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The real implications of mimicking peer firms' cash holdings

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Abstract

Purpose – This study empirically examines the nonlinear effects of mimicking peer firms' cash holdings on shareholder value, with consideration of macroeconomic conditions.

Design/methodology/approach – An instrumental variable approach for nonlinear models is estimated for a large sample of US firms over the period 1991–2019. This approach addresses the reflection problem in examining peer effects, whereby it is impossible to separate the individual's effects on the group, or vice versa, if both are simultaneously determined.

Findings – The authors find an inverted U-shaped association between shareholder value and mimicking intensity of peer firms' cash holdings. This result suggests that mimicking peer firms' cash holdings is subject to diminishing returns. It is more beneficial at lower levels of mimicking intensity but less so or suboptimal at higher levels. Further evidence indicates that this inverted U-shaped shareholder value-mimicking intensity nexus is asymmetric. Specifically, it is salient for decreases relative to increases in cash holdings and, more importantly, in good relative to bad macroeconomic states. The findings are robust to several concerns and have important implications for liquidity management policies.

Originality/value – The authors provide new empirical evidence of the nonlinear effects of mimicking peer firms' cash holdings on shareholder value, which varies with macroeconomic conditions.

Keywords Mimicking, Cash holdings, Firm value, Diminishing returns, Macroeconomic conditions

Paper type Research paper

1. Introduction

Recent studies report evidence suggesting that peer firms, in addition to firm-specific and macroeconomic factors, significantly influence corporate financing and investment policies.

JEL Classification — G20, G30, G32

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Data availability: The data that support the empirical findings of this study are available from *Thomson Reuters Datastream*. Restrictions may apply to the availability of this data, which was used under license.

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For example, Leary and Roberts (2014) find that a firm in the US, on average, increases debt by 5% in response to a one standard deviation increase in peer firms' debt. Similar significant responses to peer firms' capital structure have been reported by Bernard *et al.* (2020), Fairhurst and Nam (2018), Francis *et al.* (2016), Kalda (2020), Lee *et al.* (2017) and Liu *et al.* (2022) [1]. While this growing strand of research suggests that managers engage in industrial peer benchmarking or mimic their peers' financing policies, it is not clear whether, and if so, how such imitative strategies affect shareholder value.

We address the aforementioned research gap by empirically examining the implications of mimicking or peer benchmarking in cash holdings on shareholder value. Our study is premised on two contrasting predictions. On the one hand, mimicking the financing or investment policies of peer firms is beneficial, as it reduces information search costs and the likelihood of making poor decisions while enhancing a firm's competitive product market position (see Fairhurst and Nam, 2018; Gyimah *et al.*, 2020). On the other hand, mimicking peer firms could result in suboptimal policies as managers might overlook their firm's fundamentals or mistake noisy changes in policies of peer firms for credible market signals (Kaustia and Knüpfer, 2012; Machokoto *et al.*, 2021b). In addition, the long-term sustainability of imitative strategies on innovation and market entry is debated in strategic management literature (see Doha *et al.*, 2018; Lee and Tang, 2018; Posen and Martignoni, 2018). It is therefore not *a priori* clear whether mimicking is beneficial or not considering the aforementioned contrasting predictions.

Given the contrasting predictions and the reported marked increase in corporate cash holdings, we examine the implications of mimicking peer firms' cash holdings on shareholder value [2]. Using a large sample of 4,667 US-listed, non-financial and non-utility firms (55,314 firm-year observations) over the period 1991–2019, we find robust empirical evidence consistent with our conjectures. Specifically, we find that mimicking peer firms' cash holdings increases shareholder value up to a threshold, then decreases thereafter with further increases in mimicking intensity. This finding suggests that mimicking is not a suboptimal strategy *per se* as it reduces information search costs and the likelihood of making poor decisions while enhancing the firm's competitive product market position.

Our further empirical analyses suggest that over-reliance on peer firms as a source of information for optimising a firm's cash holdings policies might be detrimental to firm value for two reasons. First, by closely following peer firms' liquidity management policies, managers may overlook a firm's competitive strengths that are critical for survival and growth. Second, synonymous with herding behaviour in market microstructure (see Guo *et al.*, 2020; Menkhoff *et al.*, 2006; Wu *et al.*, 2020), managers might mistake noisy changes or adjustments in peer firms' liquidity management policies for a credible market signal, especially during periods of high uncertainty such as economic downturns. For these two reasons, we contend that mimicking peer firms' liquidity management policies, as shown by our findings, may result in firms adopting policies that are not in sync with their competitive advantages. The nonlinear effects of mimicking peer firms' cash holdings that we document have several important implications for liquidity management. Overall, our results are robust to alternative variable definitions, peer reference groups, estimation techniques and subsamples.

This study contributes to several strands of the literature in corporate finance and strategic management. First, we provide further corroborative evidence to the growing body of research exploring peer effects or mimicking behaviour on corporate decisions (Adhikari and Agrawal, 2018; Grennan, 2019; Leary and Roberts, 2014). A few studies have explored the implications of mimicking peer firms on capital structure (Fairhurst and Nam, 2018), innovation (Machokoto *et al.*, 2021b), corporate social responsibility (Li and Wang, 2022), initial public offerings (Aghamolla and Thakor, 2022), disclosure (Ajirloo and Switzer, 2022; Wang *et al.*, 2023) and trade credit (Gyimah *et al.*, 2020). Our study extends this line of inquiry

by exploring the implications of mimicking peer firms' cash holdings, which have surged significantly over the past few decades (see Andrén and Jankensgård, 2015; Bates *et al.*, 2018). Second, our study is related to the strategic management literature, which explores whether it pays to mimic or innovate (see Doha *et al.*, 2018; Gentry *et al.*, 2013; Lee and Tang, 2018). However, these studies are inconclusive. Our framework departs from the studies mentioned earlier by examining the nonlinear effects of mimicking on shareholder value. In doing so, we find a significant nonmonotonic association between shareholder value and mimicking intensity in cash holdings, which may explain the mixed results from extant studies using linear models (see Gentry *et al.*, 2013; Lee and Tang, 2018; Machokoto *et al.*, 2021a). Third, our study considers the relatively understudied circumstances under which mimicking behaviour enhances or impair shareholder value. Understanding such circumstances has several practical implications as liquidity management policies are becoming increasingly fundamental to a firm's success (see Bates *et al.*, 2018; He and Wintoki, 2016), especially with the transition from physical capital to intangible capital (technology and service sectors) (see Buera and Kaboski, 2012; Machokoto *et al.*, 2021a), mostly funded from internal sources.

Finally, it is worth noting that our study has several similarities with the previous work of Machokoto *et al.* (2021a), which documented the significant positive influence of peer firms on cash holdings. However, our study differs in three ways. Firstly, we examine the implications of mimicking peer firms' cash holdings on firm value rather than peer effects *per se*, as in Machokoto *et al.* (2021a). This allows us to extend their work to encompass aspects of whether mimicking is optimal or not. Secondly, we examine the nonlinear effects of mimicking peer firms' cash holdings on firm value, which expands the linear framework used in the previous study (Machokoto *et al.*, 2021a). By exploring nonlinear effects, we can investigate whether the benefits of mimicking vary with the extent or intensity of mimicking. This part of our analysis addresses recent calls to relax the functional form of relationships in corporate finance as a way of reconciling mixed findings (see Baltagi and Li, 2002; Borri *et al.*, 2022; Farah *et al.*, 2021; Kadzima and Machokoto, 2023; McGuinness *et al.*, 2017). Lastly, we compare the impact of mimicking cash holdings on firm value in good versus bad macroeconomic states to determine when it is optimal. This aspect was not explored by Machokoto *et al.* (2021a), yet it is critical to our understanding of the implications of mimicking and might help reconcile the mixed predictions on whether and when mimicking is beneficial or not.

The following sections discuss the underlying theory, hypothesis, dataset, models, instruments, findings, robustness tests and conclusions.

2. Theoretical development and hypotheses

The extant literature provides conflicting evidence on the effects of mimicking behaviour on shareholder value. The conflicting hypotheses advanced are that mimicking behaviour positively or negatively affects shareholder value.

2.1 The positive effect of mimicking behaviour on shareholder value

Mimicking reduces information search costs and enables managers to make informed decisions by incorporating strategies of their rivals (Gyimah *et al.*, 2020; Lieberman and Asaba, 2006). This first view is premised on learning-based theories, which posit that firms mimic to learn new information from their peers and in the process reduce information search costs and the likelihood of making poor decisions that may destroy shareholder value (Lieberman and Asaba, 2006; Maté-Sánchez-Val *et al.*, 2017). In the latter case, less experienced managers or rookies can make more informed decisions by closely aligning their policies with those of seasoned or more experienced counterparts (Francis *et al.*, 2016). In

addition, mimicking for learning-based motives is more salient when uncertainty is high (Lee *et al.*, 2017) and managers are unsure about the prospects within their industry (Gyimah *et al.*, 2020; Machokoto *et al.*, 2021b). Similarly, weaker firms may mimic their peers' financial policies to blend or disguise themselves, thereby reducing takeover threats (see Francis *et al.*, 2016).

