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Working Capital Management and Firm Performance Relationship: An Empirical Investigation of Australasian Firms

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This paper examines the empirical relationship between working capital management (WCM) and firm performance (FP) for Australasian publicly listed firms. Australia and New Zealand are attractive investment destinations due to their business friendly environments. The past two decades have seen increased academic attention in studies linking WCM and FP across various parts of globe. The empirical relationship between WCM-FP has not been sufficiently examined in regards to Australian and New Zealand firms. This study measures the role of WCM during the 2008 global financial crisis in both Australia and New Zealand firms. This study uses System General Method of Moments to address the endogeneity problem in order to reduce the possibility of biased results. The results show that WCM has a significant relationship with FP. More specifically, the Cash Conversion Cycle (CCC) and the Inventory Conversion Period (ICP) exhibit negative relationships

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with FP indicating that a reduction in the CCC and the ICP help to improve FP in Australasian firms. However, in the case of the Average Collection Period (ACP) and the Average Payment Period (APP), the results vary between both countries. In Australia, the ACP has no significant relationship, whereas APP has a positive relationship. This is contrary in the case of New Zealand firms. Another important finding is that firms in both markets were relatively efficient collecting their receivables during the 2008 global financial crisis period. These findings provide new empirical evidence that WCM matters for improving FP in Australasian firms.

Keywords: Working capital management; firm performance; 2008 global financial crisis; Australia; New Zealand; systems generalized method of moments.

1. Introduction

This paper investigates the empirical relationship between working capital management (WCM) and firm performance (FP) of Australasian firms. The objectives of the study are as follows: (1) to analyze the effect of WCM components on the FP of Australasian firms for the period of 2007–2016; (2) to analyze the effect of WCM during the 2008 global financial crisis (2008 GFC) on Australasian firms; (3) to investigate the dynamic relationship between WCM and FP; and (4) to analyze the relationship between firm characteristics and FP. The sample for this study was based on firms listed on the Australian Securities Exchange (ASX) and the New Zealand Stock Exchange (NZX). We considered all publicly listed firms in light of Christopher and Kamalavalli (2009) argument that WCM is important for all firms because neglecting WCM may impact upon firm survival and performance. As a result of data filters we obtained 1345 firms from the total number of firms listed in both Australia and New Zealand (2351). The empirical analysis began with traditional OLS and fixed-effect (FE) estimation techniques, followed by dynamic panel data estimation, to address the endogeneity issue. The sample period for the study was from 2007 to 2016. This study examined the relationship between WCM components, such as the cash conversion cycle (CCC), the average collection period (ACP), the average payment period (APP) and the inventory conversion period (ICP) and FP. While there is extensive literature available on the relationship between WCM components and FP (see, for example, Deloof, 2003; Juan García-Teruel and Martinez-Solano, 2007; Gakure *et al.*, 2012; Gul *et al.*, 2013; Aktas *et al.*, 2015) the empirical relationship has not been examined in the context of Australia and New Zealand firms. Furthermore, the importance of WCM has not been adequately recognized as specified by Baños-Caballero *et al.* (2014): "the idea that working capital management affects firm value also seems to enjoy wide acceptance, although the empirical evidence in working capital is scarce" (p. 333).

The study results show that CCC and ICP have a negative relationship in Australasian firms, indicating that reduction in these components lead towards better FP. In the case of ACP and APP, Australian and New Zealand firms report different results. The Australian firms tend to delay payments on their accounts, whereas New Zealand firms focus on the earliest possible collection of receivables.

A balance between liquidity and performance is required for firms to ensure smooth day-to-day operations. Firms must maintain certain levels of the liquidity in order to ensure they meet their current obligations and operate efficiently without having to borrow. WCM plays a crucial role in determining an individual business' success or failure, due to its impact on FP and liquidity (Filbeck *et al.*, 2017; Luo and Hachiya, 2005; Vahid *et al.*, 2012). In this context, the study's second contribution relates to its examination of the role of WCM components during the 2008 GFC in Australia and New Zealand. The results show that firms in both countries focused on the earliest possible collection of accounts receivable during the 2008 GFC. Thus, the working capital position of Australia and New Zealand firms was relatively unaffected by the 2008 GFC in comparison to other part of the world. As most of the firms had sufficient resources available, such as receivables, to meet their day-to-day operations, they were not dependent on banks which faced the liquidity crunch in 2008. Third, the existing literature has produced divergent results while investigating the relationship between WCM and FP. For example, Vu and Phan (2016) and Abuzayed (2012) reported a significant positive relationship, whereas Deloof (2003) and Enqvist *et al.* (2014) reported a negative relationship. Variations in results are due to the limited sample selected for these studies, as most prior studies have been limited to specific industries or specific countries. They can also be attributed to the methodology used (Black, 2001; Durnev and Kim, 2005; Klapper and Love, 2004). Existing studies have overlooked the dynamic relationship and the presence of endogeneity. The dynamic relationship indicates that prior studies on WCM-FP have ignored the two-way relationship. This study demonstrates that the relationship between WCM-FP is dynamic in nature. Finally, in terms of firm characteristics, this study concludes that firm size, current ratio and sales growth have a significant impact on FP. Australasian firms should consider firm's characteristics, together with WCM to improve FP. These findings are useful for various stakeholders. Firm managers need to manage WC components more efficiently.

