The impact of corporate governance on working capital management efficiency of American manufacturing firms

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Abstract

Purpose – The purpose of this study is to investigate the impact of corporate governance on working capital management efficiency. This study also seeks to extend the findings of Gill and Shah.

Design/methodology/approach – This study applied a co-relational research design. A sample was selected of 180 American manufacturing firms listed on the New York Stock Exchange (NYSE) for a period of 3 years (from 2009-2011).

Findings – The findings of this study indicate that corporate governance plays some role in improving the efficiency of working capital management.

Research limitations/implications – This is a co-relational study that investigated the association between corporate governance and working capital management efficiency. There is not necessarily a causal relationship between the two, although the paper provides some conjectures to the findings. The findings of this study may only be generalized to firms similar to those that were included in this research.

Originality/value – This study contributes to the literature on the factors that improve the efficiency of working capital management, and in particular on the association between several features of corporate governance and the efficiency of working capital management. The findings may be useful for financial managers, investors, financial management consultants, and other stakeholders.

Keywords Corporate governance, Working capital management, Board size, CEO duality, CEO tenure, Audit committee, Manufacturing industries, United States of America

Paper type Research paper

1. Introduction
Efficient management of working capital is essential for most firms. The management of working capital, in the context of this study, refers to the management of current assets and of current liabilities. Working capital components include receivables, inventory, payables, and using cash efficiently for day-to-day operations. The optimization of working capital balances helps minimize working capital requirements, which in turn, increase firms' free cash flow (Ganesan, 2007). Inefficient working capital management policy, induced by poor corporate governance, has a negative impact on shareholders' wealth. Effective corporate governance serves as a check on the management of the firm's resources.

Although accounts receivable, inventory, and accounts payable are important parts of working capital management, cash is one of the most vulnerable to wanton behavior by management (Isshaq *et al.*, 2009). Cash holding are funds readily available for investment in physical assets and for distribution to investors. In the spirit Keynesian postulations of the demand for money, firms hold cash for precautionary, speculative, and transactional motives. Transaction motive refers to cash which is held for everyday transactions to pay for goods or services. Precautionary motive refers to cash held for safety reasons to protect the firm from for unforeseen fluctuations. The speculation motive reflects firms' desire to hold cash balance in order to take advantages of any bargain purchases that may arise (Besley and Brigham, 2005; Gill and Shah, 2012, p. 70). Kim *et al.* (2011) describe that both precautionary and transaction motives play important roles in explaining the determinants of cash holdings.

Excessive cash in corporate accounts is not necessarily in favor of the firm. Unnecessary cash may be built up because of poor corporate governance. Tradeoff theory, pecking order theory, and free cash flow theory usually explain the pattern of cash holdings. Firms, according to tradeoff theory, set their optimal level of cash holdings by weighting the marginal costs and marginal benefits of holding cash (Afza and Adnan, 2007). The benefits of cash holding are:

- reduction in the likelihood of financial distress;
- allowing the pursuance of investment policy when financial constraints are met; and
- minimization of the costs of raising external funds or liquidating existing assets (Ferreira and Vilela, 2004).

The main cost of holding cash is the opportunity cost of the capital invested in liquid assets. The pecking order theory of Myers (1984) suggests that firms prefer to finance investments first with retained earnings or internal equity (i.e. cash available), then with safe debt and risky debt, and finally with external equity in order to minimize asymmetric information costs and other financing costs.

According to Afza and Adnan (2007), maintaining an appropriate level of liquidity within the organization is fundamental for smooth operations of a firm. The level of cash a firm maintains is characterized by its policies regarding working capital requirements, cash flow management, dividend payments, investment, and asset management (Opler *et al.*, 1999).

The board of directors and the CEO are responsible for formulating policies regarding cash management, accounts receivable, inventory purchases and maintenance, accounts payable, and all other policies in the organization. Thus, board size and CEO duality play an important role in the organization and may lead to:

- high cash balances;
- high volume of accounts receivable;
- high amount of accounts payable; and
- a fast cash conversion cycle.

Poor policies regarding accounts receivable, accounts payable, and inventory management have a negative impact on the cash conversion cycle. The policy to maintain high cash balances may reflect management's own risk aversion and that may

cause an agency problem because the board of directors and the CEO may maintain balances that do not maximize shareholders' wealth (Gill and Shah, 2012, p. 71).

By managing working capital effectively, shareholders can get maximum return on their invested capital. Weak corporate governance might have adverse consequences for cash management (Harford *et al.*, 2008), accounts receivable, inventory, accounts payable, and cash conversion. In light of these considerations, the purpose of this study is to empirically document the impact of corporate governance on working capital management efficiency.