At the same time, rivalry-based theories of mimicking posit that firms mimic to reduce competitive pressures and enhance their product market positions (Bolton and Scharfstein, 1990; Lieberman and Asaba, 2006; Machokoto *et al.*, 2021b). In the case of cash holdings, which are a more convenient internal source of capital and hedge against contractions in credit supply (Chen *et al.*, 2019), mimicking peer firms neutralises competitive aggressiveness. Hoarding cash also enhances financial flexibility or the ability to fund future investments from internal sources (Chipeta *et al.*, 2021). These critical roles of cash have recently been emphasised in the literature against a backdrop of the surge in corporate cash holdings, especially as economies transition from tangible (physical) to intangible capital, primarily financed from internal sources [3]. In addition, by mimicking peer firms' cash holdings, a firm with lower comparative advantages in gathering information or market insights can gain a competitive edge and identify investment opportunities they would otherwise not have recognised (Chen *et al.*, 2019). Taken together, this discussion suggests that mimicking cash holdings has a positive effect on shareholder value as it reduces information search costs, reduces the likelihood of making poor decisions, improves a firm's reputation/competitive position and enhances financial flexibility.

2.2 The negative effect of mimicking behaviour on shareholder value

A second view is that mimicking might lead to suboptimal decisions as managers may overlook their firm's competitive advantages or mistake noisy changes in peer firms' policies for actionable market insights (Gyimah *et al.*, 2020; Kaustia and Rantala, 2015). According to Cudd *et al.* (2006), mimicking is beneficial only when mimickers can rationally evaluate the actions of their peers and imitate those actions that apply the same decision criteria and are in line with a firm's competitive advantages. Otherwise, little or no benefit is derived from mimicking because managers may process information from peer firms in a biased manner, especially if they cannot correctly interpret their decisions (see Kaustia and Rantala, 2015). Further, investors may lose confidence in the firm and its ability to innovate and grow if they become aware of management's over-reliance on imitative strategies (Lee *et al.*, 2017). Firms also find it challenging to manage the often conflicting innovative and imitative strategies, that is, reducing costs through mimicking successful peers' while simultaneously investing in risky innovation (Arvanitis and Seliger, 2014; Lee *et al.*, 2017; Luo *et al.*, 2011). Hence, mimicking may signal a lack of innovative ideas and low future growth, negatively affecting the shareholder value.

Following the rivalry-based theories, firms may feel compelled to follow their peers to avoid the risk of insolvency and takeover (see Brown *et al.*, 2009; Delios *et al.*, 2008). Weaker firms may end up mimicking industry leaders without paying attention to their fundamentals (Fairhurst and Nam, 2018), resulting in decisions that inadvertently destroy shareholder value. For example, a weaker firm might succumb to imitation (Kaustia and Rantala, 2015) and end up holding, in our case, cash balances that diverge significantly from those that are optimal or in line with its fundamentals (Kim *et al.*, 1998; Nason and Patel, 2016). Such divergence increases the opportunity costs of holding cash as managers pass up value-enhancing investment opportunities (Chipeta *et al.*, 2021) or expose firms to bankruptcy, especially when the supply of credit contracts and the firm has excessively low cash reserves (Cui *et al.*, 2018). Furthermore, excess cash reserves are associated with agency problems (see Opler *et al.*, 1999) and can raise external concerns about the firm's financial policies, especially

if a firm diverges significantly from the optimal cash holding levels (Derouiche *et al.*, 2014). Therefore, we conjecture that over-mimicking peer firms' cash holdings may negatively impact shareholder value.

2.3 The impact of mimicking on shareholder value varies with economic conditions

The impact of macroeconomic conditions on corporate decisions is well documented in literature (see Chen and Manso, 2017; Cook and Tang, 2010; Hackbarth *et al.*, 2006; Lee *et al.*, 2018; Levy and Hennessy, 2007). Further, several studies show that in periods of high macroeconomic uncertainty, firms herd in an attempt to hedge against shocks and behave idiosyncratically (diverge) during periods of stability (Baum *et al.*, 2006, 2008). Notwithstanding the contributions of the studies mentioned before, to date, no study has examined how changes in macroeconomic conditions affect the association between mimicking behaviour and shareholder value. We conjecture that such changes in macroeconomic conditions might positively or negatively impact the shareholder value mimicking nexus for the following reasons.

On the one hand, mimicking is beneficial as it improves a firm's competitive product market position and enables it to reduce information search costs and the likelihood of making poor decisions, especially during periods characterised by high macroeconomic uncertainty (Doha *et al.*, 2018; Gentry *et al.*, 2013). In the case of cash holdings, mimicking peer firms' policies particularly increases in cash reserves, enhances shareholder value as it increases financial flexibility and immunises against shocks in credit supply (Gupta and Bedi, 2020). This is in line with several studies documenting an increase in the value of cash under uncertainty. Such an increase in the value of cash is driven by rises in interest rates and more stringent debt covenants implemented by lenders in response to high macroeconomic uncertainty (see Machokoto *et al.*, 2020a; Ojah and Pillay, 2009). Therefore, mimicking peer firms' cash holdings, especially during economic downturns, increases or preserves shareholder value.

On the other hand, mimicking peer firms' policies when macroeconomic uncertainty increases may destroy shareholder value for several reasons. This arises as information from peer firms becomes noisier and unreliable as panic sets in with deterioration in macroeconomic conditions (Calomiris and Carlson, 2017). In this case, firms may seek to align their policies with those of their peers to reduce the risk of making poor decisions (Caglayan and Xu, 2014). However, it is crucial for managers not to be distracted and to be more focused on the fundamentals of their firms, as they become more critical for survival when uncertainty is high (Machokoto *et al.*, 2021a). Bigelli and SánchezVidal (2012), Cook and Tang (2010) and Korajczyk and Levy (2003) have also shown that economic downturns reduce financing flexibility in a way that most firms diverge from the optimal policies. In such a case, mimicking peer firms which are themselves likely constrained by the lack of access to finance, might result in policies that are not aligned with the fundamentals of the focal firm. At the same time, mimicking, which tends to increase with macroeconomic uncertainty (Caglayan and Xu, 2016a), impair shareholder value as it makes firms appear more homogeneous and reduces the benefits of diversification within an industry (see Anjos and Fracassi, 2018; Fracassi, 2017). Given the aforementioned discussion, economic uncertainty can either weaken or strengthen the nexus between mimicking peer firms' cash holdings and shareholder value.

3. Methodology and data

3.1 Methodology

To empirically examine the effect of mimicking peer firms' cash holdings on firm value, we estimate the following nonlinear model [4]:

$$y_{ijt} = \alpha + \beta_1 \overline{CASH}_{-ijt} + \beta_2 \overline{CASH}^2_{-ijt} + \theta X_{ijt-1} + \eta_j + \eta_t + \xi_{ijt} \quad (1)$$

where i, j and t index for firm, industry and year, respectively. y_{ijt} is firm value, α is a constant, β_1, β_2 and θ are the coefficients to be estimated, $\overline{CASH}_{-ijt}$ is the peer firms' average cash holdings excluding the focal firm i (where the industry is defined based on the Industry Classification Benchmark Sub-Sector Code (ICBSC)), X is vector of lagged control variables explained later, η_j and η_t are industry and year fixed effects, respectively, and ξ_{ijt} is an error term [5]. The set of lagged control variables in vector X are size (Size), the dummy for R&D (RDD), short-term debt (STDA), long-term debt (LTDA), asset turnover (SALESTA), firm age (AGE), capital expenditure (CAPEX), the dummy for dividend payers (DIVD) and idiosyncratic stock risk (*ERisk*). Our choice of control variables is informed by the extant literature (see Benmelech *et al.*, 2021; Machokoto *et al.*, 2021c; Fauver *et al.*, 2017, 2018).

Studies on peer effects first address the reflection problem, a form of endogeneity that makes it challenging to disentangle peer effects from the impact of an individual group member on peer group members (reverse causality) if both are determined simultaneously (see Manski, 1993). To address the reflection problem in our case, we estimate Equation (1) *via* two-stage least squares (2SLS) and use peer firms' idiosyncratic stock risk ($\overline{ERisk}$) to instrument for endogenous peer firms' average cash holdings ($\overline{CASH}$). This approach is in line with the literature examining peer effects in capital structure (see Francis *et al.*, 2016; Gyimah *et al.*, 2020; Leary and Roberts, 2014). Appendix 1 presents a detailed discussion of the construction of the instrument along with the variable definitions and relevant summary statistics.

