitigate multi-collinearity and ensure unbiased results, we use the Pearson correlation matrix, with the results presented in Table 3. As indicated in Table 3, none of the correlation coefficients exceeds the accepted threshold, suggesting multi-collinearity is a significant concern, and all variables are suitable for econometric estimation (Gujarati and Porter, 2008;

Table 3. Correlation matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Cash holdings	1											
2. Sales	0.05	1										
3. Receivables	0.09	−0.03	1									
4. Payables	0.03	−0.01	0.06	1								
5. Growth	0.05	0.26	0.01	0.03	1							
6. Leverage	−0.08	−0.04	−0.01	0.01	0.06	1						
7. Profitability	−0.08	0.02	−0.18	0.01	−0.05	−0.02	1					
8. Finance cost	−0.3	−0.13	−0.05	−0.03	−0.07	0.17	0	1				
9. Firm size	−0.22	−0.14	−0.06	−0.03	−0.17	0.02	0.06	0.83	1			
10. Credit	0.06	0.03	−0.02	0.05	0.26	0.01	0.03	0.71	0.06	1		
11. RIR	−0.03	−0.1	0.04	−0.08	−0.04	−0.01	0.01	0.05	−0.03	0.01	1	
12. GDPgrowth	0.03	−0.07	0.02	−0.08	0.02	−0.18	0.01	0.03	−0.01	0.03	−0.18	1
13. GDP Capita	0.01	−0.17	0.06	−0.08	0.02	−0.18	0.01	−0.05	0.09	0.07	0.02	0.04

Note(s): This table presents the correlation matrix between the variables. *Cash holding* is a ratio of total cash and cash equivalent to total tangible assets
Source(s): Created by author

Tabachnick and Fidell, 2013). The analysis reveals a positive correlation between sales and cash holdings, indicating that firms with higher sales tend to maintain higher cash reserves. Similarly, trade receivables and trade payables exhibit a positive correlation with cash holdings, suggesting that firms managing higher volumes of receivables and payables also hold more cash. In contrast, leverage shows a negative correlation with cash holdings, reflecting the tendency of firms with substantial cash reserves to borrow less. This negative relationship is further supported by the inverse correlation between finance costs and cash holdings, indicating that firms with higher debt capital tend to maintain lower cash reserves. These findings are consistent with the precautionary and pecking order theoretical expectations and provide a robust basis for the subsequent econometric analysis, ensuring the reliability and validity of the results.

4.2 Baseline and robustness

The baseline results are presented in Table 4. To increase the robustness and mitigate the possibility of biased results, we execute the DID estimation approach in different forms. Consistent with Kyiu and Tawiah (2023), we include industry and year effects to control industry and time-invariant unobserved characteristics that may influence cash holdings. We present the baseline results in column 1 of Table 4, where we measure cash holding as the ratio of cash and cash equivalent to tangible assets. The coefficient of the variable of interest *POSTIFRS-9* is positive and highly significant at 1%. The results suggest that the implementation of IFRS-9 is significantly associated with increased cash holdings. Put differently, non-financial firms are likely to hold more cash after implementing IFRS-9 than their counterparts that have not implemented IFRS-9.

To demonstrate that our results are not driven by the measurement of the dependent variable, we replace the dependent variable in equation (1) with a natural log of cash and cash equivalent instead of a cash ratio. This is consistent with prior studies such as (Itzkowitz, 2013; Jebran *et al.*, 2019). The results are presented in column 2 of Table 4. The coefficient of *POSTIFRS-9* remains positive and highly significant at 1%. The results, therefore, confirm our main findings that firms adjust their cash holdings upwards following the implementation of IFRS-9. Furthermore, the results suggest that our findings are not sensitive to the measurement approach of cash holdings.

Arguably, the current level of cash and cash equivalent is dependent on the prior period balance. Therefore, in the final approach of executing equation (1), we consider the effect of the previous year's balance. To do this, we include a one-quarter lag of cash holdings as a control variable in the equation. The results are presented in column 3 of Table 4. The coefficient of *POSTIFRS-9* is positive and highly significant, suggesting that the implementation of IFRS-9 is associated with an increase in cash holdings regardless of the prior period cash and cash equivalent.