Explanatory variables were chosen in line with previous empirical studies related to working capital management and other studies. The final set included 11 proxy explanatory variables: sales growth, internationalization of firm, firm size, firm performance, accounts receivable, inventory, accounts payable, cash conversion cycle, cash holdings, current ratio, and cash conversion efficiency of the sample firms.

Nadiri (1969) pioneered a study on working capital management. Since 1969, several researchers have developed new theory by using Nadiri's model relating the desired level of real cash balances. There are a very few studies that investigated the impact of corporate governance on working capital management efficiency. Drobetz and Grüninger (2007) tested the relationships between board size, CEO duality, and cash holdings by collecting data from Switzerland. Gill and Mathur (2011) and Gill and Shah (2012) investigated the impact of CEO duality and board size on cash holdings and corporate liquidity by collecting data from Canadian firms. The present study extends these studies using data from American manufacturing firms. The results might be generalized to manufacturing industry.

Previous studies conducted by different authors emphasized on the relationships between:

- production output and cash balances (Nadiri, 1969);
- cash balances and easiness of borrowing (Dittmar *et al.*, 2003);
- leverage, firm size, and cash levels (Saddour, 2006);
- corporate governance and cash holdings (Drobetz and Grüninger, 2007);
- sales growth and corporate liquidity (Gill and Mathur, 2011);
- corporate governance and cash policy (Kuan *et al.*, 2011; Lau and Block, 2012; Gill and Shah, 2012); and
- sales growth and cash conversion cycle.

The present study emphasizes the relationship between characteristics of corporate governance such as CEO tenure, CEO duality, board size, and audit committee on various characteristics of working capital components and measures of efficiency. The study controls for some additional factors such as sales growth, internationalization of firm, firm size, and firm performance. The findings reported below indicate the importance of corporate governance in effectively managing firms' the working capital. Thus, this study adds empirical substance to existing theory.

2. Literature review

Among the working capital items, cash is the most liquid asset and is a measure of a corporation's ability to pay its bills on time. Although holding of cash is important

to pay off obligations, idle cash does not earn anything. However, firms need to build up cash reserves by ensuring that the timing of cash movements creates an overall positive cash flow situation. Thus, an optimal level of cash based on the firm's needs is the essential ingredient that enables a business to survive and prosper (Gill and Shah, 2012). According to Cossin and Hricko (2004), cash holdings allow for optimal timing of an investment and avoids the under pricing issue. However, holding excessive cash does not necessarily make good business sense. Therefore, strong corporate governance is necessary to create and maintain sound cash holding policies.

The holding and increasing of net working capital tie up money used for financing net working capital. If net working capital increases, the firm must utilize and tie up more money, and this decreases free cash flows. Production level growth necessitates increased levels of cash, inventories, and accounts receivable (Michalski, 2008, p. 48). Although having some cousin of cash and inventory help firms' smoothing operations, building unnecessary working capital backfires. Paying accounts payable after the due date also hurts the firm because of the penalty charged by suppliers. Building unnecessary working capital is also not in favor of the firm because it has a negative impact on shareholders' wealth. Therefore, an optimal working capital management policy is necessary for the firm.

Corporate governance plays an important role in controlling the management of working capital by formulating sound policies. The role of CEO duality, board size, and audit committee in working capital management cannot be ignored. CEO duality and board size help in maintaining an appropriate level of working capital in the organization (Gill and Shah, 2012). CEO tenure also helps in improving working capital management. Dahya and Travlos (2000) describe that with dual-responsibility, CEOs serve the interests of the management team and one way to protect the team's position is to hold excessive corporate liquidity. In addition, the CEO together with the board of directors formulates policies, including policy related to working capital management. According to Yermack (1996) and Lipton and Lorsch (1992), a small board of directors is more effective in the decision-making process than a larger board of directors. According to Kyereboah-Coleman (2007), small board sizes should be encouraged to promote effective communication and decision-making.

Audit committee represents another internal governance mechanism whose impact is to improve the quality of financial management of a company (Kyereboah-Coleman, 2007). Working capital management falls under the area of financial management. Kyereboah-Coleman (2007) suggests that audit committees should have a minimum size of three members to enhance independence. An independent audit committee enhances the efficiency of working capital by auditing cash accounts, accounts receivable, accounts payable, and inventory accounts, which in turn, minimizes agency problems and agency costs. According to Kyereboah-Coleman (2007, p. 9), when a CEO serves longer in a firm, it serves as an added incentive to promote the interests of shareholders due essentially to the fact that apart from job security, the CEO is afforded the opportunity to witness the results of decisions taken. In this regard, longer tenure is expected to have a positive influence on working capital management efficiency.

