2528-9705

Örgütsel Davranış Araştırmaları Dergisi
Journal Of Organizational Behavior Research
Cilt / Vol.: 7, Sayı / Is.: 2, Yıl/Year: 2022, Sayfa/Pages: 30-47
https://doi.org/10.51847/Sd9SolqBjQ

IMPACT OF CASH FLOW ON FIRM'S OPERATIONAL EFFICIENCY IN VIETNAM: MEDIATION ROLE OF STATE OWNERSHIP

Lan Le Thi HUONG[1], Van Bui DO[1*], Huong Truong Thi THU[2]

[1*]School of Banking and Finance, National Economics University, Hanoi, Vietnam.
[2]Faculty of Economics and Management, Thuy Loi University, Hanoi, Vietnam.

***Corresponding Author**
E-mail: vanbuido.neu@gmail.com

ABSTRACT

The paper investigates the effect of cash flow on the operational efficiency of non-financial companies listed on the Vietnam stock market, spanning the period from 2010 to 2019. The research results indicate that operating cash flow in the business positively affects operational efficiency, measured through two indicators of Returns on assets (ROA) and Returns on equity (ROE). The effect remains stronger for firms that have state ownership. We also address an endogeneity issue through a two-stage least square and Generalized method of moments. The results are robust through several cross-sectional heterogeneities such as firm size or firm age and other estimation techniques. Investment opportunities (Market-to-Book) and the growth of total assets (Firm growth) also positively affect the firm's performance. On the contrary, the target of company size (Firm size) and the debt ratio (Firm leverage) negatively influence operational efficiency. The paper highlights the importance of cash flow management and provides recommendations for regulators and managers to improve firms' operational efficiency.

Keywords: *Cash flow, Operational efficiency, Stock market, Investment opportunities.*

INTRODUCTION

The operational efficiency of the business is an essential financial factor that attracts investors' and managers' attention (Imhanzenobe, 2019). Induced organizational effectiveness plays a significant role in the company's safety and growth, supporting the company to succeed in the market. Therefore, operational efficiency remains a vital factor that investors consider when deciding either to purchase or sell stocks. Therefore managers, always attempt to detect manners to improve the firm's operational efficiency. From these two perspectives, this research evaluates the factors that influence a firm's operational efficiency - one of the most salient topics in corporate finance.

Cash flow is defined as the "in and out" movement of money in a company or an entity during a given time (Hovakimian & Hovakimian, 2009) or the reporting system which describes the performance of the company in terms of cash (Sabri *et al.*, 2020). Indeed, cash flow management is a prominent part of the company and will determine the survival of a business. On the one hand, cash flow plays a substantial role in influencing the decision-making process of a company since the company's purpose is to generate a net positive cash flow. Furthermore, enterprises need to manage their cash flow properly to achieve their financial needs while reducing costs and increasing firm performance.

Geliş tarihi/Recieved: 12.04.2022 – Kabul tarihi/Accepted: 02.07.2022 – Yayın tarihi/Published: 30.09.2022

A variety of empirical studies have been conducted worldwide and in Vietnam to determine the effect of cash flow on firm operational efficiency. However, their research results are contradictory and distinct. Besides, this research did not consider other mediation, such as state ownership or business modeling. This article is aimed at investigating the effect of cash flow on firm operational efficiency in Vietnam and how state ownership mediates this relationship.

To examine the effect of cash flow on firm operational efficiency, we collect financial information from 502 listed companies listed on the Ho Chi Minh stock exchange from 2010 to 2019. The sample is restricted by excluding insurance, real estate, securities, and banks due to their complex structure and a higher level of regulation and supervision. Utilizing fixed-effect models with the confirmation of the Hausman test, we find that cash flow has a positive effect on firm operational efficiency.

In the next step, we investigate how firm ownership could mediate the relationship between cash flow and operational efficiency. Vietnam has a stable and safe environment for investment however the level of corruption is quite high. Firms with political connections thus have several advantages in approaching investment opportunities. Therefore, a firm with state ownership may have a stronger relationship between cash flow and operational efficiency due to the typical political environment in Vietnam.

To address endogeneity concerns caused by reverse causality or omitted variables, we utilize the two-stage least square and generalized method of moments. We treat all firm-level variables as strictly endogenous and lags of endogenous variables as instrumental. The result remains unchanged, implying that cash flow positively affects operational efficiency, therefore our results are robust.

To alleviate the concern over a homogenous sample and whether state ownership has a real effect on the relationship between cash flow and operational efficiency, we employ a propensity score matching technique. Specifically, we match firms with state ownership (treated firms) with firms that do not have state ownership (controlled firms) based on firm characteristics such as firm size, firm age, firm leverage, and market-to-book ratio. After matching those firms, we still find that firms with state ownership have a higher level of operational efficiency. The interaction between state ownership and cash flow is positive and significant, implying the mediation role of state ownership in the relationship between cash flow and operational efficiency.

This research contributes to several strands of literature. First, the study contributes to the growing literature on cash flow and operational efficiency. Second, the research enhances understanding of the effect of state ownership on firm efficiency. Third, various techniques have been applied to resolve endogeneity concerns, such as the two-stage least square and generalized method of moments. Lastly, this research will suggest several recommendations for regulators and firm managers to enhance the firm's operational efficiency.

The paper is structured into seven sections. Section 2 reviews works of literature and hypotheses. Section 3 summarizes the research design. Section 4 presents the descriptive analysis and the main empirical results. Section 5 conducts several additional tests. Section 6 proposes some recommendations. Section 7 concludes the paper.