For our instrument, peer firms' idiosyncratic stock risk ($\overline{ERisk}$), to be valid, needs to satisfy two conditions: the relevance criterion and the exclusion restriction. The relevance criterion is met when there is a strong correlation between the instrument and the average cash holdings of peer firms ($\overline{CASH}$), which is the endogenous variable in our case. This condition is met, as previous studies have established a strong association between stock returns and cash holdings (see Jensen, 2022; Jones *et al.*, 2022; Palazzo, 2012; Simutin, 2010). Additionally, the first-stage F-statistic, which is untabulated, is greater than Staiger and Stock's (1997) rule of thumb of 10 in all our 2SLS regressions, further validating our instrument. It is noteworthy that our instrument, that is, peer firms' idiosyncratic stock risk ($\overline{ERisk}$), positively predicts the endogenous average cash holdings of peer firms (with a high correlation of 0.3385).

To satisfy the second condition, the exclusion restriction, our instrument must not directly impact the outcome variable. Although this condition cannot be directly tested in our case of an exactly identified model, we contend that our instrument satisfies this condition for three reasons. First, the idiosyncratic stock risk used to construct our instrument is calculated using a capital asset pricing model, which is augmented with excess industrial stock return factors. This ensures that the components of stock returns that are common to the focal firm's market and industry are eliminated, making our instrument orthogonal to common market and industry risks. Second, the peer firms' idiosyncratic stock risk is constructed by taking the average of all firms within an industry-country-year, excluding the i^{th} observation for the focal firms. This ensures that the component directly relating to the focal firm is excluded from the construction of the instrument. Finally, we also rely on theory and the existing literature, which has shown that peer firms' idiosyncratic equity risk is reliably orthogonal to the focal firm's decisions (see Adhikari and Agrawal, 2018; Leary and Roberts, 2014).

As hypothesised in Section 2, we expect that mimicking peer firms' cash holdings will lead to diminishing returns. Specifically, we anticipate that $\beta_1 > 0$, as mimicking, can help managers reduce the likelihood of making poor decisions, lower information search costs associated with liquidity management policies and improve a firm's competitive position.

However, if taken too far, mimicking could become suboptimal, resulting in $\beta_2 < 0$. In such cases, managers may overlook the firm's competitive advantages and hold excessively low or high cash balances. We will empirically test both predictions in the subsequent sections.

3.2 Data

We collect firm-level data from *Thomson Reuters Datastream* and macroeconomic data from The World Bank. In line with the extant literature (see Francis *et al.*, 2016; Leary and Roberts, 2014; Machokoto *et al.*, 2020a), we apply several filters to the data set. First, we exclude firms in regulated sectors, namely, utility, and financial sectors. Second, we exclude firms with missing data on key variables. Third, we drop firms with abnormal growth in assets and sales (growth>100%). Fourth, we exclude industries with less than five industry-year observations based on the Industry Classification Benchmark Subsector Code (ICBSC). This filter is integral to our analyses as it ensures that industries with very few observations do not influence our results (see Chipeta *et al.*, 2021; Francis *et al.*, 2016; Machokoto *et al.*, 2021b). Finally, we winsorise firm-specific variables at the upper and lower one percentile. Our final sample consists of 55,314 firm-year observations (4,667 US-listed firms) over the period 1991–2019. We present the summary statistics of the variables used in this study in Table 1.

Tobin's q has a mean (median) of 1.753 (1.422), which is in line with prior studies (Fauver *et al.*, 2017, 2018). Of particular interest are the trends for the main variables. Tobin's q and Tobin's q equity (MVE), our two proxies of firm value, show a positive and significant trend while profitability is decreasing. Cash holdings are similarly trending upwards as reported in prior studies (see Bates *et al.*, 2009; Brown and Petersen, 2011; He and Wintoki, 2016). These dynamics are driven by the influx of young, innovative and risky firms, which have a low-tangible asset base and are more reliant on internal financing sources such as retained earnings and cash reserves (Bates *et al.*, 2018; Fama and French, 2004; He and Wintoki, 2016). The other firm-specific factors show significant trends which indicate significant changes in the corporate universe (see Gao *et al.*, 2013; Kahle and Stulz, 2017). For example, US firms are, on average, becoming larger, less profitable, more invested in innovation and less invested in capital expenditure. The summary statistics relating to the control variables are as expected and consistent with the prior studies (see Gao *et al.*, 2013; Machokoto *et al.*, 2021b). Table 2 presents the pairwise correlations.

Tobin's q is positively correlated with Tobin's q equity (MVE), return on total assets (ROA), peer firms' cash holdings ($\overline{CASH}$), size, the dummy for R&D (RDD), firm age (AGE), capital expenditure (CAPEX) and the dummy for dividend payers (DIVD). In contrast, Tobin's q is negatively correlated with short-term debt (STDA), long-term debt (LTDA), asset turnover (SALESTA) and idiosyncratic stock risk ($\overline{ERisk}$). These pairwise correlations are as expected and in line with the literature (see Gyimah *et al.*, 2020; Machokoto *et al.*, 2020a,b, 2021b).

4. Results and discussion

4.1 The effect of mimicking on shareholder value

In this section, we examine the impact of mimicking peer firms' cash holdings on firm value. Table 3 presents the results of estimating Equation (1).

We first test our main hypothesis that mimicking peer firms' cash holdings is positively associated with firm value, as it reduces the likelihood of making incorrect decisions, lowers information search costs and strengthens a firm's competitive position. Our results, shown in column (1) of Table 3, confirm this prediction, with a positive and significant coefficient for the instrumented peer firms' cash holdings ([coefficient] = 1.799, p-value = 0.000). In terms of economic significance, this finding implies that a one standard deviation change in peer firms'

Table 1.
Summary statistics

\#	Variables	*N*	Mean	Std.Dev.	Min.	p25	Median	p75	Max.	Trend
(1)	Tobins' *q*	55,314	1.753	1.080	0.509	1.060	1.422	2.060	6.450	0.747***
(2)	MVE	55,314	2.626	2.517	0.185	1.132	1.886	3.164	15.935	2.974***
(3)	ROA	55,314	0.066	0.115	−0.415	0.027	0.078	0.126	0.330	−0.119***
(4)	$\overline{CASH}$	55,314	0.157	0.092	0.005	0.089	0.135	0.203	0.572	0.280***
(5)	SIZE	55,314	12.905	2.049	8.106	11.480	12.916	14.317	17.687	4.299***
(6)	RDD	55,314	0.484	0.500	0.000	0.000	0.000	1.000	1.000	0.051*
(7)	STDA	55,314	0.038	0.066	0.000	0.000	0.011	0.045	0.356	−0.074***
(8)	LTDA	55,314	0.163	0.163	0.000	0.004	0.129	0.269	0.642	0.045***
(9)	SALESTA	55,314	1.263	0.787	0.148	0.714	1.108	1.601	4.243	−1.278***
(10)	AGE	55,314	2.542	0.624	0.693	2.197	2.639	2.996	3.611	3.994***
(11)	CAPEX	55,314	0.054	0.054	0.001	0.019	0.038	0.070	0.292	−0.107***
(12)	DIVD	55,314	0.418	0.493	0.000	0.000	0.000	1.000	1.000	−0.291***
(13)	ERISK	55,314	0.122	0.076	0.030	0.071	0.102	0.149	0.462	−0.043***
(14)	CASH	55,314	0.157	0.171	0.000	0.027	0.092	0.230	0.748	0.280***
	Firms	4,667								
	Industries	105								
	Countries	52								

Note(s): The table presents the summary statistics for the variable used. The sample consists of 4,667 listed non-financial and non-utility firms (55,314 firm-year observations) in the US drawn from *Thomson Reuters Datastream* over the period 1991–2019. All variables used are defined in Table 1 and winsorised at the lower and upper one percentiles. Tobins' *q* is the market value *plus* debt to total assets. MVE is the market value of equity-to-book value of equity. ROA is return to total assets. $\overline{CASH}$ is the peer firm's average cash holdings. The peer firm average characteristics are calculated as the average of all firms within a particular industry-year excluding the *i*th observations (relating to the focal firms). Industry classifications are defined based on the Industry Classification Benchmark Sub-Sector Code (ICBSC). Size is the logarithm of sales. RDD is a dummy variable that takes the value of 1 if a firm reports research and development (R&D), and otherwise 0. STDA is short-term to total assets. LTDA is long-term to total assets. SALESTA is sales to total assets. AGE the logarithm of firm age. CAPEX is capital expenditure to total assets. DIVD is a dummy variable that takes the value of 1 if a firm reports pays a dividend, and otherwise 0. ***, **, * indicate significance at the one, five and ten percent levels, respectively
Source(s): Authors' own creation/work