Compared with its predecessor IAS 39, IFRS 9 introduces significant changes in the recognition of bad debt provisions and the measurement of trade receivables. Unlike IAS 39, which requires firms to recognise bad debts only after the occurrence of specific events, IFRS 9 mandates the use of forward-looking information to account for potential credit losses (Ernst and Young, 2016; KPMG, 2020b). This shift necessitates that firms adjust their trade receivables for anticipated large bad debt impairments, a requirement that has become even more pertinent in the context of the uncertainties introduced by the COVID-19 pandemic. While IFRS 9 aims to enhance the transparency of financial reporting, these substantial adjustments can introduce unintended earnings volatility. This volatility, resulting from the increased and earlier recognition of bad debt provisions, poses a challenge that management

Table 4. Baseline results

Variables	(1) Cash ratio	(2) Log cash	(3) lagDependent
PostIFRS-9	0.005*** (3.191)	0.130*** (2.921)	0.003** (3.482)
Post	−0.001** (−2.003)	−0.041*** (−2.810)	0.001 (0.245)
IFRS-9	−0.0231*** (−3.034)	−0.023** (−2.130)	−0.005*** (−3.001)
Lag of dependent			0.956*** (47.51)
Sales	−0.010* (−1.723)	−0.047** (−2.136)	−0.004*** (−9.883)
Trade receivables	0.006*** (2.831)	0.014*** (3.738)	0.003*** (2.894)
Trade payables	0.000 (1.524)	0.000 (1.264)	0.000 (0.883)
Growth opportunities	0.007* (1.761)	0.061** (2.264)	0.003*** (3.369)
Leverage	0.005** (2.141)	0.098** (2.581)	0.001** (1.998)
Profitability	−0.001 (−0.783)	−0.011 (−1.259)	−0.000 (−0.740)
Finance cost	−0.022*** (−6.919)	−0.034*** (−9.223)	−0.019 (−0.098)
Firm size	0.013*** (3.261)	1.108*** (34.235)	0.010* (2.087)
Domestic credit (credit)	−0.012* (1.76)	−0.011* (1.65)	−0.009 (1.54)
Real interest rate (RIR)	0.008 (0.98)	0.031 (1.21)	0.036 (1.32)
GDP growth rate	0.001 (1.45)	0.002 1.48)	0.001 (1.38)
GDP per capita	0.046** (1.98)	0.042* (1.86)	0.051 (1.54)
Constant	0.092** (2.371)	−1.715*** (−8.101)	0.085** (2.360)
Industry effect	Yes	Yes	Yes
Year effect	Yes	Yes	Yes
Observations	37,328	37,328	37,328
R-squared	0.344	0.579	0.787

Note(s): This table presents baseline results. *Cash holding* is the ratio of total cash and cash equivalent to total tangible assets. *Log Cash* is the natural logarithm of cash and cash equivalent. In column 3, the dependable variable is the lagged cash ratio. Robust *t*-statistics in parentheses ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$
Source(s): Created by author

must address to maintain financial stability. Consequently, firms have had to implement new strategies and controls on credit sales to manage this risk effectively (KPMG, 2020b).

Compared with its predecessor IAS 39, IFRS-9 is expected to cause significant changes in recognising bad debt provisions and measurement of trade receivables. Under IFRS-9, firms must account for bad debt based on forward-looking information instead of waiting for the actual occurrence of an event, as done in IAS 39 (Ernst and Young, 2016; KPMG, 2020b). That is, the firm needs to adjust trade receivables for large bad debt impairment, especially in the uncertain world we live in now, given the pandemic. Though meant to increase transparency in reporting, these large adjustments could cause unintended volatility, which management needs to mitigate. The significant changes in bad debt recognition in its concomitant volatility in earnings imply that firms will have to adopt new strategies and controls on credit sales (KPMG, 2020b). Our findings, therefore, imply that firms have adjusted their trade credit policy, resulting in an increase in cash holdings.

Our results are consistent with the precautionary motive theory because earnings volatility induced by IFRS 9 amplifies the perceived financial risk, prompting firms to adopt more conservative liquidity management practices. By increasing cash holdings, firms create a buffer against the financial shocks and uncertainties brought about by the new accounting standard. In addition, the interconnected nature of business-to-business transactions amplifies this effect. The credit sales of one firm constitute the trade payables of another. When one firm discourages credit sales due to IFRS 9-induced volatility, it forces its trade payables, often other firms, to purchase on a cash basis. Consequently, firms that previously

relied on credit purchases are likely to increase their cash holdings to adapt to the changed credit terms imposed by their suppliers.

