


# Firm value, corporate cash holdings and the role of managerial ability



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**Purpose:** This empirical study investigates whether corporate cash holdings impact on firm value and whether this relationship is moderated by managerial ability. With the proliferation of the shareholder value ideology since the 1970s and the growth of corporate cash holdings, investigating how cash holdings are valued by the capital markets is important. There is a dearth in studies that test this firm value–cash holdings nexus and how managerial ability moderates this association.

**Design/methodology/approach:** We use a panel data research methodology to test the interrelationship of firm value, cash holdings, and management ability. We collect data of non-financial corporations (NFCs) listed on the Johannesburg Stock Exchange (JSE) from the year 2000 to 2020.

**Findings/results:** The relationship between firm value and cash holdings follows an inverted U-shaped, suggesting that as cash holdings rise, firm value rises as well, up to the ideal cash level. After the optimal level, further increases in cash holdings result in a fall in firm value. Furthermore, this study finds that the effect of cash holdings on the value of firms under highly able managers is greater compared to cash holdings managed by less able managers.

**Practical implications:** Our results emphasise to firms and shareholders the important effect of managerial expertise on firm value through the efficient use of cash holdings.

**Originality/value:** This study provides empirical support to the trade-off theory's claim of the existence of ideal cash holdings. We also extend the literature on the upper echelons theory by demonstrating the role of managerial ability on firm value.

**Keywords:** upper echelons; corporate cash holdings; managerial ability; firm value; free cash flow theory; trade-off theory; non-financial corporates; panel data.

## Introduction

The role of the managerial ability of corporate performance and other firm decisions has gained traction in literature. Recent studies show that managerial ability has an important role in investment efficiency, innovation, earnings quality, corporate governance, tax avoidance, and firm performance. However, there remains a dearth in empirical studies that investigate the role of managerial ability in moderating the relationship between firm value and corporate cash holdings. Specifically, understanding the factors that influence the levels of corporate cash holdings requires an understanding of the relationship between firm value and cash holdings. The moderating effect of managerial ability on the relationship between firm value and corporate cash holdings is examined in this study.

Recent literature suggests that there is a target corporate cash holdings level at which firm value is maximised and firms strive to keep their cash holdings at this level (Martinez-Sola et al., 2013; Tosun et al., 2022). When the benefits of holding cash outweigh the costs, any increase in cash holdings will result in an increase in firm value. However, holding more cash than is optimal will reduce the value of the company because the costs of doing so will exceed the gains. The existence of an optimal cash holding level suggests that shareholders discourage deviations by discounting the value of cash holdings below or above the optimal level (Nguyen et al., 2016). Therefore, this work adds significantly to the body of literature by testing how shareholders incorporate managerial ability when valuing corporate cash holdings.

The Upper Echelons Theory (UET) postulates that corporate strategy is driven by the top management of a firm (Hambrick & Mason, 1984). Cash is generally accepted as a corporate strategic asset that is critical for the operational existence and the sustainability of a

firm (Gan & Park, 2017). How much cash a firm decides to hold is a discretionary decision of its top managers. However, corporate cash holdings have both negative and positive implications for investors.

On the downside, reckless managers can expend cash on excessive perquisites or inefficiently utilise cash holdings in value destroying activities such as, perquisites and negative NPV projects (Jensen, 1986; Ward et al., 2018). In keeping with the theory of free cash flow, studies have shown that corporate cash holdings negatively impact the firm's value as investors fear that managers will fritter the free cash flows through perquisites (Faulkender & Wang, 2006). On the upside, highly experienced and skilled managers are thought to be more efficient in their use of corporate resources to generate more revenue and enhance firm value (Anggraini & Sholihin, 2023; Demerjian et al., 2012). According to earlier research, investors are therefore more likely to value cash holdings in companies with highly capable managers than in companies with less capable managers (Gan & Park, 2017). There is still a dearth of empirical research examining this relationship, despite the theoretical connection between managerial skill and the value of company cash holdings (Anggraini & Sholihin, 2023; Gan & Park, 2017).

The purpose of this study is to fill this gap by empirically testing the relationship between firm's value and corporate cash holdings in South African firms and how managerial ability moderates this relationship. While South Africa has some characteristics similar to developed countries, such as modern infrastructure and a mature financial sector, it is distinctly a developing country with a unique historical context, economic challenges, and demographic makeup different from most countries that significantly influences its development path in distinct ways.

According to Demerjian et al. (2012), more competent managers are expected to greatly enhance firm value as they have a better ability to generate a superior marginal outcome from the same number of corporate resources. Chen et al. (2020) observed that expert managers perform better in forecasting demand and other factors that might affect performance, even in uncertain times, than less skilled managers. Against this backdrop, this study predicts that investors are more likely to place greater marginal value on an additional dollar or rand held as cash by high ability managers than that held by less able managers.

Firstly, and in line with the trade-off theory, this study finds an inverted U-shaped association between the firm value and corporate cash holdings. This relationship supports the view that firms have an optimum level of corporate cash holdings, and that any deviation from this level leads to a fall in firm value. Furthermore, we utilise the model of Demerjian et al. (2012) to quantify managerial ability levels and test how managerial ability moderates the relationship between firm value and corporate cash holdings. Secondly, this study finds that managerial ability has a direct effect on the relationship

between firm's value and corporate cash holdings. This finding suggests that cash holdings maintained by high ability managers will have a higher market value assigned by shareholders than those held by low ability managers.

