

WORKING CAPITAL MANAGEMENT EFFICIENCY AND FIRM PROFITABILITY ACROSS DIVERSE BUSINESS CYCLES

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Abstract

Working capital management (WCM) determines how quickly a firm turns its investment in receivables and inventories back into cash, but it is not clear whether efficient WCM matters equally for profitability in good and bad times. This study examines the relationship between WCM efficiency and firm profitability in expansion, moderate growth, and contraction phases of the business cycle. Using a panel calibrated to 160 manufacturing firms listed on the Indonesia Stock Exchange over 2010 to 2025 (2,428 firm years), it estimates two way fixed effects models with firm clustered standard errors, with the cash conversion cycle (CCC) and its components as efficiency measures. A longer CCC is associated with lower profitability: a 10 day increase reduces return on assets (ROA) by 0.15 percentage points, driven by longer receivable and inventory periods. The penalty is larger in contraction (0.21 points) than in expansion (0.12 points), but this amplification is not robust to alternative specifications. It is concentrated in small, financially constrained firms, for which a 10 day longer CCC reduces ROA by 0.39 points in contraction against 0.15 points for larger firms, a result that holds in most robustness tests. Net working capital has an inverted U shaped relation with ROA, with an optimum of about 20% of total assets in normal periods and about 25% in contraction, and almost two thirds of observations lie below the optimum. The findings suggest that WCM should be managed counter cyclically: shortening receivable and inventory periods while preserving a liquidity buffer before and during downturns, especially in smaller firms.

Keywords: working capital management; cash conversion cycle; profitability; business cycle; financial constraints; manufacturing firms

INTRODUCTION

Working capital is the part of a firm's capital tied up in day to day operations: receivables from customers, inventories of raw materials and finished goods, and the payables

owed to suppliers. For manufacturing firms these items often account for a large share of total assets, and the speed with which they are converted into cash affects both liquidity and profitability. Manufacturing is the largest single contributor to the Indonesian economy, and its firms operate in an environment that has gone through very different phases over the last fifteen years: rapid growth above 5.5% per year until 2013, a slowdown after the end of the commodity boom, the first economic contraction since 1998 when output fell by 2.07% in 2020 during the COVID 19 pandemic, and a recovery to growth of 5.11% in 2025 (Badan Pusat Statistik, 2026).

A large literature finds that firms with shorter cash conversion cycles are more profitable. Shin and Soenen (1998) and Deloof (2003) showed that reducing the number of days of receivables and inventories increases profitability, and similar results have been reported for Spanish small and medium enterprises (García Teruel & Martínez Solano, 2007), Greek listed firms (Lazaridis & Tryfonidis, 2006), and firms in Japan and Taiwan (Wang, 2002). Working capital, however, also has benefits: larger inventories prevent stockouts and production interruptions, and generous trade credit supports sales and customer relationships (Petersen & Rajan, 1997; Smith, 1980). Baños Caballero et al. (2014) and Aktas et al. (2015) therefore argue that there is an optimal level of working capital, so that both too much and too little investment in working capital reduce performance.

Most of this evidence pools observations across years and implicitly assumes that the relationship is the same in all phases of the business cycle. There are good reasons to doubt this. In downturns, customers delay payments, demand falls so that inventories accumulate, and banks and suppliers tighten credit, with the strongest effects on small firms (Gertler & Gilchrist, 1994; Love et al., 2007). The cost of capital tied up in working capital is then higher, but so is the value of a liquidity buffer. Enqvist et al. (2014) found that the profitability effect of the cash conversion cycle is stronger in economic downturns in Finland, but evidence from emerging markets, where cycles are sharper and financial constraints more widespread, is scarce, and the interaction between business cycles and financial constraints has rarely been examined jointly.

This study addresses these gaps by asking: (1) Is WCM efficiency, measured by the cash conversion cycle and its components, related to the profitability of Indonesian manufacturing firms? (2) Does this relationship differ between expansion, moderate growth, and contraction phases? (3) Is the effect of the cycle stronger for small, financially constrained firms? (4) Is there an optimal level of net working capital, and does it shift during contraction? The study contributes by distinguishing three phases of the business cycle rather than two, by

combining the cycle with financial constraints, by examining linear efficiency measures and the nonlinear optimum in the same framework, and by drawing practical implications for financial managers. Section 2 reviews the literature, Section 3 describes the method, Section 4 presents and discusses the results, and Section 5 concludes.