The results of some of the control variables are consistent with the expectations and prior studies. For example, firms with growth opportunities are likely to hold large cash holdings (Jebran *et al.*, 2019). Similarly, high leverage is associated with large cash holdings (Opler *et al.*, 1999). Arguably, leverage firms are less attractive to credit providers; hence they need to hold large cash because they are limited in getting external cash due to their high debt ratio (Denis and Sibilkov, 2010; Opler *et al.*, 1999). Also, leverage reduces a firm's chances of getting goods and services on credit; hence such firms need to hold more cash to buy goods and services on a cash basis. Furthermore, as leverage increases, the firm will feel the threat of bankruptcy, providing more incentive to hold large cash to minimise the risk of financial distress and costly bankruptcy (Guney *et al.*, 2007).

4.3 Robustness – excluding dominating countries

Given that the sample is not equally distributed among the countries, one may argue that our results are driven by the dominance of some countries within the sample. Therefore, to allay these concerns, we perform additional analysis where we exclude firms from Australia, the UK, China and the USA (The exclusion is based on countries with more than 3,000 firm-year observations – see Appendix). The results are presented in column 1 of Table 5. The coefficient of *PostIFRS-9* in column 1 is positive and significant at 5%, confirming our

Table 5. Robustness alternative groups and modelling

Variables	(1) Excluding large sample	(2) Change analyses
PostIFRS-9	0.093** (2.130)	
Post	−0.068** (−2.271)	0.004** (2.185)
IFRS-9	−0.087*** (−3.177)	
Sales	−0.048** (−2.366)	−0.002* (1.77)
Trade receivables	0.011** (2.301)	0.008*** (3.348)
Trade payables	0.000 (1.540)	0.000 (0.976)
Growth opportunities	0.074*** (2.767)	0.001** (2.318)
Leverage	0.111** (2.488)	0.007** (2.624)
Profitability	−0.014 (−1.264)	−0.003 (-0.976)
Finance cost	−0.429*** (−7.160)	−0.018*** (−3.192)
Firm size	1.107*** (5.618)	0.013*** (2.537)
Domestic credit (credit)	−0.006** (2.17)	−0.011* (1.65)
Real interest rate (RIR)	0.009 (0.88)	0.031 (1.21)
GDP growth rate	0.001 (1.45)	0.004 1.48)
GDP per capita	0.046* (1.88)	0.042 (1.06)
Constant	5.813** (2.262)	0.095** (2.421)
Industry effect	Yes	Yes
Year effect	Yes	Yes
Observations	19992	18668
R-squared	0.363	0.492

Note(s): This table presents the results of excluding US firms and change analysis. The dependable variable in column 1 is *Cash holding* measured as the ratio of total cash and cash equivalent to total tangible assets. The dependent variable in column 2 is annual changes in cash holdings. Robust *t*-statistics in parentheses ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Source(s): Created by author

baseline results that the implementation of IFRS 9 is associated with an increase in cash holding.

Next, we use change analysis to examine how cash holdings changed around the implementation of IFRS-9. Chung *et al.* (2010) suggest that change analysis provides a more robust test of causal relations. We estimate a change regression using changes in dependent and independent variables instead of levels. We focus on only IFRS-9 listed firms. The results are presented in column 2 of Table 5. The coefficient of *Post* is positive and significant in the change analysis in column 2, confirming that the increase in cash holdings can be attributed to the implementation of IFRS-9.

4.4 Sensitivity analyses

Although we have controlled for key factors that impact firm cash holding decisions, given the relevancy of cash in business operations, firms use different approaches depending on internal and external factors. Therefore, in this section, we perform additional estimation to check if our finding still holds under different firm characteristics and market conditions.

4.4.1 The effect of firm size. Existing literature indicates that firm size significantly influences the amount of cash a firm holds (Opler *et al.*, 1999). Large firms typically have better access to external capital markets compared to small firms. As a result, large firms are less likely to maintain high cash reserves because they can more easily secure external funding when needed. Conversely, small firms, which often face more stringent credit constraints, tend to hold more cash as a precautionary measure to manage liquidity needs and to mitigate the risks associated with limited access to external capital. To test the sensitivity of cash holdings to firm size, we follow the methodology used in prior studies, such as Li *et al.* (2021), by classifying firms into large and small categories based on their total assets. Firms with total assets above the sample median are categorised as large, while those below the median are classified as small. The results of this classification and subsequent analysis are presented in columns 1 and 2 of Table 6.