Literature Review and Hypotheses Development

Cash Flow Theories

Agency theory and free cash flow theory are the theoretical basis of the relationship between cash flow and corporate performance. Agency theory focuses on the conflict between managers and shareholders (Hill & Jones, 1992). Practically, Chief executive officers are not always the same as the chairman, and managers are not members of the board. Therefore, managers do not adhere to shareholders' interests and thus take steps to the detriment of shareholders or devalue the enterprises (Shapiro, 2005). Shareholders pay the costs of the agency in conjunction with supervising managers, and these costs of the agency represent a possible expense because of a conflict of interests between the shareholders and public managers

Consistent with agency theory, the free cash flow hypothesis implies that managers tend to pursue their personal goals and ignore the shareholder value when firms have excessive free cash flow (Jensen & Meckling, 1976; Jensen, 1986). Due to the conflict between managers and shareholders, the chief executive of the firm tends to invest extra cash in new projects despite the low net present value, leading to a deterioration in firm value. Jensen and Meckling (1976) investigated this hypothesis and then replicated it in Jensen (1986). Following Jensen's (1986) suggestions, managers are expected to expand resources beyond the optimum scale. The shortage of money would prevent the firm's expenditure on inefficient projects (Lang & Litzenberger, 1989). Coincidentally, managers are enforced to participate in foreign markets to increase their resources. Therefore, a company's cash flow can affect the company's operational efficiency. One way to alleviate the effect of free cash flow is by employing debt financing that restrains overinvestment behaviors, implying that this issue might be mitigated through a higher level of debt in the capital structure.

Impact of Cash Flow on Operational Efficiency

Several researchers have studied the relationship between cash flow and operational efficiency. The test findings are, however, contradictory. A positive connection between cash and performance has been found in particular authors. Several other studies find that the cash flow and output have an invariant relationship.

Moreover, several studies find a positive relationship between cash flow and operational efficiency. Adelegan (2003) has experimentally analyzed the relationship between cash flow and dividends on the Nigerian stock market. The author uses the ordinary least squares regression method, with 63 companies from 1984 to 1997. The research results show that cash flow affects the change of dividends in the firm. The author also finds a positive and meaningful relationship between the company's cash flow and efficiency. Tsuji (2013) studies the revenue and operational efficiency of the electrical equipment sector in the Tokyo stock exchange, applying an ordinary least square with annual data from 2009-2011. The findings demonstrate the different relationships between the cash flow and efficiency of the business. Cash flow factors help companies to predict future stock profits.

The link between cash flow and productivity in hospitals and the media industry in Nigeria was investigated by Frank and James (2014). Pearson's descriptive statistical analyzes and analysis have shown that the link between cash flow and net income is positive and statistically meaningful. The author has since affirmed that the cash flow has an impact on the business output of the company. In the Nigerian stock market, another study was carried out. The

research evaluated the cash flow-to-financial output of listed banks in the emerging economies from Ogbonnaya *et al.* (2016). The outcomes show that cash flow in operations has a positive effect on banks ' financial performance. Cash flow from investment and financial activities, by contrast, has a negative but weak effect on the bank's financial performance. Another study conducted by Elahi *et al.* (2021) with 20 commercial banks listed on the Pakistan Stock Exchange for the year 2011 to 2019. Results showed that operating cash flows significantly and positively influenced banks' financial stability.

On the other hand, cash flow could have a negative influence on operational efficiency. Hong *et al.* (2012) examined Chinese listed Immobilier companies' relation between free cash flow and financial results from 2006 to 2011. Here the free cash flow is negatively related to a company's financial performance. However, surplus free cash flow can affect the company's financial results. Ashtiani (2005) shows a negative but not significant link between the cash flows, investment efficiency, and financial results of listed companies on the Tehran Börse. Significance of statistics. Whereas, Watson and Wells (2005) find the relationship between the cash flow and operating performance was negative and statistically significant. The relationships between profit and cash flow variables in the Iran stock market have been analyzed by Mazloom *et al.* (2013). Multi-variable method for analyzing regression using data from 2003 to 2011. The results of the regression indicate a significant negative correlation between firm performance and cash flow.

In Vietnam, Thanh and Ha (2013) explore the effect of market performance in Vietnam from banking relations. The author uses a multiple regression analysis based on data from 465 Vietnamese companies from 2007 to 2010. Research shows that the efficiency of business decreases with increased banking ties. Moreover, the study demonstrates that cash flow is inversely linked to the company's revenue-to-equity ratio. Cash flow, therefore, negatively affects the efficiency of Vietnamese-listed companies.

Therefore, the research proposes the following hypothesis:

H1: Cash Flow Has an Impact on Firm Operational Efficiency in Vietnam

Mediation Role of State Ownership in Cash Flow- Operational Efficiency Relationship

In Vietnam, one of the most popular transitional economies, state-owned enterprises (SOEs, hereafter) remain obliged to responsible activities for society and fulfill a role as a representative of the Vietnamese government, creating more jobs and enhancing employees' welfare. Coincidentally, those objectives may conflict with the motivations of managers such as promotion or salary (2007), causing overinvestment or mismanagement of cash flow. SOEs can access external funding easier, leading to softer budget constraints (Cull & Xu, 2003; Cull *et al.*, 2015). Muda *et al.* (2021) studied the ownership structure play a role in determining the operational success of Walmart. In Vietnam, Nhung and Okuda (2015) suggest that SOEs can access more external sources of funds and make more profit. Therefore, state ownership could mediate the relationship between cash flow and operational efficiency. We, hence, propose the following hypothesis:

H2: State Ownership Has a Positive Impact On a Firm's Cash Flow- Operational Efficiency Relationship

Research Design

Sample

Our sample includes 502 non-financial companies listed on the Ho Chi Minh Stock Exchange (excluding insurance, real estate, securities, and bank industries). We also remove financial institutions from the study because of their different financial reporting systems and a higher leverage level than other sectors (Fama & French, 1993). We acquire financial data from the StoxPlus database.