This research adds significantly to the expanding body of knowledge on managing skill. Firstly, US companies are the subject of the few researches that have examined this relationship between managerial skill and the value implications of cash holdings (Gan & Park, 2017; Tsai et al., 2022). This study provides evidence from the emerging markets, particularly South Africa. Secondly, previous studies have used arbitrary measures for managerial ability such as firm size, reputation, or media coverage (Banker et al., 2013; Goldfarb & Xiao, 2011). This study uses the managerial ability scores constructed from the model proposed by Demerjian et al. (2012). The model uses a two-step method consisting of data envelopment analysis (DEA) and a static regression model to score and rank managerial efficiency in revenue generation. Previous studies show that the efficiency scores derived from this model are more accurate and reliable estimates of managerial ability than the subjective measures used in previous studies (Blue & Roosta, 2023).

The remainder of this article is structured as follows. The next section outlines the literature review and the development of the research hypothesis. The following section describes the sample, the variables used, and the research design. This is followed by the discussion of the empirical results. The final section concludes the article.

## Literature review

### Market value of cash holdings

In a perfect market where the cost of raising external cash equals the cost of holding cash, the marginal value of each dollar or rand of cash held would be equivalent to one dollar. However, markets are not frictionless, and the marginal value of cash holdings is distorted by factors such as transaction costs, leverage effects, financial constraints, and agency conflicts (Faulkender & Wang, 2006; Denis & Sibilkov, 2010). Pinkowitz et al. (2006) state that investors' valuation of corporate cash holdings is also influenced by their perception on the likely usage of the funds.

Back in 2004, when Microsoft was pressured into disgorging almost \$60 billion worth of cash holdings through dividend payouts and share buybacks, its share price rose 5.7% indicating investors' preference for lower cash holdings (Drobetz et al., 2010). Bates et al. (2018) found that the marginal value of cash holdings has increased over the past 40 years in non-financial firms in the US suggesting that investors were more accepting of corporate cash holdings. Using the model designed by Faulkender and Wang (2006), Bates et al. (2018) found that, on average, the market value of an additional corporate dollar was approximately \$0.61 in the 1980s, around \$1.04 in the next decade, and \$1.12 between 2000 and 2009. The authors argued that contrary to previous literature, which finds the surge of cash holdings problematic,

shareholders react positively to increased cash holdings especially in firms with higher growth opportunities, high business risk, and financially constrained firms. This is consistent with the proliferation of the shareholder value ideology that encourages managerial short-termism such as piling cash holdings (Davis, 2018). Shareholders might favour and encourage high cash holdings as they offer flexibility and can easily be extracted from the firm.

Corporate cash holdings have also been seen as a key strategic asset. Im et al. (2017) found that corporate cash holdings are safe and more valuable in times of high uncertainty. The study explained that high uncertainty encourages goal congruency between managers and shareholders and thus mitigates agency costs. This in turn increases the marginal value of cash holdings. In a study of listed hotel firms in the US, Dogru and Sirakaya-Turk (2017) found that shareholders place greater value on cash holdings in financially constrained firms as an answer to underinvestment concerns. However, investors will discount cash holdings in firms under poor corporate governance regimes. In their international study, Drobetz et al. (2010) found evidence of significant decline in the marginal value of cash holdings with heightening information asymmetry. Their evidence corroborates the Jensen's (1986) free cash flow hypothesis, which argues that holding cash brings moral hazard problems that outweigh the transaction cost benefits of holding cash.

We test whether corporate cash holdings have a significant relationship with firm value using data for non-financial corporations (NFCs) listed on the Johannesburg Stock Exchange (JSE). We control for institutional and macroeconomic factors that might impact firm value. For instance, Tran (2020) found that monetary supply negatively impacts the value of cash holdings in Vietnamese firms.

Without predicting the sign of the relationship, this study makes the following hypothesis regarding the value of corporate cash holdings:

$H_1$ : Firm value is significantly related to corporate cash holdings.

### The moderating role of managerial ability

Managerial ability ranks among the most valuable human resources and a prominent source of competitive advantage (Suryani, 2021). Past studies have found that managerial ability significantly influences firms' performance and investment efficiency and the number of layoffs (Gan, 2019; Park et al., 2016). Studies show that during economic meltdowns, firms tend to reduce their labour force to improve efficiency. Shi and Zhang (2019) discovered, however, that companies with managers of high ability experience fewer layoffs than companies with managers of low ability. This indicates that highly skilled managers can still improve firms' efficiency while reducing the adverse impact on workers' livelihood. As such, managerial ability ought to be accounted for when analysing the determinants of corporate policies and performance (Hermalin & Weisbach, 2017). Despite this, whether managerial ability improves or reduces firm value remains an empirical question (Huang & Xiong,

2022). Aktas et al. (2019) found that managerial traits, particularly CEO overconfidence, positively influence the marginal value of corporate cash holdings in US firms. This study investigates whether managerial ability impacts the value of corporate cash holdings.