Debt holders might use this information to assess the financial strength of firms before issuing loans to them. Findings related to the 2008 GFC may be helpful for regulators, and governments for preparing for future financial crises.

2. Literature Review and Hypothesis Development

While Swartz (1947) popularised the concept of working capital in the mid-20th century, with the idea of business operating cycles, it has become increasingly important in the last two decades. WC can be divided into three broad phases as follows:

(i) The early phase which covers from 1900 to the 1950s, when a number of disputes originated over the concept; (ii) The economic development period, which covers from the 1950 to the 1980s. This period occurred during an era of economic development, when the business world witnessed tremendous shifts from the concept of WCM towards the simulation of various mathematical models for WC. These included the decision-making model, the interlocking model, and the control limit model; and (iii) The final period, refers to a period of internationalisation and globalisation, and covers up to the present-day (1980s–2017s). In this era, researchers have attempted to increase WCM awareness, by shifting the focus from firms to the relationship between WCM and FP Awareness about WCM is even more appropriate after the 2008 GFC (Akoto *et al.*, 2013; Aktas *et al.*, 2015).

In the era of competitiveness and globalization, the survival of business world is at edge as it is facing dynamic challenges. Even the positive numbers on financial statement being an indicator of strong financial position do not ensure the survival of the business (Yang *et al.*, 2015). As a consequence of the 2008 GFC, most corporate structures restructured them as they become the victims of bankruptcy. In the state of bankruptcy firms fail to manage their financial operations and are unable to get any financial help from creditors especially in the hour of need. This bankruptcy results due to the implementation of inappropriate working capital strategies. As a result, the firms' performance got affected and caused a decline in firms' profitability.

In terms of major components of WCM, Brigham and Ehrhardt (2013) argue that WCM can be divided into four major components; CCC, AR, AP, and INV. However, CCC is traditionally used to measure the impact of WCM on FP (Baños-Caballero *et al.*, 2012; Deloof, 2003; Wang, 2002). However, Yazdanfar and Öhman (2014) have highlighted the need to include the other three components (ACP, APP, and ICP) of WCM to analyze FP. Mixed results have been reported in the literature on CCC. Several scholars have reported a negative relationship between CCC and FP (Richards and Laughlin, 1980; Deloof, 2003; Johnson and Soenen, 2003; Gul *et al.*, 2013; Enqvist *et al.*, 2014; Sivashanmugam and Krishnakumar, 2016). This implies that reducing the CCC period would help increase FP. On the contrary, Chowdhury and Amin 2007), Gakure *et al.* (2012), and Ahmed *et al.* (2016) reported a positive realtionship. Whereas, Jahfer (2015) reported no negative relationship between CCC and FP. The following relationships are hypothesised:

H1a: *CCC is negatively correlated with FP.*
H1b: *CCC is positively correlated with FP.*
H1c: *CCC is not correlated with FP.*

Most of the sampled businesses operate on credit terms and thus the collection of AR is important for FP. Efficient AR management is not only crucial for firm survival, but it also helps maintain FP by addressing the liquidity issue (Biswal *et al.*, 2012). Mixed results have been reported by most of the prior studies which investigate the empirical relationship between AR and FP. While Chowdhury and Amin (2007); Ademola (2014), and Sharma and Kumar (2011) all report a positive relationship, several others report a negative relationship (see, for example, Lyroudi and Lazaridis, 2000; Nobanee and Alhajjar, 2009); (Akoto *et al.*, 2013; Gakure *et al.*, 2012; Gul *et al.*, 2013; Javid and Zita, 2014; Hailu and Venkateswarlu, 2016; Nguyen and Nguyen, 2015; Samiloglu and Akgün, 2016; Sivashanmugam and Krishnakumar, 2016). However, Bratland and Hornbrinck (2013), Enqvist *et al.* (2014), and Nguyen *et al.* (2016) found no significant relationship. The following relationships are thus hypothesised:

H2a: *ACP is negatively correlated with FP.*
H2b: *ACP is positively correlated with FP.*
H2c: *ACP is not correlated with FP.*