According to Jensen (1993), a lack of independent leadership creates difficulty for boards to respond to failure in top management. Fama and Jensen (1983) also argue that concentration of decision management and decision control in one individual hinders boards' effectiveness in monitoring top management. However, when a CEO doubles

as board chair, it affords the CEO the opportunity to carry out decisions and projects without undue influence of bureaucratic structures (Kyereboah-Coleman, 2007, p. 9). Therefore, CEO duality can improve the efficiency of working capital.

The empirical studies on working capital management are as follows.

The pioneer study of Nadiri (1969) built a model to conduct studies on working capital management. Nadiri conducted a study on cash holdings by collecting data from the US manufacturing sector from 1948 to 1964 to estimate a model relating the desired level of real cash balances. The author found that the demand for real cash balances is determined by output.

Dittmar *et al.* (2003, p. 111) collected a sample of more than 11,000 firms from 45 countries and found that corporations in countries where shareholders' rights are not well protected hold up to twice as much cash as corporations in countries with good shareholder protection. They also found that when shareholder protection is poor, factors that generally drive the need for cash holdings, such as investment opportunities and asymmetric information, actually become less important. In addition, the study found that firms hold larger cash balances when access to funds is easier. Dittmar *et al.* explain that agency problems are important determinants of corporate cash holdings. Therefore, strong corporate governance is necessary.

Saddour (2006) sampled 297 French firms over the period 1998-2002 using tradeoff theory and pecking order theory. The author found that growth companies hold higher cash levels than mature companies.

Drobetz and Grüninger (2007) investigated the determinants of cash holdings for a comprehensive sample of 156 Swiss non-financial firms between 1995 and 2004. Drobetz and Grüninger found a positive relationship between:

- CEO duality and corporate cash holdings; and
- a non-significant relationship between board size and corporate cash holdings.

That is, CEO duality leads to significantly higher cash holdings and larger board size has no impact on corporate cash holdings.

Kuan *et al.* (2011) examined the association between corporate governance and cash policy of family-controlled firms. The authors found that the impact of corporate governance, with its separation of control rights and cash flow rights, director-ownership-in-pledge ratio and proportion of independent directors on cash policy, differs between family-controlled and nonfamily-controlled firms. The authors also found that the separation of seat control rights and cash flow rights, as well as chair duality, significantly affects the cash policy within different levels of cash holdings in firms.

Lau and Block (2012) collected data from Standard and Poor 500 and the Edgar database to investigate whether the presence of controlling founders and families had significant impact on the level of cash holdings, and their implications on firm value. The authors found that founder firms hold a significantly higher level of cash than family firms. In addition, they found a positive interaction effect between founder management and cash holdings on firm value, suggesting the presence of founders as managers helps to mitigate the agency costs of cash holdings.

Gill and Mathur (2011) collected data from Canadian service firms from 2009 to 2011 and found that sales growth positively impacts corporate liquidity.

Gill and Shah (2012) sampled Canadian firms from 2009 to 2011 and found that CEO duality and board size positively impact corporate cash holdings. The findings also suggest that CEO duality and board size negatively impact net working capital.

Valipour *et al.* (2012) took a sample of 83 Iranian firms listed in the Tehran Stock Exchange for the period of 2001-2010 and found a negative relationship between sales growth and cash conversion cycle.

In summary, the limited availability of literature review indicates that corporate governance influences the efficiency of working capital management.

3. Methods
The study applied co-relational and non-experimental research design. This process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of quantitative relationships. There is no single measure that fully expresses the efficiency of working capital. We therefore chose seven different component measures of working capital and these were seven different dependent variables in the study: accounts receivable, inventory, accounts payable, cash conversion cycle, cash holding, current ratio and cash conversion efficiency. The definitions of these variables are explained below.

3.1 Measurement
To remain consistent with previous studies, measures pertaining to:

- CEO tenure, CEO duality, board size, and audit committee were adopted from Kyereboah-Coleman (2007).
- Accounts receivables, inventory, accounts payables, and cash conversion cycle were adopted from Lazaridis and Tryfonidis (2006).
- Current ratio and cash conversion efficiency were adopted from Ganesan (2007).
- Sales growth was adopted from Valipour *et al.* (2012).

Table I shows the measurements of the dependent, independent, and control variables that were used in regression analysis.