Models and Variable Construction

To analyze the impact of cash flow on the efficiency of Vietnamese stock-market firms, we propose the following models:

Main Empirical Models

$$ROA_{it} = \delta_0 + \delta_1 * Cashflow_{it} + \delta_2 * Firm\ size_{it} + \delta_3 Firm\ growth_{it} + \delta_4 * Market - to - book_{it} + \delta_5 * Firm\ leverage_{it} + \gamma_i + \lambda_t + \epsilon_{it} \quad (1)$$

$$ROE_{it} = \delta_0 + \delta_1 * Cashflow_{it} + \delta_2 * Firm\ size_{it} + \delta_3 Firm\ growth_{it} + \delta_4 * Market - to - book_{it} + \delta_5 * Firm\ leverage_{it} + \gamma_i + \lambda_t + \epsilon_{it} \quad (2)$$

The dependent variable is Firm performance measured by two indicators: returns on assets (*ROA*) and returns on equity (*ROE*). ROA measured by net income divided by total assets and ROE measured by net income divided by total equity.

The main independent variable is the *Firm cash flow* measured by annual cash flow from the market divided by the total assets of the company.

The control variable in the model includes *Firm size, Market-to-Book, Firm growth,* and *Firm leverage*. In which, *Firm size* measured by Ln (total assets). *Market-to-Book* measured by market value divided by book value. *Firm growth* measured by annual changing ratio [by (TA_t-TA_{t-1})/TA_{t-1}]. *Firm leverage* measured by total leverage divided by total assets

We also include a firm fixed effect to control for unobserved heterogeneity and a year fixed effect to control variations between years.

Empirical Results

Descriptive Statistics and Correlation Analysis

The mean, standard deviation, minimum value, and maximum value of the variables in the research model are described in **Table 1**.

Table 1. Summary statistics

	Obs.	Std. Dev.	Mean	Minimum	First quartile	Median	Third quartile	Maximum
ROA	5584	0.07	0.07	-0.07	0.02	0.05	0.10	0.30
ROE	5584	0.13	0.14	-0.17	0.05	0.13	0.21	0.53
Firm cash flow	5531	0.14	0.06	-0.27	-0.03	0.05	0.13	0.42
Firm size	5606	1.43	12.98	10.01	12.04	12.89	13.91	16.49
Firm growth	5003	0.32	0.16	-0.26	-0.02	0.09	0.24	1.55

Market-to-Book	4555	0.58	0.73	0.13	0.34	0.55	0.91	2.82
Firm leverage	5606	0.23	0.50	0.06	0.32	0.52	0.68	0.89

Note: This table illustrates the summary statistics of all variables, including the Number of Observations, Standard Deviation, Mean value; Minimum value; values of four quantiles of the sample; Maximum value. The main dependent variables are *ROA* and *ROE* measured by net income divided by total assets and net income divided by total equity, respectively. Control variables are *Firm size, Firm growth, Market-to-book,* and *Firm leverage*.

The mean, standard deviation, minimum value, and maximum value of the variables in the research model are described in **Table 1**. The table shows that the average *ROA* value for the Vietnam stock market of non-financial firms is 7.00 percent for the 2010 to 2019 period, while the mean *ROE* value is 14 percent. That means that the average profit after tax is 7 dongs when the company spends 100 dongs of assets, and the most considerable gain is 30. Additionally, the total net profit of 100 VND invested in the company would be VND 14 on average and a record 53. The average value of the *Firm cash flow* statistics is 0.06, which means the average operating cash flow for non-financial companies listed on the stock exchange of Vietnam in the 2010-2019 period is 6% of their total company assets. The mean value of the variable *Firm leverage* is 0.50, meaning that on average, firms use about 50% of the borrowed capital to build the company's assets.

Table 2 represents the correlation between variables in the model (1) and (2) as follows:

Table 2. Pairwise correlations

Panel A: Correlation matrix for the first model						
Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) ROA	1.000					
(2) Cash flow	0.373***	1.000				
(3) Firm size	-0.071***	-0.014	1.000			
(4) Firm growth	0.186***	-0.194***	0.084***	1.000		
(5) Market-to-book	0.329***	0.149***	0.164***	0.109***	1.000	
(6) Firm leverage	-0.436***	-0.193***	0.330***	0.064***	-0.140***	1.000
Panel B: Correlation matrix for the second model						
Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) ROE	1.000					
(2) Cash flow	0.286***	1.000				
(3) Firm size	0.060***	-0.014	1.000			
(4) Firm growth	0.249***	-0.194***	0.084***	1.000		
(5) Market-to-book	0.266***	0.149***	0.164***	0.109***	1.000	
(6) Firm leverage	-0.037***	-0.193***	0.330***	0.064***	-0.140***	1.000

Note: This table reports the correlation matrix between variables. The main dependent variables are *ROA* and *ROE* measured by net income divided by total assets and total equity, respectively. Control variables are *Firm size, Firm growth, Market-to-book,* and *Firm leverage*. Significance at the 10%, 5%, and 1% level is indicated by *, **, *** respectively.

Örgütsel Davranış Araştırmaları Dergisi
Journal of Organizational Behavior Research
Cilt / Vol.: 7, Sayı / Is.: 2, Yıl/Year: 2022, Sayfa/Pages: 30-47

Table 2 represents the correlation between variables in the model (1) and (2). Panel A is correlation matrix for the first model, panel B is Correlation matrix for the second model. From the results Panel A and Panel B of the correlation coefficient matrix between pairs of variables have absolute values less than 0.8, so there is no multicollinearity issue between the variables in the model. Therefore, eliminating research variables is not necessary, and the model is rational.

