economies

Article

The Influence of Operating Capital and Cash Holding on Firm Profitability

Ashfaq Habib [1], Muhammad Asif Khan [2,3,*], József Popp [4,*] and Mónika Rákos [5]

[1] Department of Business Administration, University of Poonch, Rawalakot 12350, Pakistan; ashfaqhabib@upr.edu.pk
[2] Department of Commerce, Faculty of Management Sciences, University of Kotli, Kotli 11100, Pakistan
[3] School of Economics and Management, University of Johannesburg, Johaneesburg 2006, South Africa
[4] Department of Management, Faculty of Applied Sciences, WSB University, 43-100 Dabrowa Górrnicza, Poland
[5] Faculty of Economics and Business, University of Debrecen, 4032 Debrecen, Hungary; rakos.monika@econ.unideb.hu
* Correspondence: khanasif82@uokajk.edu.pk (M.A.K.); popp.jozsef@uni-neumann.hu (J.P.)

Abstract: This study analyzes the influence of operating capital on a firm's profitability in the manufacturing sector of China. The study investigates that operating capital develops a non-linear relationship with firm profitability by using the ordinary least square (OLS), fixed effect (FE), and generalized method of moments (GMM) regression. The research reveals that positive operating capital in financially less-constrained firms significantly negatively influences the firm's profitability. Conversely, negative operating capital in financially constrained firms significantly positively influences the firm's profitability. Further, we find that financially less-constrained firms design an efficient level of operating capital by holding positive operating capital and negative cash, while constrained firms design an efficient level of operating capital by holding negative operating capital and positive cash. Additionally, we also identify the optimal level of operating capital to increase the firm's profitability. Generally, we conclude that a firm can design a level of efficient operating capital by trading-off cash with non-cash assets.

Keywords: operating capital; cash holding; financial constrained firms; less-constrained firms

Citation: Habib, Ashfaq, Muhammad Asif Khan, József Popp, and Mónika Rákos. 2022. The Influence of Operating Capital and Cash Holding on Firm Profitability. *Economies* 10: 69. https://doi.org/10.3390/economies10030069

Academic Editor: Andreia Dionísio

Received: 27 October 2021
Accepted: 9 February 2022
Published: 21 March 2022

1. Introduction

The importance of operating capital management has been critically discussed in all corporate finance textbooks. Research-oriented articles have also highlighted the significance of operating capital management for corporations (Akbulut 2011). An extensive body of literature has pointed out that operating capital plays a pivotal role in the development of corporate strategy for maximizing a firm's value. In recognition of this importance, the Chief Finance Officers (CFO) magazine in the United States of America (USA) annually publishes the operating capital management performance of many countries' listed firms.

A firm's operating capital comprises operating assets and operating liabilities. Operating assets such as cash, marketable securities, inventories and accounts receivable are used to pay for operating liabilities such as accounts payable and short term debts in order to run business operations smoothly (Aktas et al. 2015). The net operating capital is the difference between operating assets and operating liabilities and is a source of liquidity. Investment in net operating capital shows the portion of operating capital that is retained by a firm within one operating cycle. The net operating capital is a major source of liquidity for making payments to suppliers on time and running the business operation smoothly (Ayyagari et al. 2010). Similarly, operating liabilities are the fundamental source of external finance because they support the encounter to challenges faced by a firm in order to raise long term finance externally (Baños-Caballero et al. 2014). Hence, operating capital along

with fixed capital is an important source of finance in order to run business operations in the long term.

Firms maintaining a higher level of operating capital are in a position to maintain large inventories for controlling input price fluctuations and distributions. Large operating capital also assists in increasing the trade credit and enjoying cash discounts to make payment on time (Bates et al. 2009). Further, with higher operating capital, a firm can relax trade credit policies with potential customers to increase sales revenue. However, a higher level of operating capital is not free of cost. Higher investment in operating capital requires additional financing, which increases cost and promotes bankruptcy risk (Burney et al. 2021). Moreover, large investments in operating capital restrain the firm's capacity to invest in profitable projects and increases the opportunity cost of capital. On the other hand, firms maintaining a lower level of operating capital hold a minimum amount of cash, maintaining a lower level of inventory and implementing more rigid credit standards to extend trade credit to customers (Charitou et al. 2001). This reduces the firm's interest expenses and the opportunity cost of capital, but can be the result of a liquidity crisis, dearth of inventory and decrease in sales revenue. Firms may also fail to pay vendors on time and increase their short term bankruptcy cost. Further, a lower level of liquidity increases the financing cost of business to a higher credit risk, which eventually accelerates financial distress costs (Cull et al. 2015).

Managers are consistently focusing on setting the desired level of operating capital by operating their business operations smoothly. A smooth operational strategy demands maintenance of an efficient level of operating capital and increases profitability. Efficient operating capital meets operating obligations on time and reduces over-investment in liquidity assets (Dang et al. 2014). Hence, efficient operating capital helps to increase profitability by setting an efficient level for different components such as cash, marketable securities, inventories and accounts payables, etc. (De Jong et al. 2011). However, it has been observed that a firm's profitability is not only increased by maintaining an efficient level of operating capital, but also by maintaining the optimal level of operating capital. However, investigating and setting an optimal level of operating capital is not an easy task, because the level of operating capital is influenced by a firm's fundamental factors and a country's economic position.

Recently, (Mun and Jang 2015; Dhole et al. 2020) investigated a non-linear relationship between firm operating capital and firm profitability. Their study found that a higher level of operating capital negatively affects a firm's profitability and a lower level of operating capital influences profitability positively (Dong and Su 2010). The contribution of this study is to investigate the association between operating capital and a firm's profitability in both financially constrained and less constrained firms. Further, a novel factor is traced by investigating the moderating role of cash in the relationship between operating capital and firm profitability in both constrained and less constrained firms. Moreover, a unique classification scheme of dividend payout ratio, leverage and credit rating is developed to segregate firms into financially constrained and less constrained firms. Therefore, the aim of this study is to examine the non-linear relationship between operating capital and firm profitability in financially constrained and less-constrained firms. The study also focuses on investigating the interactive effect of cash in the relationship between operating capital and firm profitability in order to set an efficient level of operating capital. Further, this research also identifies the optimal level of operating capital for constrained and less-constrained firms, respectively. The structure of this research study consists of an introduction, literature review and hypothesis development, data and variable explanation, research methodology and model explanation, results and discussion, conclusion, and managerial implication.