Accounts payable (AP) is another important component for measuring FP in the context of WCM components. Poutziouris *et al.* (2005) argue that trade credit is a common, inexpensive, and flexible source of short-term funds. However, providing cash discounts for early payment is much more valuable for a firm than late payments (Petersen and Rajan, 1997). While several scholars have found a negative relationship between AP and FP (see Deloof, 2003; Padachi, 2006; Chowdhury and Amin, 2007; Javid and Iqbal, 2007; Gakure *et al.*, 2012; Gul *et al.*, 2013; Jahfer, 2015; Nguyen and

Nguyen, 2015; Mathuva, 2015; Ahmed *et al.*, 2016; Hailu and Venkateswarlu, 2016), others have reported a positive relationship (see Mathuva, 2009; Afeef, 2011; Nobanee *et al.*, 2011; Akoto *et al.*, 2013; Ademola, 2014; Temtime, 2016). The following relationships are thus hypothesised:

H3a: *There is a negative and significant relationship between APP and FP.*
H3b: *There is a positive and significant relationship between APP and FP.*
H3c: *There is no correlation between APP and FP.*

Likewise, efficient inventory management leads to increase in FP (Koumanakos, 2008). In the case of inventory, several studies have found negative relationship (Gakure *et al.*, 2012; Gul *et al.*, 2013; Javid and Zita, 2014; Nguyen and Nguyen, 2015; Ahmed *et al.*, 2016; Hailu and Venkateswarlu, 2016). In contrast, Chowdhury and Amin (2007), Akoto *et al.* (2013), Ademola (2014), Sivashanmugam and Krishnakumar (2016); and Temtime (2016) reported a positive relationship between inventory and FP. The following relationships are hypothesised:

H4a: *There is a negative and significant relationship between ICP and FP.*
H4b: *There is a positive and significant relationship between ICP and FP.*
H4c: *There is no correlation between ICP and FP.*

3. Data, Sample and Methodology

3.1. *Data and sample*

The financial data for all of the 2,351 firms listed on the Australia and NZX were obtained from annual reports in the Bloomberg database. Of the 2,351 firms, 2,185 are Australian while 166 were listed on the New Zealand stock markets. We applied various data filter criteria, such as deleting negative values, and dropping all of the firms which had data for less than four years (Appel *et al.*, 2016). This meant that our data were unbalanced panel data. It consisted of 1,345 firms with 7968 observations for the period of 2007 to 2016. This period includes the 2008 GFC.

3.2. *Variables*

Following prior studies (Baños-Caballero *et al.*, 2014; Deloof, 2003; Juan García-Teruel and Martinez-Solano, 2007), the independent variables in this study are WCM components; the CCC, accounts receivable, AP and inventory turnover. FP is measured using both accounting (ROA) and operational performance (ROE) as proxies for the dependent variables

Table 1. Variables measurement.

Variables	Measurement	Symbols
Independent variables		
Cash Conversion Cycle	ACP+ITID-APP	CCC
Average Collection Period	AR*365/Total credit sales	ACP
Average Payment Period	AP*365/Cost of sales	APP
Inventory Conversion Period	Ending inventory *365/COGS	ICP
Dependent variables		
Return on assets	Net income/Total assets	ROA
Return on equity	Net income/Total equity	ROE
Control variables		
Firm size	Natural logarithm of capitalisation	FS
Current ratio	Current assets/Current liabilities	CR
Sales growth	Increase in current year sales compared to last year	SG

Notes: ACP stands for Average Collection Period; ITID stands for inventory turnover in days; AR stands for accounts receivable; AP stands for Accounts payable; and COGS stands for the cost of goods sold.

(Aktas *et al.*, 2015; Appel *et al.*, 2016; Lee and Lee, 2009; Low *et al.*, 2015). Various studies have confirmed that FP can be affected by the current ratio, debt to equity ratio, leverage, firm size, and sales growth. Hence, in order to control for the effect of these variables on the WCM and FP relationship, in our study, the current ratio, firm size, and sales growth are considered as control variables (Jiang *et al.*, 2012; Kim *et al.*, 2018). The variables are defined in Table 1.

3.3. *Empirical model*

In additional to investigating the WCM and FP relationship, this study also addresses the issue of endogeneity. Endogeneity may be due to two main reasons. The first is related to deleted variables, while the second reverse causality. In order to investigate the relationship between WCM components and FP, this study uses a system generalized method of moments (SGMM) estimation. We applied SGMM due to the dynamic panel data for the following reasons. First, there is a chance that unobserved effects will be correlated with the regressors. SGMM is an appropriate technique for controlling such effects. Second, due to outliers in our data, there is some uncertainty about the homogeneity of the data. Third, in order to address autocorrelation issue, a lagged-dependent variable was considered as it helps to overcome omitted variables, which change over time. According to Nadeem *et al.* (2017), and Sila *et al.* (2016), the lag-dependent variable helps to capture the effect of omitted variables over time. Similarly, Gujarati (2012) recommends various means to analyze the nature of a model (that is, static or dynamic), including the use of a lagged-dependent variable. Arellano and Bover (1995) and Blundell and Bond (1998) advocate using the GMM technique, which they developed. In Monte Carlo estimations, they showed that estimators behave differently than estimator of GMM difference as proposed by Arellano and Bond (1991) for shorter periods of time. Roodman (2015) notes that Arellano–Bond has one- and two-step variants for the estimators. Roodman recommends the use of the two-step estimate, as the standard errors seem to be strictly downward biased. The following dynamic panel model regression was used to estimate the relationship between WCM and FP:

$$\mathrm{FP}_{it} = \alpha + \beta_1 \mathrm{LFP}_{it-1} + \beta_2 \mathrm{WCM}_{it} + \beta_3 \mathrm{Control}_{it} + T.\gamma + \eta_i + e_{it}, \tag{1}$$

where FP is firms' performance, LFP_{it-1} is the dependent variable with lagged value, WCM_{it} represents components of WCM (CCC, ACP, APP, and ICP), η_i and e_{it} are unobserved firm specific effects and error term for firm i at time t, respectively (see Table 1).

4. Results and Discussion

4.1. *Descriptive statistics*

Table 2 shows the mean value for CCC is 67 days for Australian firms, with minimum and maximum values of −221 and 787 days, respectively. In New Zealand firms, the mean value for CCC is 102 days, with a minimum value of −408 and a maximum value of 589 days. The mean value for CCC in Australia firms is consistent with Tingbani (2015) findings for British firms (on average 66 days). However, this value is better than Enqvist *et al.*'s (2014) findings for Finnish firms (on average 108 days) and Gill *et al.* (2010) findings for American firms (on average 90 days). Shorter CCC durations mean better FP. In the case of New Zealand firms, the mean value for CCC is consistent with Pais and Gama (2015) findings for Portuguese firms (on average 102 days) and Enqvist *et al.* (2014) findings for Finnish firms (on average 108 days). Similarly, the mean value for ACP is 154 days for Australian firms and 95 days for New Zealand firms. The mean ACP value is consistent with Juan García-Teruel and Martinez-Solano (2007) findings for Spanish firms (on average 96 days). In terms of APP, the mean value is 79 days in Australia and 62 days in New Zealand. This finding is consistent with Pais and Gama (2015) report on Portuguese firms (on average 62 days). Finally, the ICP mean value is 74 days for Australia and 72 days for New Zealand.

Table 2. Descriptive statistics (2007–2016).

Countries	Obs.	Variables	Mean	Median	Minimum	Maximum
Australia		ROA	10.54	5.983	−90.506	49.108
		ROE	19.594	9.260	−172.415	183.305
		CCC	66.81	78.784	−259.891	787.753
		ACP	154.79	69.772	−221.136	430.321
		APP	79.15	61.344	−123.870	577.424
		ICP	73.81	94.974	−20.474	1242.990
New Zealand		ROA	2.217	3.703	−84.831	27.738
		ROE	4.212	3.963	−121.230	132.121
		CCC	102.660	88.256	−408.845	589.408
		ACP	94.775	78.697	0.107	665.283
		APP	62.240	59.280	0.359	118.068
		ICP	71.866	67.108	32.231	344.66

Notes: The variables are average values obtained for the period of 2007–2016. Obs. shows number of observations. The minimum and maximum values are 1 and 99 percentiles restricted, respectively.

This finding is consistent with Juan García-Teruel and Martinez-Solano (2007) work on Spanish firms (on average 77 days). The descriptive statistics for WCM components shows that Australian and New Zealand firms are more efficient in managing WCM components compared to European and American markets. The ROA average is 10.54% for Australian firms, while ROE is 19.59% which is higher (5.01%) than the US market (Aktas *et al.*, 2015). Whereas in case of New Zealand it is lower than US market. Thus, overall Australian WCM management is much better than other counterparts.

4.2. *Preliminary results*

Before applying regression analysis, various basic diagnostics tests were performed. In order to check the data for stationarity, we ran the Fisher type p test, which in case of unbalanced panel data, is considered to be the most appropriate test to check for data stationarity. The results are presented in Table 3. We also performed the Pearson pairwise correlation test to check for multicollinearity in the data. The untabulated results indicate that the values are below 0.80, which are within required limits (see Gujarati, 2012). Hence, there is no multicollinearity issue in our data. The variance inflation factor tests (VIF) also show that the mean VIF is 1.76, indicating there is no issue of multicollinearity[1] (Kalnins, 2018). Next, we applied the Breusch–

[1]Results of both tests (the Pearson Pairwise Correlation and the Variance Inflation Factor test) are available upon request.