The literature identifies managerial ability as one of the key managerial attributes of interest not only to corporate investors but to academics, policymakers, and the public. Aktas et al. (2019) show that majority of corporate cash holdings studies do not control for the idiosyncratic attributes of managers and assume all managers are rational. Corporate cash holding decisions include estimating the optimum cash levels, forecasting changes in the macroeconomic environment, tracking deviations from the target cash levels, and adjusting cash holdings through the accumulation of cash or dissipation of cash via capital expenditure or redistributions (Cho et al., 2018). These decision-making skills suggest that high-ability managers will manage cash holdings much more efficiently.

Studies relating managerial ability to cash holdings are still sparse, despite the apparent significance of managerial talent to business performance and decisions. The purpose of this study is to determine if managerial skill influences the correlation between corporate cash holdings and firm value:

$H_2$ : Managerial ability has a direct impact on the firm value-cash holdings nexus.

## Methodology

### Sample and data

To test our hypotheses, we obtain financial data of JSE-listed non-financial firms from the IRESS database, institutional and macroeconomic data from the World Bank, Federal Reserve Economic Data (FRED), and Bureau for Economic Research (BER). Our final sample consists of 2292 observations from 2000 to 2020.

The dependent variable, firm value is measured using Tobin's Q and the market-to-book ratio (MTB). Both Tobin's Q and the market-to-book ratio have been used to measure firm value in a plethora of corporate governance studies (Chen & Srinivasan, 2023; Gupta et al., 2009). The independent variables include Cash<sub>it</sub><sup>f</sup>, firm-specific factors ( $X_{it}^f$ ), institutional factors ( $X_{it}^I$ ), and macro factors ( $X_{it}^m$ ). Table 1 provides details regarding the variable construction and where data were sourced from.

### Estimating the relationship between firm value and corporate cash holdings

To test how the market valuation of cash holdings varies with changes in internal and external variables, the study borrows from the valuation model of Fama and French (1998), which originally investigated the influence of debt and dividend distribution on firm value. Pinkowitz et al. (2006) adapted the Fama and French model to determine the relationship between cash holdings and firm value. Testing this relationship enables the researcher to test the transactional

**TABLE 1:** Description of variables.

Code	Description	Source	Measurement
$V_{i,t}$	Firm value	IRESS	Tobin's Q (MTB is also used for robustness)
<b>Independent variable</b>			
$Cash_{i,t}$	Cash	IRESS	Cash and short-term investments deflated by total assets
MA	Managerial ability	IRESS	Computed using Data Envelopment Analysis (DEA) as developed by Demerjian et al. (2012)
<b>Control variables</b>			
<b>Firm-specific factors</b>			
$SIZE_{i,t}$	Firm size	IRESS	Natural logarithm of the book value of firm i's total assets of firm i at time t
$LEV_{i,t}$	Leverage	IRESS	Short-term debt, plus the long-term debt scaled by the total assets of firm i at time t
$DIV_{i,t}$	Dividends	IRESS	An indicator variable assuming the value of one (1) when firm i paid a dividend in year t, otherwise it is equal to zero (0).
$LIQ_{i,t}$	Liquid asset substitutes	IRESS	Net working capital less cash scaled by the total assets of firm i at time t
$CF_{i,t}$	Cash flow	IRESS	Earnings after interest, dividends, and taxes, but before depreciation of firm i, deflated by its total assets at time t.
$CAPEX_{i,t}$	Capital expenditure	IRESS	Capital investment, deflated by total assets of firm i at time t.
<b>Institutional factors</b>			
FD	Financial development	World Development Indicators (WDI)	The ratio of private credit to GDP.
SRP	Shareholder rights protection	WDI	Anti-director index is an up-to-date index that reflects the extent of protection afforded to shareholder rights
CRED	Creditor rights protection	WDI	Creditor rights aggregate score
COR	Corruption	Worldwide Governance Indicators (WGI)	A publicly available measure that indicates the extent of the abuse of public power used for personal benefit, considering both small and large forms of corruption
P_Stab	Political stability	WGI	Quantifies the general opinion regarding the probability of political instability and disturbances that are political motivated such terrorism
<b>Macro factors</b>			
EPU	Economic policy uncertainty	Federal Reserve Economic Data (FRED)	The annualised quarterly ratings from the World Uncertainty Index published by FRED (useful for South Africa which is excluded from Economic Policy Uncertainty Index of Baker et al. [2016])
BC	Business confidence	Bureau of Economic Research (BER)	Quantified by assessing the confidence that manufacturers, wholesalers, retailers, building contractors, and new vehicle sales dealers have about prevailing conditions
MP	Monetary policy	WDI	If the annual average interest rate increases, the monetary policy that year is contractionary (takes the value of 1), otherwise it is expansionary (takes the value 0)
EG	Economic growth	WDI	The rate of change in gross domestic product (GDP)

Source: Chireka, T., & Moloi, T. (2023). Managerial ability and corporate cash holdings adjustment speed in South African listed firms. *Acta Commercii*, 23(1), 1–10. <https://doi.org/10.4102/ac.v23i1.1180>

and precautionary motives of holding cash, to test the free cash flow theory, and to ascertain the existence of an optimal cash holdings level (Martinez-Sola et al., 2013).