2. Literature

2.1. Operating Capital and Financial Constraints

Under the perfect market hypothesis, maintaining liquidity is irrelevant because the firms can raise funds to finance investment opportunities at a reasonable cost. The

irrelevance hypothesis states that the total wealth of shareholders is unchanged, whether the firm invests the liquidity within itself or distributes it among shareholders (Edwards et al. 2016). On the other hand, recent studies have shown that liquidity is an important factor that determines shareholders' wealth and affects the value of a firm (Enqvist et al. 2014). The firms' operating capital is an important source of liquidity in the management of business operations. The firm's financial position is an essential factor that may determine its level of operating capital.

(Ayyagari et al. 2010; Fatemi and Luft 2002) examined the significance of informal finance and investigate that financially less-constrained invest more in operating capital to manage day-to-day business operations. Similarly, (Guariglia et al. 2011; Faulkender et al. 2012) used the data of Chinese private firms and find that financially sound firms maintain positive operating capital for increasing sales revenue and reap the benefits of growth opportunity opportunities. Likewise, (Bates et al. 2009; García-Teruel and Martínez-Solano 2007) investigated that firms having lower debt ratio and opportunity to generate funds externally maintain the higher operating capital to smooth functioning of business operations and pay current obligations on time. Consistent with these arguments, (Sangalli 2013; Goodell et al. 2021) determined that firms do face financial constraints, invest more in inventory, extend the trade credits to customers and pay suppliers in time to avail the cash discount.

Additionally, (Aktas et al. 2015; Guariglia et al. 2011) argued that debt holders of a firm prefer to maintain a sufficient level of operating capital to reduce the short-term bankruptcy cost of capital and pay interest on time. The higher operating capital needs to invest more in inventories, granting the trade credits and payment to suppliers. It gives the benefits of lower carrying cost of inventory, increases the sales revenue by extending the trade credits, and attracts new customers (Habib and Hasan 2017). Further, it also reduces the short-term bankruptcy cost and avails the trade discount to make payment to creditors on time (Habib and Hasan 2017). Hence, higher operating capital generates fruitful returns from the current operation of the business that give an assurance to the lender for the payment of annual interest expenses and principal amount due on time.

On the other hand, a higher operating capital not only promotes the agency cost of capital for securing the lender interest, but also disturbs the optimal level of operating capital that may negatively affect the firm profitability (Habib and Hasan 2017). The higher operating capital also increases the opportunity cost and financing cost of capital. A large amount of capital confined in operating capital also reduces the firm's ability for long-term investment and to earn higher returns. It also increases financing and the agency's cost of capital to generate additional financing to avail the investment opportunity (Habib and Hasan 2017). Further, the higher operating capital not only increases the opportunity cost of capital, but also increases the volume of external debt and interest expenses. Therefore, we propose our first hypothesis.

Hypothesis 1. *The financially less-constrained firms hold positive operating capital, which may negatively influence the firm profitability.*

On the other hand, (Baños-Caballero et al. 2014; Aktas et al. 2015) explained that constrained firms hold a lower operating capital to run the business operation smoothly and spare the large portion of capital to invest in more profitable projects. It reduces the short-term financing cost of capital and increases the positive effect on firm profitability. Likewise, (Edwards et al. 2016; Habib and Huang 2019) and (Dhole et al. 2020; Kieschnick et al. 2013) found that financially constrained firms set the lower operating capital to get the tax shield benefits and retain funds for profitable investment opportunities. Similarly, (Cull et al. 2015; Korajczyk and Levy 2003) used the data of Chines listed firms and explain that financially constrained firms have higher default risk, lower credit rating, expensive external financing, and higher agency cost. The study found that financially constrained firms maintain lower operating capital by adopting rigid credit policies to

extend trade credit, hold small inventory levels and delay payment to suppliers to increase the firm profitability.

Further, the packing order hypothesis also sets the hierarchy of funds and prefers to use the internal cash to avail the new investment projects. (Tong and Green 2005; Lantz 2008) argued that firm internal cash flows are a suitable source of finance to balance the equity and debt in a capital structure. In such a condition, financially constrained firms set the minimum operating capital and space the internal cash flows for long-term investment. Furthermore, (Dang et al. 2014; Manova et al. 2015) explained that it is not easy for financially constrained firms to set the optimal capital structure and need to maintain a lower operating capital for sparing funds for profitable investment opportunities. The lower operating capital reduces the agency cost of capital, helps to set the optimal capital structure, and spares the internal resources for long-term investment. It also increases the operational performance of the business by maintaining a lower level of inventories, reduces the collection cost of receivables, and fully enjoy the trade credit in due period.

Hypothesis 2. *The financially constrained firms hold negative operating capital, which may positively influence the firm profitability.*

2.2. Cash Holding and Financial Constraints

(Opler et al. 2001; Modigliani and Miller 1958) argued that firms are maintaining cash for transaction motives and precautionary motives to fulfill unforeseen needs, particularly when the external financing is costly. Further, (Charitou et al. 2001; Mun and Jang 2015) stated that any factors that negatively affect the consistency of cash flows from business operations may stimulate the firms to hold more cash as insurance against the risk of uncertainty for future cash flows. The trade-off, pecking order, and agency theories have advanced in the literature to discuss the significance of holding cash despite the opportunity cost associated with liquidity.

