The Impact of Corporate Governance Mechanisms on Working Capital Management Efficiency: Evidence from Egypt

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Abstract

This study aims at investigating the impact of corporate governance mechanisms on working capital management efficiency. A sample of 99 manufacturing firms listed on the Egyptian stock exchange is used for the period from 2014 to 2017. Using panel data analysis, generalized least square regression models with cross section weights are estimated to investigate the impact of the main characteristics of the board of directors, the characteristics of the audit committee and the institutional ownership on the efficient management of the working capital. The results indicate that the corporate governance mechanisms have significant impact on the working capital management efficiency.

Key words:

Corporate governance, board of directors, audit committee, working capital management, cash conversion cycle, Egypt.

1. Introduction

The success of the organizational performance depends on a set of intangible elements, which enhance and sustain the company's competitive advantages. These elements represent the managerial efficiency, the corporate human capital, the internal audit system and the relations between the management and the employees (Carmeli and Tishler, 2004). These elements are also considered as the primary background of the successful business steering system, which has been reformed and restructured due to the global financial crises in the form of the corporate governance revolution.

The main features of the corporate governance system are to provide a framework of effective mechanisms, to rebuild the trust between the corporations and the investors, to enhance and optimize the appropriate use of the company's resources, to accomplish the short, medium and long-term goals of the company in order to maximize the shareholders' wealth (Kajananthan and Achchuthan, 2013). Moreover, the system of the corporate governance covers different aspects of the corporate performance such as the accounting performance, financial management, the corporate social responsibility and the company's compliance with laws and regulations in order to enhance the efficient and the optimal appropriation of resources, improve the transparency of financial information and ensure the accountability of the company (Manafi et al., 2015).

On the other hand, corporate finance basically deals with three decisions: capital structure decision, capital budgeting decision and working capital management decisions and according to financial management, the working capital management is a very important

component of the corporate finance theory that is concerned with managing the firm's short-term investment decisions (Sharma and Kumar, 2011). In this context, the most active area that requires managerial efficiency and the optimal appropriation of resources is the management of the working capital (Fiador, 2016). The working capital can be defined as that part of the capital, which is needed for carrying out the company's day-to-day operations. It is considered as the difference between the liquid sources of cash (current assets), and the company's obligations in which cash will be required after a short period (current liabilities) (Filbeck and Krueger, 2005).

The main objective of the management of working capital is to manage its components to maximize the company's profitability and maintain a sufficient amount of liquidity (Manjhi, 2013). Working capital management is directly linked with liquidity, as its main purpose is to achieve the necessary cash flow which provides the company with the ability of meeting its due debts and the operational expenses as well as reducing the cost of debt (Barine, 2012). Moreover, it is directly linked to profitability so that good policy for working capital management can reduce the collection period to a minimum while maintaining customers, lengthen the repayment period without incurring delay penalties, reduce inventory to a minimum without exposure to the risk of stock out and reduce cash conversion cycle for good investment opportunities (Filbeck and Krueger, 2005).

The global financial crisis of 2008 raised the awareness of the mismanagement of the working capital. Recently, OECD (2009) reported that the firms' working capital was influenced by the financial and economic crisis, especially the small-medium enterprises (SME) in many

countries, since firms faced high levels of bad debts (decrease in receivables turnover) and high levels of inventory due to the low level of demand, which resulted in a rapid depletion of working capital and a decrease in liquidity. Therefore, managers should properly address the main factors affecting the level of the working capital components to ensure the efficient performance of the firm's operation (Haron, 2016)

Therefore, each company should manage the working capital in such a way that to avoid the excessive investment in its components which may result in an inventory pile up, increase the probability of bad debts and increase the costs of external financing or face a deficit that may interrupt the business operations (Ukaegbu, 2014). Also, each company should have clear policies regarding the investments in and the financing of the working capital components in order to minimize the possibility of managers making decisions which are not in the best interests of the shareholders (Watson and Head, 2012).

In order to minimize the interest divergences, companies can establish a set of monitoring mechanisms to make sure that managers use their specific knowledge and the available resources of the company to maximize the shareholders wealth. Moreover, decisions related to the efficient management of working capital are strategic by nature (Kamau and Basweti, 2013), which need significant characteristics of corporate governance to enhance the performance of a firm in controlling such decisions of short-term financing and investment effectively (Sharma and Kumar, 2011).

In this context, the board of directors is considered as an internal governance mechanism, which is responsible for reviewing the corporate strategy and the business plan, setting performance objectives, overseeing

the operating, investing and financial activities of the firm, controlling the interest divergence between managers and shareholders and monitoring and the highest decision makers within the firm (OECD, 2004). Since the efficient management of working capital is considered as a fundamental part of the business strategy in creating shareholders' value and the way that most companies aim at maximizing their profit (Sharma and Kumar, 2011), it is expected that the board's main characteristics may influence the efficient management of working capital.

Chaudhry and Ahmed (2015) indicated that the board of directors is responsible for devising policies and procedures for running the organization successfully, including policies relating to cash management, inventory management, account receivable and account payable management. In addition, the presence of outside directors on the board provides more stringent monitoring on the top management to ensure that the management applies the most effective policies to achieve the efficient management of working capital (Kieschnick et al., 2006) and their appointment enables the boards to act as "professional referees" in evaluating and disciplining the managerial actions (Kyereboah-Coleman, 2007).