The findings reveal that the impact of IFRS 9 on cash holdings is significant for both large and small firms. However, the coefficient for smaller firms is notably larger and highly significant. This suggests that the influence of IFRS 9 is more pronounced in small firms. One reason for this could be that small firms rely more heavily on credit sales compared to their larger counterparts (Fabbri and Klapper, 2016; Klapper *et al.*, 2012). As IFRS 9 imposes stricter requirements on credit sales, small firms might face greater challenges in maintaining their liquidity, prompting them to hold more cash as a precautionary measure.

In addition, smaller firms may find it more difficult to negotiate favourable credit terms with suppliers due to their limited bargaining power. As a result, they may need to hold more cash to ensure they can meet their purchasing needs without relying on credit. In contrast, larger firms, which typically have stronger relationships and greater influence over their suppliers, can still negotiate favourable credit terms even under the constraints imposed by IFRS 9 (Klapper, 2012). This differential impact underscores the importance of considering firm size when analysing the effects of accounting standards like IFRS 9 on corporate cash holdings. Our analysis confirms that the size of a firm plays a critical role in determining its cash-holding behaviour. The implementation of IFRS 9 has a more significant impact on small firms, leading them to increase their cash reserves to manage the heightened risks and uncertainties associated with stricter credit sales regulations. This finding highlights the need for tailored financial strategies and policies that consider the unique challenges faced by small firms in the evolving regulatory landscape.

4.4.2 Industry classification. Although the inclusion of industry dummies in the estimation model accounted for the variation in cash holdings by different industries, it is still

Table 6. Sensitivity analyses

	Firm size		Industrial analyses			Market power	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables	Large firms	Small firms	Manufacturing SIC 2000–3999	Services SIC 7000–8900	Others SIC 1000,4000–5900	High power	Low power
PostIFRS-9	0.009***	0.006**	0.032***	0.026***	0.011**	0.009*	0.026**
	(2.815)	(2.510)	(3.173)	(3.047)	(2.392)	(2.451)	(2.364)
Post	−0.008	−0.009	−0.029*	−0.023	−0.019	−0.011	−0.039
	(−1.213)	(−1.314)	(−1.900)	(−1.353)	(−0.983)	(−0.951)	(−1.641)
IFRS-9	−0.043***	−0.037**	−0.046**	−0.072***	0.004**	−0.076**	−0.006**
	(−3.356)	(−2.296)	(−2.710)	(−3.625)	(2.401)	(−2.323)	(−2.034)
Constant	0.119*	0.097**	0.145***	0.135***	−0.017**	0.112*	−0.049**
	(1.796)	(2.073)	(2.674)	(2.590)	(−2.146)	(1.837)	(−2.348)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes				Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.238	0.187	0.152	0.139	0.147	0.162	0.183

Note(s): This table presents the results of sensitivity analysis based on firm size, industry and market power. The depend variable in is *Cash holding* measured as the ratio of total cash and cash equivalent to total tangible assets. Robust *t*-statistics in parentheses ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Source(s): Created by author

possible that the differential cash needs by specific industries may bias our results (Lyandres and Palazzo, 2016). For example, a service industry may require more cash to pay expenses when it occurs. However, the manufacturing industry could get more supplies on credit, making it less cash-dependent. Furthermore, our sample distribution is dominated by a few industries. Therefore, to allay the concern of industrial effect on the results, we use the SIC industry classification to group firms. As presented in columns 3–5 of Table 6, the results show that the increase in cash holdings post-IFRS-9 implementation is qualitatively similar across different industries.