(Manova et al. 2015; Opler et al. 2001) explained that financially less-constrained firms have plenty of internal cash flows, and lower borrowing costs are likely to invest more in inventory and accounts receivables. Further, (Pinkowitz et al. 2013; Pais and Gama 2015) suggested that less-constrained firms increase their investment in operating capital with the increasing level of growth opportunities, the uncertainty of future cash flows, and limited access to the capital market. Likewise, (Habib and Huang 2019; Pinkowitz et al. 2013) and (Goodell et al. 2021; Raheman and Nasr 2007) found that less-constrained firms have an abundance of internal cash flows and also an opportunity to raise finance externally at a reasonable cost. Such firms maintain the higher operating capital and invest more to avail of profitability investment opportunities. Similarly, (Manova et al. 2015; Opler et al. 2001) documented that less-constrained firms invest more in operating capital and maintain lower cash holding to reduce the net cost of short-term liquidity. Likewise, (Edwards et al. 2016; Habib and Huang 2019) investigated that financially less-constrained firms maintain efficient operating capital by trading-off the non-cash assets with cash assets to increase the firm profitability.

Furthermore, (Korajczyk and Levy 2003; Sangalli 2013) investigated that the less-constrained firms invest more in operating capital to increase sales revenues. The firms maintain a large amount of inventories to reduce the risk of a shortage of inventories, adopt the liberal trade policy to increase the sales revenues, and delay payment to the suppliers without losing the relationship with them. The higher operating capital reduces the short-term bankruptcy cost of the firms. The less-constrained firms have lower-cost access to externally market and efficiently generate the cash flows from operations. Such types of firms do not need to retain large cash flows to support the business operations because they can raise funds externally at a lower-cost. Hence, the financially less-constrained firms design the efficient operating capital by holding the positive operative capital and negative cash holding.

Hypothesis 3. *The financially less-constrained firms hold the positive operating capital and negative cash holding to maintain an efficient operating capital.*

On the other hand, (Pais and Gama 2015; Habib and Hasan 2017) argued that financially constrained firms hold more cash and less-operating capital than the less-constrained firms. The financially constrained firms have limited access to generate funds externally and retain cash to run the business operations smoothly. Likewise, (Pais and Gama 2015; Habib and Hasan 2017) suggested that financially constrained firms maintain minimum operating capital and spare the internal cash holding to avail the investment opportunities. (Pais and Gama 2015; Habib and Hasan 2017) analyzed the cash holding and credit rating of large Korean public limited firms after the Asian financial crisis of 1997. The study indicated that the level of corporate cash holding is associated with a level of credit rating. Firms having poor credit rating are maintaining the more cash to reduce the cost of financing. Such firms maintain a lower level of operating capital and retain cash to meet the day-to-day business operations. Likewise, (Habib and Hasan 2017; Sharma and Kumar 2011) found that financially constrained firms maintain a lower level of operating capital and higher cash holding to reduce the risk of a shortfall in the near future. Moreover, (Faulkender et al. 2012; Tong and Green 2005) investigated that firms having high leverage, massive capital expenditure, and more volatility of cash flows are stimulating to hold the lower operating capital and hoarding more cash to run the business operations.

The literature shows that financially constrained firms have a limited amount of internal funds and a higher cost of borrowing externally. Hence, the constrained firms maintain a lower level of inventory to reduce its storing cost, adopt the strict credit policy to minimize the receivable cost, and make payment in time to develop a good relationship with the supplier (Ukaegbu 2014). While a lower level of operating capital increases the short-term bankruptcy cost of firms, the firms mitigate the bankruptcy risk by retaining a sufficient amount of internal cash flows to pay short-term business obligations (Zeballos et al. 2013). Therefore, the financially constrained firms design the efficient operating capital by holding the negative operating cash flows and positive cash holding.

Hypothesis 4. *The financially constrained firms hold the negative operating capital and positive cash holding to maintain an efficient operating capital.*

3. Materials and Methods

3.1. Sample Study

This study explores the relationship between operating capital and firm profitability of Chinese manufacturing firms from 2009 to 2019. The RESSET Chinese financial research database has been used to collect the financial data of listed manufacturing companies of the Shanghai stock exchange. There are 1560 manufacturing firms actively traded in the Chinese stock exchange, out of which only 780 companies have been selected for analysis due to complete data availability.

The data has been normalized by converting the 1% outliner into an average in the entire dataset. Further, data reliability is checked by using Cronbach's Alpha. The Alpha value (0.78) shows that there is no specific trend in data, and it can be used for research analysis. Finally, we have the data of 780 firms; consisting of 8580-panel observations for 2009 to 2019.

3.2. Definition of Variables

This study uses the Return on Equity (ROA = Operating earnings/total shares outstanding) as explained variables to reveal the influence of operating capital on firm profitability of manufacturing firms in China. The independent variables include Rate of Operating Capital (ROC = Operating capital/sales), Rate of Inventory (RINV = Inventory/sales), Rate of Accounts Receivable (RAR = Accounts receivables/sales) and Rate of Accounts Payable (RAP = Accounts payable/sales). Further, the whole sample is segre-

gated into positive ROC (cash and cash equivalent more than short term debt) and negative ROC (cash and cash equivalent less than short term debt) to more rationally examine the influence of operating capital on firm profitability. The purpose is to examine the behavior of positive and negative operating capital on firm profitability. The operating capital is a combination of cash assets and non-cash assets. The Rate of Cash Holding of cash assets (RCH = Cash and cash equivalent short-term debt/sales) is used as a measure of firm cash level. Similarly, the Rate of Cash Cycle on non-cash assets (RCC = Inventory + accounts receivables-trade payable/sales) is used as a measure of Rate of Cash Cycle. The study also uses the set of control variables leverage, firms' size, and sales growth to reveal the influence of operating capital firm on firm profitability.

The multicollinearity is checked by applying the Tolerance (Toler) and Variance Inflationary Factor (VIF). The test values of Toler and VIF of all explanatory variables are greater than 0.5 and less than 2, respectively, which indicates that the independent variables are not seriously correlated to each other. Table 1 represents the variables, their estimation, and test values of multicollinearity of all explanatory variables used in this study.

Table 1. Variable estimation and multicollinearity test.