LITERATURE REVIEW

Working Capital Management and the Cash Conversion Cycle

Richards and Laughlin (1980) proposed the cash conversion cycle (CCC) as a dynamic measure of liquidity: the number of days between paying suppliers for inputs and collecting cash from customers for the output. It is the sum of days sales outstanding (DSO) and days inventory outstanding (DIO) minus days payables outstanding (DPO). Jose et al. (1996) found that firms with shorter CCCs earn higher returns in many US industries, and Shin and Soenen (1998) reported a strong negative relation between the net trade cycle and profitability. Deloof (2003) found for Belgian firms that profitability falls with longer receivable, inventory, and payable periods; the negative relation with payables was interpreted as reverse causality, since less profitable firms wait longer to pay their bills. García Teruel and Martínez Solano (2007) confirmed that shortening the CCC improves the profitability of small and medium enterprises.

The Tradeoff and the Optimal Level of Working Capital

Investment in working capital involves a tradeoff between profitability and liquidity (Smith, 1980). On the benefit side, inventories protect against supply interruptions and price increases and smooth production (Blinder & Maccini, 1991), and trade credit stimulates sales, allows customers to verify product quality, and strengthens long term relationships (Ng et al., 1999; Petersen & Rajan, 1997). On the cost side, working capital must be financed, and the resulting financing and opportunity costs reduce firm value (Kieschnick et al., 2013). Firms also hold liquid assets for precautionary reasons when external finance is costly (Opler et al., 1999). These opposing effects imply a concave, inverted U shaped relation between working capital and performance. Baños Caballero et al. (2012, 2014) confirmed such a relation and found that the optimum is lower for financially constrained firms, and Aktas et al. (2015) showed that firms moving towards the optimal level of working capital improve their stock and operating performance.

Business Cycles, Financial Constraints, and Working Capital

Business cycles affect both sides of the tradeoff. In contractions, sales fall faster than production can be adjusted, inventories accumulate, and customers stretch their payment terms,

so that the CCC lengthens precisely when financing is hardest to obtain. Gertler and Gilchrist (1994) showed that small manufacturing firms account for a disproportionate share of the decline in sales and inventories after a monetary tightening, because they depend on bank credit. Fazzari and Petersen (1993) found that constrained firms use working capital as a buffer to smooth fixed investment, and Love et al. (2007) showed that trade credit contracts after financial crises. Conversely, firms with ample liquidity can gain market share by extending credit to customers during a crisis (Garcia Appendini & Montoriol Garriga, 2013). Enqvist et al. (2014) found that the negative relation between the CCC and profitability is stronger in economic downturns than in booms, suggesting that efficient WCM is most valuable when conditions are poor.

Hypotheses

Based on this literature, the study tests four hypotheses. **H1:** WCM efficiency is positively related to profitability, that is, the CCC and its receivable and inventory components are negatively related to profitability (Deloof, 2003; García Teruel & Martínez Solano, 2007). **H2:** The negative relation between the CCC and profitability is stronger in contraction than in expansion (Enqvist et al., 2014). **H3:** The amplification in contraction is stronger for small, financially constrained firms (Baños Caballero et al., 2014; Gertler & Gilchrist, 1994). **H4:** Net working capital has an inverted U shaped relation with profitability, and the optimal level is higher in contraction because of the precautionary value of liquidity (Aktas et al., 2015; Opler et al., 1999).

METHOD

Data and Business Cycle Phases

The analysis uses an unbalanced annual panel of 160 manufacturing firms over 2010 to 2025, with a total of 2,428 firm year observations. The firms belong to six subsectors: food and beverages, consumer goods, chemicals and plastics, basic materials, automotive and components, and textiles and garments; 110 firms are observed from 2010 and the others enter the sample between 2011 and 2015. In the present version of the study the panel is simulated: the firm level variables were generated to reproduce typical characteristics of manufacturing firms listed on the Indonesia Stock Exchange, including subsector differences in working capital cycles and the macroeconomic shocks described below, and the results are therefore illustrative. ROA and GOP are winsorized at the 1st and 99th percentiles.

