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CASH CONVERSION CYCLE, ASSET TURNOVER, CAPITAL EXPENDITURE AND FIRM VALUE: THE MEDIATING ROLE OF PROFITABILITY

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ABSTRACT

Purpose: *To examine the impact of the cash conversion cycle, asset turnover, and capital expenditure on firm value, using profitability as the mediating factor.*

Methodology/approach: *Using a sample consisting of 61 non-cyclical consumer goods listed firms in Indonesia from 2016 to 2021, a structural equation modeling is employed to analyze the direct, indirect, and total effects of the variables being studied on firm value.*

Findings: *The cash conversion cycle does not have significant direct or total effects on firm value, but it has a negative and significant indirect effect on firm value through profitability. Asset turnover and capital expenditures directly significantly affect firm value in different directions, but they both have positive and significant total effects on firm value. Profitability fully mediates the effect of the cash conversion cycle on firm value, and partially mediates the effect of capital expenditures on firm value.*

Practical implications: *To ensure value creation, firms are suggested to monitor the cash conversion cycle, enhance asset turnover, and ensure the profitability of capital expenditures.*

Originality/value: *Providing empirical evidence on the mediating role of profitability in analyzing the effect of the cash conversion cycle, asset turnover, and capital expenditures on firm value.*

KEYWORDS: *Asset turnover; Cash conversion cycle; Capital expenditure; Firm value; Mediation; Profitability.*

ABSTRAK

Tujuan penelitian: Menguji pengaruh siklus konversi kas, perputaran aset, dan belanja modal terhadap nilai perusahaan, dengan profitabilitas sebagai faktor mediasi.

Metode/pendekatan: Dengan menggunakan sampel penelitian yang terdiri dari 61 perusahaan non-cyclical consumer goods yang terdaftar di Indonesia dari tahun 2016 hingga 2021, penelitian ini menerapkan pemodelan persamaan struktural untuk menganalisis pengaruh langsung, tidak langsung, dan total dari variabel-variabel yang diteliti terhadap nilai perusahaan.

Hasil: Perputaran arus kas tidak memiliki pengaruh langsung mau pun total terhadap nilai perusahaan, namun memiliki pengaruh negatif tidak langsung yang signifikan terhadap nilai perusahaan dengan mediasi profitabilitas. Perputaran aset dan belanja modal memiliki pengaruh langsung terhadap nilai perusahaan – meskipun dengan arah yang berbeda, namun keduanya memiliki pengaruh total positif yang signifikan terhadap nilai perusahaan. Profitabilitas memediasi penuh pengaruh perputaran arus kas terhadap nilai perusahaan, namun memediasi secara parsial pengaruh belanja modal terhadap nilai perusahaan.

Implikasi praktik: Untuk menciptakan nilai, perusahaan disarankan memonitor secara ketat perputaran arus kas, meningkatkan purputaran aset dan memastikan profitabilitas dari belanja modal.

Orisinalitas/kebaharuan: Memberikan bukti empiris terkait peran mediasi profitabilitas terkait pengaruh perputaran arus kas, perputaran aset dan belanja modal terhadap nilai perusahaan.

KATA KUNCI: Perputaran Aset; Belanja Modal; Mediasi; Nilai Perusahaan; Profitabilitas; Siklus Konversi Kas.

INTRODUCTION

Based on the neoclassical economic theory of the firm, Fama and Miller (1972) argue that the main objective of the firm should be the maximization of the firm's current market value. Furthermore, according to Brigham and Daves (2019), the primary objective of a corporation is maximizing stockholder wealth, while Ross et al. (2019) specifically state that from the financial management perspective, the firm's main goal is to maximize the current stock

value, which is reflected by its current market price[1]. A firm can maximize its value through various financial and non-financial strategies (Suriawinata & Almurni, 2023), and in the literature, there are four types of financial decisions or policies that may affect firm value, i.e. investment decision, financing or capital structure decision, dividend decision, and working capital decision. However, according to Chang (2018), the management of working capital has received much less consideration compared to the other major corporate finance policies, i.e. capital budgeting, capital structure, and dividend policies. By conducting a comprehensive review of the existing literature, Prasad et al. (2019) classify studies on the management of working capital into five broad categories, i.e.: (i) the impact of management of working capital on profitability, (ii) the association between working capital management and corporate capital expenditure, (iii) the trade-offs between pursuing profitability versus maintaining liquidity, (iv) the determinants of working capital investments, and (v) the value impact of the management of working capital. Yet, according to Zeidan and Shapir (2017), there are three persistent empirical findings relating to working capital management literature, i.e. (i) firms tend to over-invest in working capital, (ii) return on investments in working capital is below the cost of capital, and (iii) reducing the cash conversion cycle (*CCC*) improves profitability. Furthermore, Zeidan and Shapir (2017) state that those findings might be because there is no general model that optimizes investments in working capital. They also assert that reducing *CCC* or increasing the return on working capital investments over the cost of capital might involve adjustments in many aspects of a firm's activities, such as production, marketing, and financing activities. Although Baños-Caballero et al. (2014), Aktas et al. (2015), Singhania and Mehta (2017), and El-Ansary and Al-Gazzar (2021) have indicated the existence of an optimal level of investments in working capital, while Masri and Abdulla (2018) and Zeidan (2022) have developed models that might help firms in setting their optimal levels of investment in working capital, it is yet unclear how in practice firms could attain their optimal levels of investment in working capital considering the firms' dynamics operating activities.

Funds invested in working capital indicate the amount of capital used by a firm for supporting its operational activities. The main components of working capital are: (i) raw material, work-in-progress, and finished-goods inventories, (ii) account receivables, and (3) operating cash balances needed for transactional, precautionary, and speculative purposes (Michalski, 2014). Fundamentally, the working capital of a firm is its current assets, and they might be funded by current liabilities, non-current liabilities, or equity capital. The term net working capital refers to the difference between a firm's current assets and its current liabilities. A positive net working capital means that the firm's current assets exceed its current liabilities, and the net working capital is financed by long-term liabilities and/or equity. On the other hand, negative net working capital means that the firm's current assets are below its current liabilities, and most likely such a firm suffers liquidity pressure as its current assets are not sufficient to cover its short-term liabilities.