Variables	Acronym	Formula	Multicollinearity	
			Tolr	VIF
Return on Equity	ROE	Operating income/total shares outstanding		
Rate of operating capital	ROC	Operating assets-operating liabilities/sales	0.87	1.14
Operating capital square	ROC^2	Square of ROC	0.82	1.16
Positive ROC	PROC	Cash and cash equivalent more than short term debt/sales	0.80	1.15
Negative ROC	NROC	Cash and cash equivalent less than short term debt/sales	0.83	0.13
Rate of cash holding	RCH	Cash and cash equivalent-short term debt/sales	0.79	1.25
Rate of cash cycle	RCC	Inventory + accounts receivables-trade payable/sales	0.84	1.17
Rate of inventory	RINV	Inventory/sales		
Rate of accounts Receivables	ARR	Accounts receivables/sales		
Rate of accounts payable	RAP	Accounts payables/sales		
Rate of firm size	RFS	Total assets/sales	0.96	1.03
Rate of sales growth	RGRW	Percentage growth in sales	0.89	1.09
Rate of Leverage	RLEV	Long term debt/total assets	0.87	1.13

Further, this study uses the dividend payout ratio, leverage, and credit rating to segregate the firms into financially constrained and less-constrained firms. The firms that pay the regular dividend in consecutive three years maintain the lower leverage, and better credit rating are included in the sample of less-constrained. In contrast, the firms that do not follow the regular dividend policy, higher leverage and lower credit rating are included in the sample of constrained firms. Table 2 shows the numbers of financially less-constrained firms and constrained firms from 2009–2019 by using the DPR, Leverage, and credit rating. According to the pecking order theory firms, first preference is internal cash holding to finance the investment projects. The financially constrained firms do not have sufficient internal cash holding and prefer debt financing to finance the investment opportunities. The constrained firms have lower cash holding and higher debt ratio to avail the investment opportunity. Such firms do not have adequate cash holding to regularly distribute the dividend among the shareholders. The constrained firms have lower DPR and poor credit ratings.

Table 2. Classification of constrained and less-constrained firms.

Variables/Time Period	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Less-Constrained Firms											
DPR	176	170	174	178	175	180	181	176	169	171	175
Leverage	155	152	148	153	158	161	162	165	166	161	162
Credit Rating	160	154	158	155	159	160	172	170	169	167	170
Total	155	152	148	153	158	160	162	165	166	161	162
Constrained firms											
DPR	96	100	96	92	95	90	89	94	101	99	95
Leverage	115	118	122	117	112	109	108	105	104	109	108
Credit Rating	110	116	112	115	111	110	98	100	101	103	100

3.3. Model Specification

The panel data methodology is applied to examine the effect of operating capital on firm profitability. Panel data provides the benefits of more reliable estimation of the equation, overcome the heterogeneity, and reducing estimation errors. We first estimate the panel data under the Ordinary Least Squares (OLS). Latterly, Fixed Effect (FE) is used to reduce the serially correlated errors that are difficult to control in a traditional regression model. Finally, the endogeneity problem has been controlled by applying the Generalized Method of Moments (GMM). The endogeneity errors are the result of the correlation of explanatory variables with errors terms, due to the absence of some variables in the equation. GMM encounters the endogeneity problem by using the lag-difference of explanatory variables as instrument variables. Finally, the following models develop under the three regression techniques to reveal the association of operating capital with firm profitability.

In OLS, FE and GMM $\beta_0,\ \beta_1, \ldots\ldots, \beta_8$ betas are the vector of parameters, which captures the rate of change in dependent variables caused by independent variable and μ is the error term.

1-Panel OLS estimation

$$\mathrm{ROE} = \beta_0 + \beta_1(\mathrm{ROC}) + \beta_2(\mathrm{ROC})^2 + \beta_3(\mathrm{PROC}) + \beta_4(\mathrm{NROC}) + \beta_5(\mathrm{RFS}) + \beta_6(\mathrm{RGRW}) + \beta_7(\mathrm{RLEV}) + \mu \quad (1)$$

2-Panel FE estimation

$$\mathrm{ROE}_{i,t} = \beta_0 + \beta_1(\mathrm{ROC}_{i,t}) + \beta_2(\mathrm{ROC})^2 + \beta_3(\mathrm{PPROC}_{i,t}) + \beta_4(\mathrm{NROC}) + \beta_5(\mathrm{RFS}_{i,t}) + \beta_6(\mathrm{RGRW}) + \beta_7(\mathrm{RLEV}_{i,t}) + \alpha_i + \mu_{i,t} \quad (2)$$

3-Panel GMM estimation

$$\mathrm{ROE}_{i,t} = \beta_0 + \beta_1(\mathrm{ROE}_{i,t-1}) + \beta_2(\mathrm{ROC}_{i,\,t}) + \beta_3(\mathrm{ROC})^2 + \beta_4(\mathrm{PROC}_{i,\,t}) + \beta_5(\mathrm{NROC}_{i,\,t}) + \beta_6(\mathrm{RFS}_{i,t}) + \beta_7(\mathrm{RGRW}_{i,t}) + \beta_8(\mathrm{RLEV}_{i,t}) \quad (3)$$

where $\mathrm{ROE}_{i,t-1}$ is an instrument used to remove Endogeneity.

Standard: $\mathrm{ROC}_{i,t}$, $\mathrm{PROC}_{i,\,t}$, $\mathrm{NROC}_{i,\,t}$ $\mathrm{RFS}_{i,t}$, $\mathrm{RGRW}_{i,t}$, $\mathrm{RLEV}_{i,t}$.

4. Results

4.1. Descriptive Statistics

Table 3 represents the results of the descriptive statistics of the entire sample, positive ROC in less-constrained firms, and negative ROC in constrained firms from the period 2009–2019. In the whole sample, the mean and Standard Deviation (Std. Dev) of ROR (0.08) and (0.05) are not significantly different to the mean (0.07) and Std.Dev (0.05) in negative ROC group. However, the mean of ROE (0.06) and Std.Dev (0.03) in the positive ROC group are significantly different to the remaining two groups. In the whole sample, the mean of ROC (-0.06) indicates that the majority of firms maintain the negative operating capital to retain the finance for long-term investment. Similarly, in less-constrained firms, the mean of ROC (0.14) and in constrained firms mean of ROC (-0.09) indicates that less-constrained

firms hold the positive ROC and constrained firms hold the negative ROC to run business operations smoothly.

Table 3. Descriptive statistics.