Table 2.
Correlations

\#	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	Tobins' q	1													
(2)	MVE	0.797***	1												
(3)	ROA	0.311***	0.221***	1											
(4)	$\overline{CASH}$	0.186***	0.108***	−0.193***	1										
(5)	SIZE	0.044***	0.139***	0.343***	−0.171***	1									
(6)	RDD	0.183***	0.129***	−0.107***	0.377***	−0.105***	1								
(7)	STDA	−0.103***	−0.016***	−0.070***	−0.091***	−0.055***	−0.046***	1							
(8)	LTDA	−0.181***	0.047***	0.060***	−0.290***	0.284***	−0.210***	−0.011***	1						
(9)	SALESTA	−0.020***	−0.002	0.134***	−0.165***	0.084***	−0.245***	0.107***	−0.169***	1					
(10)	AGE	0.043***	0.089***	0.100***	0.033***	0.464***	0.043***	−0.114***	0.070***	−0.066***	1				
(11)	CAPEX	0.018***	0.010**	0.102***	−0.239***	0.055***	−0.190***	−0.054***	0.125***	−0.027***	−0.086***	1			
(12)	DIVD	0.037***	0.069***	0.276***	−0.281***	0.416***	−0.069***	−0.068***	0.100***	0.007	0.334***	0.049***	1		
(13)	ERISK	−0.064***	−0.066***	−0.299***	0.159***	−0.424***	0.034***	0.154***	−0.080***	0.077***	−0.303***	−0.069***	−0.382***	1	
(14)	CASH	0.273***	0.131***	−0.126***	0.480***	−0.271***	0.260***	−0.204***	−0.402***	−0.157***	−0.060***	−0.201***	−0.200***	0.114***	1

Note(s): The table presents the pairwise correlations. The sample consists of 4,667 listed non-financial and non-utility firms (55,314 firm-year observations) in the US drawn from Thomson Reuters Datastream over the period 1991–2019. All variables used are defined in Table 1 and winsorised at the lower and upper one percentiles. Table 1 defines all variables used; ***, **, * indicate significance at the one, five and ten percent levels, respectively
Source(s): Author's own creation/work

Table 3. The effect of mimicking peer firms' cash holdings on firm value

Samples Variables	Full sample (1)	Excl.Crisis (2)	Decreases (3)	Increases (4)	Bad state (5)	Good state (6)	Full sample (7)	Excl.Crisis (8)	Decreases (9)	Increases (10)	Bad state (11)	Good state (12)
$\overline{CASH}$	1.799***	1.584***	2.168***	1.555***	1.354***	1.882***	3.363***	3.034***	4.224***	2.756***	2.625***	3.374***
	(0.285)	(0.280)	(0.455)	(0.367)	(0.417)	(0.383)	(0.539)	(0.568)	(0.823)	(0.713)	(0.723)	(0.796)
$\overline{CASH} * \overline{CASH}$							−5.723***	−4.983***	−7.840***	−4.289***	−5.264***	−4.940***
							(1.061)	(1.129)	(1.615)	(1.407)	(1.463)	(1.553)
SIZE	0.056***	0.058***	0.064***	0.048***	0.051***	0.059***	0.056***	0.057***	0.063***	0.048***	0.051***	0.058***
	(0.003)	(0.003)	(0.005)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.005)	(0.004)	(0.004)	(0.004)
RDD	0.257***	0.271***	0.272***	0.244***	0.248***	0.271***	0.269***	0.279***	0.292***	0.253***	0.265***	0.277***
	(0.012)	(0.012)	(0.019)	(0.016)	(0.018)	(0.016)	(0.011)	(0.012)	(0.018)	(0.015)	(0.017)	(0.015)
STDA	−1.167***	−1.222***	−0.983***	−1.256***	−1.241***	−1.119***	−1.212***	−1.257***	−1.057***	−1.286***	−1.290***	−1.152***
	(0.064)	(0.068)	(0.100)	(0.084)	(0.095)	(0.087)	(0.063)	(0.067)	(0.097)	(0.083)	(0.093)	(0.085)
LTDA	−1.070***	−1.129***	−0.928***	−1.164***	−1.072***	−1.092***	−1.092***	−1.141***	−0.966***	−1.178***	−1.111***	−1.099***
	(0.036)	(0.037)	(0.056)	(0.046)	(0.055)	(0.046)	(0.034)	(0.036)	(0.053)	(0.045)	(0.052)	(0.045)
SALESTA	0.006	0.001	0.019*	−0.000	−0.004	0.013	−0.008	−0.010	−0.001	−0.011	−0.019*	0.003
	(0.007)	(0.007)	(0.011)	(0.009)	(0.010)	(0.009)	(0.007)	(0.007)	(0.010)	(0.009)	(0.010)	(0.009)
AGE	−0.078***	−0.075***	−0.097***	−0.053***	−0.103***	−0.053***	−0.081***	−0.078***	−0.105***	−0.055***	−0.108***	−0.055***
	(0.009)	(0.009)	(0.016)	(0.011)	(0.015)	(0.012)	(0.009)	(0.009)	(0.016)	(0.011)	(0.015)	(0.012)
CAPEX	2.025***	2.057***	2.031***	2.145***	2.045***	1.940***	1.981***	2.032***	1.970***	2.109***	1.980***	1.920***
	(0.091)	(0.095)	(0.136)	(0.123)	(0.141)	(0.118)	(0.089)	(0.094)	(0.133)	(0.121)	(0.137)	(0.117)
DIVD	0.137***	0.131***	0.164***	0.120***	0.149***	0.124***	0.134***	0.130***	0.159***	0.118***	0.142***	0.124***
	(0.011)	(0.011)	(0.017)	(0.014)	(0.016)	(0.015)	(0.011)	(0.011)	(0.016)	(0.014)	(0.016)	(0.015)
Constant	0.991***	0.981***	0.842***	1.083***	1.253***	0.684***	0.923***	0.911***	0.765***	1.029***	1.211***	0.613***
	(0.066)	(0.068)	(0.103)	(0.090)	(0.091)	(0.085)	(0.072)	(0.075)	(0.110)	(0.098)	(0.096)	(0.097)
Turning point X							0.294	0.304	0.269	0.321	0.249	0.341
Turning point Y							1.682	1.517	2.112	1.378	1.312	1.687
Turning point YY							5.669	5.489	5.336	5.887	6.154	4.756
Expond maxima							1.342	1.356	1.309	1.379	1.283	1.407

(*continued*)

Table 3.

Samples Variables	Full sample (1)	Excl.Crisis (2)	Decreases (3)	Increases (4)	Bad state (5)	Good state (6)	Full sample (7)	Excl.Crisis (8)	Decreases (9)	Increases (10)	Bad state (11)	Good state (12)
t-value of *U* test							4.338	3.425	4.185	2.219	3.23	2.159
p-value of *U* test							[0.000]	[0.000]	[0.000]	[0.013]	[0.001]	[0.015]
Extreme point							0.294	0.304	0.269	0.321	0.249	0.341
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
\# observations	55,314	51,033	22,772	32,542	24,748	30,566	55,314	51,033	22,772	32,542	24,748	30,566
Adj.R^2	0.145	0.142	0.145	0.146	0.151	0.144	0.144	0.141	0.145	0.145	0.149	0.144

Note(s): The table presents estimation results of Equation (1) that relate firm value to peer firms' cash holdings, firm-specific and macroeconomic variables. All regression models include (but not reported for brevity) industry and time-fixed effects to control for unobserved firm-specific and time-specific factors and omitted variable bias. Table 1 defines all variables used. The sample consists of 4,667 listed non-financial and non-utility firms (55,314 firm-year observations) in the US drawn from *Thomson Reuters Datastream* over the period 1991–2019. All variables used are defined in Table 1 and winsorised at the lower and upper one percentiles. Robust standard errors reported in parentheses are calculated using the Huber White Sandwich Estimator for the covariance matrix. ***, **, * indicate significance at the one, five and ten percent levels, respectively, based on robust standard errors

Source(s): Authors' own creation

cash holdings, on average, results in a 16.6% increase in firm value [*coefficient* × standard deviation = 1.799 × 0.092], suggesting that mimicking or peer benchmarking can be beneficial. However, there are also conflicting results in the literature regarding the advantages and disadvantages of mimicking, suggesting that it may not always be the best approach (see Gyimah *et al.*, 2020; Machokoto *et al.*, 2021b). This motivates us to examine whether the nonlinear effects of mimicking cash holdings on firm value could explain these mixed results.