3.2 Data collection
A database was built from a selection of approximately 500 financial reports from publicly traded companies between January 1, 2009 and December 31, 2011. The selection was drawn from Mergent Online (www.mergentonline.com/compsearch.asp) to collect a random sample of manufacturing firms. Out of approximately 500 financial reports announced by public companies between January 1, 2009 and December 31, 2011, only 180 financial reports were usable. Cross sectional yearly data was used in this study. Thus, 180 financial reports resulted in 540 total observations. Since the random sampling method was used to select companies, the sample is considered a representative sample. The sample included manufacturing firms that manufactured and processed products for the following sectors:

- consumer products (30 firms);
- services (two firms);
- utilities (ten firms);

Regression equation (A): $AR = \alpha + \beta_1 TN_{it} + \beta_2 CD_{it} + \beta_3 BS_{it} + \beta_4 AC_{it} + \mu_{it}$
Regression equation (B): $INV = \alpha + \beta_1 TN_{it} + \beta_2 CD_{it} + \beta_3 BS_{it} + \beta_4 AC_{it} + \mu_{it}$
Regression equation (C): $AP = \alpha + \beta_1 TN_{it} + \beta_2 CD_{it} + \beta_3 BS_{it} + \beta_4 AC_{it} + \mu_{it}$
Regression equation (D): $CCC = \alpha + \beta_1 TN_{it} + \beta_2 CD_{it} + \beta_3 BS_{it} + \beta_4 AC_{it} + \mu_{it}$
Regression equation (E): $CH = \alpha + \beta_1 TN_{it} + \beta_2 CD_{it} + \beta_3 BS_{it} + \beta_4 AC_{it} + \mu_{it}$
Regression equation (F): $CR = \alpha + \beta_1 TN_{it} + \beta_2 CD_{it} + \beta_3 BS_{it} + \beta_4 AC_{it} + \mu_{it}$
Regression equation (G): $CCE = \alpha + \beta_1 TN_{it} + \beta_2 CD_{it} + \beta_3 BS_{it} + \beta_4 AC_{it} + \mu_{it}$

Dependent variables	*Measurement*
Accounts receivables ($AR_{i,t}$)	(Accounts receivables/sales) $\times$ 365 days
Inventory ($INV_{i,t}$)	(Accounts payables/cost of goods sold) $\times$ 365 days
Accounts payables ($AP_{i,t}$)	(Inventory/cost of goods sold) $\times$ 365 days
Cash conversion cycle ($CCC_{i,t}$)	No. of days A/R $+$ no. of days inventory $-$ no. of days A/P
Cash holdings ($CH_{i,t}$)	Log of average cash
Current ratio ($CR_{i,t}$)	Current assets/current liabilities
Cash conversion efficiency ($CCE_{i,t}$)	Cash flow from operations/sales
Independent (explanatory) variables	
CEO tenure ($TN_{i,t}$)	Number of years serving as a CEO
CEO duality ($CD_{i,t}$)	Assigned value 1 if same person occupied the post of the chairperson and the CEO and 0 for otherwise
Board size ($BS_{i,t}$)	Number of directors serving on board
Audit committee ($AC_{i,t}$)	Number of audit committee members
Control variables	
Sales growth ($GROW_{i,t}$)	(Current year sales $-$ previous year sales)/previous year sales
Internationalization of the firm ($MULTI_{i,t}$)	Assigned value 1 for international firm and 0 for otherwise
Firm size ($FS_{i,t}$)	Log of average assets
Firm performance ($FP_{i,t}$)	Net income after tax/revenue

Notes: $\mu_{i,t}$ – the error term; $GROW_{i,t}$ – sales growth of firm i in time t

Table I.
Proxy variables and
their measurements

- IT and communications (four firms);
- industrials (71 firms);
- materials (62 firms); and
- energy (one firm).

Note that since there were only two companies from services, ten from utilities, four from IT and communications, and one from the energy sector, these companies were added into consumer products.

3.3 Descriptive statistics
Table II shows descriptive statistics of the collected variables. The explanation on descriptive statistics is as follows:

- total observations: $180 \times 3 = 540$;
- $TN = 11.56$ years;
- $BS = 10.08$;
- $GROW = 13$ percent;

	Minimum	Maximum	Mean	SD
TN	1	40	11.56	8.47
BS	5	16	10.08	2.26
AC	1	10	4.31	1.56
GROW	−0.81	0.80	0.13	0.15
AR	0.30	237.82	50.57	24.97
INV	2.15	723.56	78.32	63.58
AP	2.66	228.59	44.58	25.15
CCC	7.21	525.79	86.99	57.89
CH	0.60	5.10	2.41	0.73
CR	0.69	11.85	2.46	1.43
CCE	0.02	11.11	0.27	0.88

Notes: SD – standard deviation; TN – CEO tenure; BS – board size; AC – audit committee; GROW – firm growth; AR – accounts receivables (in days); INV – inventory holding (in days); AP – accounts payables (in days); CCC – cash conversion cycle (in days); CH – cash holding; CR – current ratio; CCE – cash conversion efficiency

Table II.
Descriptive statistics of
independent, dependent,
and control variables
(2009-2011)

- AR = 50.57 days;
- INV = 78.32 days;
- AP = 44.58 days;
- CCC = 86.99 days;
- CH = 2.41 million;
- CR = 2.46; and
- CCE = 0.27.