Business cycle phases are defined from annual real GDP growth published by Badan Pusat Statistik. **Expansion** covers 2010 to 2013, when growth exceeded 5.5% per year; **moderate growth** covers 2014 to 2019 and 2022 to 2025, when growth was close to 5%; and **contraction** covers 2020 and 2021, when output fell by 2.07% and then recovered by only 3.70%, well below its previous trend. The three phases contain 516, 1,592, and 320 firm year observations respectively.

Variables

Profitability is measured by return on assets (ROA) and, as a robustness check, by gross operating profit (GOP) relative to operating assets, following Deloof (2003). WCM efficiency is measured by the cash conversion cycle,

$$CCC_{it} = DSO_{it} + DIO_{it} - DPO_{it} \quad (1)$$

where $DSO = \text{accounts receivable} / \text{sales} \times 365$, $DIO = \text{inventories} / \text{cost of goods sold} \times 365$, and $DPO = \text{accounts payable} / \text{cost of goods sold} \times 365$. A shorter CCC indicates more efficient WCM. The level of investment in working capital is measured by net working capital (NWC), current assets minus current liabilities divided by total assets. Control variables are firm size (SIZE, the natural logarithm of total assets), leverage (LEV, total liabilities over total assets), and sales growth (GROWTH), which are standard in this literature (Baños Caballero et al., 2012; Deloof, 2003). ROA is net income over total assets, and GOP is sales minus cost of goods sold plus depreciation, over total assets minus financial assets.

Empirical Models

The baseline model relates profitability to WCM efficiency,

$$ROA_{it} = \alpha_i + \lambda_t + \beta_1 CCC_{it} + \gamma' X_{it} + \varepsilon_{it} \quad (2)$$

where α_i are firm fixed effects that absorb time invariant differences in management quality and business models, λ_t are year fixed effects that absorb common macroeconomic shocks, and X_{it} contains the control variables. The model is also estimated with DSO, DIO, and DPO in place of the CCC. To examine whether the relationship varies over the business cycle, the CCC is interacted with the phase dummies,

$$ROA_{it} = \alpha_i + \lambda_t + \beta_1 CCC_{it} + \beta_2 CCC_{it} \times EXP_t + \beta_3 CCC_{it} \times CON_t + \gamma' X_{it} + \varepsilon_{it} \quad (3)$$

so that β_1 is the effect in moderate growth, $\beta_1 + \beta_2$ the effect in expansion, and $\beta_1 + \beta_3$ the effect in contraction; the main effects of the phase dummies are absorbed by the year fixed effects. To test H3, the model is extended with $CCC \times SMALL$ and $CCC \times CON \times SMALL$. Small firms, defined by the lowest tercile of initial total assets (54 firms), are used as a proxy for

financial constraints, following Gertler and Gilchrist (1994) and Baños Caballero et al. (2014). Finally, the optimal level of working capital is examined with a quadratic specification,

$$ROA_{it} = \alpha_i + \lambda_t + \delta_1 NWC_{it} + \delta_2 NWC_{it}^2 + (\delta_3 NWC_{it} + \delta_4 NWC_{it}^2) \times CON_t + \gamma' X_{it} + \varepsilon_{it} (4)$$

in which an inverted U requires $\delta_2 < 0$, with the turning point at $-\delta_1 / 2\delta_2$. Following Lind and Mehlum (2010) and Haans et al. (2016), the inverted U is confirmed only if the slope is significantly positive at the low end and significantly negative at the high end of the data, evaluated at the 5th and 95th percentiles of NWC. All models are estimated by ordinary least squares with firm and year fixed effects, and standard errors are clustered by firm to account for serial correlation within firms (Petersen, 2009). Variance inflation factors are below 1.04, so multicollinearity is not a concern.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 summarizes the variables. The average firm earns an ROA of 5.23% and has a cash conversion cycle of 98 days, made up of 58 days of receivables and 97 days of inventory, of which 57 days are financed by suppliers. The CCC varies widely, with a standard deviation of 49 days, and some firms have a negative cycle because they collect from customers before paying suppliers. Net working capital averages 17.3% of total assets, and the average firm has total assets of about Rp3.2 trillion.