Table 3. The Fisher-type test and modified Fisher-type test.

Country	Dep. Variable	Inv. Chi-Sq.	M-Inv. Chi
Australia	ROA	276.801[a]	6.529[a]
		(0.0000)	(0.0000)
	ROE	264.317[a]	5.831[a]
		(0.0000)	(0.0000)
New Zealand	ROA	54.222[a]	3.913[a]
		(0.0000)	(0.0000)
	ROE	66.750[a]	5.651[a]
		(0.0000)	(0.0000)

Notes: The table presents t-statistics (p-values) of inverse chi-squared and modified inverse chi-squared.
[a]indicates significance at a 1% level.

Table 4. Breusch–Pagan/Cook–Weisberg test for heteroscedasticity.

Countries	ROA	ROE
Australia	25.19[a]	78.24[a]
	(0.0000)	(0.0000)
New Zealand	13.19[a]	8.61[a]
	(0.0007)	(0.0001)

Notes: The table presents the Breusch–Pagan test results with ROA, and ROE (p-value).
[a]indicates significance at a 1% level.

Table 5. The Wooldridge results for autocorrelation.

Country	ROA	ROE
Australia	3.155[a]	17.988[a]
	(0.0079)	(0.0001)
New Zealand	4.915[a]	35.401[a]
	(0.0006)	(0.0005)

Notes: The table presents the p-value of the Wooldridge test for autocorrelation in parenthesis.
[a]indicates significance at a 1% level.

Pagan test to check for the presence of heteroscedasticity in the data and the Wooldridge test for autocorrelation. The results are presented in Tables 4 and 5.

Table 3 shows that there is no problem of unit root and that the data set is stationary, as the $p-$values (0.0000) are significant. In Tables 4 and 5, ROA and ROE show significant results at a 1% level. Therefore, we reject our null hypothesis; thus, the data suffer from heteroscedasticity and autocorrelation. Baltagi (2008) argues that the presence of autocorrelation and the heteroscedasticity issue in data will produce unbiased and consistent results, but are not effective when using OLS and FE estimation techniques. Before taking any corrective measures to address the heteroscedasticity and autocorrelation problems in the data, we checked for the possibility of endogeneity. Gujarati (2012) notes that one way to check the nature of the model (dynamic or static) is to use a lagged-dependent variable as a regressor. In short, if we introduce a lagged-dependent variable as a regressor and the results appear to be significant this means the model is dynamic in nature and should be investigated using dynamic panel data methods.

4.3. *Dynamic OLS results*

To identify the appropriate model for this study, traditional OLS and dynamic OLS models were estimated separately. The purpose was to identify two changes: (1) changes in R^2 values and (2) the significance of the coefficients. In this regard, both static and dynamic models were run.

$$\mathrm{FP}_{it}(\mathrm{ROA},\ \mathrm{ROE}) = \alpha + \beta X_{it} + \beta C_{it} + \eta_i + e_{it}, \tag{2}$$

$$\mathrm{FP}_{it}(\mathrm{ROA},\ \mathrm{ROE}) = \alpha + \mathrm{FP}_{it-1} + \beta X_{it} + \beta C_{it} + \eta_i + e_{it}. \tag{3}$$

FP_{it} is FP measured by ROA and ROE. FP_{it-1} is lagged-dependent variable of the previous year. X represents WCM components (CCC, ACP, APP, and ICP), C represents control variables, η_i is unobserved firm specific effects, and e_{it} is error term for firm i at time t.

Tables 6 and 7 present the static and dynamic OLS results, with ROA and ROE as dependent variables for Australian and New Zealand firms, respectively. Results (in both tables) are significant at 1% and 5%. A significant increase in R^2 is observed in both Tables 6 and 7 using ROA and ROE as dependent variables. Wintoki *et al.* (2012) argue that an increase in R^2 indicates the presence of a dynamic relationship. The lagged ROA and ROE are also significant at a 1% level which implies that the lagged variable is also a regressor; this confirms the dynamic nature of the model (Gujarati, 2012) and supports our argument that the WCM and FP relationship is dynamic in nature.