Our study begins by testing the hypothesis that mimicking the cash holdings of peer firms has a positive correlation with firm value. We believe that this strategy reduces the likelihood of making incorrect decisions, lowers information search costs and strengthens a firm's competitive position. Our findings, displayed in column (1) of Table 3, support this prediction with a significant and positive coefficient for instrumented peer firms' cash holdings ([coefficient] = 1.799, p-value = 0.000). In terms of economic significance, we observed that a one standard deviation change in peer firms' cash holdings results in, on average, a 16.6% increase in firm value [*coefficient* × standard deviation = 1.799 × 0.092]. This indicates that mimicking or peer benchmarking can be beneficial. However, there are also conflicting results in the literature regarding the advantages of mimicking, suggesting that it may not always be the best approach (see Gyimah *et al.*, 2020; Machokoto *et al.*, 2021b). This prompted us to examine whether the nonlinear effects of mimicking cash holdings on firm value could explain these mixed results.

In column (2), for the subsample that excludes the financial crisis (*Excl.crisis* — 2008 and 2009), we find similar results as the instrumented peer firms' cash holdings has a positive coefficient of 1.584 and a p-value of 0.000. Similarly, columns (3) and (4) show positive and significant effects of mimicking on firm value for subsamples of firms mimicking decreases (*decreases*) and increases (*increases*) in peer firms' cash holdings. Interestingly, the benefits of mimicking, as shown by the positive association between the instrumented peer firms' cash holdings and firm value, are more pronounced when a firm mimic decreases relative to increases in peer firms' cash holdings. This asymmetry suggests that investors view hoarding cash less favourably as it entails curtailing and postponing investments (Chipeta *et al.*, 2021). Overall, our findings align with our hypotheses and show that optimising cash holdings through mimicking peer firms' policies is significantly and positively associated with shareholder value. We attribute these positive effects of peer benchmarking in cash holdings to (1) savings from reductions in information search costs, (2) reduced likelihood of making poor decisions, (3) enhanced financial flexibility resulting from optimised liquidity management policies and (4) improved competitive positions.

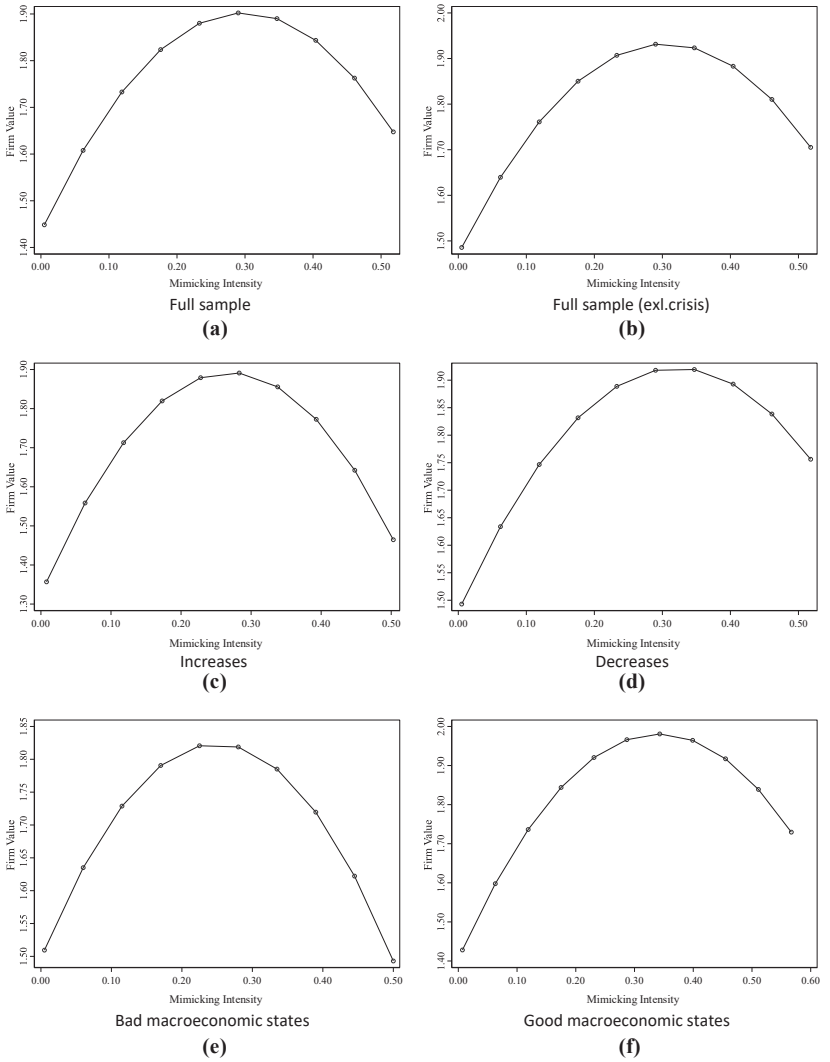
In columns (5) and (6), we examine the impact of macroeconomic conditions on the relationship between firm value and mimicking of peer firms' cash holdings. To accomplish this objective, we divided the samples into two subsamples based on macroeconomic conditions: good (years with an increase in GDP growth) or bad (years with a decrease in GDP growth). Columns (5) and (6) show that the coefficient of the instrumented peer firms' cash holdings is positive and significant at the 1% level in both good and bad macroeconomic states. However, the effect of mimicking peer firms' cash holdings on firm value is more pronounced in good macroeconomic states. Specifically, a one standard deviation increase in peer firms' cash holdings results in a 12.8% increase in firm value during bad macroeconomic states and a 16.8% increase in firm value during good macroeconomic states. These results support the notion that changes in peer firms' policies can become unreliable and noisy as actionable signals with important market insights during economic downturns (see Calomiris *et al.*, 2017), increasing the risk that managers may misinterpret such changes as credible market signals (see Kaustia and Rantala, 2015). Therefore, our findings, which are robust to different methods of categorising macroeconomic conditions, suggest that managers should concentrate on strategies that capitalise on the company's competitive advantages during

bad macroeconomic times rather than mimicking peer firms' policies. This approach is more in line with the popular phrase *sticking to the knitting*.

Next, in columns (7)–(12) of Table 3, we further examine whether mimicking peer firms' cash holdings has a nonlinear effect on firm value. This could help to clarify the inconsistent results in the extant literature on the impact of mimicking on firm performance or value, as well as its sustainability (see Gentry *et al.*, 2013; Lee and Tang, 2018; Machokoto *et al.*, 2021a). Consistent with our central hypothesis, which posits a nonlinear relationship between mimicking peer firms' cash holdings and firm value, column (7) reveals a significant and positive coefficient for the instrumented peer firms' cash holdings ($\overline{CASH}$), along with a significant and negative coefficient for the squared term of the instrumented peer firms' cash holdings ($\overline{CASH}^2$). These coefficients $\beta_1 > 0$ and $\beta_2 < 0$ suggest a statistically significant inverted U-shaped association between mimicking intensity and firm value, with a turning point of 0.294 $\left|\frac{-\beta_1}{-2\beta_2} = \frac{-1 \times 3.363}{2 \times -5.723}\right|$. The *utest* of Lind and Mehlum (2010) further confirms the nonmonotonic association between firm value and mimicking intensity with a *t*-value of 4.338 [*p*-value = 0.000]. These findings suggest that mimicking peer firms' cash holdings initially increases the firm's value by lowering information search costs, reducing the likelihood of making incorrect decisions and improving the firm's competitive position in the product market. However, mimicking peer firms' cash holdings starts to decrease firm value when it reaches a moderately high level (the threshold) due to the likely adoption of cash holdings policies that are not in sync with the firm's competitive advantages or managers misinterpreting noisily changes in peer firms' policies for actionable market insights.

In columns (8)–(10), we also find similar results, with the turning point ranging from 0.269 to 0.321 for the restricted samples of firms excluding the financial crisis (excluding 2008 and 2009) and firms mimicking decreases and increases in peer firms' cash holdings. Next, in columns (11) and (12), we find a higher turning point of mimicking intensity on firm value in good macroeconomic states (0.341) relative to bad macroeconomic states (0.249) [6]. To gain a deeper understanding of how mimicking peer firms impacts firm value, we have plotted the marginal effects in Figure 1 for the full sample, as well as for the restricted samples of firms excluding the financial crisis (2008 and 2009), and for firms that mimic decreases and increases in peer firms' cash holdings. The plots of the marginal effects of mimicking peer firms' cash holdings show a clear nonlinear relationship between mimicking and firm value. We consistently observe that mimicking increases firm value below a certain threshold but reduces it when it is above that threshold. These findings suggest that mimicking peer firms' cash holdings is advantageous as it enables managers to enhance their competitive position, reduce information search costs and decrease the probability of making poor liquidity management decisions. However, as the plots of the marginal effects indicate, excessive mimicking can result in suboptimal cash holdings or liquidity management policies, with firms either holding too much or too little cash reserves.