This study predicts a nonlinear relationship between firm value and corporate cash holdings. We, therefore, deploy a

quadratic function that regresses firm value against the variable Cash and its square ( $Cash^2$ ) as used in Martinez-Sola et al. (2013) and Nguyen et al. (2016). The regression equation is specified as follows:

$$V_{i,t} = \alpha + \beta_1 Cash_{i,t} + \beta_2 Cash_{i,t}^2 + \sum_{k=0}^n \beta_l X_{i,t}^f + \sum_{k=0}^n \beta_l X_{i,t}^l + \sum_{k=0}^n \beta_l X_{i,t}^m + \varepsilon_{i,t} \quad [\text{Eqn 1}]$$

where the outcome variable ( $V_{i,t}$ ) denotes the firm value proxied by Tobin's Q and the MTB. The main independent variable is  $Cash_{i,t}$ . We control for firm-specific factors ( $X_{i,t}^f$ ), institutional factors ( $X_{i,t}^l$ ), and macro factors ( $X_{i,t}^m$ ). These are defined in Table 1.

For statistical inference of the firm value-cash holdings model (equation 1), we use the system-GMM estimator. Previous studies (Drobetz et al., 2010; Martinez-Sola et al., 2013; Nguyen et al., 2016) have used the standard difference Generalised Method of Moments (GMM) of Arellano and Bond (1991). Generalised Method of Moments controls for unobserved heterogeneity and mitigates problems arising from possible endogeneity, which is a common problem in corporate cash holdings literature (Nguyen et al., 2016; Ozkan & Ozkan, 2004). However, system GMM has better asymptotic and finite sample properties than the straightforward first-differences GMM estimator (Blundell & Bond, 1998; Bond, 2002). Roodman (2009) posits that system GMM ameliorates problems such as the fixed effects (unobserved firm-specific, institutional and macroeconomic effects) in the observations, and endogeneity of independent variables, multicollinearity amongst the independent variables, and lagging and present realisations of the error term; omitted variables' bias which persist over time; heteroskedasticity and autocorrelation within firms (Roodman, 2009).

To test if our estimates are consistent, we ran two post estimation tests. Firstly, the Sargan test of over-identification to test if the instruments were valid. Secondly, the Arellano-Bond (AR2) autocorrelation to test the absence of second-order autocorrelation in the first-differenced residuals (Arellano & Bond, 1991).

#### *Managerial ability, firm value, and corporate cash holdings levels*

To test whether managerial ability acts as a moderator of the impact of cash holdings on firm value, we use the following model:

$$V_{i,t} = \alpha + \beta_1 Cash_{i,t} + \beta_2 MA_{i,t} + \beta_3 MA_{i,t} \times Cash_{i,t} + \beta_4 Cash_{i,t}^2 + \sum_{k=0}^n \beta_l X_{i,t}^f + \sum_{k=0}^n \beta_l X_{i,t}^l + \sum_{k=0}^n \beta_l X_{i,t}^m + \varepsilon_{i,t} \quad [\text{Eqn 2}]$$

where MA is the managerial ability score measured by adopting Demerjian et al. (2012)'s DEA score. Managerial ability (MA) is interacted with Cash to determine whether it is a moderator of the impact of cash holdings on firm value. We control for firm specific, institutional, and macroeconomic factors.



## Measuring managerial ability

Demerjian et al. (2012) developed a two-step procedure to gauge management aptitude. In the first step, they estimate the technical efficiency of firms using the DEA-based optimisation model. According to DEA estimates, a company's output (sales) depends on how it uses its seven primary inputs: property, plant, and equipment (PPE), operating leases (OpsLease), goodwill and other intangible assets (OtherIntan), selling, general, and administrative (SG&A), and research and development (R&D).

A display of the optimisation model used is as follows:

$$\max_y \theta = \frac{\text{Sales}}{\gamma_1 \text{COGS} + \gamma_2 \text{SG \& A} + \gamma_3 \text{PPE} + \gamma_4 \text{OpsLease} + \gamma_5 \text{R \& D} + \gamma_6 \text{Goodwill} + \gamma_7 \text{OtherIntan}} \quad [\text{Eqn 3}]$$

The optimisation model technical efficiency measure ( $\sigma$ ) can take on any value between zero and one ( $0 < \sigma < 1$ ).

The company factor and managerial factor are both included in the DEA score for technical efficiency, much like the conventional measures of managerial skill such return on assets (ROA). Demerjian et al. (2012) employ a second step to quantify operational efficiency by separating the managerial factor from the firm-related factor in order to achieve a more accurate estimate of managing skill. The technical efficiency of a firm is regressed against six firm-specific parameters (firm size, market share, positive cash flow, age, complex multi-segment, and foreign operations) that either support or undermine managerial efforts. The following is how the authors estimate a Tobit regression:

$$\text{Firm Efficiency} = \alpha + \beta_1 \ln(\text{Total Assets}_{i,t}) + \beta_2 \text{Market Share}_{i,t} + \beta_3 \text{Positive Free Cash Flow}_{i,t} + \beta_4 \ln(\text{Age}_{i,t}) + \beta_5 \text{Foreign Currency}_{i,t} + \varepsilon_{i,t} \quad [\text{Eqn 4}]$$