4.4. *The Wooldridge test for strict exogeneity results*

In this section, we applied the Wooldridge test to check for strict exogeneity and to measure the endogeneity relationship between WCM and FP. Table 8

Table 6. Dynamic OLS Estimation with ROA and ROE (Australia)

	Static OLS	Dynamic OLS
ROA		
CCC	-0.125^{a}	-0.258^{a}
	(0.000)	(0.001)
ACP	-0.213^{b}	-0.526^{a}
	(0.014)	(0.009)
APP	0.224	0.441
	(0.252)	(0.231)
ICP	-0.320^{a}	-0.672^{a}
	(0.004)	(0.001)
Lagged ROA		-4.400^{b}
		(0.031)
R^2	0.17	0.54
ROE		
CCC	-0.321^{a}	-0.564^{a}
	(0.001)	(0.001)
ACP	-0.434^{b}	-0.341^{a}
	(0.020)	(0.000)
APP	0.542	0.121
	(0.231)	(0.321)
ICP	-0.458^{b}	-0.765^{b}
	(0.011)	(0.019)
Lagged ROE		0.254^{b}
		(0.023)
R^2	0.17	0.52

Notes: The table presents the static OLS and Dynamic OLS results, with ROA and ROE as dependent variables. *p*-values in parenthesis show standard coefficients. Control variables and year dummies were also included. [a] and [b] show significance at 1% and 5% levels, respectively.

presents the results for the Wooldridge test. The null hypothesis can be rejected as it violates the strict exogeneity assumption. According to Wooldridge (2002), this leads to the use of the dynamic model estimation technique, since the OLS and FE estimation techniques produce inconsistent results.

The dynamic OLS and Wooldridge test results confirm the presence of endogeneity in assessing the relationship between WCM and FP in our study. The application of OLS and FE will therefore generate inefficient results (Baltagi, 2008). Therefore, Blundell and Bond's (1998) two-step system GMM estimation technique was applied. According to Baltagi (2008), GMM is an appropriate technique to use because it produces consistent and efficient results even in the presence of heteroscedasticity and autocorrelation.

Table 9 presents the results for the relationship between WCM components and FP, using SGMM with ROA and ROE as dependent variables for

Table 7. Dynamic OLS Estimation with ROA and ROE (New Zealand)

	Static OLS	Dynamic OLS
ROA		
CCC	−0.233[a]	−0.453[a]
	(0.007)	(0.001)
ACP	0.219	0.132
	(0.623)	(0.321)
APP	0.395[a]	0.541[a]
	(0.004)	(0.000)
ICP	−0.389[b]	−0.761[b]
	(0.032)	(0.043)
Lagged ROA		0.470[a]
		(0.000)
$_R2$	0.07	0.58
ROE		
CCC	−0.160[a]	−0.349[a]
	(0.002)	(0.001)
ACP	0.483	−0.126
	(0.532)	(0.651)
APP	0.569[b]	0.643[b]
	(0.020)	(0.011)
ICP	−0.109[b]	−0.321[a]
	(0.034)	(0.009)
Lagged ROE		0.418[a]
		(0.001)
R^2	0.23	0.49

Notes: The table presents static OLS and Dynamic OLS results, with ROA and ROE as dependent variables. *p*-values in parenthesis show standard coefficients. The R^2 value with parenthesis and without parenthesis reflects the static and dynamic OLS R^2 values, respectively. Control variables and year dummies were also included. [a] and [b] show significance at 1% and 5% levels, respectively.

Table 8. The Wooldridge test for strict exogeneity.

	CCC $(t+1)$	ACP $(t+1)$	APP $(t+1)$	ICP $(t+1)$
Australia	−0.531[a]	0.045	0.701[a]	−0.240[b]
	(0.000)	(0.128)	(0.000)	(0.033)
New Zealand	0.451[a]	0.145[b]	0.514[a]	0.054
	(0.002)	(0.025)	(0.000)	(0.341)

Notes: This table presents the impact of current FP by using ROA on future WCM with *p*-values showing standard coefficients. Control variables and year dummies are also included. [a] and [b] show significance at 1% and 5% levels, respectively.

Table 9. Two-Step Robust System GMM Results with ROA and ROE

	Australia		New Zealand	
Variables	ROA	ROE	ROA	ROE
Lagged DV	0.251[a]	0.702[a]	0.698[a]	0.902[a]
	(0.004)	(0.001)	(0.000)	(0.001)
CCC	−0.531[a]	−0.761[a]	−0.451[a]	−0.387[a]
	(0.000)	(0.000)	(0.002)	(0.001)
ACP	−0.045	0.211	−0.145[b]	−0.541[a]
	(0.128)	(0.218)	(0.025)	(0.001)
APP	0.701[a]	0.508[a]	0.514	0.210
	(0.000)	(0.000)	(0.300)	0.176
ICP	−0.240[b]	−0.540[b]	−0.198[a]	−0.170[a]
	(0.033)	(0.044)	(0.001)	(0.000)
WALD Test	(0.000)	(0.000)	(0.000)	(0.000)
Hansen Test	0.772	0.973	0.648	0.461
AR2	0.787	0.475	0.181	0.212
No. INST	19	17	15	13
Obs.	640	627	280	210

Notes: AR (2) is the test for second order autocorrelation. No. INST and No. Groups are the number of instruments and the number of groups, respectively. Control variables and year dummies are also included. Standard coefficients are presented (p-values). [a] and [b] show significance at 1% and 5% levels, respectively.