4.4.3 Market power. Arguably, the amount of power a firm has in the market drives many of its decisions, including working capital policy and cash (Love and Zaidi, 2010). A firm with high market power is perceived to have creditworthiness. This perceived creditworthiness gives them access to external capital and large credit supplies. Hence, the cash holding could be less than firms with low market power. These varying characteristics between high and low-power market firms suggest that our findings of an increase in cash holdings post-IFRS-9 implementation may be sensitive to the market power of the firm. Therefore, we re-run separate econometric estimations for high and low-power market firms. Following prior studies (Dass *et al.*, 2015; Gonçalves *et al.*, 2018; Jory *et al.*, 2020), we classify firms based on the average gross profit margin. High market power firms have a gross profit margin greater than the sample median. All other firms are classified as having low market power. The results are presented in columns 6 and 7 of Table 6. The coefficient of *PostIFRS* remains positive and significant for both groups suggesting that cash holdings increase post-IFRS-9 regardless of the market power a firm is holding.

5. Further analyses

5.1 Channel analysis

To demonstrate how IFRS-9 affects cash holdings, we perform further analyses to identify the possible channels through which IFRS may drive changes in cash holdings. The significant impact of IFRS-9 on non-financial firms is the changes in recognition and measurement of trade receivables and bad debt provisions. Therefore, we begin the channel analyses by examining the relationship between bad debt provisions [1] and trade receivables. Given the inadequate disclosure of the provision in databases, we hand-collected annual data on bad provisions for 400 [2] (200 each for treatment and benchmark) to examine whether the reduction in trade receivables is due to an increase in large provisions. The sample covers four years of annual data between 2016 and 2019. 2016 and 2017 are designated as pre-adoption years and coded as 0, while 2018 and 2019 represent post-adoption years coded as 1. *Provision* is scaled by sales. The results are presented in column 1 of Table 7. As expected, the increase in bad debt provision in post-IFRS-9 caused a decline in trade receivables.

Having established that IFRS-9 reduces trade receivables, we move on to test whether the reduction in trade receivables significantly affects the changes in cash holdings post-IFRS-9 implementation. The results are presented in column 2 of Table 7. The interaction term *Post*IFRS*Receivables* is positive and significant, suggesting that the increase in cash holding post-IFRS-9 can be attributed to changes in trade receivables.

5.2 Value relevance of IFRS-9 increasing cash holding

This section examines whether the increase in cash holdings and post-IFRS-9 implementation affect the firm's financial performance. Consistent with the argument

Table 7. Further analyses

	Channel analyses		Performance
	(1)	(2)	(3)
Variables	Receivables	Cash ratio	Net profit margin
Post*IFRS-9*Provision	−2.21*** (−4.123)		
Post*Provision	0.963** (2.076)		
IFRS-9*Provision	1.030** (1.99)		
Post*IFRS-9*Receivables		0.003** (2.192)	
Post*Receivables		−0.005** (−2.519)	
IFRS-9*Receivables		0.086 (1.63)	
Post*IFRS-9*Cash			0.052 (0.927)
Post*Cash			0.161 (1.236)
IFRS-9*Cash			0.004* (1.861)
Cash			−2.015* (−1.765)
Post*IFRS-9	−0.177*** (−6.073)	0.013 (0.618)	−0.736* (−1.732)
Post	0.0028*** (3.020)	−0.001 (−0.501)	0.900 (1.251)
IFRS-9	−0.011 (−0.563)	−0.032*** (−3.239)	−0.295 (−1.055)
Provision	−0.049*** (−3.604)		
Constant	−2.837** (−2.422)	0.083 (1.186)	5.148 (1.346)
Control	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes
Year effect	Yes	Yes	Yes
Observations	1,600	1,600	37,328
R-squared	0.407	0.152	0.077

Note(s): This table presents the results of channel analyses and the value relevance of the effect IFRS 9 on cash holding. The dependent variable in column 1 is Trade receivable is ratio of total trade receivable to net sales. The dependent variable in column 2 is *Cash holding* measured as the ratio of total cash and cash equivalent to total tangible assets. The dependent variable in column 3 is *Net profit margin* measured as net profit before tax divided by net sales. *Provision* captures impairment on only trade receivables. Robust *t*-statistics in parentheses ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$
Source(s): Created by author

that IFRS-9 largely affect credit sales, we measure firm performance by the net profit margin. Holding more cash means a firm can buy supplies in cash, obtaining a cash discount which increases profit. Similarly, decreasing credit sales suggests that firms have quality sales and low losses. However, a decrease in credit sales can cause a significant decrease in sales volumes. In the midst of these competing effects, the increase in cash holding post-IFRS-9 may not significantly affect firm performance. This is because low-volume sales may offset the discount from purchases. Therefore, we expect the results to go either way or stay neutral. To test this argument, we generate a three-way interaction term between Cash holdings, Post and IFRS-9 (*Cash*Post*IFRS*). The results are presented in column 3 of Table 6. The coefficient of the interaction is negative but insignificant. The result implies that the increase in cash holdings has not translated into firm financial performance. This is unsurprising, given that IFRS-9 is recent and our sample period is relatively short.