The Impact of Cash Flow on Firm Operational Efficiency

In this section, we investigate the effect of cash flow on firm operational efficiency. The primary dependent variables are the Return on assets and the Return on equity. Models (1) and (3) examine our full sample while models (2) and (4) exclude 10% of the largest firms since those large firms could dominate the effect of the other firms. The results are illustrated in **Table 3** below:

Table 3. The effect of cash flow on firm operational efficiency

Dependent variable	ROA		ROE	
	(1) Full sample	(2) Exclude 10% largest firm	(3) Full sample	(4) Exclude 10% largest firm
Cash flow	0.058***	0.055***	0.105***	0.102***
	(0.008)	(0.008)	(0.016)	(0.016)
Firm size	-0.006	-0.006	-0.002	-0.003
	(0.004)	(0.004)	(0.008)	(0.009)
Firm growth	0.055***	0.059***	0.104***	0.109***
	(0.004)	(0.005)	(0.009)	(0.01)
Market-to-book	0.02***	0.02***	0.04***	0.039***
	(0.003)	(0.003)	(0.005)	(0.006)
Firm leverage	-0.152***	-0.149***	-0.146***	-0.133***
	(0.013)	(0.014)	(0.025)	(0.027)
Constant	0.212***	0.209***	0.233**	0.249**
	(0.043)	(0.051)	(0.092)	(0.107)
Observations	4325	3844	4325	3844
R-squared	0.305	0.306	0.248	0.253
Year dummy	Yes	Yes	Yes	Yes

Note: This table reports the impact of state ownership on cash flow and operational efficiency. The main dependent variables are *ROA* and *ROE* measured by net income divided by total assets and total equity, respectively. Control variables are *Firm size, Firm growth, Market-to-book,* and *Firm leverage*. Standard errors are robust and clustered at the firm level. Standard errors are reported in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, *** respectively.

Firm Cash Flow

The *Firm cash flow* variable coefficient (δ_1) in model 1 is 0.058, at a significant level of 1%. The coefficient of the cash flow variable in model 3 is 0.105 with 1% of significance.

Therefore, the operating cash flow has a positive and statistically significant impact on two indicators that measure the company's performance, namely return on asset and return on equity of non-financial companies listed on the stock market in Vietnam. Consequently, as the company's operational cash flow ratio rises, operational efficiency always improves. Adelegan (2003), Frank and James (2014), and Ogbonnaya, Ekwe, and Uzoma (2016) have considered this analysis. The above relationship, however, contrasts with the results found in the Iran stock market by Ashtiani (2005) on the Tehran Stock Exchange, Watson and Wells (2005), Mazloom, Azarberahman, and Azarberahman (2013) with the dependent equity income variable, Hong, Shuting, and Meng (2012) on the Chinese listed real estate companies, Tsuji (2013), the Tokyo Stock Exchange (2013).

Firm Size

Coefficients of the *Firm size* variable in model 1 and model 3 have negative values of 0.006 and 0.002, respectively. Nevertheless, firm size has no impact on the business performance of non-financial companies listed on Vietnam's stock market. Some authors found no correlation between firm size and operational efficiency, such as Ha-Brookshire (2009) found no evidence of the impact of the firm size variable. Thus, it can be seen that the results on the effect of scale on operational efficiency are not consistent among studies, depending on the characteristics of each different industry.

Market-to-Book

The coefficient of the market-to-book variable in model 1 and model 3 are both positive values: 0.02 and 0.04 at 1% of significance correspondingly. That means investment opportunities have a strong statistical positive effect on income on both assets and equity of non-financial companies listed on Vietnam's stock market.

Firm Growth

The growth rate variable - *Firm growth* has positive Beta coefficients (0.055 and 0.104) and has a very high statistical significance of 1% in the two above models. Therefore, if the company has a high growth rate, its operational efficiency will also increase. Thus, investment opportunities and growth rates have a positive impact on the operational efficiency of non-financial companies listed on Vietnam's stock market. This outcome shows that companies with more investment opportunities and are in a period of high growth are also more efficient than firms with fewer investment opportunities and low growth. This result is similar to many globally, such as Amidu (2007), Onanjiri and Korankye (2014), and Gill *et al.* (2011).

Firm Leverage

The coefficient of the debt ratio variable (*Firm leverage)* in model 1 and model 3 are both negative (-0.152 and -0.146), with high statistical significance at 1%. Therefore, the debt ratio hurts the operational efficiency of the firm. Thus, with the non-financial companies listed on Vietnam's stock market using more debt, their operational efficiency decreases. The same result is also found in the study of Amidu (2007), Dogan and Topal (2014) with the dependent variable of ROA. However, some studies have found a positive effect of debt use

on operational efficiencies such as Sunday and Partners (2015) with the dependent variable ROA, Priya and Nimalathasan (2013), Dogan and Topal (2014) with the dependent variable ROE and Gupta and Raman (2020) with the dependent variable output of individual company.

However, it can be seen from the data that a small number of firms have significantly high values, so we exclude 10% of the largest firms to build another two models (2) and (4). It becomes clear that model 2 and model 4 produce almost the same outcomes compared to model 1 and model 3 in terms of economic significance.

Validity Test

In this part, we investigate the autocorrelation phenomenon, heteroskedasticity, and multicollinearity in the models. The Wooldridge test (with the ***xtserial*** command) is used to test for autocorrelation. The analysis of variance change in the FEM model is done with ***xttest3*** command. To check the phenomenon of multicollinearity, the author used the ***vif*** command in STATA.

Table 4. Validity test

Panel A: Autocorrelation test	
Wooldridge test for autocorrelation in panel data H_0: no first-order autocorrelation	
Model 1	**Model 2**
F(1, 542) = 140.465 Prob > F = 0.0000	F(1, 542) = 99.369 Prob > F = 0.0000
Panel B: Heteroskedasticity test	
Modified Wald test for groupwise heteroskedasticity in the fixed effect regression model H_0: sigma(i)^2 = sigma^2 for all i	
Model 1	**Model 2**
chi2 (601) = 5.9e+35 Prob>chi2 = 0,0000	chi2 (502) = 2.4e+33 Prob>chi2 = 0,0000

Panel C: Multicollinearity test		
	VIF	**1/VIF**
Firm cash flow	1.34	0.74
Firm size	8.29	0.14
Firm Market-to-book	1.40	0.71
Firm growth	1.46	0.68
Firm leverage	7.38	0.13
Mean VIF	4.27	

From the test of autocorrelation phenomenon, heteroskedasticity, and multicollinearity in the **Table 4** show that: The results of the Wooldridge test (Panel A) have the value Prob > F = 0.000 (< 0.05), so both models have autocorrelation. The Modified Wald test (Panel B) results for model 1 and model 2 both have Prob>chi2 = 0.000 (< 0.05). Therefore, we conclude to reject the hypothesis that is both models have the phenomenon of heteroskedasticity. The results of the

VIF magnification coefficients of the independent variables (Panel C) are less than 10, so the model does not have a multicollinearity phenomenon. From the test results in **Table 4** shows that the two models have the phenomenon of autocorrelation and heteroskedasticity. Therefore, the cluster and robust command in STATA is used to correct the autocorrelation and heteroskedasticity in the FEM model.