Australasian firms. Table 9 shows that the CCC and ICP have a negative and significant relationship with FP at 1% and 5% levels, respectively, in Australian firms. This implies that a reduction in CCC and ICP will help to increase Australian FP. The findings are consistent with Deloof (2003) work on Belgium firms; Padachi (2006) work on Mauritania firms; Lazaridis and Tryfonidis (2006) work on Greek firms; Juan García-Teruel and Martinez-Solano (2007) work on Spanish firms; Enqvist *et al.* (2014) work on Finnish firms; and Tingbani (2015) work on British firms. These findings support two of our earlier hypothesises; *H1a* and *H4a*. This means that Australia firm can achieve better FP by reducing the CCC and ICP periods. In terms of APP, we found a positive relationship in the Australian firms. This means that the payment period needs to be delayed or prolonged to enable the firms to make profits. This prolonged period of payment is consistent with prior studies (see, for example, Mathuva, 2009; Nobanee and Alhajjar, 2009). This supports our argument, postulated in hypothesis *H3b*. In the case of Australian firms, ACP does not have a significant impact on FP. This is also in line with *H2c*. Our findings on the ACP–FP relationship is consistent with previous studies (see, for example, Bratland and Hornbrinck, 2013; Enqvist *et al.*, 2014; Nguyen *et al.*, 2016).

Table 9 also reports the results of the WCM and FP relationship for New Zealand firms. The results show that CCC, ACP, and ICP are negative and significant at 1%. This means New Zealand firms also need to reduce CCC, ACP, and ICP periods to enhance FP. This is consistent with previous findings (see, for example, Deloof, 2003; Lazaridis and Tryfonidis, 2006; Juan García-Teruel and Martinez-Solano, 2007; Enqvist *et al.*, 2014). However, APP shows no significant relationship in New Zealand firms. These findings support our arguments in *H1a*, *H2a* and *H4a*.

This result implies that Australian firms have uniform policies regarding CCC and ICP management; that is, a reduction in these components will help increase FP. However, they differ in terms of ACP and APP. Australian firms provide customer freedom, with relax receivable policies, whereas New Zealand firms have more stringent policies regarding receivables collection. In terms of APP, Australian firms have an edge over New Zealand firms, as Australian firms prolonged the payment period to their suppliers and take the advantage by investing the delayed amount of payment. As noted above, there was no significant relationship found in relation to New Zealand firms. This means that New Zealand firms do not focus on APP when considering FP.

For the purpose of confirming the study's robustness, ROE was used as another FP indicator (Nadeem *et al.*, 2017). The ROE results were consistent with the results produced by ROA (in the case of Australasian firms), whereas CCC, and ICP were found to have a negative and significant relationship in both markets. While APP has a positive relationship with FP in Australia, ACP was found to have a negative relationship in New Zealand firms.

To confirm the S-GMM results, there are certain conditions that need to be satisfied. These include AR1 and AR2 (first-order autocorrelation tests). Additionally, all the instruments must be valid as specified in the Hansen test. Results in Tables 8 and 9 show that the null hypothesis cannot be rejected based on the *p*-value for AR2. Similarly, in light of Hansen test, the null hypothesis cannot be rejected as the *p*-values are above the conventional significant values. Furthermore, if the number of instruments are less than the number of groups, then the instrument validity is verified (Roodman, 2006). Table 9 results demonstrate that the number of instruments are less than number of groups, in all specifications. This means that the study's SGMM results are valid (Kiviet *et al.*, 2017; Roodman, 2006).

Furthermore, this study also explored the impact of WCM during the 2008 GFC by including the financial crisis (F.C*) term with WCM components in Eq. (3), as follows:

$$\mathrm{FP}_{it} = \alpha + \beta_1 \mathrm{LFP}_{it-1} + \beta_2 \mathrm{WCM}_{it} + \beta_3 \mathrm{F.C} * \mathrm{WCM}_{it} + \beta_4 \mathrm{Control}_{it} + \eta_i + e_{it} \tag{4}$$

Table 10 reports the results with the F.C* term. The results show that only ACP is significant at 1%, with ROA and ROE, in both Australian and New Zealand firms. This implies that during the 2008 GFC, both Australian and New Zealand firms focused on their accounts receivable period. Australian results are different from those reported earlier in Table 9. Table 9 shows that there is no significant relationship between ACP, FP, in the case of Australian firms, over the period of 2007–2016. However, Table 10 shows that during the 2008 GFC the Australian firms focused on the earliest possible collection of accounts receivable. In contrast, New Zealand firms demonstrate consistent practices; in short, they pay attention to accounts receivable in both normal and crisis periods. Thus, the result shows no significant difference for New Zealand firms during the 2008 GFC. The results reveal that Australian firms perform more efficiently than New Zealand firms. During the normal time period, Australian firms appear to focus on aggressive WC policies by extending the creditor repayment period; they use this money for investment purposes, as indicated by prior literature. However, during the crisis period, they opted for more conservative WC policies by focusing on