As for the control variables in column (4) of our main results, we observe a positive association between firm value and firm size, R&D (RDD), SALESTA, capital expenditure (CAPEX) and dividend payers (DIVD). Conversely, firm value is negatively associated with short-term debt (STDA), long-term debt (LTDA) and firm age (AGE). The majority of the coefficients for the control variables align with previous studies (see Chipeta *et al.*, 2021; Fauver *et al.*, 2017, 2018; Agyei-Boapeah *et al.*, 2020; Machokoto *et al.*, 2020b), except for the positive coefficient for firm size. We attribute this anomaly to economies of scale (Demsetz, 1973), greater flexibility (Fama and French, 1993), diversification opportunities (Berger and Ofek, 1995), lower levels of information asymmetry (Myers and Majluf, 1984) and improved access to finance (Rajan, 1998) associated with larger firms. The effect of R&D on firm value is not surprising, given the mixed evidence in the literature about its positive impact on



Note(s): The figure plots the marginal effects of mimicking from estimation results of Equation (1). Full sample includes all firms in sample. Full sample (exl.crisis) excludes the financial crisis (2008—2009). Decreases (ΔCash<0) and increases (ΔCash>0) are for decreases and increases in cash holdings, respectively. The sample consists of 4,667 listed non-financial and non-utility firms (55,314 firm-year observations) in the US drawn from Thomson Reuters Datastream over the period 1991—2019. All variables used are defined in Table 1 and winsorised at the lower and upper one percentiles

Source(s): Author's own creation

Figure 1.
Marginal effects of mimicking peer firms' cash holdings on firm value

competitive advantages and negative impact due to the perceived risks associated with innovation (Machokoto *et al.*, 2021b). These findings highlight the intricate and multifaceted nature of the relationship between firm-specific factors and firm value.

5. Robustness tests

In this section, we implement a comprehensive battery of tests and checks to evaluate the robustness of our findings. First, we assess the sensitivity of our results to using alternative proxies of firm value. Second, we gauge the robustness of our findings by using alternative sub-sampling approaches. Third, we assess the sensitivity of our results to using other alternative estimation techniques. Finally, we reestimate our results using several alternative peer reference groups. Table 4 presents these robustness tests.

In Table 4, we evaluate the sensitivity of our results by using alternative proxies of firm value and performance, specifically Tobin's q equity (MVE) and return-on-assets (ROA), in columns (1)–(2). The results show a similar nonlinear association between firm value/performance and the mimicking intensity of peer firms' cash holdings. These results help alleviate concerns that how we construct or define our dependent variables might bias our inferences.

Next, in columns (3) and (4), we assess whether our findings are robust to using alternative subsampling approaches by industry. Our results are consistent with our primary findings. Columns (3) and (4) show a significant nonlinear association between firm value and mimicking peer firms' cash holdings for subsamples of firms in both industrial (IND) and non-industrial (non-IND) sectors. However, the turning point for the subsample of firms in non-industrial sectors (0.293) is approximately 97% higher than that for the subsample of firms in industrial sectors (0.149). This indicates that non-industrial firms that are associated with comparatively less access to external financing due to low asset pledgeability benefit significantly more from building cash reserves. Overall, columns (3) and (4) reinforce our conclusions and demonstrate the robustness of our empirical findings when using alternative subsampling approaches.

In columns (5)–(8) of Table 4, we test the robustness of our results using several alternative instrumental variable estimation techniques. Specifically, we reestimate Equation (1) using generalised method of moments (IVGMM), limited-information maximum likelihood (LIML) and instrumental variables estimation techniques of Lewbel *et al.* (2012) that use heteroskedasticity-based instruments (IVREG2H and IVREG2HGMM) [7]. Columns (5)–(8), for results based on alternative estimators, consistently show a significant nonlinear association between mimicking the intensity of peer firms' cash holdings and firm value ($\beta_1 > 0$ and $\beta_2 < 0$). The turning points are in line with our main findings and range from a low of 0.294 to a high of 0.799. Based on these additional analyses, we conclude that our empirical results are robust to alternative instrumental variable estimation techniques.

Next, in columns (9)–(12), we test the sensitivity of our results using alternative peer reference groups. Specifically, we use the 3-digit Standard Industrial Classification Code (SIC3), 4-digit Standard Industrial Classification Code (SIC4), Fama French 38 Industrial Classification (FF38) and Fama French 48 Industrial Classification (FF48) as alternative peer reference groups. These alternative peer reference groups are informed by the literature (see Gyimah *et al.*, 2020; Leary and Roberts, 2014; Machokoto *et al.*, 2021a,b). In line with our main findings, columns (9)–(12) consistently show significant positive and negative coefficients of instrumented peer firms' cash holdings and their squared term, respectively. This finding is consistent with the non-monotonic association shown in Figure 1 and implies that the benefits of mimicking peer firms' cash holdings are subject to diminishing returns [8].

Taken together, our battery of tests suggests that the nonlinear association between mimicking intensity of peer firms' cash holdings and firm value is robust to using alternative variable definitions, sub-sampling, estimation techniques and peer reference groups.

6. Conclusion

It is unclear whether mimicking peer firms' financing and investment policies is beneficial or not, given two counteracting predictions. On the one hand, mimicking reduces information

Table 4.
Robustness tests

	Alternative variables		Alternative subsampling		Alternative estimation techniques				Alternative peer reference groups			
Samples	MVE	ROA	IND	Non-IND	IVGMM	LIML	IVREG2H	IVREG2H-GMM	SIC3	SIC4	FF38	FF48
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$\overline{CASH}$	9.816***	0.546***	9.874***	3.389***	3.363***	3.363***	2.307***	1.910***	3.006***	3.824***	3.111***	3.543***
	(1.331)	(0.058)	(1.559)	(0.930)	(0.539)	(0.539)	(0.284)	(0.265)	(0.594)	(0.761)	(0.631)	(0.657)
$\overline{CASH} * \overline{CASH}$	−20.254***	−1.911***	−33.095***	−5.788***	−5.723***	−5.723***	−2.063***	−1.195**	−5.137***	−6.548***	−6.338***	−5.239***
	(2.561)	(0.115)	(6.218)	(1.722)	(1.061)	(1.061)	(0.593)	(0.542)	(1.326)	(1.498)	(1.934)	(1.659)
SIZE	0.150***	0.014***	0.040***	0.059***	0.056***	0.056***	0.056***	0.057***	0.058***	0.057***	0.058***	0.057***
	(0.007)	(0.000)	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
RDD	0.727***	−0.001	0.195***	0.310***	0.269***	0.269***	0.262***	0.253***	0.244***	0.243***	0.271***	0.254***
	(0.029)	(0.001)	(0.017)	(0.015)	(0.011)	(0.011)	(0.010)	(0.010)	(0.014)	(0.016)	(0.011)	(0.011)
STDA	0.404**	−0.099***	−1.178***	−1.235***	−1.212***	−1.212***	−1.187***	−1.190***	−1.156***	−1.171***	−1.239***	−1.187***
	(0.188)	(0.007)	(0.102)	(0.078)	(0.063)	(0.063)	(0.062)	(0.060)	(0.066)	(0.073)	(0.062)	(0.062)
LTDA	1.092***	−0.028***	−1.058***	−1.092***	−1.092***	−1.092***	−1.082***	−1.062***	−1.093***	−1.081***	−1.158***	−1.094***
	(0.104)	(0.003)	(0.057)	(0.043)	(0.034)	(0.034)	(0.031)	(0.030)	(0.037)	(0.042)	(0.030)	(0.031)
SALESTA	0.118***	0.009***	0.023*	−0.021***	−0.008	−0.008	0.001	−0.001	−0.009	−0.012*	−0.006	−0.003
	(0.017)	(0.001)	(0.012)	(0.008)	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.006)	(0.006)
AGE	−0.136***	−0.012***	−0.053***	−0.088***	−0.081***	−0.081***	−0.079***	−0.079***	−0.085***	−0.090***	−0.079***	−0.082***
	(0.021)	(0.001)	(0.016)	(0.011)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)
CAPEX	3.260***	0.119***	1.137***	2.236***	1.981***	1.981***	2.004***	1.970***	1.941***	1.960***	1.889***	1.954***
	(0.210)	(0.009)	(0.167)	(0.104)	(0.089)	(0.089)	(0.088)	(0.086)	(0.089)	(0.092)	(0.088)	(0.087)
DIVD	0.344***	0.025***	0.161***	0.124***	0.134***	0.134***	0.135***	0.125***	0.136***	0.132***	0.125***	0.138***
	(0.026)	(0.001)	(0.018)	(0.013)	(0.011)	(0.011)	(0.011)	(0.010)	(0.011)	(0.012)	(0.011)	(0.011)
ERISK	−0.211	−0.255***	−0.409***	−0.362***	−0.371***	−0.371***	−0.371***	−0.385***	−0.385***	−0.448***	−0.307***	−0.363***
	(0.183)	(0.010)	(0.138)	(0.087)	(0.073)	(0.073)	(0.072)	(0.071)	(0.076)	(0.082)	(0.072)	(0.072)
Constant	−0.668***	−0.147***	0.957***	0.817***	0.923***	0.923***	0.973***	0.936***	0.940***	0.927***	0.924***	0.880***
	(0.179)	(0.007)	(0.131)	(0.095)	(0.072)	(0.072)	(0.061)	(0.059)	(0.076)	(0.085)	(0.071)	(0.073)
Turning point X	0.242	0.143	0.149	0.293	0.294	0.294	0.559	0.799	0.293	0.292	0.245	0.338
Turning point Y	4.908	0.273	4.937	1.694	1.682	1.682	1.153	0.955	1.503	1.912	1.555	1.772
Turning point YY	2.085	−0.433	6.773	5.251	5.669	5.669	6.471	6.797	5.519	5.940	5.224	5.916