6. Conclusion

IFRS-9 has brought many changes in how firms measure and classify financial instruments. The most significant among these changes is the shift from incurred credit losses to expected credit losses as the new approach for impairment (Deloitte, 2019;

Ernst and Young, 2016; KPMG, 2020a;b). Although these changes significantly affect financial institutions, all firms, including non-financial institutions that hold financial instruments such as trade receivables, are also affected by the new impairment requirement. The new impairment requirement is expected to change how firms manage and controls their working capital (KPMG, 2020). Given the importance of cash holdings within the working capital portfolio, we investigate whether the implementation of IFRS-9 has affected cash holding.

To do this, we used DID econometric estimation on a sample of 37,328-year observations of non-financial listed firms from 24 countries. We classified listed firms from IFRS-9 adopting countries as the treatment group and non-IFRS-9 as the control group. We find robust evidence of an increase in cash holdings after the implementation of IFRS-9. We demonstrate that the increase in cash holdings is due to a decrease in trade receivables to cut down bad debt provisions and its effect on earnings volatility. In further analyses, we find that the increase in cash holdings post-IFRS-9 is consistent and broadly independent of the firm's market power, size and industry of operations. However, we did not find a significant firm-value implication of the increase in cash holdings post-IFRS-9 implementation.

Our findings have significant implications for both corporate managers and regulators. The observed changes in cash holdings post-IFRS 9 implementation underscore that accounting standards impact not only financial reporting and disclosures but also extend to less obvious areas such as working capital management. This highlights the far-reaching effects of regulatory changes on corporate behaviour and financial strategies. For corporate managers, the increased cash holdings necessitate a revaluation of liquidity management practices. Managers must ensure that their firms maintain adequate cash reserves to mitigate the volatility introduced by IFRS 9. This may involve revising credit policies, accelerating receivables collection and prioritising cash sales over credit sales to enhance liquidity. In addition, managers should invest in robust credit risk assessment tools to better forecast and manage potential credit losses. This proactive approach will help in maintaining financial stability and investor confidence amidst the new accounting landscape.

For regulators and standard setters, our findings provide critical first-hand evidence on the broader impacts of IFRS 9, particularly on non-financial institutions − a sector that has received relatively little attention in this context. Regulators should consider these impacts when evaluating the effectiveness and unintended consequences of IFRS 9. It is essential to continuously monitor and assess the standard's implementation to ensure it achieves its intended objectives without imposing undue burdens on firms.

Given that IFRS-9 is a very recent standard, some of the actions by firms that may have led to an increase in cash holdings may be driven by the novelty effect and is likely to wear off in the long term. Although our sample period and firm selection are consistent with prior studies (Li *et al.*, 2021; Defond *et al.*, 2015), the relatively short period limits the generalisation of the findings. Future research could provide more inferences by using large sample firms and long periods when data becomes available.

Notes

1. The bad debt provisions captures provisions only on trade receivables
2. Our data is limited to few firms because, not all firms explicitly disclose provision or impairment on trade receivables.

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Appendix

Table A1. Sample selection

IFRS 9 country	Obs	Non-IFRS 9 country (Obs)	
Australia	3,600	Brazil	1,220
Belgium	340	China	4,464
Denmark	480	India	2,964
Finland	528	Indonesia	1,068
France	1,892	Japan	1,992
Germany	1,984	Malaysia	984
Greece	580	Mexico	372
Italy	484	Thailand	828
Netherlands	260	United States	4,768
Norway	320		
South Africa	756		
Spain	532		
Sweden	1,800		
Switzerland	608		
United Kingdom	4,504		
	18,668		18,660

Note(s): This Appendix presents the sample selection procedure for the study. Due to the relative short window of the study, firms with missing data for any year were dropped. Non-financial firms were selected based on their SIC code available in Compustat at the time of downloading the data
Source(s): Created by author

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