Working capital management refers to the process of managing a firm's current assets and current liabilities to attain an optimum level of operational efficiency that contributes to the firm's value creation process. A study by Pricewaterhouse Coopers (PwC) shows that efficient working capital management can improve profitability, and firms are suggested to develop a comprehensive value creation plan with working capital as a core component (PricewaterhouseCoopers, 2019). A more recent study by PricewaterhouseCoopers (2021)

[1] If capital market investors have all the relevant information, the current market price should equal a firm's intrinsic or fundamental value.

reveals that unstable supply chains caused by the Covid-19 pandemic are disrupting firms' operating activities, and therefore pressuring firms to manage their working capital investments effectively and efficiently. In fact, a total of 65% of business executives being surveyed state that efficiency in working capital management is a critical management objective during the pandemic period and beyond (PricewaterhouseCoopers, 2021).

A measure that is commonly utilized to assess the effectiveness of working capital management for supporting the daily operations of a firm is the cash conversion cycle (CCC) (Lin & Lin, 2021). The CCC is a metric that measures the time (number of days) needed by a firm to convert its investments in inventories and trade receivables into cash, after taking into consideration the time needed to pay purchases on account from its suppliers. A higher CCC means that corporate funds are tied up in working capital (e.g. inventories and trade receivables) for a longer time, and firms with higher CCCs have to wait longer to recoup cash invested in the working capital during their normal course of operating activities. As a consequence, such firms may have to resort to more expensive sources of financing, such as interest-bearing debt (either short-term or long-term) and equity capital to finance their working capital needs. Too much reliance on more expensive funds to finance working capital requirements will have a detrimental effect on profitability [e.g. Enqvist et al. (2014); Chang (2018)] as well as on shareholder value (Zeidan & Shapir, 2017).

The cash conversion cycle (CCC) is calculated by the following formula:

$$CCC = DIO + DSO - DPO \quad (1)$$

where DIO is the number of days of inventory outstanding from the time when the raw materials are purchased and received up to the time the finished goods are sold and shipped; DSO is the number of days sales outstanding from the time revenues are recognized (when finished goods are shipped) up to the time when cash is collected, and DPO is the number of days payment outstanding from the time raw materials are received from suppliers up to the time when account payables are paid. The formulas for DIO, DSO, and DPO are:

$$DIO = \frac{Inventories}{Cost\ of\ Goods\ Sold/365} \quad (2)$$

$$DSO = \frac{Account\ Receivables}{Sales/365} \quad (3)$$

$$DPO = \frac{Account\ Payables}{Cost\ of\ Goods\ Sold/365} \quad (4)$$

Another concept related to the CCC is the operating cycle (OPC), which refers to the total number of days required from purchasing raw materials from suppliers, processing the raw materials in the manufacturing facilities into finished goods, storing them in the warehouse, and finally selling and shipping the finished goods to buyers until payments are received. The OPC is calculated as:

$$OPC = DIO + DSO \quad (5)$$

The relationships among DIO, DSO, DPO, CCC, and OPC are shown in Figure 1. In short, the lower the number of CCCs, the shorter the length of time needed to recoup cash from working capital investments, and *vice versa*.

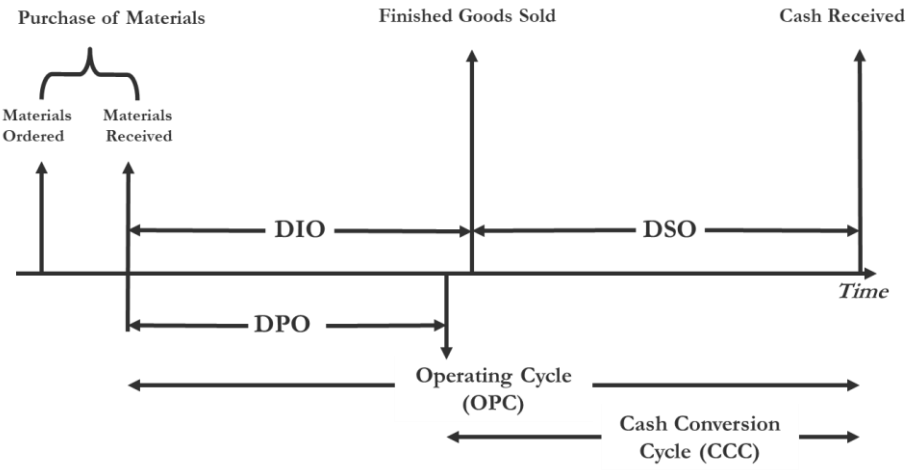

Figure 1. Graphical relationships among DIO, DSO, DPO, OPC & CCC

Source: Brigham and Ehrhardt (2019)

From Figure 1, it can be easily seen that the level of CCC could be reduced by: (i) decreasing DIO, (ii) decreasing DSO, (iii) increasing DPO, or (iv) combinations of the aforementioned. Efforts to decrease the level of CCC provide firms with several challenges. Firstly, increasing DPO would be a tricky one since suppliers obviously would recalculate their prices to incorporate the additional cost of funds due to longer payment terms.

Secondly, how low a firm could decrease DSO depends on common practices in the industry and the competitive position of the firm in the product market. Thirdly, to decrease DIO firms need to streamline their production processes and push their products to the market as soon as they are ready for shipment. Therefore, to reduce the level of its CCC, a firm needs to explore and analyze all the available options, and then devise comprehensive working capital management that enhances the value of the firm as suggested by PwC in their studies (PricewaterhouseCoopers, 2019, 2021).

Nevertheless, if a firm is successful in eliminating its excess working capital and reducing the level of its CCC – that is shortening the number of days the firm's cash is locked up in working capital, then such a firm could utilize the freed cash to induce more sales or invest in new projects with positive NPVs. Thus, enhancing firm value.

To summarize, the level of CCC is determined by the summation of the number of days inventory outstanding (DIO) from raw materials received to finished goods shipped and the number of days sales outstanding (DSO), then deducted by the number of days payable outstanding (DPO) to suppliers. Data from our samples reveal that the average number of DIO is 86 days, DSO is 45 days, DPO is 45 days, and thus CCC is 86 days, which is approximately 3 months. These numbers indicate that DIO plays an important role in determining CCC, because depending on their market competitive position and negotiation skills, actually, firms could set payment terms for sale and purchase transactions to be more or less equal. Then, what remains to be managed is the number of DIOs. In this study, we assert that firms with more productive assets or have higher asset turnover should have lower DIO, and potentially will have lower CCC. In other words, firms with rapid sales turnover for a given level of total assets will find that their inventory turns faster, thus lowering the number of DIO, which then translates to lower CCC, *ceteris paribus*.