Table 10. Two-Step Robust System GMM Results (ROA and ROE) — 2008 GFC

	Australia		New Zealand	
Variables	ROA	ROE	ROA	ROE
F.C* CCC	−0.321	−0.777	−0.122	−0.227
	(0.009)	(0.580)	(0.329)	(0.344)
F.C* ACP	−0.656[a]	−0.367[b]	−0.321[a]	−0.123[b]
	(0.001)	(0.011)	(0.005)	(0.019)
F.C* APP	0.501	0.676	−0.313	0.222
	(0.101)	(0.870)	(0.322)	(0.671)
F.C* ICP	−0.341	−0.212	−0.444	−0.189
	(0.120)	(0.191)	(0.761)	(0.322)

Notes: Control variables and year dummies are also included. Standard coefficients are presented (p-values). [a] and [b] show significance at 1% and 5% levels, respectively.

accounts receivable. This means that they have ample cash for operations, and suggests that they are less willing to take risks. New Zealand firms seem to adopt conservative WC policies, regardless of economic environment. They pay their creditors earlier than their Australian counterparts and do not hold cash for future investments. It is evident from Table 10 that, in terms of WC management during the 2008 GFC, Australasian firms performed better than such as Vietnam and Turkey. Australasian firms' focus on early collection of accounts receivable provided them with ample cash for their day-to-day operating expenses. Prior literature has shown that inefficient management of accounts receivable during the 2008 GFC resulted in the closure of numerous firms around the world (Boumediene, 2015). This suggests that Australasian-based firms can use accounts receivable to manage their WC during financial crises as indicated by from the results of the 2008 GFC.

5. Conclusion and Policy Implications

Academic attention on the role of WCM on FP has increased over the past two decades. Most of the previous studies reported that WCM contributes to increasing FP by affecting profitability levels. However, as noted above, there are still questions that need to be addressed. For example, most prior studies have focused on individual countries, or a specific industries/sectors. This study explored the cross country relationship by comparing Australian and New Zealand listed firms. However, WCM-FP country comparisons remain largely under explored. Furthermore, prior studies typically investigate the WCM-FP relationship using OLS and FEs estimation techniques, and ignore the dynamic nature of this relationship. This study addresses the dynamic nature using SGMM techniques.

The findings indicate that by reducing the CCC period and INVD, Australasian firms can improve their performance. Additionally, firms can increase their profits by delaying creditor payments. The findings also show that while New Zealand firms focus more on collecting their accounts receivables at the earliest possible time, Australian firms have a more relaxed credit policy.

During the 2008 GFC, accounts receivable is negative and significant in both Australia and New Zealand firms. This suggests that Australasian firms focused on expediting their accounts receivables during the 2008 GFC in order to have sufficient cash for their day-to-day operations and to manage their liquidity position. This focus helped the firms to survive and perform better during the 2008 GFC. Accounts receivable can be used in the future, not only in the Australian and New Zealand markets, but also in other parts of world to avoid the negative consequences of financial crises. A failure in the collection of accounts receivables was one of the main reason for firm failures across the in world as banks refused to provide loans to some of their clients (Boumediene, 2015). This study has raised several issues that could be explored in later research. Future research should investigate the dynamic nature of the WCM-FP relationship in other parts of the world to support the empirical evidence for the existence of the dynamic relationship between WCM and FP. Furthermore, cross country comparisons may be conducted in the future to provide comparative results. Second, a qualitative study could explore optimum ways to handle WCM components so as to improve FP. Finally, the growth role, and/or the role of macroeconomic conditions could be investigated to test the impact on the relationship between WCM and FP.

In addition to WCM components, this study also reports a significant relationship between FP and firm characteristics, such as firm size, sales growth, and current ratio. This study has found a positive relationship between firm size and FP which means that larger firms have better FP in comparison to smaller firms. This is due to the presence of a large number of skilled managers, access to the latest technology and greater purchasing power, which enables larger firms to buy materials in bulk. CR also exhibits a positive relationship, which means that higher firm liquidity margins help to achieve better FP. Conversely, sales growth has an inverse relationship with FP. The growth role or role of macroeconomic conditions could be investigated in future to assess their impact on the WCM and FP relationship. Furthermore, the study's results are based on developed markets and should be interpreted with care when considering other markets (especially for emerging and frontier markets). Emerging and frontier markets have different country-specific factors, such as CG rules and regulations, levels of economic development and different tax systems. It would be interesting to determine the effects of WCM on FP in other markets, such as emerging and frontier markets.

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