Table 1. Descriptive statistics

Variable	Mean	SD	Min	Median	Max
ROA (%)	5.23	5.21	-9.14	5.36	16.81
GOP (%)	9.51	6.69	-8.04	9.69	24.65
CCC (days)	98.01	49.32	-33.94	98.67	240.10
DSO (days)	58.33	23.80	5.00	59.44	148.12
DIO (days)	96.61	36.22	5.00	97.26	231.28
DPO (days)	56.92	18.54	5.00	56.83	122.87
NWC	0.173	0.091	-0.113	0.173	0.511
SIZE	28.79	1.44	25.24	28.80	33.37
LEV	0.460	0.155	0.070	0.455	0.950
GROWTH	0.064	0.154	-0.567	0.065	0.558

Note: N = 2,428 firm years of 160 firms, 2010 to 2025. Source: simulated data.

Table 2 and Figure 1 show how these variables change over the cycle. Profitability falls sharply in contraction, from an average ROA of 7.58% in expansion and 5.57% in moderate growth to -0.28% in contraction. At the same time the CCC lengthens from 89 days in expansion to 98 days in moderate growth and 112 days in contraction. The lengthening comes

mainly from receivables, which rise by 14 days between expansion and contraction, and from inventories, which rise by 14 days. Firms partly offset this by paying suppliers later, with DPO rising by 6 days relative to moderate growth. All differences between the phases are statistically significant. Figure 1 shows that the CCC peaked in 2020, exactly when ROA reached its lowest point, and then returned gradually to its precrisis level.

Table 2. Mean values by business cycle phase

Variable	Expansion	Moderate growth	Contraction	F	p
ROA (%)	7.58	5.57	-0.28	291.00	< 0.001
CCC (days)	89.0	98.2	111.5	20.91	< 0.001
DSO (days)	54.5	57.6	68.3	36.50	< 0.001
DIO (days)	91.4	96.6	105.1	14.44	< 0.001
DPO (days)	56.8	56.0	61.9	13.70	< 0.001
NWC	0.165	0.175	0.181	3.74	0.024
LEV	0.458	0.455	0.484	4.68	0.009
GROWTH	0.099	0.063	0.012	32.70	< 0.001
Observations	516	1,592	320		

Note: Expansion = 2010 to 2013; moderate growth = 2014 to 2019 and 2022 to 2025; contraction = 2020 to 2021. F and p from one way ANOVA. Source: simulated data.

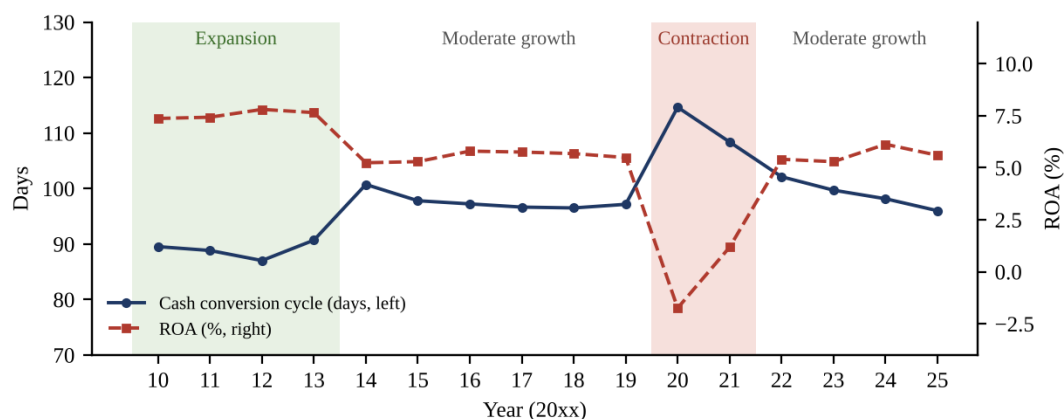


Figure 1. Average cash conversion cycle and ROA, 2010 to 2025

Source: simulated data (illustrative).

WCM Efficiency and Profitability

Table 3 reports the baseline estimates. In column (1), the coefficient of the CCC is -0.0154 and significant at the 1% level: a 10 day increase in the cash conversion cycle reduces ROA by 0.15 percentage points, and a one standard deviation increase (49 days) reduces it by about 0.76 points, or 15% of the average ROA. Columns (2) to (4) show that this effect is driven by receivables and inventories: the coefficients of DSO (-0.0196) and DIO (-0.0211) are negative and significant at the 1% level, whereas the coefficient of DPO is negative but not

significant ($p = 0.344$). Among the controls, larger firms, firms with lower leverage, and firms with higher sales growth are more profitable. H1 is therefore supported.