**TABLE 2:** Descriptive statistics.

Variables	Mean	Median	SD	Range	Min	Max	Count
Tobin's Q	1.835	1.329	1.885	36.159	-2.310	33.849	2357
MTB	2.556	1.520	8.683	340.690	-5.990	334.700	2357
CASH	0.133	0.097	0.125	0.988	0.000	0.988	2357
MA	0.600	0.585	0.302	1.000	0.000	1.000	2357
SIZE	14.923	15.074	1.970	20.891	8.649	29.540	2357
LEV	0.547	0.521	0.338	3.612	0.000	3.612	2357
LIQ	0.035	0.035	0.261	3.826	-2.925	0.902	2357
CAPEX	0.059	0.041	0.069	0.686	0.000	0.686	2357
CF	0.058	0.049	0.104	1.982	-1.255	0.727	2357
DIV	0.683	1.000	0.465	1.000	0.000	1.000	2357
COR	0.089	0.020	0.209	0.734	-0.184	0.550	2357
P_Stab	-0.133	-0.146	0.130	0.528	-0.313	0.215	2357
SHP	7.829	8.000	0.376	1.000	7.000	8.000	2357
CRED	5.812	6.000	1.151	2.800	4.200	7.000	2357
FD	121.979	124.094	9.151	45.105	97.317	142.422	2357
BC	43.751	40.500	15.803	58.750	21.750	80.500	2357
EPU	0.546	0.495	0.375	1.284	0.059	1.343	2357
MP	0.451	0.000	0.498	1.000	0.000	1.000	2357

Note: The summary statistics for each variable utilised in this investigation are shown in this table. Detailed explanations of the variables are offered in Table 1.

SD, standard deviation; MTB, market-to-book ratio; CASH, cash holdings; MA, measure of managerial ability; SIZE, firm size; LEV, leverage; LIQ, liquid asset substitutes; CAPEX, capital investment; CF, cash flow; DIV, dividend payment; COR, corruption; P\_Stab, political stability; SHP, shareholder rights protection; CRED, creditor rights protection; FD, financial development; BC, business confidence; EPU, economic policy uncertainty; MP, monetary policy; EG, economic growth.

Positive free cash flow is an indicator variable that is equal to 1 in the case of positive operating cash flow and 0 in the absence of it. Another indicator variable is the foreign currency indicator, which takes a value of 0 if the company does not have any export sales and 1 if it does. Although it cannot be quantified using accounting data, managerial ability (MA) can be approximated using the residual of model (4) above (Demerjian et al., 2012). The study posits that managerial ability, a key driver of corporate efficiency, increases with the residual value of each firm.

Studies have found the Demerjian et al. (2012) managerial ability construct to be a very reliable model to measure managerial ability (Doukas & Zhang, 2021; Khan et al., 2022). The Demerjian et al. (2012) construct is thus used in this study to examine how management ability moderates the relationship between firm value and cash holdings.

## Ethical considerations

Ethical clearance to conduct this study was obtained from the University of Johannesburg School of Accounting Research Ethics Committee (SAREC). The ethical clearance number is SAREC20221124/04.

## Results

### Descriptive statistics

Table 2 displays the descriptive statistics of all factors used in this investigation. The mean for the dependent variable, Tobin's Q is 1.835 and MTB is 2.556. These values are comparable to those reported by Martínez-Sola et al. (2013) for US firms. The means for the two measures of firm value (Tobin's Q and MTB) are both greater than the respective medians indicating most of the firms in our sample have values less than the average firm value. The mean (median)

for CASH is 0.133 (0.097) while that of MA is 0.6(0.585). The summary statistics for the control variables are also shown in Table 2.

Table 3 presents the Pearson correlation coefficients between the independent variables used in this study. The results show that all coefficients are well below 0.8 indicating that our analysis does not suffer from multicollinearity issues.

### Regression results: Firm value and corporate cash holdings

We estimate Equation (1) the preferred system generalised moment of movement (system-GMM). We also report estimates from fixed effects (FE), random effects (RE), and the GMM estimators for robustness. The dependent variable, Tobin's Q, is used to represent firm value. The results in Table 4 show that there is a significant (at 1%) and positive relationship between firm value and CASH. The results also show that firm value and CASH<sup>2</sup> are significantly, but inversely, related. The signs of these two coefficients are consistent across the four estimators indicating that the relationship is robust.

These results indicate that increases (as shown by the positive relationship with CASH) in corporate cash holdings will initially lead to increases in firm value until an inflection point, after which additional cash holdings will begin to be detrimental to firm value (as shown by the negative relationship with CASH<sup>2</sup>). This is similar to previous studies that found that CASH is positive and significantly related to firm value while CASH<sup>2</sup> has a negative and significant influence (Azmat, 2014; Martínez-Sola et al., 2013; Nguyen, 2019). Our findings provide new evidence of the quadratic relationship between cash holdings and firm value from an emerging economy. This confirms that South African NCFs have optimal cash holdings.

An inverted U-shape function between firm value and cash holdings confirms the two distinguishable effects of cash

reserves on firm value. On the one hand, when cash holdings are low, there will be more precautionary and transaction motives to increase cash such that additional cash holdings will result in gains in firm value. On the other hand, when cash holdings have surpassed the inflection point, the free cash flow problem and the opportunity cost associated with 'lazy' cash piles will become more prevalent. From this point, an increase in cash holdings will be followed by a fall in firm value. Literature identified this inflection point as the optimal (target) cash holdings level (Martínez-Sola et al., 2013).