Variables	Whole Sample			Less-Constrained Firms Positive ROC			Constrained Firms Negative ROC		
	Mean	**Std. Dev**	**Max**	**Mean**	**Std. Dev**	**Max**	**Mean**	**Std. Dev**	**Max**
ROE	0.08	0.05	0.35	0.06	0.03	0.25	0.07	0.05	0.35
ROC	−0.06	0.04	0.27	0.14	0.08	0.27	−0.09	0.06	0.22
RCH	−0.07	0.05	0.31	−0.05	0.03	0.25	0.11	0.08	0.31
RCC	0.11	0.07	0.19	0.09	0.04	0.10	−0.05	0.03	0.13
RAR	0.28	0.15	0.45	0.31	0.19	0.45	0.17	0.09	0.28
RINV	0.33	0.19	0.65	0.24	0.15	0.65	0.14	0.09	0.39
RAP	0.41	0.27	0.55	0.36	0.24	0.51	0.41	0.17	0.55
RFS	5.91	0.41	19.80	7.01	0.54	17.32	6.90	0.35	19.80
RGRW	0.15	0.11	0.55	0.09	0.07	0.44	0.07	0.05	0.55
RLEV	0.29	0.22	0.74	0.22	0.13	0.74	0.15	0.11	0.45
SKEW	0.003			0.004			0.002		

The mean value of RCH (−0.07) in the whole group indicates that maximum firms maintain a lower level of liquidity than their current obligations. Similarly, the mean of RCH (−0.05) in the positive ROC group and mean of RCH (0.11) in the negative ROC group show that less-constrained firms hold negative cash holding and constrained firms hold the positive cash holding, respectively, to maintain the efficient level of operating capital. In RCC components (RINV, RAR and RAP), the mean value of RAP is higher both in less-constrained and constrained firms, which shows that manufacturing firms in China take the benefit of high trade credits. In the whole group, the mean value of control variables RFS (5.91) and Std. Dev (0.41), the mean value of RGRW (0.15) and Std. Dev (0.11), the mean value of RLEV (0.29) and Std. Dev (0.22) indicate that control variables have lower standard deviation against their mean value in the entire dataset.

4.2. Correlation of Constrained and Less-Constrained Firms

Under Table 4, the upper side of the triangle shows the correlations among the constrained firms' variables and the lower side of the triangle shows the correlations among the less-constrained firms' variables. In the constrained firms, a significant positive correlation exists between ROE and ROC (0.24). It shows that constrained firms maintain a lower level of operating capital that is positively correlated with the firm profitability. In constrained firms, the ROC components RAR (−0.17), RINV (−0.08), and RAP (−0.33) are significantly negatively correlated with ROE, except for RCH (0.23), which is significantly positively correlated with ROE.

Table 4. Correlation matrixes of constrained and less-constrained firms.

Variables	ROE	ROC	RCH	RCC	RAR	RINV	RAP	RFS	RGRW	RLEV
ROE	1	0.24 [a]	0.23 [a]	0.08 [c]	−0.17 [a]	−0.08 [a]	−0.33 [a]	0.19 [a]	0.13 [b]	−0.23 [a]
ROC	−0.11 [a]	1	0.54 [a]	0.35 [a]	0.14 [a]	0.18 [c]	−0.17 [a]	−0.02 [c]	0.10 [b]	−0.20 [a]
RCH	−0.05 [a]	0.44 [a]	1	−0.29 [b]	−0.23 [a]	−0.16 [a]	0.09 [a]	−0.16 [b]	0.12 [a]	−0.26 [b]
RCC	−0.11 [a]	0.14 [a]	−0.41 [a]	1	0.47 [a]	0.41 [a]	−0.37 [b]	0.23 [a]	−0.06 [a]	−0.05 [c]
RAR	−0.22 [b]	0.16 [a]	−0.18 [a]	0.58 [a]	1	0.15 [a]	0.45 [a]	0.14 [a]	0.06 [c]	0.15 [b]
RINV	−0.11 [a]	0.06 [a]	−0.28 [a]	0.76 [a]	0.26 [a]	1	0.24 [a]	0.18 [b]	0.04 [c]	0.07 [a]
RAP	−0.19 [a]	0.05 [a]	0.04 [b]	0.06 [c]	0.50 [a]	0.20 [a]	1	−0.04 [c]	0.08 [a]	0.18 [a]
RFS	0.04 [c]	−0.03 [c]	−0.07 [a]	0.11 [a]	0.14 [a]	−0.03 [c]	0.04 [c]	1	−0.07 [a]	0.09 [b]
RGRW	0.07 [a]	−0.19 [a]	0.20 [c]	−0.06 [a]	0.03 [c]	0.04 [c]	0.15 [c]	−0.07 [a]	1	0.07 [a]
RLEV	−0.07 [a]	−0.23 [a]	−0.37 [a]	0.26 [a]	0.34 [a]	0.19 [a]	0.11 [a]	0.17 [a]	−0.17 [a]	1

[a] = significant at 0.01; [b] = significant at 0.05; [c] = significant at 0.10.

Similarly, the ROC components RCH (0.54), RCC (0.35), RAR (0.14), and RINV (0.18) are significantly positively correlated with ROC except for RAP (−0.17), which is significantly negatively correlated with ROC. It shows that constrained firms enjoy the trades' credits to finance the business operations. The control variables RFS (0.19), RGRW (0.13), and RLEV (−0.23) are significantly correlated with ROE, which indicates that control variables also play an important role to determine the level of operating capital in constrained firms.

On the other hand, the lower side of the triangle under Table 4 represents the correlation among the variables of less-constrained firms. A significant negative correlation develops between ROE and ROC (−0.11) in less-constrained firms. It guides less-constrained firms to maintain a higher level of operating capital to finance the day-to-day business operations. The higher volume of operating capital is the result of increasing the financing and opportunity cost of capital, which may negatively influence the firm profitability. Similarly, all ROC components, RCH (−0.05), RCC (−0.11), RAR (−0.22), RINV (−0.11), and RAP (−0.19), develop a significant negative correlation with ROE. The results indicate that a higher level of operating capital reduces the profitability of the firms.