Table 3. WCM efficiency and profitability: baseline fixed effects estimates

Variable	(1)	(2)	(3)	(4)
CCC	-0.0154*** (0.0035)			
DSO		-0.0196*** (0.0069)		
DIO			-0.0211*** (0.0047)	
DPO				-0.0066 (0.0070)
SIZE	0.815** (0.329)	0.769** (0.333)	0.842*** (0.321)	0.781** (0.326)
LEV	-6.060*** (1.509)	-5.981*** (1.511)	-6.104*** (1.503)	-6.006*** (1.512)
GROWTH	4.001*** (0.449)	3.955*** (0.445)	4.007*** (0.450)	3.962*** (0.446)
Firm and year fixed effects	Yes	Yes	Yes	Yes
Observations	2,428	2,428	2,428	2,428
R ² (LSDV)	0.723	0.722	0.723	0.721

Note: Dependent variable: ROA (%). Firm clustered standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Source: simulated data.

WCM Efficiency Across Business Cycle Phases

Table 4 introduces the business cycle. In column (1), the coefficient of the CCC in moderate growth is -0.0154 . The implied effect is -0.0120 in expansion and -0.0210 in contraction, so that a 10 day longer cycle reduces ROA by 0.12 points in expansion, 0.15 points in moderate growth, and 0.21 points in contraction. The difference between contraction and expansion is significant (Wald test $p = 0.022$), but the difference between contraction and moderate growth is not ($p = 0.153$). H2 is therefore only partly supported: efficient WCM matters more in bad times than in boom years, but the additional penalty in contraction is moderate on average.

Column (2) shows that the cycle effect is concentrated in small firms. The triple interaction $CCC \times CON \times SMALL$ is -0.0126 and significant at the 1% level, while $CCC \times CON$ remains insignificant. Figure 2 shows the implied marginal effects. For large and medium firms, a 10 day longer CCC reduces ROA by 0.07 points in expansion (not significant), 0.10 points in moderate growth, and 0.15 points in contraction. For small firms the corresponding

effects are 0.19, 0.22, and 0.39 points, so that in contraction the penalty for slow cash conversion is about 2.7 times as large for small firms as for larger ones. H3 is supported.

Column (3) decomposes the cycle effect into the components of the CCC. In contraction, the negative effects of receivables (-0.0106 , $p = 0.175$) and inventories (-0.0103 , $p = 0.070$) become somewhat stronger, but the clearest change concerns payables: the interaction $DPO \times CON$ is -0.0281 and significant at the 1% level. In contraction, firms that pay their suppliers later are markedly less profitable, which suggests that longer payables in a downturn reflect financial distress rather than efficient use of supplier finance.

Table 4. WCM efficiency and profitability across business cycle phases

Variable	(1) Cycle	(2) Constraints	(3) Components
CCC	-0.0154^{***} (0.0037)	-0.0104^{**} (0.0045)	
CCC $\times$ EXP	0.0034 (0.0032)	0.0034 (0.0032)	
CCC $\times$ CON	-0.0055 (0.0039)	-0.0041 (0.0038)	
CCC $\times$ SMALL		-0.0120^* (0.0068)	
CCC $\times$ CON $\times$ SMALL		-0.0126^{***} (0.0033)	
DSO			-0.0189^{***} (0.0070)
DIO			-0.0197^{***} (0.0048)
DPO			-0.0035 (0.0070)
DSO $\times$ CON			-0.0106 (0.0078)
DIO $\times$ CON			-0.0103^* (0.0057)
DPO $\times$ CON			-0.0281^{***} (0.0107)
SIZE	0.836** (0.326)	0.839*** (0.321)	0.803** (0.326)
LEV	-6.083^{***} (1.504)	-5.740^{***} (1.489)	-6.115^{***} (1.502)
GROWTH	3.995*** (0.447)	4.043*** (0.446)	4.028*** (0.444)
Firm and year fixed effects	Yes	Yes	Yes

Variable	(1) Cycle	(2) Constraints	(3) Components
Observations	2,428	2,428	2,428
R ² (LSDV)	0.724	0.727	0.727

Note: Dependent variable: ROA (%). The base category is moderate growth; the main effects of EXP and CON are absorbed by year fixed effects and the main effect of SMALL by firm fixed effects. Firm clustered standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Source: simulated data.