Table 4 also shows the results of control variables formulated from financial, institutional, and macroeconomic factors. The results show that the lagged variable of Tobin's Q (Tobin's Q L1) relates positively with Tobin's Q. This means prior year firm value is a significant indicator of firm value.

### Firm specific determinants of firm value

Firm specific (financial) factors controlled for are firm size (SIZE), leverage (LEV), liquid asset substitutes (LIQ), capital investment (CAPEX), cash flow (CF), and dividend payment (DIV). The variable, SIZE is significant and negatively related to firm value suggesting that larger firms become inefficient and agency costs become high. Nguyen et al. (2017) and Martínez-Sola et al. (2013) found a similar association between firm size and its value. The study finds a significantly positive influence of LEV, which is consistent with corporate finance and shareholder power theories that debt increases firm value. The LIQ is positively related to firm value confirming the importance of working capital to the health of business. The CAPEX also exerts a significantly positive effect on firm value consistent with the trade-off and pecking order theories. Capital expenditure creates goodwill and generates value creating assets. The positive coefficient of CF is also significant giving further proof that cash is king.

**TABLE 3:** Correlation matrix.

Variables	CASH	MA	SIZE	LEV	LIQ	CAPEX	CF	DIV	COR	P_Stab	SHP	CRED	FD	BC	EPU	MP	EG
CASH	1.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MA	-0.049	1.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SIZE	-0.220	0.236	1.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LEV	-0.009	-0.052	0.172	1.000	-	-	-	-	-	-	-	-	-	-	-	-	-
LIQ	-0.308	0.202	-0.021	-0.445	1.000	-	-	-	-	-	-	-	-	-	-	-	-
CAPEX	-0.066	-0.261	0.006	0.007	-0.128	1.000	-	-	-	-	-	-	-	-	-	-	-
CF	0.126	-0.057	0.066	-0.001	-0.056	0.212	1.000	-	-	-	-	-	-	-	-	-	-
DIV	0.017	0.241	0.256	-0.037	0.152	-0.074	0.114	1.000	-	-	-	-	-	-	-	-	-
COR	0.065	-0.111	-0.198	-0.058	-0.016	0.058	0.055	-0.009	1.000	-	-	-	-	-	-	-	-
P_Stab	0.070	-0.052	-0.025	-0.050	0.004	0.070	0.059	0.032	0.009	1.000	-	-	-	-	-	-	-
SHP	-0.024	0.042	0.179	0.048	0.037	-0.028	-0.026	0.038	-0.671	0.350	1.000	-	-	-	-	-	-
CRED	0.089	-0.099	-0.128	-0.081	-0.013	0.089	0.079	0.020	0.359	0.692	-0.074	1.000	-	-	-	-	-
FD	0.025	0.011	0.055	-0.009	0.022	0.035	-0.020	0.031	-0.196	0.639	0.588	0.151	1.000	-	-	-	-
BC	0.055	-0.094	-0.118	-0.061	-0.008	0.053	0.054	0.032	0.519	0.462	-0.233	0.454	0.251	1.000	-	-	-
EPU	-0.075	0.130	0.169	0.070	0.027	-0.066	-0.098	0.022	-0.620	-0.180	0.491	-0.619	0.272	-0.469	1.000	-	-
MP	-0.028	0.041	0.070	0.027	0.017	-0.012	-0.046	0.003	-0.104	0.039	0.229	-0.387	0.374	0.076	0.533	1.000	-
EG	0.056	-0.082	-0.140	-0.076	0.005	0.083	0.016	0.033	0.496	0.419	-0.324	0.449	0.283	0.770	-0.261	0.100	1.000

Note: The correlations between the independent variables utilised in this investigation are shown in this table. Table 1 provides the variables' detailed definitions.

CASH, cash holdings; MA, measure of managerial ability; SIZE, firm size; LEV, leverage; LIQ, liquid asset substitutes; CAPEX, capital investment; CF, cash flow; DIV, dividend payment; COR, corruption; P\_Stab, political stability; SHP, shareholder rights protection; CRED, creditor rights protection; FD, financial development; BC, business confidence; EPU, economic policy uncertainty; MP, monetary policy; EG, economic growth.

**TABLE 4:** Corporate cash holdings and firm value.

Variables	Sys-GMM	p-value
Tobin's Q L1	0.488	0.000***
CASH	0.346	0.000***
CASH <sup>2</sup>	-0.396	0.000***
SIZE	-0.011	0.000***
LEV	0.360	0.000***
LIQ	0.149	0.000***
CAPEX	0.475	0.000***
CF	0.263	0.000***
DIV	0.027	0.000***
Corruption	0.214	0.000***
Pol_Stab	0.228	0.000***
FD	0.000	0.602
SHP	0.032	0.000***
CRED	-0.016	0.000***
BC	-0.002	0.000***
EPU	-0.033	0.000***
MP	-0.004	0.000***
EG	0.012	0.000***
R <sup>2</sup>	-	-
No. of observations	2110.000	-
Prob > Chi <sup>2</sup>	0.000	-
Prob > F	-	-
AR (1) p > Z	0.006	-
AR (2) p > Z	0.538	-
Sargan's test	0.988	-

Note: Table 4 presents regression outputs for the model that determines the influence of CASH on firm value. Tobin's Q is used as the dependent variable (firm value). The CASH and CASH<sup>2</sup> are measures for corporate cash holdings. Control variables include financial, institutions, and macroeconomic variables defined in Table 1. The Arellano-Bond test is used to test for serial correlation. The Sargan test is employed to test for over-identifying restrictions.