Thus far, studies on the effect of the cash conversion cycle or working capital on firm value are sparse and have provided contradictory results. For example, Wang (2019) finds a significant negative relationship between CCC and stock returns, while Lin and Lin (2021)

provide evidence of a significant positive relationship between CCC and stock returns. Other examples, Chang (2018), Le (2019), and Boisjoly et al. (2020) find a significant negative relationship between investments in working capital and the value of the firm, while Baños-Caballero et al. (2019) find evidence that a higher investment in working capital enhances the value of the firm. Additionally, as mentioned above, Baños-Caballero et al. (2014), Aktas et al. (2015), Singhania and Mehta (2017), and El-Ansary and Al-Gazzar (2021) reveal that the relationship between working capital and firm value is concave, or inverted U-shaped, which indicates that there is a sort of an optimal level of investments in working capital. Therefore, based on the results of existing studies mentioned above, it can be concluded that there is an empirical gap in the value impact of working capital management – as proxied by the CCC.

To fill the empirical gap, we develop a structural equation model (SEM) consisting of three regression equations with three observed endogenous variables, namely the CCC, profitability, and firm value. This approach aims to obtain a richer understanding of the impacts of CCC on profitability and firm value, by taking into account the role of asset turnover as an important factor that determines the level of CCC, as well as the mediating role of profitability on the relationship between the CCC and firm value. In other words, this study investigates the value impact of the CCC by taking into consideration the structural relationships among the CCC, profitability, and firm value. To be more specific, using a set of samples consisting of 61 non-cyclical consumer goods listed firms in Indonesia covering the period of 2016 to 2021, this study examines the impact of CCC, asset turnover, and capital expenditure on firm value, mediated by profitability. Since prior studies have shown that CCC affects profitability as well as firm value [e.g. Enqvist et al. (2014); Baños-Caballero et al. (2014); Aktas et al. (2015); Singhania and Mehta (2017); Zeidan and Shapir (2017); Chang (2018); Dhole et al. (2019); Baños-Caballero et al. (2019); Boisjoly et al. (2020)], we extend our study by examining whether the CCC affects firm value through profitability. Asset turnover is included in our analysis because we believe that it plays an important role in affecting the level of CCC. As explained in the preceding paragraph, firms with rapid sales turnover for a given level of total assets shall have relatively lower numbers of DIOs compared to those firms with much lower asset turnover. Additionally, asset turnover also affects both profitability and firm value [e.g. Alarussi and Alhaderi (2018); Damayanti and Sitohang (2019); Nurlaela et al. (2019); Salainti and Sugiono (2019); Wanisih et al. (2021)]. To the best of our knowledge, our approach to investigating the value relevance of the CCC within a system of equations involving CCC, profitability, and firm value as endogenous variables is relatively novel.

Considering that capital expenditure is an important financial decision that affects both profitability and firm value [e.g. McConnell and Muscarella (1985); Del Brio et al. (2003); Kim and Lee (2018); Ullah et al. (2021)], this study also explores the impact of capital expenditure on firm value using profitability as a mediating factor. Finally, many studies have shown that leverage is an important factor that also determines firm value [e.g. Fosu et al. (2016); Vo and Ellis (2017); Faccio and Xu (2018); Sadiq et al. (2020)], and therefore this study includes leverage as a control variable.

The results of our study, among others, reveal a couple of important findings relating to the CCC specifically, and to working capital management, in general. Firstly, the CCC indirectly and negatively affects firm value through profitability, but the CCC does not have significant direct or total effects on firm value. This finding means that profitability fully mediates the effect of CCC on firm value. Secondly, asset turnover reduces CCC, increases profitability, and positively contributes to firm value directly, but not through profitability. Relating to capital expenditure, our study finds that capital expenditure has a significant positive direct

effect on profitability, but a significant negative direct effect on firm value. Interestingly, after taking into account the positive significant indirect effect through profitability, capital expenditure has a positive and significant total effect on firm value. Overall, we believe that our findings contribute to the yet-expanding literature on working capital management, as proxied by the cash conversion cycle, by providing empirical evidence on the impact of CCC on profitability and firm value, as well as the mediating role of profitability on the value impact of the cash conversion cycle (CCC), total asset turnover, and capital expenditure.

Though the results are mixed, prior studies have shown that the cash conversion cycle (CCC) potentially affects the profitability and valuation of a firm [e.g. Zeidan and Shapir (2017); Chang (2018); Dhole et al. (2019)]. Excess working capital could drive a higher level of CCC, causing a firm's cash to be locked up in working capital longer than necessary, with the result of exposing the firm to opportunity loss that reduces profitability. As an example, too much funds tied up in accounts receivable reduces cash available for acquiring or producing merchandise for sale, thus exposing firms to opportunity loss from the loss of sales. Similarly, too much inventory in slow-moving merchandise also exposes firms to opportunity loss as the tied-up funds could instead be invested in fast-moving merchandise. Therefore, based on the above analysis and discussion, it is hypothesized that:

H_1: *A higher CCC reduces profitability.*

In their analysis, Zeidan and Shapir (2017) show that investments in working capital have two opposing effects. The first is the revenue effect that creates value, where firms invest in working capital to avoid the opportunity loss of not having sufficient inventories in case there is a meaningful increase in future sales. While the preceding motive is economically justified, the additional investment in working capital could potentially trigger the second effect, which is an increase in the CCC that destroys value - assuming that there are no changes in the payment terms to suppliers[2]. Conceptually, a firm could determine the optimum level of investment in working capital by balancing the expected marginal profits from sales increase with the expected marginal costs of having a longer CCC. However, if the firm fails to either achieve the anticipated increase in sales, or the additional operating profit margin from sales increase is below the firm's cost of capital associated with the additional working capital investment, then the firm value is destroyed. In short, any additional working capital that drives a higher CCC, but does not provide additional operating profit margin above the cost of capital will destroy firm value. Therefore, it is hypothesized that:

H_2: *A higher CCC reduces firm value.*

The preceding analyses argue that CCC reduces profitability as well as firm value. However, it is well understood that profitability is positively associated with firm value. Higher profitability indicates higher expected future dividend payments that have a positive impact on share price (Gordon, 1959), and thus, firm value. Based on this analysis, it is possible that the negative effect of CCC on firm value could also be mediated by or transmitted through profitability. Therefore, it is hypothesized that:

[2] Actually, a firm could offset the increase in CCC by requesting renegotiation on payment terms with its suppliers, i.e. lengthening the invoice payment due date, thus increasing the DPO. However, the suppliers will most likely react to such a request by increasing their selling prices, as they also have to take into account the additional costs of funds relating to the extended trade receivables collection. For the respective firm, although the CCC remains the same due to the offsetting effect of the increase in DPO, the increase in the raw materials purchase price will undoubtedly reduce profitability and firm value.