3.4 Pearson bivariate correlation analysis
Bivariate correlation analysis showed that:

- accounts receivable management efficiency is positively correlated with the CEO duality;
- accounts payable management efficiency is positively correlated with the CEO tenure, CEO duality, board size, and audit committee;
- cash management efficiency is positively correlated with CEO tenure, board size, and audit committee; and
- current ratio management efficiency is positively correlated with CEO tenure, and negatively correlated with board size and audit committee.

4. Regression analysis, findings, discussion, conclusion, limitations, and future research
In this section we present the empirical findings on the relationship between corporate governance and working capital management of the American manufacturing firms. We used the general least square model with cross section weight of seven industries (consumer products manufacturing, service products manufacturing, utilities products manufacturing, IT and communications products manufacturing,

industrials products manufacturing, materials production, and energy production). When using pooled data and cross sections there may be a problem of heteroskedasticity (changing variation after short period of time) (Raheman and Nasr, 2007, p. 292). To counter this problem, we used the general least square with cross section weights. In this regression, the common intercept was calculated for all variables and assigned a weight.

There was also possibility of endogeneity issues because we used multiple regression analysis. The issues of endogeneity also take place if certain variables are omitted and there are measurement errors. To minimize endogeneity issues, the most important variables that impact the working capital management efficiency were used and the measurements were borrowed from the previous empirical studies. As the sample of companies only included companies that "survived" during the study period, there might have been a survival bias in the study. We consider this to be a minor issue as the purpose of the study was to focus on the effects of corporate governance on the efficiency of the management of working capital by firms.

4.1 Corporate governance and accounts receivable management efficiency
Positive relationships between:

- CEO duality and accounts receivable; and
- internationalization of the firm and accounts receivables were found (Table III); that is, CEO duality and the internationalization of the firm improve the efficiency of accounts receivable management, which in turn, helps reduce working capital requirements.

Non-significant relationships between:

- CEO tenure and accounts receivable;
- board size and accounts receivable;
- audit committee and accounts receivable;
- sales growth and accounts receivables;
- firm size and accounts receivables; and
- financial performance and accounts receivables were found (Table III).

4.2 Corporate governance and inventory management efficiency
A positive relationship between internationalization of the firm and inventory was found (Table III); that is, internationalization of the firm improves the efficiency of inventory management, which in turn, helps reduce working capital requirements.

Non-significant relationships between:

- CEO tenure and inventory;
- CEO duality and inventory;
- board size and inventory;
- audit committee and inventory;
- sales growth and inventory;
- firm size and inventory; and
- financial performance and inventory were found (Table III).

	Un-standardized coefficients		Standardized coefficients[c]			Collinearity statistics	
	B	SE	Beta	t	Sig.	Tolerance	VIF

Corporate governance and accounts receivable management ($R^2 = 0.172$; adjusted $R^2 = 0.133$)

Constant	29.273	10.923		2.680	0.008		
TN	0.107	0.216	0.036	0.496	0.620	0.914	1.095
CD	10.095	3.573	0.209	2.825	0.005	0.882	1.133
BS	−0.166	0.953	−0.016	−0.174	0.862	0.554	1.804
AC	0.786	1.186	0.055	0.663	0.508	0.716	1.397
GROW	1.334	11.092	0.009	0.120	0.904	0.846	1.183
MULTI	25.213	5.421	0.328	4.651	0.000	0.974	1.027
FS	−1.687	3.541	−0.044	−0.476	0.634	0.570	1.755
FP	−41.855	25.317	−0.119	−1.653	0.100	0.929	1.076

Corporate governance and inventory management ($R^2 = 0.067$; adjusted $R^2 = 0.023$)