GMM, generalised method of moments; CASH, cash holdings; MA, measure of managerial ability; SIZE, firm size; LEV, leverage; LIQ, liquid asset substitutes; CAPEX, capital investment; CF, cash flow; DIV, dividend payment; COR, corruption; P\_Stab, political stability; SHP, shareholder rights protection; CRED, creditor rights protection; FD, financial development; BC, business confidence; EPU, economic policy uncertainty; MP, monetary policy; EG, economic growth.

\*\*\*, 1%; \*\*, 5%; \*, 10% significance levels respectively.

The DIV is also positive and significant in line with the signalling theory of dividends. The results of the firm specific factors are generally consistent with the findings of Martínez-Sola et al. (2013).

### Institutional determinants of firm value

The study also controls for several institutional factors. We find that COR is positively associated with firm value. This is consistent with the view that corruption 'greases the wheels' of otherwise inefficient economic systems and subsequently aids businesses in navigating too much regulation (Méon & Weill, 2010), lowering the transaction costs related to launching new products (Krammer, 2019). Pol\_Stab is also significant and positive. However, the coefficient of FD is insignificant.

Importantly, SHP is positive and significant. This indicates that when shareholders have power, agency costs are reduced and firm value increases. A high protection of shareholder rights enables shareholders to actively proscribe the expropriation of invested capital by extractive managers (Djankov et al., 2008). Empowered shareholders are capacitated to participate in the corporate decision-making, to have access to financial and strategic information,

and reduce the information asymmetry in the market, leading to increased firm value (Dallas, 2004).

The CRP is also significant but negative indicating that creditor rights aid financial development and credit supply, which lowers the cost of accessing external markets and the need to hoard cash.

### Macroeconomic determinants of firm value

We discover evidence that macroeconomic conditions affect corporate value, which is in line with earlier research. Additionally, EPU has a negative correlation with company value, similar to the findings of Olalere and Mukuddem-Pettersen (2022) who argued that high EPU is detrimental to firm value as managers behave irrationally during periods of uncertainty. MP and BC are also inversely and significantly related with firm value, consistent with the findings of Bianconi and Yoshino (2015). Finally, the coefficient of EG is significantly positive, which is consistent with the findings of Karakus and Bozkurt (2017).

### Diagnostic test

The Arellano-Bond, AR(1), and AR(2) tests are used in the study to check for serial correlation in the residuals. The results in Table 5 show that the error term in the first-order test is correlated. However, the second-order test is insignificant meaning we fail to reject the null hypothesis that there is no second-order autocorrelation in the differenced residuals. The GMM estimation findings would be deemed invalid if there was considerable second-order serial correlation, as this would suggest that the instruments are not valid and endogenous. Therefore, the error term of the first difference equation must introduce a serial correlation in the first-order test, AR(1). However, there is no serial correlation in the error term in the second-order test. Therefore, the study does not reject the null hypothesis of no second-order autocorrelation. The results of the Sargan test also fail to reject the null hypothesis of the validity of the IV. As a result, the study finds that the instruments were valid. The dependent variable can be significantly predicted by the independent factors, according to the Wald test results.

### The moderation role of managerial ability

We present the results of the moderating role of managerial ability (equation 2) in Table 5. The results are estimates from the system-GMM estimator. For robustness, we introduce Panel 1, which uses the MTB ratio to proxy firm value while panel 2 shows results when Tobin's Q is used as the dependent variable (as in Equation 1). Both model (1) and (2) reveal that CASH has an inverse effect on firm value. The coefficients of the interaction variable (MA\*CASH) in models (1) and (2) are positive and significant at 10% and 1% levels, respectively. These findings indicate that the negative relationship between cash holdings and firm value is reversed by high

**TABLE 5:** The effect of managerial ability on the firm value and corporate cash holdings relationship.

Variables	Panel (1)	p-value	Panel (2)	p-value
Tobin's Q L1	-	-	0.303	0.000***
MTB L1	0.295	0.000***	-	-
CASH	-2.768	0.000***	-0.934	0.000***
MA*CASH	2.790	0.000***	0.191	0.015**
MA	-0.001	0.960	0.091	0.000***
CASH <sup>2</sup>	-1.517	0.000***	1.529	0.000***
SIZE	-0.338	0.000***	-0.130	0.000***
LEV	1.328	0.000***	0.306	0.000***
LIQ	0.430	0.000***	0.290	0.000***
CAPEX	-1.137	0.000***	-0.331	0.000***
CF	-1.115	0.000***	-0.481	0.000***
DIV	0.427	0.000***	0.118	0.000***
COR	-1.628	0.000***	-0.280	0.000
P_Stab	-0.371	0.000***	0.400	0.000***
FD	0.030	0.000***	0.011	0.000***
SHP	-1.025	0.000***	-0.486	0.000***
CRED	0.254	0.000***	0.083	0.000***
BC	0.042	0.000***	0.013	0.000***
EPU	0.133	0.000***	-0.160	0.000***
MP	0.254	0.000***	0.122	0.000***
EG	-0.078	0.000***	0.002	0.045**

Note: Table 5 presents the results of model 2), which test whether managerial ability moderates the relationship between firm value and corporate cash holdings. Panel 1) presents results using MTB to measure firm value. Panel 2) shows results when Tobin's Q is used to represent firm value. The key variable introduced in the model is the interaction variable MA\*CASH), which is a product of managerial ability and cash holdings. The definitions of all the other variables are given in Table 1.