H_3: *A higher CCC reduces firm value through profitability.*

This study asserts that the amount of sales and turnover have a significant role in determining and justifying the required amount of working capital investments. As stated previously, if a firm could streamline its production line and push its products to the market as soon as they are ready for shipment, then the firm would have a shorter DIO – thus, reducing the CCC. Therefore, if the firm could increase its total assets' productivity or asset turnover by generating more sales for a given level of total assets, then such a firm would be able to have a lower level of CCC, *ceteris paribus*. Therefore, it is hypothesized that:

H_4: *A higher asset turnover reduces CCC.*

The asset turnover of a firm will increase if the firm experiences an increase in sales, while its total assets remain constant. *Ceteris paribus*, higher sales for a given level of total assets (i.e. higher total asset turnover) will increase profitability, because, within a relevant range, the firm's fixed cost is constant. In other words, the additional contribution margin resulting from increases in sales adds to the firm's profitability. Therefore, it is hypothesized that:

H_5: *A higher asset turnover increases profitability.*

The preceding analyses argue that a higher asset turnover reduces CCC but increases profitability. However, since a higher CCC reduces profitability, then the effect of asset turnover on profitability may be also mediated by or transmitted through the CCC. Therefore, it is hypothesized that:

H_6: *A higher asset turnover increases profitability through CCC.*

An increase in asset turnover indicates an increase in sales for a given level of total assets. *Ceteris paribus*, an increase in sales will increase the net cash flows for the firm. Since firm value is determined by the expected future net cash flows discounted by the cost of capital (Koller et al., 2020), then it can be concluded that asset turnover is positively associated with firm value. Therefore, it is hypothesized that:

H_7: *A higher asset turnover increases firm value.*

Since it is argued that asset turnover positively affects profitability as well as firm value, while profitability positively affects firm value, then the effect of asset turnover on firm value may be also mediated by profitability. Therefore, it is hypothesized that:

H_8: *A higher asset turnover increases firm value through profitability.*

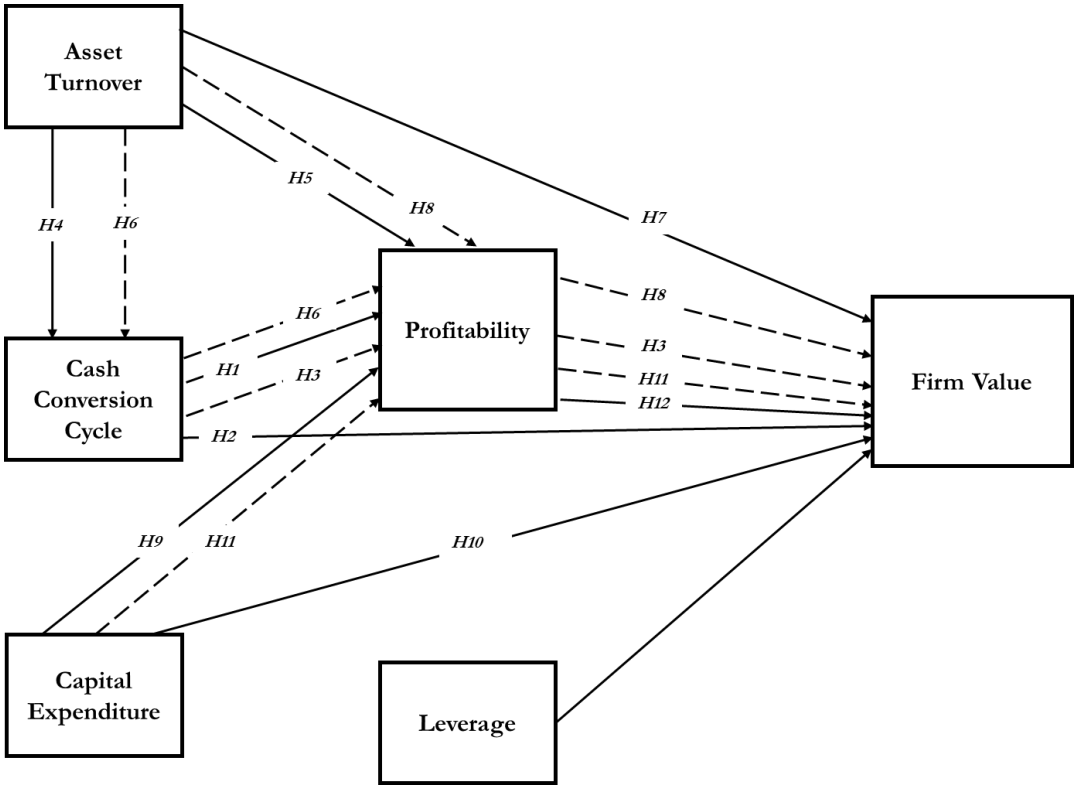

Figure 2. The Research Conceptual Framework

If managers consistently follow the shareholder value maximization principle, they will choose investment projects that not only increase profitability but also have positive NPVs. The sources of increases in profitability due to investment projects pursued by a firm could be derived from decreases in costs for a given level of revenues, or increases in sales for a given level of costs, or both. Therefore, it is hypothesized that:

H_9: *Capital expenditure increases profitability.*

McConnell and Muscarella (1985) state the market value of a firm is equal to the summation of the discounted value of expected future net cash flows from assets currently in place in that firm and the discounted net present value (NPV) of future investment opportunities available to the firm. Therefore, based on this line of thinking, capital expenditure pursued by a firm should positively affect firm value. Prior studies by Del Brio et al. (2003), Kim and Lee (2018), and Ullah et al. (2021) have shown that capital expenditure positively and significantly affects firm value. Therefore, it is hypothesized that:

H_{10}: *Capital expenditure increases firm value.*

We assert that the impact of capital expenditure on firm value might be either direct or channeled indirectly through profitability. The case for the direct impact of capital expenditure on firm value is because the capital market instantaneously capitalizes the expected NPV of the new projects (McConnell & Muscarella, 1985). Nevertheless, the impact of capital expenditure on firm value could also be channeled through profitability, in the sense that the new projects are expected to increase profitability, with an eventual effect of increasing firm value. Therefore, it is hypothesized that:

H_{11}: *Capital expenditure increases firm value through profitability.*

Finally, as previously explained, an increase in profitability indicates that future dividends will increase, and therefore positively affect share price (Gordon, 1959) and the value of the firm. Therefore, it is hypothesized that:

H_{12}: *A higher profitability increases firm value.*

Figure 2 presents the research conceptual framework, showing the hypothesized relationships among the variables being studied, including the control variable, i.e. leverage.