Constant	9.392	33.209		0.283	0.778		
TN	0.784	0.657	0.092	1.194	0.234	0.914	1.095
CD	3.430	10.864	0.025	0.316	0.753	0.882	1.133
BS	−3.250	2.898	−0.111	−1.121	0.264	0.554	1.804
AC	5.796	3.605	0.140	1.608	0.110	0.716	1.397
GROW	17.554	33.724	0.042	0.521	0.603	0.846	1.183
MULTI	36.670	16.480	0.167	2.225	0.027	0.974	1.027
FS	7.641	10.765	0.069	0.710	0.479	0.570	1.755
FP	20.410	76.972	0.020	0.265	0.791	0.929	1.076

Corporate governance and accounts payable management ($R^2 = 0.254$; adjusted $R^2 = 0.220$)

Constant	−26.021	11.191		−2.325	0.021		
TN	0.349	0.221	0.109	1.579	0.116	0.914	1.095
CD	8.324	3.661	0.160	2.274	0.024	0.882	1.133
BS	0.549	0.977	0.050	0.562	0.575	0.554	1.804
AC	1.720	1.215	0.110	1.415	0.159	0.716	1.397
GROW	−5.669	11.364	−0.036	−0.499	0.619	0.846	1.183
MULTI	14.265	5.553	0.172	2.569	0.011	0.974	1.027
FS	11.456	3.628	0.276	3.158	0.002	0.570	1.755
FP	−25.606	25.938	−0.068	−0.987	0.325	0.929	1.076

Corporate governance and cash conversion cycle management ($R^2 = 0.092$; adjusted $R^2 = 0.049$)

Constant	66.266	29.012		2.284	0.024		
TN	0.638	0.601	0.082	1.062	0.290	0.918	1.089
CD	1.967	9.597	0.016	0.205	0.838	0.891	1.123
BS	−4.253	2.538	−0.167	−1.676	0.096	0.550	1.819
AC	5.154	3.149	0.143	1.637	0.104	0.715	1.398
GROW	18.520	29.477	0.050	0.628	0.531	0.851	1.176
MULTI	44.503	14.939	0.226	2.979	0.003	0.953	1.049
FS	−3.168	9.527	−0.033	−0.333	0.740	0.564	1.773
FP	−0.770	67.131	−0.001	−0.011	0.991	0.928	1.078

Corporate governance and cash management ($R^2 = 0.720$; adjusted $R^2 = 0.707$)

Constant	−1.305	0.201		−6.501	0.000		
TN	0.009	0.004	0.091	2.141	0.034	0.914	1.095
CD	0.013	0.066	0.009	0.202	0.840	0.882	1.133
BS	−0.020	0.018	−0.063	−1.163	0.247	0.554	1.804
AC	0.005	0.022	0.011	0.236	0.814	0.716	1.397
GROW	0.002	0.204	0.000	0.010	0.992	0.846	1.183
MULTI	0.152	0.100	0.063	1.529	0.128	0.974	1.027
FS	0.996	0.065	0.820	15.309	0.000	0.570	1.755
FP	1.587	0.465	0.143	3.411	0.001	0.929	1.076

(*continued*)

Table III.
WLS regression
estimates on factors
affecting working capital
management efficiency[a,b]

MF
39,2

126

	Un-standardized coefficients		Standardized coefficients[c]			Collinearity statistics	
	B	SE	Beta	t	Sig.	Tolerance	VIF
Corporate governance and current ratio management ($R^2 = 0.304$; adjusted $R^2 = 0.271$)							
Constant	4.456	0.585		7.620	0.000		
TN	0.039	0.012	0.225	3.377	0.001	0.914	1.095
CD	−0.135	0.191	−0.048	−0.707	0.481	0.882	1.133
BS	−0.127	0.051	−0.213	−2.486	0.014	0.554	1.804
AC	−0.002	0.063	−0.003	−.033	0.973	0.716	1.397
GROW	0.396	0.594	0.046	0.668	0.505	0.846	1.183
MULTI	0.403	0.290	0.090	1.387	0.167	0.974	1.027
FS	−0.606	0.190	−0.270	−3.196	0.002	0.570	1.755
FP	6.896	1.355	0.337	5.088	0.000	0.929	1.076
Corporate governance and cash conversion efficiency management ($R^2 = 0.094$; adjusted $R^2 = 0.052$)							
Constant	0.335	0.466		0.719	0.473		
TN	6.431	0.009	0.001	0.007	0.994	0.914	1.095
CD	0.276	0.152	0.141	1.814	0.071	0.882	1.133
BS	−0.040	0.041	−0.097	−0.991	0.323	0.554	1.804
AC	−0.013	0.051	−0.021	−0.248	0.804	0.716	1.397
GROW	−0.388	0.473	−0.065	−0.821	0.413	0.846	1.183
MULTI	−0.088	0.231	−0.028	−0.383	0.702	0.974	1.027
FS	0.019	0.151	0.012	0.127	0.899	0.570	1.755
FP	3.687	1.079	0.258	3.415	0.001	0.929	1.076