Meanwhile, all ROC components RCH (0.44), RCC (0.14), RAR (0.16), RINV (0.06) and RAP (0.09) are significantly positively correlated with ROC. It shows that the increasing level of each component of operating capital increases the volume of operating capital, which ultimately reduces the firm profitability. The control variables RFS (0.04) and RGRW (0.07) are significantly positively correlated with ROE, except for LEV (−0.07), which is significantly negatively correlated ROE. It shows that control variables also affect the profitability of financially less-constrained firms.

4.3. Regression Analysis of Constrained and Less-Constrained Firms

This study investigates the influence of operating capital on firm profitability by using the OLS, FE, and GMM in constrained and less-constrained firms in Table 5. Firstly, the association of operating capital with firm profitability has been revealed in the whole sample. In the whole sample, ROC significantly negatively influences the ROE in OLS (0.05), FE (0.04), and GMM (0.03), respectively. The ROC^2 term applies to investigate the non-linear association of operating capital with firm profitability. In the whole sample, ROC^2 is significantly negatively affected by the ROE in OLS (−0.03), FE (−0.03), and GMM (−0.01). It shows that operating capital develops a negative non-linear relationship with firm profitability.

Table 5. Analysis of constrained and less-constrained firms.

Dependent Variable		Whole Sample		Constrained Firms			Less-Constrained Firms		
ROE	**OLS**	**FE**	**GMM**	**OLS**	**FE**	**GMM**	**OLS**	**FE**	**GMM**
ROC	0.05 [a]	0.04 [a]	0.03 [a]						
ROC^2	−0.03 [a]	−0.03 [a]	0.01 [a]						
PROC							−0.04 [a]	−0.02 [a]	−0.02 [a]
NROC				0.06 [a]	0.05 [a]	0.03 [a]			
RLEV	−0.05 [a]	−0.03 [a]	0.03 [a]	0.05 [a]	0.04 [a]	−0.03 [a]	−0.06 [a]	−0.05 [a]	−0.03 [a]
RGRW	0.06 [a]	0.04 [b]	0.02 [b]	0.07 [a]	0.06 [a]	0.05 [b]	0.06 [a]	0.05 [b]	0.05 [b]
RFS	−0.04 [a]	−0.03 [a]	−0.01 [a]	−0.07 [b]	−0.06 [c]	−0.03 [c]	0.05 [a]	0.04 [a]	0.04 [b]
R2	0.45	0.41		0.47	0.41		0.46	0.38	
F-test	17.12 [a]	13.12 [a]		13.21 [a]	11.78 [a]		13.23 [a]	12.09 [a]	
Arellano-Bond									
1st Order			−5.79 [a]			−2.93 [a]			−3.22 [a]
2nd Order			0.05			−0.09			0.28

[a] = significant at 0.01; [b] = significant at 0.05; [c] = significant at 0.10.

The dividend payout ratio, leverage, and credit rating are used to identify the constrained and less-constrained firms. The positive ROC in less-constrained firms significantly negatively influences the ROE in OLS (−0.04), in OLS, FE (−0.02), and GMM (−0.02) as

proposed in Hypothesis 1. (Raheman and Nasr 2007; Burney et al. 2021; Zeballos et al. 2013; Cull et al. 2015), and (Pais and Gama 2015; Habib and Hasan 2017) agree that the less-constrained firms have an adequate amount of internal funds and hold a higher level of operating capital, which is negatively affected by the firm profitability. However, the negative ROC in constrained firms significantly positively influences the ROE in OLS (0.06), FE (0.05), and GMM (0.03), as explained in Hypothesis 2. It shows that constrained firms do not have an adequate amount of funds and hold lower operating capital. The lower operating capital reduces the interest expenses and opportunity cost, which positively influences the firm profitability. (Edwards et al. 2016; Habib and Huang 2019) and (Dhole et al. 2020; Kieschnick et al. 2013) also agree that financially constrained firms hold lower operating capital, which positively influences profitability. However, it contradicts the study of (Cull et al. 2015; Korajczyk and Levy 2003), which finds that expensive external financing and higher agency cost of debt enhance the negative influence of operating capital on firm profitability.

Further, we find the optimal level of operating capital by taking the partial derivation of ROC in terms of sales. The financially less-constrained firms reach the optimal level of operating capital, where ROC in terms of sales in OLS (17.23%), in FE (14.76%), and GMM (11.53%), respectively. However, the constrained firms reach the optimal level of operating capital, where ROC in terms of sales in OLS (12.30%), in FE (10.54%), and GMM (8.11%), respectively.

4.4. Cash Holding in Constrained and Less-Constrained Firms

The interaction term of (RCH × ROC) is used to test the moderating role of cash both in constrained and less-constrained firms in Table 6. The dummy variable is created, 1 for positive RCH and 0 for negative RCH. The interaction term of (PROC× RCH) in less-constrained firms positively influences the ROE in OLS (−0.061), FE, (−0.043), and GMM (−0.039). It indicates that less-constrained firms hold positive ROC and Negative RCH to maintain the efficient level of operating capita, as proposed in Hypothesis 3.

Table 6. Cash holding in constrained and less-constrained firms.

Dependent Variable ROE	Constrained Firms			Less-Constrained Firms		
	OLS	FE	GMM	OLS	FE	GMM
ROC	0.075 [a]	0.054 [a]	0.038 [a]	−0.059 [a]	−0.054 [a]	−0.049 [a]
RCH (Dummy)	0.066 [a]	0.058 [a]	0.027 [a]	−0.072 [a]	−0.054 [a]	−0.043 [a]
NROC × RCH (Dummy)	0.055 [a]	0.053 [a]	0.038 [a]			
PROC × RCH				0.061 [a]	0.043 [a]	0.039 [a]
RLEV	0.055 [b]	0.036 [b]	0.016 [c]	−0.067 [a]	−0.052 [b]	−0.043 [b]
RGRW	0.066 [b]	0.053 [b]	0.028 [c]	0.071 [a]	0.063 [a]	0.036 [b]
RFS	−0.059 [a]	−0.054 [a]	−0.037 [a]	−0.051 [b]	−0.043 [c]	−0.033 [c]
R2	0.43	0.36		0.41	0.38	
Arellano-Bond						
1st Order			−2.71 [a]			−2.17 [a]
2nd Order			−0.09			−0.04

[a] = significant at 0.01; [b] = significant at 0.05; [c] = significant at 0.10.