METHOD

To examine the impact of the cash conversion cycle, asset turnover, and capital expenditure on firm value, using profitability as the mediating factor, this study develops a quantitative-causality research design to determine the cause-and-effect relationships among variables being studied. Employing a purposive sampling method, this study uses a set of samples consisting of 61 non-cyclical consumer goods firms listed on the Indonesia Stock Exchange from 2016 to 2021. The sample firm must be listed during the full period of the study, otherwise, the firm is excluded from the sample. The final sample is 366 observations, resulting from 61 sample firms with 6-year observations each.

Firm value is proxied by Tobin's Q (*Q*) ratio, calculated as in Suriawinata and Nurmalita (2022) with the following specification:

$$Q = (MVE+DEBT)/TA \quad (6)$$

where *Q* is Tobin's Q, and *MVE* is the market value of equity calculated by multiplying the year-end closing price per share with the total amount of shares issued and outstanding. *DEBT* is the book value of the total liabilities, and *TA* is the book value of the total assets. A value-creating firm should have Tobin's Q greater than 1.0, indicating that the market value of the firm's total asset is greater than its book value.

The cash conversion cycle (*CCC*) is computed based on equations (1) to (4). As a measure of profitability, this study utilizes the return on invested capital (*ROIC*) as in Brigham and Ehrhardt (2019). However, we use the book value of the total assets as the invested capital, and the formula becomes:

$$ROIC = \frac{NOPAT}{Total\ Assets} = \frac{EBIT*(1\text{-}Corporate\ Tax)}{Total\ Assets} \quad (7)$$

where *NOPAT* is the net operating profit after tax, and *EBIT* is earnings before interest and tax. The remaining variables used by these studies are: (i) total asset turnover (*TATO*) which reflects asset productivity, (ii) capital expenditure (*CAPEX*), and (iii) leverage, as proxied by the total debt-to-total asset ratio (*DAR*). As mentioned previously, this study includes leverage as a control variable. The following present the formulas used for the aforementioned variables:

$$TATO = \frac{Sales}{Total\ Assets} \quad (8)$$

$$CAPEX = \frac{Fixed\ Assets_t - Fixed\ Assets_{t-1}}{Total\ Assets_t} \quad (9)$$

$$DAR = \frac{Total\ Debt}{Total\ Assets} \quad (10)$$

This study employs a panel multiple regression analysis with a structural equation modeling approach, consisting of three regression equations with three observed endogenous variables (*CCC*, *ROIC*, and *Q*) and three observed exogenous variables (*TATO*, *CAPEX*, and *DAR*):

$$CCC_{it} = a_0 + a_1 TATO_{it} + \epsilon_{it} \quad (11)$$

$$ROIC_{it} = \beta_0 + \beta_1 TATO_{it} + \beta_2 CCC_{it} + \beta_3 CAPEX_{it} + \varepsilon_{it} \quad (12)$$

$$Q_{it} = \gamma_0 + \gamma_1 TATO_{it} + \gamma_2 ROIC_{it} + \gamma_3 CCC_{it} + \gamma_4 CAPEX_{it} + \gamma_5 DAR_{it} + \omega_{it} \quad (13)$$

The structural equations employed in this study (i.e. Equation 11, 12, and 13) are specified using theoretical relationships developed based on existing literature and the results of prior studies, that have been discussed in the preceding section. All the exogenous, endogenous, and endogenous mediator variables utilized in this study are continuously observed variables, and therefore validity and reliability tests are not conducted. Figure 1 shows that the structural equation model consisting of Equations 11, 12, and 13 is a recursive path model, so there is no identification problem. Finally, the structural equation model is estimated using the maximum likelihood method, and the model fit is assessed before testing the hypotheses.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 presents descriptive statistics for the dependent, independent, and control variables. *Q* has a mean value of 1.818, meaning that the market values of sample firms are above their book values, indicating value creation. *ROIC* has a mean value of 0.055 or 5.50%. The average cash conversion cycle (CCC) is approximately 86 days. *TATO* has a mean value of 1.231. *CAPEX* has a mean value of 0.029, showing that on average the amount of capital expenditure of sample firms during the study period is 2.90% of their total assets. Finally, DAR has an average value of 0.52, indicating around 52% of the total assets of the sample firms are financed by debts.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Q	366	1.818	1.867	.422	14.415
ROIC	366	0.055	0.154	-1.93	0.827
CCC	366	85.998	114.649	-45.551	1017.162
TATO	366	1.231	0.881	0.035	4.571
CAPEX	366	0.029	0.122	-1.144	0.491
DAR	366	0.520	0.303	0.007	2.900

Source: Processed data

Table 2. Pair-wise Correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)
(1) Q	1.000					
(2) ROIC	0.403***	1.000				
(3) CCC	-0.080	-0.196***	1.000			
(4) TATO	0.129**	0.102*	-0.223***	1.000		
(5) CAPEX	0.029	0.408***		-0.015	1.000	
(6) DAR	0.002	-0.381***	-0.189***	0.017	-0.233***	1.000

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Processed data

Table 3. Variance Inflation Factor

	VIF	1/VIF
ROIC	1.444	0.693
DAR	1.291	0.775
CAPEX	1.219	0.820
CCC	1.188	0.842
TATO	1.061	0.942
Mean VIF	1.240	.

Source: Processed data

Table 2 reports the pair-wise correlations among the variables. *ROIC* and *TATO* have positive and significant correlations with *Q*. While *CCC* and *DAR* have negative and significant correlations with *ROIC*, but *CAPEX* has a positive and significant correlation with *ROIC*. Both *TATO* and *DAR* have negative and significant correlations with *CCC*, meaning that an increase in *TATO* or *DAR* is associated with a decrease in *CCC*. Lastly, *DAR* and *CAPEX* are negatively and significantly correlated.

As shown in Table 2, none among the independent and control variables that has an absolute correlation value >0.8, meaning that there is no indication of a multicollinearity problem in the data (Gujarati & Porter, 2009). However, the value of VIF can also be used to detect the problem of multicollinearity, as reported in Table 3. The table shows that none of the variables has a VIF value that exceeds 10, and therefore, it can be concluded that there is no multicollinearity problem [Gujarati and Porter (2009); Greene (2018)]. The problem of multicollinearity may lead to fallacious path coefficient estimates or resulting in statistically non-significance of the parameter estimates.