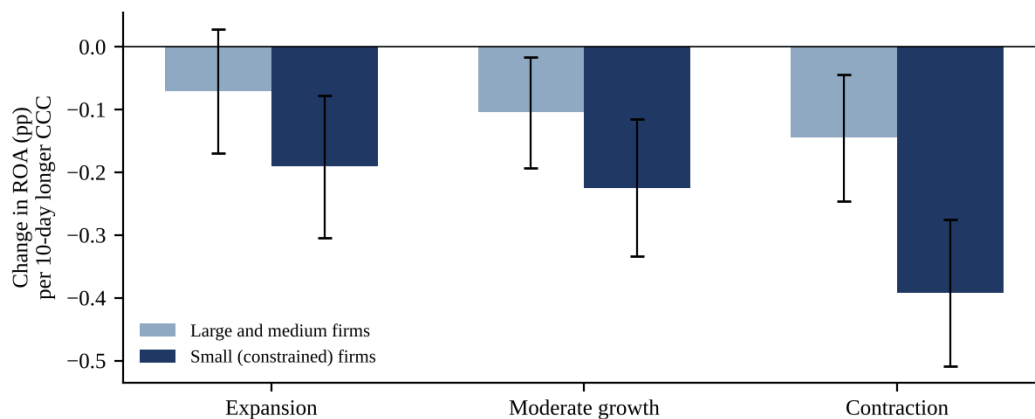


Figure 2. Effect of a 10 day longer CCC on ROA by cycle phase and firm size

Marginal effects from Table 4, column (2), with 95% confidence intervals. Source: simulated data (illustrative).

The Optimal Level of Net Working Capital

Table 5 tests H4. The coefficient of NWC is positive (19.67) and that of its square is negative (-48.46), both significant at the 1% level. The slope is significantly positive at the 5th percentile of NWC and significantly negative at the 95th percentile, which satisfies the Lind and Mehlum (2010) conditions for an inverted U. Profitability is maximized when net working capital equals 20.3% of total assets in expansion and moderate growth and 24.9% in contraction, and the inverted U also holds within the contraction years. The point estimates therefore suggest that the optimal liquidity buffer rises in a downturn, although the interaction terms are not individually significant, so the shift should be interpreted with caution. Notably, 63% of the observations lie below the optimum, which means that for most firms a further reduction of working capital would lower rather than raise profitability. H4 is supported for the inverted U, and only weakly for the shift of the optimum.

Table 5. Net working capital and profitability: the optimal level

Variable	Coefficient	SE	p
NWC	19.669***	3.085	< 0.001
NWC ²	-48.458***	7.536	< 0.001
NWC × CON	8.954	6.843	0.191
NWC ² × CON	-9.076	16.317	0.578
SIZE	0.789**	0.331	0.017
LEV	-5.997***	1.535	< 0.001
GROWTH	3.946***	0.436	< 0.001
Observations	2,428		
R ² (LSDV)	0.727		
<i>Panel B. Turning points and slopes</i>			
Optimal NWC, expansion and moderate growth	0.203		
Optimal NWC, contraction	0.249		
Slope at P5 (NWC = 0.025), normal	17.24***	2.76	< 0.001
Slope at P95 (NWC = 0.328), normal	-12.09***	2.68	< 0.001
Slope at P5, contraction	25.74***	5.73	< 0.001
Slope at P95, contraction	-9.08**	4.53	0.045

Note: Dependent variable: ROA (%). Panel A: firm and year fixed effects; firm clustered standard errors. Panel B: turning point = $-\delta_1 / 2\delta_2$; slopes evaluated at the 5th and 95th percentiles of NWC. *** p < 0.01, ** p < 0.05, * p < 0.10. Source: simulated data.

Robustness Checks

Table 6 repeats the specification of Table 4, column (2), in four alternative ways: with GOP as the measure of profitability; with the CCC lagged by one year to reduce the risk of reverse causality; excluding 2020, the year of the pandemic shock; and with the CCC measured relative to the median of the same subsector and year, which captures efficiency relative to peers. The negative effect of the CCC is negative in all four specifications and significant at the 10% level or better (p between 0.009 and 0.053). The interaction $CCC \times CON$ is not significant in any specification, which confirms that the cycle effect for the average firm is weak and partly driven by 2020. The triple interaction $CCC \times CON \times SMALL$, by contrast, remains negative and significant with GOP, with the lagged CCC, and without 2020, but it loses significance when the CCC is measured relative to industry peers (p = 0.619). This indicates that small firms are hurt mainly by the cycle wide lengthening of their cash conversion cycle, as customers in the whole industry pay later, rather than by being less efficient than their peers.