(*continued*)

Table 4.

	Alternative variables		Alternative subsampling		Alternative estimation techniques				Alternative peer reference groups			
Samples Variables	MVE (1)	ROA (2)	IND (3)	Non-IND (4)	IVGMM (5)	LIML (6)	IVREG2H (7)	IVREG2H-GMM (8)	SIC3 (9)	SIC4 (10)	FF38 (11)	FF48 (12)
ExpondMaxima	1.274	1.153	1.161	1.34	1.342	1.342	1.749	2.223	1.34	1.339	1.278	1.402
t-value of *U* test	7.355	9.192	4.484	2.981	4.338	4.338			3.224	3.888	2.722	2.22
p-value of *U* test	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]			[0.001]	[0.000]	[0.003]	[0.013]
Extreme point	0.242	0.143	0.149	0.293	0.294	0.294	0.559	0.799	0.293	0.292	0.245	0.338
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
\# observations	55,314	55,314	14,267	41,047	55,314	55,314	55,314	55,314	53,597	50,068	55,275	55,258
Adj.R^2	0.093	0.191	0.109	0.145	0.144	0.144	0.146	0.145	0.144	0.140	0.145	0.148

Note(s): The table presents estimation results of Equation (1) that relate firm value to peer firms' cash holdings, firm-specific and macroeconomic variables. All regression models include (but not reported for brevity) industry and time-fixed effects to control for unobserved firm-specific and time-specific factors and omitted variable bias. The sample consists of 4,667 listed non-financial and non-utility firms (55,314 firm-year observations) in the US drawn from *Thomson Reuters Datastream* over the period 1991–2019. All variables used are defined in Table 1 and winsorised at the lower and upper one percentiles. Robust standard errors reported in parentheses are calculated using the Huber White Sandwich Estimator for the covariance matrix. ***, **, * indicate significance at the one, five and ten percent levels, respectively, based on robust standard errors

Source(s): Authors' own creation

search costs and the likelihood of making poor decisions while, at the same time, enhancing a firm's competitive product market position. On the other hand, mimicking might be suboptimal as managers might mistake noisy changes in peer firms' policies for a credible market signal or overlook the firm's fundamentals and competitive strengths that are critical for survival and long-term growth. In this study, we test these counteracting predictions using cash management policies as exemplary forms of financing policy.

Using a large sample of US firms over the period 1991–2019 and an instrumental variable approach, we document a significant non-monotonic effect of mimicking peer firms' cash holdings on shareholder value. This inverted U-shaped association suggests that mimicking is beneficial at lower intensity levels, but too much of it is less beneficial or suboptimal. Further results show that the benefits of mimicking peer firms are salient in good macroeconomic states relative to bad ones when managers should use the firms' resources to the fundamentals. In sum, our findings are robust to a host of concerns and have several important theoretical and practical implications.

6.1 Theoretical implications

This study highlights significant diminishing returns to mimicking that point to a trade-off between the benefits and costs of mimicking peer firms' cash holdings. Such a trade-off calls for the development of theoretical frameworks that are akin to the trade-off theory in capital structure studies (see Abel, 2018; Hennessy and Whited, 2005; Strebulaev, 2007; Strebulaev and Whited, 2013). In addition, mimicking peer firms' policies, as exemplified in our case by cash holdings, either moves the firm closer or away from the optimal point. A move towards the optimal point, as suggested by the initial increase in firm value with mimicking intensity, is viewed more favourably by investors. However, excessive mimicking, as our results suggest, is viewed less favourably by investors as it might inevitably result in managers holding suboptimal cash balances that are not in sync with the firms' fundamentals and might exacerbate agency problems. Thus, this will result in the hump-shaped association, which is indicative of a trade-off between the benefits and costs of mimicking peer firms' policies.

Our study, therefore, raises interesting theoretical questions about whether mimicking peer firms' policies leads to a race to the top or bottom in the product market. If so, through which mechanism does mimic peer firms impact shareholder value? We provide some preliminary evidence in relation to these important questions by showing that the impact of mimicking peer firms' cash holdings on shareholder value is asymmetric – being more pronounced for increases relative to decreases in cash holdings and, more importantly, being salient in good relative to bad macroeconomic states. However, further research is required to understand the mechanisms better and quantify the benefits or costs of mimicking peer firms' policies, especially considering the rising interdependence of firms with globalisation and economic integration.

6.2 Practical implications

Our study has significant practical implications for managers and investors. First, our findings indicate that mimicking peer firms positively impacts firm value and can enhance shareholder value. This is because mimicking can help reduce the likelihood of making incorrect decisions, lower information search costs and increase a firm's competitive position (see Adhikari and Agrawal, 2018; Grennan, 2019; Leary and Roberts, 2014). However, managers and investors alike must be mindful of the extent to which firms mimic cash holdings, as indicated by the nonlinear effects of mimicking cash holdings on firm value. While mimicking peers can be advantageous, managers should not overlook their firms' competitive advantages, which are critical for survival and growth, especially during bad macroeconomic states. Second, our research underscores the importance of optimising cash

holdings. Our study finds that mimicking peers can lead to suboptimal cash holdings, which investors view unfavourably. This is due to the opportunity costs incurred when holding excess cash, which entails curtailing or postponing investments. This issue, as highlighted in the literature (see Andrén and Jankensgård, 2015; Bates *et al.*, 2009; Brown and Petersen, 2011; He and Wintoki, 2016), is increasingly important as economies shift from physical to intangible capital (service and technology sectors), and cash holdings have increased over the past decades. In sum, our research suggests that managers should carefully weigh the costs and benefits of mimicking peer firms' cash management policies to optimise cash management.

6.3 Limitations and future research

Although our study makes several contributions to the literature, it also has caveats that can inform future research. First, our study focuses on a single country: the US. This focus, although parsimonious, may limit the generalisability of the results to other contexts, especially emerging markets beleaguered by institutional voids (see Francis *et al.*, 2016; Machokoto *et al.*, 2020a; Oztekin and Flannery, 2012). Therefore, extending this study to other countries and examining the moderating role of the institutional environment is an interesting future research agenda.

Second, several countries have instituted corporate governance reforms, which, as argued by Fauver *et al.* (2018), improve shareholder value and reduce information asymmetry and agency costs. Such reforms are likely to impact mimicking behaviour and help in alleviating concerns relating to identification that has become a major concern when drawing causal inferences in management and economic studies (see Baker *et al.*, 2022; Fauver *et al.*, 2021). Therefore, examining peer effects using difference-in-difference approaches around major reforms or events represents an interesting future research area, given that peer effects might potentially magnify positive and negative shocks within and across industries and countries.

Finally, our study does not examine the impact of the COVID-19 pandemic on peer effects, which is likely to be significant given the unanticipated uncertainty and contractions in credit supply (Bae *et al.*, 2021; Ding *et al.*, 2021; Hoang *et al.*, 2022). Further, peer effects are likely to matter more in corporate decisions during COVID-19 as spikes in uncertainty increase information search costs, disrupt capital markets and increase herding behaviour (see Caglayan and Xu, 2014, 2016a,b). Therefore, the COVID-19 pandemic represents a rare and unique experimental setting that increases our ability to test theory and distinguish between competing propositions of mimicking behaviour in corporate decisions – the learning- *versus* rivalry-based theories of mimicking.