Hypotheses Testing

This study examines the impact of the cash conversion cycle (*CCC*), asset turnover (*TATO*), and capital expenditure (*CAPEX*) on firm value (*Q*), using profitability (*ROIC*) as the mediating factor. However, based on the results of the skewness and kurtosis normality test (D'Agostino & Belanger, 1990) and the Breusch-Pagan Lagrange Multiplier panel heteroscedasticity test (Greene, 2018), the data suffer from the problems of non-normality and heteroskedasticity in the residuals. Therefore, the structural equation model is estimated using the Huber-White robust standard errors (Greene, 2018).

Table 4 exhibits the regression results of Equations (11), (12), and (13), while Table 5 and Table 6 show the indirect effects as well as the total effect of the variables being investigated using the structural equation modeling (SEM) approach.

Because the parameters are estimated using robust standard errors, the only goodness of fit test of statistics reported by STATA 16 is the Standardized Root Mean Square Residual (SRMR) with a value of 0.089. This value is slightly above the recommended threshold value of ≤0.08 (Hu & Bentler, 1999), but some researchers regard a value of less than 0.10 as an acceptable fit [(Kline, 2016); (Kock, 2020)]. As a note, the SRMR is defined as the difference between the observed correlation and the model-implied correlation matrix. An SRMR value of 0 indicates a perfect fit, while values of SRMR > 0.1 indicate a poor fit (Kline, 2016). Since the reported SRMR value of this study is 0.089, based on a more lenient SRMR cutoff criteria of ≤ 0.1, the model is retained. The following describes the statistical results of the testable hypotheses of this study.

	Coef.	Robust Std.Err.	z	P>z
STRUCTURAL				
CCC (Eq. 11)				
TATO	-29.018	5.986	-4.850	0.000***
Cons	121.733	12.192	9.980	0.000***
ROIC (Eq. 12)				
CCC	-0.000	0.000	-1.890	0.059*
TATO	0.013	0.008	1.770	0.076*
CAPEX	0.500	0.298	1.680	0.094*
Cons	0.040	0.017	2.340	0.019**
Q (Eq. 13)				
ROIC	6.451	2.168	2.980	0.003***
CCC	0.001	0.001	1.520	0.128
TATO	0.178	0.086	2.060	0.039**
CAPEX	-2.122	1.264	-1.680	0.093*
DAR	1.127	0.514	2.190	0.028**
Cons	0.632	0.295	2.140	0.032**
R-Squared				
ROIC	0.1867			
Q	0.2616			
CCC	0.0497			
Overall	0.2709			

Table 4. Structural Equation Results

**** p<0.01, ** p<0.05, * p<0.1*

Source: Processed data

Direct Effect

As shown by the results of regression analysis on Equation (11) in Table 4, asset turnover (*TATO*) has a negative and significant effect (at the 1% level) on the cash conversion cycle (*CCC*), thus supporting H4.

The regression results of Equation (12) in Table 4 show that *CCC* has a negative effect on profitability (*ROIC*) at the 10% level of significance, meaning that H1 that states a higher *CCC* reduces profitability is supported, albeit rather weak.

TATO and CAPEX both have positive effects on profitability (*ROIC*) at the 10% level of significance, indicating that increases in *TATO*, as well as *CAPEX*, will increase profitability (*ROIC*). Therefore H5 and H9 are supported, although similar to the results of H1, the findings are rather weak.

The regression results of Equation (13) in Table 4 show that profitability (*ROIC*) has a positive effect on firm value (*Q*) at the 1% level of significance. This result supports H12 which states that higher profitability increases firm value. On the other hand, this study finds that *CCC* does not affect firm value (*Q*) as shown by the insignificant *p-value* of *CCC* (above 10%). Therefore, it can be concluded that *CCC* does not affect firm value (*Q*), and therefore H2 is not supported.

TATO has a positive and significant effect (at the 5% level) on firm value (*Q*), which means that H7 is supported. On the other hand, *CAPEX* has a negative and significant effect (at the 10% level) on firm value (*Q*), which means that the result is contrary to the predicted

positive relationship between *CAPEX* and firm value (*Q*). Therefore, H10 is not supported. Finally, although not part of the hypotheses to be tested, leverage - as proxied by *DAR* - has a positive and significant effect (at the 5% level) on firm value (*Q*).

Indirect Effect

Testing the mediation or indirect effects can be done by conducting the Sobel test (Sobel, 1982, 1986). However, as indicated by Ng and Lin (2016), the problems of non-normality and heteroskedasticity can significantly undermine the statistical power of the Sobel test. Since the data of this study suffer from the aforementioned problems, we do not report the Sobel test in analyzing the mediation effect, and report only the results from the structural equation model decomposition[3].

Table 5 reports the analyses of the indirect effects from the structural equation decomposition, From Table 5, it can be seen that asset turnover (*TATO*) indirectly and positively affects profitability (*ROIC*) through the cash conversion cycle (*CCC*) with a 10% level of significance. This result means that H6 is supported.

The results in Table 5 also show that *CCC* indirectly and negatively affects firm value (*Q*) through profitability (*ROIC*), while *CAPEX* indirectly and positively affects firm value (*Q*) through profitability (*ROIC*), both at the 5% level of significance. These results support H3 and H11. Additionally, because the cash conversion cycle (*CCC*) significantly affects profitability (*ROIC*), and profitability (*ROIC*) significantly affects firm value (*Q*), while the cash conversion cycle (*CCC*) does not have a significant direct effect on firm value (*Q*), then it can be concluded that profitability (*ROIC*) fully mediates (i.e. complete mediation) the effect of the cash conversion cycle (*CCC*) on firm value (*Q*) (Hayes, 2022). In other words, profitability fully absorbs the effect of *CCC* on firm value (*Q*). In the past, the mediation effect is analyzed provided that the total effect is significant. However, currently, it is no longer the case. According to Hayes (2022), regardless of the absence of a significant total effect, the finding of a significant indirect effect in a regression analysis is also important.

Table 5. Structural Equation Decomposition – Indirect Effects

	Coef.	Robust Std.Err.	Z	P>z
STRUCTURAL				
ROIC				
TATO	0.0054	0.0031	1.75	0.081*
Q				
CCC	-0.0012	0.0004	-2.48	0.013**
TATO	0.0195	0.0638	1.43	0.151
CAPEX	3.2265	1.4828	2.18	0.030**

**** p<0.01, ** p<0.05, * p<0.1*

Source: Processed data

[3] Nonetheless, when we ignore the problems of non-normality and heteroskedasticity in estimating the structural equation model (SEM) as well as conducting the Sobel test, the results of the Sobel test point to the same conclusion as in the reported results of the structural equation model decomposition with robust standard errors (Tables 4, 5 and 6).