Notes: [a]Dependent variables: AR, INV, AP, CCC, CH, CR, and CCE; [b]independent variables: TN, CD, BS, AC, GROW, MULTI, FS, and FP; [c]linear regression through the origin; [d]weighted least squares regression (WLS) – weighted by sector; SEE – standard error of the estimate; TN – CEO tenure; BS – board size; AC – audit committee; GROW – firm growth; AR – accounts receivables (in days); INV – inventory holding (in days); AP – accounts payables (in days); CCC – cash conversion cycle (in days); CH – cash holding; CR – current ratio; CCE – cash conversion efficiency; GROW – sales growth; MULTI – internationalization of firm; FS – firm size; FP – financial performance

Table III.

4.3 Corporate governance and accounts payable management efficiency
Positive relationships between:

- CEO duality and accounts payable;
- internationalization of the firm and accounts payable; and
- firm size and accounts payable were found (Table III); that is, CEO duality, internationalization of the firm, and firm size improve the efficiency of accounts payable management, which in turn, helps reduce working capital requirements.

Non-significant relationships between:

- CEO tenure and accounts payable;
- board size and accounts payable;
- audit committee and accounts payable;
- sales growth and accounts payable; and
- financial performance and accounts payable were found (Table III).

4.4 Corporate governance and cash conversion cycle management efficiency
A positive relationship between internationalization of the firm and cash conversion cycle, and a negative relationship between board size and cash conversion cycle was found (Table III); that is, internationalization of the firm improves the efficiency of cash conversion cycle management, which in turn, helps reduce working capital requirements, and board size does not improve cash conversion cycle.

Non-significant relationships between:

- CEO tenure and cash conversion cycle;
- CEO duality and cash conversion cycle;
- audit committee and cash conversion cycle;
- sales growth and cash conversion cycle;
- firm size and cash conversion cycle; and
- financial performance and cash conversion cycle were found (Table III).

4.5 Corporate governance and cash management efficiency
Positive relationships between:

- CEO tenure and cash holdings;
- firm size and cash holdings; and
- financial performance and cash holdings were found (Table III); that is, CEO tenure, firm size, and financial performance improve the efficiency of cash management.

Non-significant relationship between:

- CEO duality and cash holdings;
- board size and cash holdings;
- audit committee and cash holdings;
- sales growth and cash holdings; and
- internationalization of the firm and cash holdings were found (Table III).

4.6 Corporate governance and current ratio management efficiency
Positive relationships between:

- CEO tenure and current ratio;
- firm size and current ratio;
- financial performance and current ratio; and
- a negative relationship between board size and current ratio were found (Table III); that is, CEO tenure, firm size, and financial performance improve the efficiency of current ratio management, and board size does not improve current ratio management efficiency.

Non-significant relationships between:

- CEO duality and current ratio;
- audit committee and current ratio;

- sales growth and current ratio; and
- internationalization of the firm and current ratio were found (Table III).

4.7 Corporate governance and cash conversion efficiency management
Positive relationships between:

- CEO duality and cash conversion efficiency; and
- financial performance and cash conversion efficiency were found (Table III); that is, CEO duality and financial performance improve cash conversion efficiency management, which in turn, helps reduce working capital requirements.

Non-significant relationships between:

- CEO tenure and cash conversion efficiency;
- board size and cash conversion efficiency;
- audit committee and cash conversion efficiency;
- sales growth and cash conversion efficiency;
- internationalization of the firm and cash conversion efficiency; and
- firm size and cash conversion efficiency were found (Table III).

Note that:

- A test for multicollinearity was performed. All the variance inflation factor (VIF) coefficients are less than 2 and tolerance coefficients are greater than 0.50.
- Financial performance, CEO tenure, internationalization of the firm, board size, sales growth, CEO duality, audit committee, and firm size explain 17.20 percent of the variance in accounts receivable management efficiency of American manufacturing firms.
- Financial performance, CEO tenure, internationalization of the firm, board size, sales growth, CEO duality, audit committee, and firm size explain 6.70 percent of the variance in inventory management efficiency of American manufacturing firms.
- Financial performance, CEO tenure, internationalization of the firm, board size, sales growth, CEO duality, audit committee, and firm size explain 25.40 percent of the variance in accounts payable management efficiency of American manufacturing firms.
- Financial performance, CEO tenure, internationalization of the firm, board size, sales growth, CEO duality, audit committee, and firm size explain 9.20 percent of the variance in cash conversion cycle management efficiency of American manufacturing firms.
- Financial performance, CEO tenure, internationalization of the firm, board size, sales growth, CEO duality, audit committee, and firm size explain 72 percent of the variance in cash holding efficiency of American manufacturing firms.
- Financial performance, CEO tenure, internationalization of the firm, board size, sales growth, CEO duality, audit committee, and firm size explain 30.40 percent of the variance in current ratio management efficiency of American manufacturing firms.