(Korajczyk and Levy 2003; Sangalli 2013; Manova et al. 2015; Opler et al. 2001) and (Edwards et al. 2016; Habib and Huang 2019) also agree that financially less-constrained firms hold positive operating capital and negative cash holding to maintain the efficient level of operating capital. However, in the constrained firm, the interaction term of (NROC× RCH) significantly positively influences ROE (0.055), FE (0.053), and GMM (0.038). It shows that constrained firms maintain negative operating capital and positive cash holding to maintain the efficient level of operating capital, as proposed in Hypothesis 4. (Pais and Gama 2015; Habib and Hasan 2017; Sharma and Kumar 2011) and (Faulkender et al.

2012; Tong and Green 2005) also find that financially constrained firms hold the negative operating capital and positive cash holding to maintain the efficient level of operating capital. Overall, results indicate that firms set the efficient level of operating capital by trading-off between the cash holding and operating capital.

The serial correlation tests under the GMM model in Tables 5 and 6 confirmed that instruments used to estimate the model are valid and correctly specified since we do not reject the null hypothesis of no serial correlation existing at 2nd order in our models. Hence, the instrument variables used to remove the serial correlation are not correlated with the errors in the GMM model and give the most robust results about the endogeneity problem, which is difficult to remove by using the OLS and FE. Therefore, the results estimated under the GMM model are more reliable and robust than the OLS and FE.

5. Conclusions

This study examines the influence of operating capital on firm profitability of Chinese manufacturing firms. The study finds that operating capital develops a non-linear relationship with firm profitability. The operating capital in less-constrained firms significantly negatively influences the firm profitability, as proposed in Hypothesis 1. In less-constrained firms, the positive operating capital increases the financing and opportunity cost of capital, which negatively influences the firm profitability. On the other hand, in financially constrained firms, operating capital significantly positively influences the firm profitability, as proposed in Hypothesis 2. The financially constrained firms do not have an adequate amount of funds and maintain the negative operating capital. The negative operating capital has lower financing and opportunity cost, which increases the positive effect of operating capital on firm profitability.

Further, the moderating role has been tested both in financially less-constrained and constrained firms. The financially less-constrained firms hold positive operating capital and negative cash holding. In less-constrained firms, the interactive effect of (ROC $\times$ RHC) also significantly affects the firm profitability, as proposed in Hypothesis 3.

On the other hand, the study reveals that financially constrained firms hold negative operating capital and positive cash holding, as proposed in Hypothesis 4. The interactive effect of (ROC $\times$ RHC) is significantly positively influenced on firm profitability. The results show that manufacturing firms in China develop a reverse combination of operating capital and cash holding to set the efficient level of operating capital.

This research proposes theoretical and managerial implications for firms operating in the manufacturing sector in China. Theoretically, we find that operating capital develops a non-linear relationship with firm profitability. The research reveals that internal cash holding performs an important role in maintaining an efficient level of operating capital. The financially constrained firms set the efficient level of operating capital by holding the negative operating capital and positive cash holding. While the less-constrained firms set the efficient level of operating capital by holding the positive operating capital and negative cash holding.

In a managerial perspective, this study shows that when a firm holds a positive operating capital, it is better to ease the cash conversion cycle by increasing investment in inventory or paying vendors on time. Further, when a firm is generating cash from operations efficiently, it should maintain a lower level of cash holding, as it desires to set the appropriate level of accounts receivables and inventories. On the other hand, if a firm has a lower level of operating capital, it needs to reduce the negative shock of liquidity shortage and secure the assets by decreasing expenses or acquiring short-term loans. Such firms should increase the level of operating capital until it reaches the efficient level of operating capital.

Author Contributions: Conceptualization, A.H. and M.A.K.; methodology, A.H.; software, A.H.; validation, A.H., M.A.K. and J.P.; formal analysis, A.H.; investigation, A.H. and M.R.; resources, A.H.; data curation, A.H.; writing—original draft preparation, A.H.; writing—review and editing, M.A.K. and M.R.; visualization, A.H.; supervision, J.P.; project administration, M.A.K.; funding acquisition, J.P. and M.R. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded under the program of the Minister of Science and Higher Education titled "Regional Initiative of Excellence" in 2019–2022, project number 018/RID/2018/19, the amount of funding PLN 10 788 423,16.

Institutional Review Board Statement: Ethical review and approval were waived for this research study due to meet the ethical requirements of international research publications.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data used in the present study is publicly available.

Conflicts of Interest: The authors declare no conflict of interest.

References

Akbulut, Ramazan. 2011. An application to measure impact of working capital management on profitability in firms in manufacture sector quoted on ISE. *Istanbul Business Research* 40: 195–206.

Aktas, Nihat, Ettore Croci, and Dimitris Petmezas. 2015. Is working capital management value-enhancing? Evidence from firm performance and investments. *Journal of Corporate Finance* 30: 98–113. [CrossRef]

Ayyagari, Meghana, Asli Demirgüç-Kunt, and Vojislav Maksimovic. 2010. Formal versus informal finance: Evidence from China. *The Review of Financial Studies* 23: 3048–97. [CrossRef]

Baños-Caballero, Sonia, Pedro J García-Teruel, and Pedro Martínez-Solano. 2014. Working capital management, corporate performance, and financial constraints. *Journal of Business Research* 67: 332–38. [CrossRef]

Bates, Thomas W., Kathleen M. Kahle, and René M. Stulz. 2009. Why do US firms hold so much more cash than they used to? *The Journal of Finance* 64: 1985–2021. [CrossRef]

Burney, Robert B., Hui Liang James, and Hongxia Wang. 2021. Working capital management and CEO age. *Journal of Behavioral and Experimental Finance* 30: 100496. [CrossRef]

Charitou, Andreas, Colin Clubb, and Andreas Andreou. 2001. The effect of earnings permanence, growth, and firm size on the usefulness of cash flows and earnings in explaining security returns: Empirical evidence for the UK. *Journal of Business Finance & Accounting* 28: 563–94.