Table 6. Structural Equation Decomposition – Total Effects

	Coef.	Robust Std.Err.	Z	P>z
STRUCTURAL				
CCC				
TATO	-29.0177	5.9863	-4.850	0.000***
ROIC				
CCC	-0.0002	0.0001	-1.890	0.059*
TATO	0.0188	0.0073	2.560	0.010**
CAPEX	0.5001	0.2983	1.680	0.094*
Q				
ROIC	6.4514	2.1678	2.980	0.003***
CCC	-0.0002	0.0005	-0.340	0.734
TATO	0.2696	0.0964	2.800	0.005***
CAPEX	1.1043	0.5272	2.090	0.036**
DAR	1.1270	0.5140	2.190	0.028**

**** p<0.01, ** p<0.05, * p<0.1*

Source: Processed data

On the other hand, since capital expenditure (*CAPEX*) significantly affects both profitability (*ROIC*) and firm value (*Q*), and profitability (*ROIC*) significantly affects firm value (*Q*), then it can be deduced that profitability (*ROIC*) partially mediates the effect of capital expenditure (*CAPEX*) on firm value (*Q*).

Lastly, the results reported in Table 5 show that asset turnover (*TATO*) does not have an indirect effect on firm value (*Q*) through profitability (*ROIC*) as indicated by the *p-value* of 0.151, which is above the significance level of 10%. Therefore, profitability (*ROIC*) does not mediate the effect of asset turnover (*TATO*) on firm value (*Q*), meaning that H8 is not supported.

Total Effect

Table 6 reports the total effect of asset turnover (*TATO*) on profitability (*ROIC*) as well as the individual total effect of the cash conversion cycle (*CCC*), asset turnover (*TATO*), and capital expenditure (*CAPEX*) on firm value (*Q*), respectively.

The results show that the total effect of asset turnover (*TATO*) on profitability (*ROIC*) is positive and significant at the 5% level. Similarly, the individual total effects of asset turnover (*TATO*) and capital expenditure (*CAPEX*) on firm value (*Q*) are positive and significant at the 1% and 5% levels, respectively. On the contrary, the cash conversion cycle (*CCC*) does not exhibit any significant total effects on firm value.

Discussion

This study aims to examine the impact of the cash conversion cycle, asset turnover, and capital expenditure on firm value, using profitability as the mediating factor. The negative relationship between the cash conversion cycle (*CCC*) and profitability found in this study is not surprising. Firms with a higher *CCC* have to wait longer to recoup cash tied up in working capital, and as a consequence, such firms are exposed to opportunity loss from tied-up funds

that lower profitability[4]. The finding of this study provides additional evidence to the literature study by Prasad et al. (2019) which shows that 79% of the total 29 studies reviewed report a negative and significant effect of working capital (*CCC*) on the profitability of firms. In other words, the results of this study are similar to most previous empirical studies on working capital which reveal that *CCC* is negatively related to profitability (Prasad et al., 2019).

Based on Zeidan (2022), any additional working capital - as proxied by a higher *CCC* – that does not generate sales or improve the operating profit margin will destroy firm value (*Q*). On the contrary, any reduction in the *CCC* that does not affect operating profit margin or sales will enhance firm value. Therefore, according to Zeidan (2022), the value relevant of *CCC* depends on whether or not additional working capital as proxied by the *CCC* enables firms to generate more sales or improve operating profit margins. Because prior studies have shown that *CCC* significantly affect firm value, either positively (Baños-Caballero et al., 2019) or negatively [e.g. Chang (2018); Le (2019); Boisjoly et al. (2020)], the finding of a non-significant effect of *CCC* on firm value in this study is interesting, and require further exploration. A plausible explanation is that during the period of study of 2016-2021, the Indonesian central bank, i.e. Bank Indonesia (BI), aggressively reduced the BI 7-day repo rate to create a low-interest environment to stimulate the domestic economy as well as to avoid further deterioration in the economy due to the outbreak of the Covid-19 pandemic[5]. It seems that the low-interest environment created by the central bank reduces the opportunity cost of funds tied up in working capital in such a magnitude that higher investments in working capital do not significantly negatively affect firm value. On the other hand, higher investments in working capital during the period of study do not significantly positively affect firm value because the market demand remains weak, regardless of the effort made by the central bank to stimulate the economy by implementing a low-interest-rate monetary policy. It seems that the additional benefits from a lower cost of funds completely offset the negative indirect effect of *CCC* on firm value through profitability, hence this might explain the non-significant total effect of the *CCC* on firm value fund in this study.

Alternatively, analyses by Masri and Abdulla (2018) and Zeidan (2022) imply the existence of an optimal level of working capital that maximizes firm value as well as balances the liquidity-profitability dichotomy of multiple firm's objectives. However, since firms do not know *ex-ante* the optimal level of working capital associated with future sales, then all costs associated with the over-allocation of resources on working capital represent deadweight loss[6] that negatively affects profitability and indirectly affects firm value through profitability. Nevertheless, excess working capital also represents slack that would benefit firms in case of sudden hikes in sales. If the potential benefits of slack in working capital exactly offset the deadweight loss of excess working capital, then this might explain the insignificant direct

[4] Tied-up funds lower profitability because otherwise those funds could be utilized to produce more finished goods, more sales, and more profits.

[5] As an illustration, from April 2016 – April 2018, Bank Indonesia (BI) reduced the 7-day repo rate from 5.50% to 4.25%, but then gradually increased the rate from 4.25% in April 2018 to 6.00% in June 2019 to maintain the Rupiah exchange rate. As the Rupiah exchange rate began to stabilize, BI gradually reduced the 7-day repo rate to 4.50% in March 2020, the month in which the COVID-19 disease was globally declared as a pandemic. To stimulate the economy during the COVID-19 pandemic, BI further reduced the 7-day repo rate to 3.50% in February 2021, and the rate remained at that level until the end of 2021.

[6] Borrowing from economics, deadweight loss arises from an inefficient allocation of resources because firms do not exactly know the optimal level of working capital.

effect of *CCC* on the firm value found in this study. Nonetheless, further research might be required to confirm the above contentions.

The results of this study show that asset turnover negatively affects the cash conversion cycle, which results indicate that higher asset turnover will require less working capital investments or shorter *CCC*. Speedy asset turnover will reduce DIO - that is the number of days needed for manufacturing the finished goods and storing them in the warehouse until sold; and as a consequence, *CCC* decreases. Assuming that the numbers of DSO and DPO are constant due to compliance by respective parties with the agreed-upon payment terms[7] (between buyers and sellers), then higher sales for a given level of inventories will reduce DIO, thus reducing *CCC* as well. The finding is consistent with the analyses provided by Zeidan (2022) that, *ceteris paribus*, higher sales (i.e. higher asset turnover) reduce *CCC*.