How Firm Ownership Matters for Operational Efficiency and Firm Cash Flow

In this part, we examine the role of firm ownership in conditioning the relationship between cash flow and efficiency. We hypothesize that firms with state ownership could have more advantages than other firms, especially in Vietnam (Rand & Tarp, 2012). We capture the effect of state ownership on operational efficiency using dummy variable *State ownership,* taking a value of 1 if the firm shares are owned by the government. Otherwise, it takes the value of 0. The interaction between *Cash flow* and *State ownership* captures the influence of cash flow on operational efficiency in firms with state ownership. The positive value implies that the effect remains stronger for firms with government connections and vice versa. The effect is captured by employing the following models:

$$ROA_{it} = \delta_0 + \delta_1 * Cashflow_{it} + \delta_2 * Goverment\ ownership + \delta_3 * Cashflow * Government\ ownership + \delta_4 * Firm\ size_{it} + \delta_5 * Firm\ growth_{it} + \delta_6 * Market - to - book_{it} + \delta_7 * Firm\ leverage_{it} + \gamma_i + \lambda_t + \epsilon_{it} \quad (3)$$

$$ROE_{it} = \delta_0 + \delta_1 * Cashflow_{it} + \delta_2 * Goverment\ ownership + \delta_3 * Cashflow * Government\ ownership + \delta_4 * Firm\ size_{it} + \delta_5 * Firm\ growth_{it} + \delta_6 * Market - to - book_{it} + \delta_7 * Firm\ leverage_{it} + \gamma_i + \lambda_t + \epsilon_{it} \quad (4)$$

The results are illustrated in **Table 6** as follows:

Table 5. The impact of state ownership and cash flow on operational efficiency

Dependent variable	ROA		ROE	
	(1) Fixed effect	(2) Fixed effect	(3) Fixed effect	(4) Fixed effect
Cash flow	**0.058*** **	**0.048*** **	**0.105*** **	**0.098*** **
	(0.008)	**(0.01)**	**(0.016)**	**(0.022)**
State ownership		**0.041*** **		**0.055*** **
		(0.006)		**(0.012)**
Cash flow*State ownership		**0.124*** **		**0.207*** **
		(0.03)		**(0.059)**
Firm size	-0.006	0.002**	-0.002	0.007***
	(0.004)	(0.001)	(0.008)	(0.002)
Firm growth	.055***	0.051***	0.104***	0.098***
	(0.004)	(0.004)	(0.009)	(0.009)
Market-to-book	0.020***	0.024***	0.04***	.046***
	(0.003)	(0.003)	(0.005)	(0.005)
Firm leverage	-0.152***	-0.141***	-0.146***	-0.069***

	(0.013)	(0.008)	(0.025)	(0.014)
Constant	0.212***	0.088***	0.233**	0.067**
	(0.043)	(0.015)	(0.092)	(0.029)
Obs.	4325	4325	4325	4325
Year dummy	Yes	Yes	Yes	Yes

Note: This table reports the impact of state ownership on cash flow and operational efficiency. The main dependent variables are ROA and ROE measured by net income divided by total assets and total equity, respectively. The main independent variables are Cash flow and State ownership. Control variables are Firm size, Firm growth, Market-to-book, and Firm leverage. Standard errors are robust and clustered at the firm level. Standard errors are reported in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, *** respectively.

As can be seen from **Table 5**, *State ownership* has a positive impact on operational efficiency measured by *ROA* and *ROE*. Those firms with political connections might get opportunities to have a lower cost of credit and more investment. In case of distress, those firms often get more chances of acquiring capital injection (Boubakri *et al.*, 2012). Moreover, the effect of cash flow on operational efficiency becomes more influential within government-related firms.

Two-Stage Least Square and Generalized Method of Moments

To capture the possible endogeneity issue due to the reverse causality between operational efficiency and cash flow, we apply the two-stage least square method (Joher *et al.*, 2006). Meanwhile, higher cash flow would enhance operational efficiency. Nonetheless, firms with higher operational efficiency could have excess cash to invest in new projects. To resolve the endogeneity issue, we employ the first lag and second lag of *Cash flow* as instrumental variables since they would have a direct effect on *Cash flow* but would not have a direct effect on other variables (Roodman, 2009). The following models illustrate a two-way relationship between operational efficiency and cash flow.

$$ROA_{it} = \delta_0 + \delta_1 * Cashflow_{it} + \delta_2 * Firm\ size_{it} + \delta_3 Firm\ growth_{it} + \delta_4 * Market - to - book_{it} + \delta_5 * Firm\ leverage_{it} + \gamma_i + \lambda_t + \epsilon_{it} \quad (5)$$

$$Cash\ flow_{it} = \delta_0 + \delta_1 * ROA_{it} + \delta_2 * Firm\ size_{it} + \delta_3 Firm\ growth_{it} + \delta_4 * Market - to - book_{it} + \delta_5 * Firm\ leverage_{it} + \gamma_i + \lambda_t + \epsilon_{it} \quad (6)$$

$$ROE_{it} = \delta_0 + \delta_1 * Cashflow_{it} + \delta_2 * Firm\ size_{it} + \delta_3 Firm\ growth_{it} + \delta_4 * Market - to - book_{it} + \delta_5 * Firm\ leverage_{it} + \gamma_i + \lambda_t + \epsilon_{it} \quad (7)$$

$$Cash\ flow_{it} = \delta_0 + \delta_1 * ROA_{it} + \delta_2 * Firm\ size_{it} + \delta_3 Firm\ growth_{it} + \delta_4 * Market - to - book_{it} + \delta_5 * Firm\ leverage_{it} + \gamma_i + \lambda_t + \epsilon_{it} \quad (8)$$