Cull, Robert, Wei Li, Bo Sun, and Lixin Colin Xu. 2015. Government connections and financial constraints: Evidence from a large representative sample of Chinese firms. *Journal of Corporate Finance* 32: 271–94. [CrossRef]

Dang, Viet Anh, Minjoo Kim, and Yongcheol Shin. 2014. Asymmetric adjustment toward optimal capital structure: Evidence from a crisis. *International Review of Financial Analysis* 33: 226–42. [CrossRef]

De Jong, Abe, Marno Verbeek, and Patrick Verwijmeren. 2011. Firms' debt–equity decisions when the static tradeoff theory and the pecking order theory disagree. *Journal of Banking & Finance* 35: 1303–14.

Dhole, Sandip, Sagarika Mishra, and Ananda Mohan Pal. 2020. Efficient working capital management, financial constraints and firm value: A text-based analysis. *Pacific-Basin Finance Journal* 58: 101212. [CrossRef]

Dong, Huynh Phuong, and Jyh-tay Su. 2010. The relationship between working capital management and profitability: A Vietnam case. *International Research Journal of Finance and Economics* 49: 59–67.

Edwards, Alexander, Casey Schwab, and Terry Shevlin. 2016. Financial constraints and cash tax savings. *The Accounting Review* 91: 859–81. [CrossRef]

Enqvist, Julius, Michael Graham, and Jussi Nikkinen. 2014. The impact of working capital management on firm profitability in different business cycles: Evidence from Finland. *Research in International Business and Finance* 32: 36–49. [CrossRef]

Fatemi, Ali, and Carl Luft. 2002. Corporate risk management: Costs and benefits. *Global Finance Journal* 13: 29–38. [CrossRef]

Faulkender, Michael, Mark J. Flannery, Kristine Watson Hankins, and Jason M. Smith. 2012. Cash flows and leverage adjustments. *Journal of Financial Economics* 103: 632–46. [CrossRef]

García-Teruel, Pedro Juan, and Pedro Martínez-Solano. 2007. Effects of working capital management on SME profitability. *International Journal of Managerial Finance* 2: 164–77. [CrossRef]

Goodell, John W., Abhinav Goyal, and Andrew Urquhart. 2021. Uncertainty of uncertainty and firm cash holdings. *Journal of Financial Stability* 56: 100922. [CrossRef]

Guariglia, Alessandra, Xiaoxuan Liu, and Lina Song. 2011. Internal finance and growth: Microeconometric evidence on Chinese firms. *Journal of Development Economics* 96: 79–94. [CrossRef]

Habib, Ahsan, and Mostafa Monzur Hasan. 2017. Firm life cycle, corporate risk-taking and investor sentiment. *Accounting & Finance* 57: 465–97.

Habib, Ashfaq, and Xiaoxia Huang. 2019. CSR investment and cash flow sensitivity under the managerial optimism. *Journal of Statistics and Management Systems* 22: 11–30. [CrossRef]
Kieschnick, Robert, Mark Laplante, and Rabih Moussawi. 2013. Working capital management and shareholders' wealth. *Review of Finance* 17: 1827–52. [CrossRef]
Korajczyk, Robert A., and Amnon Levy. 2003. Capital structure choice: Macroeconomic conditions and financial constraints. *Journal of Financial Economics* 68: 75–109. [CrossRef]
Lantz, B. 2008. Efficiency of Working Capital Management and Corporate Profitability. *Journal Financial Practice and Education* 10: 76–88.
Manova, Kalina, Shang-Jin Wei, and Zhiwei Zhang. 2015. Firm exports and multinational activity under credit constraints. *Review of Economics and Statistics* 97: 574–88. [CrossRef]
Modigliani, Franco, and Merton H. Miller. 1958. The cost of capital, corporation finance and the theory of investment. *The American Economic Review* 48: 261–97.
Mun, Sung Gyun, and SooCheong Shawn Jang. 2015. Working capital, cash holding, and profitability of restaurant firms. *International Journal of Hospitality Management* 48: 1–11. [CrossRef]
Opler, Tim, Lee Pinkowitz, René Stulz, and Rohan Williamson. 2001. Corporate cash holdings. *Journal of Applied Corporate Finance* 14: 55–67. [CrossRef]
Pais, Maria Amélia, and Paulo Miguel Gama. 2015. Working capital management and SMEs profitability: Portuguese evidence. *International Journal of Managerial Finance* 11: 341–58. [CrossRef]
Pinkowitz, Lee, Rene M. Stulz, and Rohan Williamson. 2013. Is there a US high cash holdings puzzle after the financial crisis? *Fisher College of Business Working Paper*: 07. Available online: https://www.econbiz.de/ (accessed on 26 October 2021).
Raheman, Abdul, and Mohamed Nasr. 2007. Working capital management and profitability–case of Pakistani firms. *International Review of Business Research Papers* 3: 279–300.
Sangalli, Ilaria. 2013. Inventory investment and financial constraints in the Italian manufacturing industry: A panel data GMM approach. *Research in Economics* 67: 157–78. [CrossRef]
Sharma, Amit K., and Satish Kumar. 2011. Effect of working capital management on firm profitability: Empirical evidence from India. *Global Business Review* 12: 159–73. [CrossRef]
Tong, Guanqun, and Christopher J. Green. 2005. Pecking order or trade-off hypothesis? Evidence on the capital structure of Chinese companies. *Applied Economics* 37: 2179–89. [CrossRef]
Ukaegbu, Ben. 2014. The significance of working capital management in determining firm profitability: Evidence from developing economies in Africa. *Research in International Business and Finance* 31: 1–16. [CrossRef]
Zeballos, Ariel C., Ralf W. Seifert, and Margarita Protopappa-Sieke. 2013. Single product, finite horizon, periodic review inventory model with working capital requirements and short-term debt. *Computers & Operations Research* 40: 2940–49.