This study also finds that asset turnover positively affects profitability and firm value. A higher asset turnover indicates that more sales are generated per unit of funds invested in the total assets. Due to increasing return to scale from sales,[8] higher asset turnover will increase profitability. Additionally, as shown by the *DuPont equation* (Brigham & Ehrhardt, 2019), an increase in asset turnover (*TATO*) will increase profitability, as measured either by return on asset (ROA) or return on equity (ROE). Asset turnover also indirectly affects profitability through the *CCC*. Higher asset turnover shortens the length of CCC and releases funds tied up in the working capital which, in turn, has a positive impact on profitability. To summarise, asset turnover (*TATO*) positively contributes to profitability (*ROIC*) directly as well as indirectly through the cash conversion cycle (*CCC*). Finally, higher asset turnover or asset productivity also indicates higher cashflows to the firm with the effect of increasing firm value. However, this study finds that profitability does not mediate the effect of asset turnover on firm value, which indicates that both asset turnover and profitability independently affect firm value. It could be that the value impact of asset turnover (*TATO*) – as a measure of asset productivity – has been fully absorbed by firm value (*Q*), thus eliminating the mediating role of profitability.

As predicted, this study finds a positive direct relationship between capital expenditure (*CAPEX*) and profitability (*Q*). Firms make capital expenditures either for sales expansion or cost reduction through newer and more efficient production technology (Ross et al., 2019). *Ceteris paribus*, increases in sales, as well as reductions in costs due to capital expenditure (CAPEX), definitely contribute to the increase in profitability. Interestingly, this study finds that capital expenditure (*CAPEX*) has a negative direct effect on firm value (*Q*). It might be that the capital market responds skeptically to firms' capital expenditures unless such expenditures will increase profitability, as shall be explained below.

In contrast to the finding of a negative direct effect of capital expenditure (*CAPEX*) on firm value (*Q*), this study reveals that capital expenditure (*CAPEX*) has an indirect positive effect on firm value (*Q*) through profitability. However, after combining both the negative direct effect and the positive indirect effects (through profitability) of capital expenditure on firm value, the total effect of capital expenditure on firm value becomes positive. These seemingly contradictory results are discussed in the following paragraph.

[7] For example, common practices are net 30, net 60, and net 90. Net 90 means that payment is due 90 days after the invoice date. Payment terms for customers and suppliers of a firm are not necessarily the same, depending on the firm's operational, financial, and marketing strategies.

[8] Since fixed costs (i.e. within production and operating cost components) are constant, *ceteris paribus*, an increase in sales will increase the operating profit margin.

Though based on the value maximization principle firms invest in projects with positive NPVs, the capital market might respond skeptically and negatively to such expenditures, especially when such capital expenditures involve a huge amount of funds. Firms having large sums of cash available for investment activities are exposed to the agency costs of free cash flows as proposed by Jensen and Meckling (1976) and Jensen (1986), in a sense that firms make investment decisions to maximize managerial private benefits – such as managerial perks and empire-building endeavors – rather than maximizing shareholder value. However, once the profitability effects of capital expenditures are accounted for, the capital market values the effect of capital expenditures accordingly as demonstrated by McConnell and Muscarella (1985). Thus, the latter explains the seemingly contradictory results described in the previous paragraph, and the final result is that capital expenditure (*CAPEX*) has a positive total effect of on firm value (*Q*). In short, according to Ross et al. (2019), capital expenditures that result in higher profitability will enhance firm value.

This study confirms the general view that higher profitability increases firm value. Higher profitability means higher expected dividend payments in the future. Based on Gordon (1959), the share price will increase following increases in expected future dividends, and thus firm value will increase as well.

Finally, the positive effect of leverage on firm value (*Q*) found in this study may indicate that the benefits of debt financing from interest-tax shields are larger than the expected financial distress costs due to the use of debt financing

CONCLUSION

This study provides several empirical findings. Firstly, the cash conversion cycle (*CCC*) is negatively related to profitability. Firms with a higher cash conversion cycle are exposed to opportunity loss from tied-up funds that potentially decrease profitability. Additionally, the cash conversion cycle does not have direct or total effects on firm value. However, the cash conversion cycle indirectly negatively affects firm value through profitability, and that profitability fully mediates the effect of the cash conversion cycle on firm value.

Secondly, asset turnover has a negative effect on the cash conversion cycle, meaning that higher asset turnover will require less working capital investments or shorter *CCC*. Therefore, it is important for firms to increase sales and ensure the productivity of their investments in working capital. Furthermore, asset turnover has positive direct, indirect - through the cash conversion cycle, and total effects on profitability. In fact, the cash conversion cycle partially mediates the effect of asset turnover on profitability.

Thirdly, profitability, asset turnover, and capital expenditure have positive total effects on firm value. Finally, based on the results of the mediation analysis, it can be concluded that profitability fully mediates the effect of the cash conversion cycle on firm value, partially mediates the effect of capital expenditures on firm value, but does not mediate the effect of asset turnover on firm value.

One implication relating to the results of this study is that working capital management, as proxied by the cash conversion cycle, plays an important role in affecting firm value through profitability. Another implication is that asset productivity - measured by asset turnover – enhances firm value. And lastly, for capital expenditures to create value, such expenditures must be sufficiently profitable as evidenced by a positive and significant total effect of capital expenditures on firm value, after taking into account the indirect effect of capital expenditures on firm value through profitability.

A major limitation of this study relates to the period of study of 2016-2021 where during almost 80% of the period (57 months out of 72 months, or 6 years), Bank Indonesia pursued an unprecedented low-interest-rate monetary policy that lowered firms' cost of funds. Low cost of funds and weak market demand due to faltering economic growth and the outbreak of the Covid-19 pandemic during the period of study might have affected the results of this study which finds a weak significant negative total effect of working capital management on profitability, and an insignificant total effect of working capital management on firm value.

Another important limitation is the nature of the data used in this study which are characterized by non-normality and heteroskedasticity that has affected the measurements of the goodness of fit of the model. However, as implied by Kline (2016), the relevancy of the theories that underly the development of a model is more important; and should a model respecification be explored, the process should be guided more by rational (and theoretical substances) considerations rather by purely statistical ones.

It is suggested that future research could overcome the above limitations by incorporating relevant macroeconomic variables as exogenous variables to account for the effects of external factors or conducting separate analyses for the non-COVID-19 and Covid-19 periods using quarterly data, and developing alternative model specifications that improve model fit.

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