In addition, we employ a generalized method of moments (GMM) to investigate the effect of cash flow on operational efficiency. The model first developed by Arellano and Bond (1991) takes the first-difference equation to eliminate the endogeneity issue. To overcome weak instruments, Blundell and Bond (1998) developed a system GMM to combine the level regression and difference equations, using lagged differences as instruments. We treat all firm-level variables as strictly endogenous. We include lagged endogenous variable model to capture the dynamic

nature of these variables and the potential presence of endogeneity caused by reverse causality or omitted variables.

$$ROA_{it} = \delta_0 + \delta_1 * ROA_{i,t-1} + \delta_2 * Cash\ flow_{it} + \delta_3 * Firm\ size_{it} + \delta_4 Firm\ growth_{it} + \delta_5 * Market - to - book_{it} + \delta_6 * Firm\ leverage_{it} + \gamma_i + \lambda_t + \epsilon_{it} \quad (9)$$

$$ROE_{it} = \delta_0 + \delta_1 * ROE_{i,t-1} + \delta_2 * Cash\ flow_{it} + \delta_3 * Firm\ size_{it} + \delta_4 Firm\ growth_{it} + \delta_5 * Market - to - book_{it} + \delta_6 * Firm\ leverage_{it} + \gamma_i + \lambda_t + \epsilon_{it} \quad (10)$$

We checked the model specification using the Hansen test. We also employ Arellano and Bond's test for zero autocorrelation, which determines if the first differenced residuals are free from second-order serial correlation.
The results are depicted in **Table 6**:

Table 6. Two-stage least square and Generalized method of moments

	ROA			ROE		
	(1) Fixed effect	*(2) 2SLS*	*(3) GMM*	*(4) Fixed effect*	*(5) 2SLS*	*(6) GMM*
L.ROA			0.282*			
			(0.149)			
L.ROE						0.237
						(0.173)
Cash flow	**0.058*** **	**0.864*** **	***0.355*** **	**0.107*** **	**1.505*** **	***0.553****
	(0.008)	**(0.071)**	***(0.123)***	**(0.016)**	**(0.125)**	***(0.259)***
Firm size	-0.004	-0.001	-0.078*	0.002	-0.000	-0.079
	(0.004)	(0.001)	(0.044)	(0.008)	(0.002)	(0.093)
Firm growth	0.057***	0.121***	0.107	0.107***	0.226***	0.306**
	(0.004)	(0.011)	(0.069)	(0.009)	(0.020)	(0.153)
Market-to-book	0.020***	0.000	0.033	0.04***	0.000	0.027
	(0.003)	(0.000)	(0.028)	(0.005)	(0.000)	(0.064)
Firm leverage	-0.152***	-0.038***	-0.049	-0.145***	0.121***	-0.251
	(0.013)	(0.012)	(0.153)	(0.025)	(0.022)	(0.338)
Constant	0.212***	0.028*	1.037*	0.233**	-0.041	1.166
	(0.043)	(0.015)	(0.529)	(0.092)	(0.027)	(1.236)
Obs.	4325	3961	4319	4325	3961	4319
Adjusted R^2	0.305	0.247		0.248	0.215	
p-value(AR2)			0.313			0.325
p-value(Hansen test)			0.458			0.144
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table reports the impact of cash flow on operational efficiency using a two-stage least square. The main dependent variables are *ROA* and *ROE* measured by net income divided by total assets and total equity, respectively.

Control variables are *Firm size, Firm growth, Market-to-book,* and *Firm leverage*. Models (1) and (4) apply the fixed effect model with confirmation of the Hausman test. Models (2) and (5) apply the two-stage least square. Models (3) and (6) apply GMM models. Standard errors are robust and clustered at the firm level. Standard errors are reported in parentheses. Significance at the 10%, 5%, and 1% level is indicated by *, **, *** respectively.

After controlling for the endogeneity issue, The Two-stage least square model results in **Table 6** show that the cash flow variable coefficient (δ1) in model 2 is 0.864 and in model 4 is 1.505, at a significant level of 1%. So, the cash flow has a positive impact on two indicators that measure the company's performance: return on assets and return on equity of non-financial companies listed on the stock market in Vietnam. It means that, as the company's operational cash flow ratio rises, operational efficiency always improves.[1]

For the model validity, Hansen tests, and Arellano and Bond's tests have been incorporated, and both are insignificant, implying that our models are valid (Kleibergen & Mavroeidis, 2009). The GMM model results in **Table 6** show that the *cash flow* variable coefficient (δ_1) in model 3 is 0.355, at a significant level of 1%. The coefficient of the cash flow variable in model 6 is 0.553 with 5% of significance. Therefore, the operating cash flow has a positive and statistically significant impact on two indicators that measure the company's performance, namely return on asset and return on equity of non-financial companies listed on the stock market in Vietnam. This results are consistent with the results of model (1) and model (3) when using the Fixed effect model. It means that, as the company's operational cash flow ratio rises, operational efficiency always improves.

Additional Tests

We rule out an alternative explanation, such as young versus old firms or small versus a large firm. The results are consistent through several additional tests, confirming that cash flow positively affects operational efficiency.