Table 6. Robustness checks

Variable	(1) GOP	(2) Lagged CCC	(3) Excluding 2020	(4) Industry adjusted
CCC	-0.0126* (0.0065)	-0.0093** (0.0039)	-0.0118** (0.0046)	-0.0121*** (0.0046)
CCC × EXP	0.0073* (0.0042)	0.0044 (0.0037)	0.0032 (0.0032)	0.0008 (0.0032)
CCC × CON	-0.0076 (0.0053)	-0.0007 (0.0036)	-0.0004 (0.0051)	-0.0015 (0.0056)
CCC × SMALL	-0.0173* (0.0097)	0.0082 (0.0072)	-0.0101 (0.0071)	-0.0110 (0.0073)
CCC × CON × SMALL	-0.0114** (0.0046)	-0.0155*** (0.0035)	-0.0123*** (0.0043)	-0.0050 (0.0101)
Controls, firm and year FE	Yes	Yes	Yes	Yes
Observations	2,428	2,268	2,268	2,428
R ² (LSDV)	0.672	0.724	0.690	0.724

Note: Column (1): dependent variable GOP (%); columns (2) to (4): ROA (%). In column (2) the CCC terms use the CCC of the previous year; in column (4) the CCC is measured as the deviation from the subsector and year median. Firm clustered standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Source: simulated data.

Discussion

Is efficient WCM always profitable? The negative relation between the CCC and profitability confirms the main finding of Shin and Soenen (1998), Deloof (2003), and García Teruel and Martínez Solano (2007): capital tied up in receivables and inventories has a cost, and firms that convert it into cash faster earn more. At the same time, the inverted U for net working capital shows that efficiency should not be confused with minimization. Consistent with Baños Caballero et al. (2014) and Aktas et al. (2015), profitability is highest at a moderate level of working capital, and most firms in the sample are below rather than above that level.

Why do downturns matter mainly for small firms? In contraction, the CCC of the average firm lengthens by more than 20 days compared with expansion, because customers pay later and inventories accumulate. Larger firms can finance this additional working capital from internal funds or bank lines, so that the profitability cost changes little over the cycle. Small firms depend more on short term bank credit, which becomes more expensive and less available in downturns (Gertler & Gilchrist, 1994; Love et al., 2007), so that each additional day of working capital costs them more. This explains why the cycle effect found by Enqvist et al. (2014) appears here mainly as a constraint effect.

Implications. For financial managers, the results support counter cyclical WCM: tightening credit policies and inventory control during good times, monitoring customers'

payment behavior closely when the economy weakens, and building a liquidity buffer of about one fifth to one quarter of total assets before a downturn rather than during it. Small firms should give priority to receivable collection and inventory reduction, and arrange committed credit lines in advance. For banks and policymakers, the findings suggest that working capital financing and supply chain finance programs for small manufacturing firms are most valuable during contractions, when the profitability cost of slow cash conversion is highest.

CONCLUSION

This study examined the relationship between working capital management efficiency and firm profitability across expansion, moderate growth, and contraction phases of the business cycle for Indonesian manufacturing firms. In this illustrative analysis, a longer cash conversion cycle is associated with lower profitability, mainly through receivable and inventory periods. The profitability penalty of slow cash conversion is larger in contraction than in expansion, but for the average firm the difference is moderate and not robust; the clear amplification occurs among small, financially constrained firms, for which a 10 day longer cycle costs about 2.7 times as much ROA in contraction as for larger firms. Net working capital has an inverted U shaped relation with profitability, with an optimum of about 20% of total assets that tends to rise in contraction, and most firms operate below this optimum. Efficient WCM therefore means converting working capital into cash quickly while keeping an adequate liquidity buffer, and its value depends on both the phase of the business cycle and the financial position of the firm.

The study has limitations. Most importantly, the present results are based on a simulated panel, and the analysis must be repeated with actual financial statement data of listed firms before substantive conclusions can be drawn. In addition, the contraction phase covers only two years dominated by the pandemic, which differs from an ordinary recession; firm size is only a proxy for financial constraints; and fixed effects estimation does not fully remove the possibility of reverse causality. Future research could use quarterly data, system GMM estimators, and alternative measures of financial constraints.

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