Notes

1. Similarly significant peer effects were also reported on cash holdings (Chen *et al.*, 2019; Machokoto *et al.*, 2021a), trade credit (El Ghoul and Zheng, 2016; Gyimah *et al.*, 2020), corporate governance (Foroughi *et al.*, 2022), initial public offerings (Aghamolla and Thakor, 2022), corporate social responsibility (Li and Wang, 2022), employee welfare (Rind *et al.*, 2022), advertisement expenditure (Su *et al.*, 2023), disclosure (Ajirloo and Switzer, 2022; Wang *et al.*, 2023) and investments (Bustamante and Frésard, 2020; Foucault and Fresard, 2014; Li *et al.*, 2023; Machokoto *et al.*, 2021b).
2. Several studies report marked increases in corporate cash holdings over the past 3 decades (see Andrén and Jankensgård, 2015; Bates *et al.*, 2018; Graham and Leary, 2018; He and Wintoki, 2016).
3. Several studies have reported marked increases in cash holdings and linked this trend to a rise in risky innovation investments financed mainly from internal sources (Bates *et al.*, 2009; Brown *et al.*, 2009; He and Wintoki, 2016).
4. Other studies have used a similar model (see Gyimah *et al.*, 2020; Nason and Patel, 2016).

5. The industry-fixed effects are defined at a lower level of granularity, the Industry Classification Benchmark Sub-Sector Code (ICBSC), than the Industry Classification Benchmark Sub-Sector Code (ICBSC) used for peer firms' averages, as cash holdings are less likely to vary significantly at the higher levels of industrial granularity. Using a lower level of granularity for the industry-fixed effects is in line with Adhikari and Agrawal (2018), Gyimah *et al.* (2020) and Machokoto *et al.* (2021a).
6. It is worth noting that our results are robust to using negative and positive growth rates in GDP to identify bad and good macroeconomic states, respectively. These untabulated results are available upon request.
7. The identification strategy and associated estimators of Lewbel *et al.* (2012) involve augmenting external instruments with internally generated instruments from higher-order moments of the data set when traditional or standard instruments are weak or difficult to obtain.
8. Appendix 2 presents the results for the placebo test. To implement the placebo test, we first randomly assign firms to pseudo-peer reference groups and test whether mimicking pseudo-peer reference firms' cash holdings affects shareholder value. Appendix 2 shows that the coefficient of the instrumented pseudo-peer reference firms' cash holdings ($\widehat{CASH}$) is consistently not significant, suggesting that our main findings are unlikely to be driven by other confounding factors unrelated to mimicking behaviour in cash holdings.

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Appendix 1
Stock return regressions

The table presents the detailed descriptions and summary statistics for the instruments calculated from the following models:

$$r_{ijt} = \alpha_{ijt} + \beta_{ijt}^{m}\left(rm_t - rf_t + \beta_{ijt}^{ind}\left(\overline{r}_{-ijt} - rf_t\right)\right) + \eta_{ijt} \tag{2a}$$

$$\widehat{r}_{ijt} = \widehat{\alpha}_{ijt} + \widehat{\beta}_{ijt}^{m}\left(rm_t - rf_t + \widehat{\beta}_{ijt}^{ind}\left(\overline{r}_{-ijt} - rf_t\right)\right) + \eta_{ijt} \tag{2b}$$

$$\eta_{ijt} = r_{ijt} - \widehat{r}_{ijt} \tag{2c}$$

where r_{ijt} is the stock return for firm i in industry j over month t, $rm_t - rf_t$ is the excess market return, $\overline{r}_{-ijt} - rf_t$ is the excess return on an equally weighted industry portfolio, excluding the focal firm i's return, and η_{ijt} is the error term. The expected monthly returns ($\widehat{r}_{ijt}$) are the predicted returns from estimating the augmented market model that includes the excess return on an equally weighted industry portfolio. The idiosyncratic monthly returns are calculated as the difference between r_{ijt} and $\widehat{r}_{ijt}$. Peer firms' average characteristics are calculated as the average of all firms within a particular industry-year excluding the i^{th} observation of the focal firm. Industry classifications are defined based on the Industry Classification Benchmark Sub-Sector Code (ICBSC). Equation (2a) is estimated on a rolling annual basis using monthly returns. Each firm is required have a minimum of 24 months of historical returns data

and up to 60 months of data are used for the estimations of Equation (2a). The expected return is calculated based on the estimated coefficients from Equation (2a) for the previous year ($t-1$) and the monthly factor returns for the current year (t). The annual idiosyncratic stock risk is the geometric average of the monthly idiosyncratic returns. The instrument, peer idiosyncratic return shock ($\overline{ERisk}$), is calculated using the approach in Equation (1). The sample consists of 4,667 listed non-financial and non-utility firms (55,314 firm-year observations) in the US drawn from *Thomson Reuters Datastream* over the period 1991–2019. All variables used are defined in Table 1 and winsorised at the lower and upper one percentiles.

Variables	Mean	Median	SD
$\widehat{\alpha}_{ijt}$	0.032	0.026	0.035
$\widehat{\beta}^{m}_{ijt}$	0.608	0.521	1.333
$\widehat{\beta}^{IND}_{ijt}$	0.509	0.406	1.052
# of observations per regression	60	60	2
Adj.R^2	0.191	0.161	0.138
Monthly returns	0.020	0.010	0.156
Expected monthly returns	0.021	0.016	0.040
Idiosyncratic monthly returns	0.124	0.102	0.089

Source(s): Authors' own creation

Table A1. Stock return regressions

Appendix 2

Samples Variables	Full sample (1)	Excl.Crisis (2)	Below-target (3)	Above-target (4)	Bad state (5)	Good state (6)
$\overline{CASH}$	−0.248	−0.296	−0.570	0.003	0.201	−0.682
	(0.568)	(0.565)	(0.748)	(0.866)	(0.766)	(0.826)
SIZE	0.055***	0.057***	0.057***	0.054***	0.052***	0.057***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
RDD	0.296***	0.306***	0.288***	0.305***	0.278***	0.311***
	(0.010)	(0.011)	(0.013)	(0.016)	(0.015)	(0.014)
STDA	−1.238***	−1.284***	−0.985***	−1.434***	−1.250***	−1.219***
	(0.062)	(0.065)	(0.084)	(0.090)	(0.091)	(0.083)
LTDA	−1.204***	−1.248***	−1.144***	−1.263***	−1.174***	−1.230***
	(0.030)	(0.031)	(0.040)	(0.043)	(0.045)	(0.040)
SALESTA	−0.014**	−0.017***	−0.024***	0.003	−0.019**	−0.009
	(0.006)	(0.007)	(0.008)	(0.010)	(0.009)	(0.009)
AGE	−0.083***	−0.080***	−0.082***	−0.076***	−0.110***	−0.054***
	(0.009)	(0.010)	(0.012)	(0.014)	(0.015)	(0.012)
CAPEX	1.958***	2.022***	2.034***	1.941***	2.002***	1.884***
	(0.086)	(0.091)	(0.118)	(0.128)	(0.133)	(0.114)
DIVD	0.115***	0.110***	0.118***	0.112***	0.135***	0.100***
	(0.010)	(0.011)	(0.014)	(0.016)	(0.015)	(0.014)
ERISK	1.972***	1.998***	1.879***	2.039***	2.275***	1.782***
	(0.101)	(0.108)	(0.135)	(0.151)	(0.153)	(0.134)
Constant	1.180***	1.161***	1.115***	1.216***	1.300***	0.994***
	(0.092)	(0.092)	(0.122)	(0.138)	(0.121)	(0.135)

(*continued*)

Table A2. Placebo test

Samples Variables	Full sample (1)	Excl.Crisis (2)	Below-target (3)	Above-target (4)	Bad state (5)	Good state (6)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
# observations	55,295	51,014	29,857	25,438	24,736	30,559
Adj.R^2	0.146	0.143	0.141	0.155	0.154	0.143

Note(s): The table presents estimation results of Equation (1) that relate firm value to peer firms' cash holdings, firm-specific and macroeconomic variables. All regression models include (but not reported for brevity) industry and time-fixed effects to control for unobserved firm-specific and time-specific factors and omitted variable bias. Table 1 defines all variables used. Firms are randomly assigned to pseudo peer groups for the placebo test. The sample consists of 4,667 listed non-financial and non-utility firms (55,314 firm-year observations) in the US drawn from *Thomson Reuters Datastream* over the period 1991–2019. All variables used are defined in Table 1 and winsorised at the lower and upper one percentiles. Robust standard errors reported in parentheses are calculated using the Huber White Sandwich Estimator for the covariance matrix. ***, **, * indicate significance at the one, five and ten percent levels, respectively, based on robust standard errors

Table A2. **Source(s):** Authors' own creation

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