Table 7. Additional tests

Dependent variable	***ROA***		***ROE***		***ROA***		***ROE***	
	(1) Young firm	*(2) Old firm*	*(3) Young firm*	*(4) Old firm*	*(5) Small firm*	*(6) Large firm*	*(7) Small firm*	*(8) Large firm*
Cash flow	***0.05****	***0.062****	***0.085****	***0.117****	***0.055****	***0.057****	***0.091****	***0.118****
	(0.01)	***(0.011)***	***(0.022)***	***(0.022)***	***(0.011)***	***(0.011)***	***(0.021)***	***(0.027)***
Firm size	-0.008	-0.003	-0.009	0.006	0.004	-0.011**	0.012	-0.006
	(0.005)	(0.005)	(0.013)	(0.009)	(0.007)	(0.005)	(0.013)	(0.011)
Firm growth	0.054***	0.055***	0.106***	0.1***	0.076***	0.041***	0.135***	0.081***
	(0.007)	(0.006)	(0.014)	(0.012)	(0.007)	(0.005)	(0.014)	(0.011)
Market-to-book	0.022***	0.018***	0.042***	0.037***	0.02***	0.022***	0.029***	0.053***

[1] In unreported validity tests, our F test of the excluded exogenous variable is significant, implying that our instruments do not explain operational efficiency directly and LM tests confirm that our model is identified, implying that our models have been conducted appropriately.

	(0.004)	(0.004)	(0.009)	(0.007)	(0.004)	(0.004)	(0.007)	(0.009)
Firm leverage	-0.131***	-0.166***	-0.116***	-0.167***	-0.151***	-0.157***	-0.145***	-0.144***
	(0.018)	(0.017)	(0.042)	(0.03)	(0.019)	(0.018)	(0.036)	(0.037)
Constant	0.224***	0.187***	0.305*	0.149	0.09	0.291***	0.067	0.299**
	(0.066)	(0.06)	(0.156)	(0.116)	(0.078)	(0.066)	(0.141)	(0.151)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1641	2684	1641	2684	2220	2105	2220	2105
R-squared	0.269	0.307	0.208	0.255	0.298	0.312	0.249	0.237

Note: This table reports the impact of cash flow on operational efficiency. The main dependent variables are *ROA* and *ROE* measured by net income divided by total assets and total equity, respectively. Control variables are *Firm size, Firm growth, Market-to-book,* and *Firm leverage*. Model (1) to (4) compares operational efficiency between young firms and old firms, while model (5) to (8) compares operational efficiency between small firms and large firms. Standard errors are reported in parentheses. Standard errors are robust and clustered at the firm level. Significance at the 10%, 5%, and 1% level is indicated by *, **, *** respectively.

From the result of the *cash flow* variable coefficient (δ_1) in **Table 7** show that *Cash Flow* has a positive and statistically significant impact on ROA and ROE in young companies and old companies, small firms and large firms. However, the *cash flow* variable coefficient (δ_1) of old firms are higher than those of young firms. Similarly, the *cash flow* variable coefficient (δ_1) of large firms are higher than those of small firms. Therefore, it can be concluded that the effect of cash flow on a firm's performance is significantly evident in larger firms rather than small firms. Meanwhile, in young companies, the impact of cash flow is smaller than that of older companies.

Recommendations

The company's operational efficiency is positively correlated with the ratio of operating cash flow to total assets. So if the company wants to increase its operational efficiency, it is necessary to control the proportion of cash flow operating in the company. Companies should consider increasing their operating cash flows as their total assets increase. Besides, investment opportunities and the growth of the company are also important indicators that have a significantly positive impact on operational efficiency. However, according to the life cycle theory, these two indicators will change according to the different development cycles of the company. In the early stages and growth phases, a company often has various excellent investment opportunities to expand its customer base and reach potential markets. Therefore, the company should maintain a higher amount of cash to carry out investment and development activities and increase assets, thereby helping to improve operational efficiency. When the stage is ripe, investment opportunities decrease, and competition in the market increases, leading to a decrease in efficiency in using assets and equity of enterprises. In that case, the company should reduce the amount of cash by distributing it to its shareholders, like paying a cash dividend. The above move can help stabilize investor sentiment when receiving dividends from businesses. Finally, to improve operational efficiency, companies need to limit the use of debt. Using too

much debt will hurt operational efficiency. Therefore, managers need to calculate to determine the optimal debt structure for each enterprise to improve operational efficiency.

CONCLUSION

The article has examined the effect of cash flow on the performance of non-financial companies listed on Vietnam's stock market for the period 2010-2019. The research results have shown that operating cash flow in the business positively affects operational efficiency, measured through two indicators of Returns on assets (*ROA*) and Returns on equity (*ROE*). Besides, investment opportunities (Market-to-Book) and the growth of total assets (Firm growth) also positively affect the firm's performance. On the contrary, the target of company size (*Firm size*) and the debt ratio (*Firm leverage*) hurt operational efficiency.

From the above empirical research results, the author gives some recommendations for the company to improve its operational efficiency, thereby increasing the company's value and helping it attract more investors. In addition, it is essential to see how the effect of cash flow on company performance varies from the ownership to the government that mediates this relationship.

ACKNOWLEDGMENTS: None

CONFLICT OF INTEREST: None

FINANCIAL SUPPORT: This paper has been supported by National Economic University, Vietnam under Grant Number 345/QĐ-ĐHKTQD dated 20 February 2020.

ETHICS STATEMENT: We certify that the study is conducted in an honest manner and does not contain plagiarism. We give a right to the publisher to edit, modify, publish and distribute the study in an unlimited amount, in any shape for form and format on any carries of information and by anyways.

References

Adelegan, O. J. (2003). An empirical analysis of the relationship between cash flow and dividend changes in Nigeria. *African Development Review, 15*(1), 35-49.

Amidu, M. (2007). How does dividend policy affect performance of the firm on Ghana stock Exchange. *Investment Management and Financial Innovations, 4*(2), 103-112.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277-297.

Ashtiani, A. R. (2005). The study of relationship between accounting ratios and operating cash flows, investments financing and stock returns in TSE. Mashhad, Islamic Azad University of Mashhad, Iran.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115-143.

Boubakri, N., Guedhami, O., Mishra, D., & Saffar, W. (2012). Political connections and the cost of equity capital. *Journal of corporate finance*, *18*(3), 541-559.