- Financial performance, CEO tenure, internationalization of the firm, board size, sales growth, CEO duality, audit committee, and firm size explain 9.20 percent of the variance in cash conversion efficiency of American manufacturing firms (Table III).

4.8 Random and fixed-effects
The random and fixed effects of independent variables on the dependent variables indicate that the efficiency of working capital management differs from sector to sector and from year to year. The changes in the measures of working capital management may be due to the changes in economic situations, changes in the general level of interest rates that affect the opportunity cost of holding cash, and changes in working capital management policies.

4.9 Discussion
The main purpose of this study was to find the impact of corporate governance on working capital management efficiency. The findings indicate that:

- CEO duality and the internationalization of the firm improve the efficiency of accounts receivable management.
- Internationalization of the firm improves the efficiency of inventory management.
- CEO duality, internationalization of the firm, and firm size improve the efficiency of accounts payable management.
- Internationalization of the firm improves the efficiency of cash conversion cycle management.
- CEO tenure, firm size, and financial performance improve the efficiency of cash management.
- CEO tenure, firm size, and financial performance improve the efficiency of current ratio management, while board size does not improve the efficiency of current ratio management.
- CEO duality and financial performance improve cash conversion efficiency management.

The findings of this study lend some support to the findings of Nadiri (1969), Dittmar *et al.* (2003), Saddour (2006), Drobetz and Grüninger (2007), Kuan *et al.* (2011), Lau and Block (2012) and Gill and Shah (2012). Table IV shows previous authors' findings.

4.10 Conclusion
The present study found that corporate governance improves the efficiency of working capital management of American manufacturing firms. Larger board size may not be in favor of American manufacturing firms because it does not improve working capital management efficiency.

The results of this study generally support the tradeoff theory of cash holdings. Precautionary and transaction motives play important roles in explaining the determinants of cash holdings for American firms.

130

Author(s)	Previous findings	Country(ies)
Nadiri (1969)	Found that the demand for real cash balances is determined by output	USA
Dittmar *et al.* (2003)	Found that firms hold larger cash balances when access to funds is easier	45 different countries
Saddour (2006)	Found that cash levels negatively affected by high leverage, firm size, level of liquid assets	France
Drobetz and Grüninger (2007)	Found a positive relationship between (i) CEO duality and corporate cash holdings and (ii) a non-significant relationship between board size and corporate cash holdings	Switzerland
Gill and Mathur (2011)	Found that sales growth positively impact corporate liquidity	Canada
Kuan *et al.* (2011)	Found that the impact of corporate governance, with its separation of control rights and cash flow rights, director-ownership-in-pledge ratio and proportion of independent directors on cash policy, differs between family-controlled and nonfamily-controlled firms. Authors also found that the separation of seat control rights and cash flow rights, as well as chair duality, significantly affects the cash policy within different levels of cash holdings in firms	Taiwan
Lau and Block (2012)	Found that founder firms hold a significantly higher level of cash than family firms. In addition, they found a positive interaction effect between founder management and cash holdings on firm value, suggesting the presence of founders as managers helps to mitigate the agency costs of cash holdings	USA
Gill and Shah (2012)	Found that CEO duality and board size positively impact corporate cash holdings. Their findings also suggest that CEO duality and board size negatively impact net working capital	Canada
Valipour *et al.* (2012)	Found a negative relationship between sales growth and cash conversion cycle	Iran

Table IV.
Previous findings related to the relationship between corporate governance and working capital management

The CEO tenure improves the efficiency of cash management. Thus, the argument of Kyereboah-Coleman (2007) is supported in that when a CEO serves longer in a firm, he or she has a positive influence on working capital management efficiency.

4.11 Limitations
This study is limited to the sample of American manufacturing firms. The findings of this study could only be generalized to firms similar to those that were included in this research. In addition, sample size is small.

In practice, there may be implementation challenges of the findings. For example, CEO duality may improve cash conversion efficiency in one company, but not in another company. In similar manners, other findings may not be applicable to other companies.

4.12 Future research
Future research should investigate generalizations of the findings beyond the American firms. Important control variables such as industry sectors from different countries, board composition, etc. should also be used.

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