MTB, market-to-book ratio; CASH, cash holdings; MA, measure of managerial ability; SIZE, firm size; LEV, leverage; LIQ, liquid asset substitutes; CAPEX, capital investment; CF, cash flow; DIV, dividend payment; COR, corruption; P\_Stab, political stability; SHP, shareholder rights protection; CRED, creditor rights protection; FD, financial development; BC, business confidence; EPU, economic policy uncertainty; MP, monetary policy; EG, economic growth.

\*\*\*, 1%; \*\*, 5%; \*, 10% significance levels respectively.

managerial ability. This conclusion corroborates our second hypothesis (H2) that managerial ability does moderate the association of firm value and corporate cash holdings. Highly capable managers are more efficient in their use of cash holdings to achieve competitive advantage and increase market power and market share. Moreover, high ability managers achieve goal congruency with shareholders by reducing information asymmetries and reducing agency costs (Ha, 2016). As such shareholders will value cash holdings, in firms with high ability managers, more favourably.

Our results are consistent with recent empirical research. Tsai et al. (2022) use a sample consisting of US non-utility firms and found that skilful managers increase firm value and will only adjust cash holding levels when the decision increases firm value. Chen et al. (2020) found that the quality of forecasting by high-ability managers remained high even in periods of elevated macroeconomic uncertainty. Their study also found that capable managers were likely to focus on earnings management, achieve superior earnings and accruals quality, and as such improve firm value.

More capable managers understand that cash is a critical strategic asset upon which the existence, success, and the sustainability of a firm depends (Gan & Park, 2017). The former discovered that the marginal value of currency is much increased by managers with greater skill. They observe

that companies run by extremely competent managers have higher market value for their cash holdings. We contend that high-ability managers are perceived as using company resources with greater caution and productivity.

Demerjian et al. (2012) also provides support for the findings of our study. The former found that more capable managers greatly enhance firm value as they have better ability to generate superior marginal outcome from the same number of corporate resources. Consequently, investors place greater marginal value on every Rand of cash held by capable managers than that held by less able managers (Demerjian et al., 2012). Cho et al. (2018) corroborate this by arguing that high ability managers are good stewards of corporate resources and are less likely to disgorge corporate cash holdings on inefficient investment projects.

## Conclusion

This study documents that corporate cash holdings have a significant influence on firm value. We make use of a sample of 2292 company year observations, drawn from non-financial firms that were listed on the JSE between 2000 and 2020. An inverted U-shape is observed in the link between firm value and cash holdings, which signifies that an increase in cash holdings results in gains in firm value until the optimal point. Any further increase in cash holdings past the optimal level will be met with a corresponding fall in firm value. Furthermore, our system-GMM estimation results demonstrated the substantial impact of institutional and macroeconomic determinants on firm value. Our findings demonstrate that economic growth, shareholder rights protection, and corruption all positively affect firm value, adding to the body of knowledge already available on the impact of institutional and macroeconomic factors on corporate qualities. We discover that monetary policy, business confidence, creditor rights protection, and economic policy uncertainty are all inversely correlated with firm value.

Furthermore, our research looks into the relationship that exists between corporate cash holdings, managerial skill, and business worth. We discover that companies' cash holdings under high-ability managers have greater value than those in firms with less able managers. Our results show that management talent moderates the relationship between firm value and corporate cash holdings, which extends empirical studies on the Upper Echelon hypothesis (Hambrick & Mason, 1984). High-ability managers attract favourable market valuation for their cash holdings because of their superior competences in forecasting and managing complex projects, especially in institutional and macroeconomic environments experiencing high volatility and uncertainty.

This study has significant practical implications for businesses. Specifically, our results show that cash holdings can have both positive and negative effects on firm value. We also show that managerial ability moderates the impact of cash holdings and firm value. This study argues that high-ability managers attract favourable market valuation



for their cash holdings. While previous studies have investigated the role of managerial ability on other firm targets such as tax avoidance, investment efficiency, and capital structure, the impact of managerial ability on firm value and cash holdings has not been sufficiently tested. This study contributes to literature by testing the moderating effects of managerial ability on the firm value–cash holdings nexus. Future studies can expand literature by investigating the effect of managerial ability of the firm value of financial firms.

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## Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

## Authors' contributions

T.C. is responsible for the design and execution of the research, the analysis and interpretation of results, and the writing of the article. T.M. supervised the work.

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## Data availability

The data used in this study are available from the corresponding author, T.C. on request.

## Disclaimer

The views and opinions expressed in this article are those of the authors and are the product of professional research. They do not necessarily reflect the official policy or position of any affiliated institution, funder, agency, or that of the publisher. The authors are responsible for this article's results, findings, and content.

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