Cull, R., & Xu, L. C. (2003). Who gets credit? The behavior of bureaucrats and state banks in allocating credit to Chinese state-owned enterprises. *Journal of Development Economics*, *71*(2), 533-559.

Cull, R., Li, W., Sun, B., & Xu, L. C. (2015). Government connections and financial constraints: Evidence from a large representative sample of Chinese firms. *Journal of Corporate Finance*, *32*, 271-294.

Dogan, M., & Topal, Y. (2014). The influence of dividend payments on company performance: The Case of Istanbul Stock Exchange (BIST). *European Journal of Business and Management*, *6*(3), 189-197.

Elahi, M., Ahmad, H., Shamas Ul Haq, M., & Saleem, A. (2021). The Impact of Operating Cash Flows on Financial Stability of Commercial Banks: Evidence from Pakistan. *The Journal of Asian Finance, Economics and Business*, *8*(11), 223-234. doi:10.13106/JAFEB.2021.VOL8.NO11.0223

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, *33*(1), 3-56.

Frank, B. P., & James, O. K. (2014). Cash flow and corporate performance: A study of selected food and beverages companies in Nigeria. *European Journal of Accounting Auditing and Finance Research*, *2*(7), 77-87.

Gill, A., Biger, N., & Mathur, N. (2011). The effect of capital structure on profitability: Evidence from the United States. *International Journal of Management*, *28*(4), 3.

Gupta, K., & Raman, T. V. (2020). Intellectual capital: a determinant of firms' operational efficiency. *South Asian Journal of Business Studies*, *10*(1), 49-69. doi:10.1108/SAJBS-11-2019-0207

Ha-Brookshire, J. E. (2009). Does the firm size matter on firm entrepreneurship and performance? US apparel import intermediary case. *Journal of Small Business and Enterprise Development*.

Hill, C. W., & Jones, T. M. (1992). Stakeholder-agency theory. *Journal of Management Studies*, *29*(2), 131-154.

Hong, Z., Shuting, Y., & Meng, Z. (2012). Relationship between free cash flow and financial performance evidence from the listed real estate companies in China. *IPCSIT*, *36*, 331-335.

Hovakimian, A., & Hovakimian, G. (2009). Cash flow sensitivity of investment. *European Financial Management*, *15*(1), 47-65.

Imhanzenobe, J. O. (2019). Operational efficiency and financial sustainability of listed manufacturing companies in Nigeria. *Journal of Accounting and Taxation*, *11*(1), 17-31.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review*, *76*(2), 323-329.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305-360.

Joher, H., Ali, M., & Nazrul, M. (2006). The impact of ownership structure on corporate debt policy: two stage least square simultaneous model approach for post crisis period: evidence from Kuala Lumpur Stock Exchange. *International Business & Economics Research Journal (IBER)*, *5*(5).

Kleibergen, F., & Mavroeidis, S. (2009). Weak instrument robust tests in GMM and the new Keynesian Phillips curve. *Journal of Business & Economic Statistics*, *27*(3), 293-311.

Lang, L. H., & Litzenberger, R. H. (1989). Dividend announcements: cash flow signalling vs. free cash flow hypothesis?. *Journal of Financial Economics*, *24*(1), 181-191.

Liu, Q., & Lu, Z. J. (2007). Corporate governance and earnings management in the Chinese listed companies: A tunneling perspective. *Journal of Corporate Finance*, *13*(5), 881-906.

Mazloom, A., Azarberahman, A., & Azarberahman, J. (2013). The association between various earnings and cash flow measures of firm performance and stock returns: some Iranian evidence. *International Journal of Accounting and Financial Reporting*, *3*(1), 24.

Muda, I., Indra, N., & Dharsuky, A. (2021). The community Walmart uncertainty model: A review of ownership and capital structure aspects. *Uncertain Supply Chain Management*, *9*(1), 49-56.

Nhung, L. T. P., & Okuda, H. (2015). Effects of state ownership on companies' capital structure and profitability: Estimation analysis before and after the Lehman shock. *Journal of Asian Economics*, *38*, 64-78.

Ogbonnaya, A. K., Ekwe, M. C., & Uzoma, I. J. (2016). Relationship of cash flow ratios and financial performance of listed banks in emerging economies–Nigeria example. *European Journal of Accounting, Auditing and Finance Research*, *4*(4), 89-97.

Onanjiri, R., & Korankye, T. (2014). Dividend payout and performance of quoted manufacturing firms in Ghana. *Research Journal of Finance and Accounting*, *5*(15), 442-454.

Priya, K., & Nimalathasan, B. (2013). Dividend policy ratios and firm performance: a case study of Selected Hotels & Restaurants in Sri Lanka. *Global Journal of Commerce and Management Perspective*, *2*(6), 16-22.

Rand, J., & Tarp, F. (2012). Firm-level corruption in Vietnam. *Economic Development and Cultural Change*, *60*(3), 571-595.

Roodman, D. (2009). A note on the theme of too many instruments. *Oxford Bulletin of Economics and Statistics*, *71*(1), 135-158.

Sabri, T. B., Sweis, K. M. H., Ayyash, I. N. M., Qalalwi, Y. F. A., & Abdullah, I. S. A. (2020). The Relationship Between of Cash Flows (Financing, Investment and Operating) and Stock Prices, Size of the Firms. *International Journal of Financial Research*, *11*(5), 424-433. doi:10.5430/ijfr.v11n5p424

Shapiro, S. P. (2005). Agency theory. *Annual Review of Sociology*, 31, 263-284.

Thanh, V. H., & Ha, N. M. (2013). The effect of banking relationship on firm performance in Vietnam. *International Journal of Economics and Finance*, *5*(5), 148-158.

Tsuji, C. (2013). An Investigation of comprehensive income and firm performance: The case of the electric appliances Industry of the Tokyo Stock Exchange. *Accounting and Finance Research*, *2*(2), 29-35.

Watson, J., & Wells, P. A. (2005). The association between various earnings and cash flow measures of firm performance and stock returns: Some Australian Evidence. *Available at SSRN 815365*.