Moreover, crucial decisions, including decisions relating to working capital management are taken at board meetings and the issues requiring immediate solution are addressed in board meetings (Chaudhry and Ahmed, 2015). This requires the board to hold frequent meetings, set agendas for the company and obtain the necessary information so as to determine which issues the board should give preference (Kamau and Basweti, 2013). The CEO duality is expected to affect the efficient management of working capital, as the CEO and executive managers are

more responsible toward the company's resources as they are directly informed with the day-to-day operations, therefore they have the adequate and the accurate information to enhance the future performance as well as developing and implementing the optimal strategies and policies for achieving these purposes (Elsayed, 2010).

In addition, the audit committee represents another internal governance mechanism whose role is to improve the quality of financial management of a company. 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 (Gill and Biger, 2013). An independent audit committee may provide objective and neutral opinions and criticism regarding the policies carried out by management (Rahmat et al., 2009). Also, the financial expertise of the audit committee members will boost the committee effectiveness, since it will have the ability to understand the technical accounting standards and practices and effectively overseeing the financial reporting process (DeZoort and Salterio, 2001; cited by Salleh and Stewart, 2012). The most common problem that affects the quality of financial reporting is the earnings management, in particular, the real earnings management. It reflects the management practices that deviate from the business operating activities to report certain earnings, which directly affects the cash flow (Sun et al., 2014). The most common items for real earnings management are the accounts receivables and inventory as they represent potential earnings

manipulation risk and their valuation is not an easy task (Krishnan and Visvanathan, 2009).

Moreover, the institutional ownership is expected to have an effect on the efficient management of working capital. The institutional investors have the time, resources and possibility for monitoring, disciplining and influencing managers. They either directly or indirectly exercise strong influence in management activities. They exert this influence through their ownership and share trading (Pourali et al., 2013).

According to the previous discussion, as the main objective of corporate governance is improving corporate performance and competitiveness; ensuring the efficient management of working capital becomes an important element in accomplishing such goal. In this connection, more recent studies have been conducted to examine the relationship between corporate governance and working capital management efficiency, and the current study aims at exploring such relationship in the Egyptian context by investigating the following research question: do the corporate governance mechanisms exert a significant impact on the working capital management efficiency?

In addition, the main objectives of the current study include determining the influence of corporate governance mechanisms on working capital management efficiency in Egyptian companies and suggesting the best corporate governance mechanisms to acquire the efficient management of the working capital. As far as the researcher knows, no published studies addressed such a link in the Egyptian context.

Moreover, the previous studies have addressed the impact of the audit committee in terms of size only and didn't address any other characteristics; the current study proposes to examine two additional proxies for the audit committee characteristics which are the composition of the audit committee and the financial expertise of its members. In addition, the current study adopts another financial proxy for measuring the efficient management of working capital which is the operating working capital investment policy, which measures the company's level of investment in the operating working capital (Hill et al., 2010; Palombini and Nakamura, 2012; Wasiuzzaman and Arumugam, 2013 and Moussa, 2019).

To achieve the objectives of the current study, this paper is organized as follows: Section 2 reviews the prior literature on the impact of the corporate governance mechanisms on working capital management efficiency. Section 3 presents hypotheses development. Section 4 describes the research methodology and the data. Section 5 presents the regression results. Section 6 provides the study conclusion and recommendations for future research.

2. Literature review

This section reviews the prior literature, which have been conducted to explore the impact of corporate governance mechanisms on working capital management efficiency.

Gill and Biger (2013) investigated the impact of corporate governance on working capital management efficiency of American manufacturing corporations by linking four corporate governance mechanisms "CEO tenure, CEO duality, board size and audit committee" as explanatory variables and the working capital

management efficiency "accounts receivable, accounts payable, inventory, cash conversion cycle, current ratio, cash conversion efficiency and cash holdings". By applying regression analysis on data of 180 American manufacturing firms for a period of three years from 2009 to 2011, they found that CEO duality, CEO tenure and board size could influence decisions related to the working capital management efficiency.

Kamau and Basweti (2013) adopted six corporate governance practices: CEO duality, board size, board committees, board meetings, CEO tenure and directors remuneration and employed the measures of profitability index, utilization index and efficiency index to measure the working capital management efficiency as the overall efficiency index (EI). By applying a regression analysis on collected data from 42 companies listed at Nairobi Securities Exchange from 2006-2012, they found that none of the governance practices exerted any impact on working capital management efficiency.

Aghajari (2015) linked three CG mechanisms: institutional ownership, CEO tenure and CEO duality to the working capital management efficiency (accounts receivable, accounts payable, inventory, cash conversion cycle, current ratio and cash conversion efficiency). The data were collected from 75 corporations listed on Tehran stock exchange for the period of 6 years (2009-2014). The results showed that CEO duality had a positive significant impact on accounts receivable, inventory, accounts payable and cash conversion cycle as well as, the institutional ownership had a significant negative effect on accounts receivable, accounts payable and cash conversion cycle and a positive effect on inventory period, but no effect on cash conversion efficiency. Moreover, CEO tenure had a significant effect on cash conversion cycle,

but no effect on cash conversion efficiency. He concluded that the policy on holding cash balance can reflect management risk aversion.

Chaudhry and Ahmed (2015) examined the effect board size, audit committee, board meeting, board committees and board independence on average collection period, average payment period, inventory turnover period, and cash conversion cycle. The study utilized multiple regression analysis on data obtained from annual financial reports of a sample of 168 manufacturing firms listed on Karachi stock exchange for the period (2010-2013). The results revealed that board size and audit committee had significant negative influences on average collection period, average inventory period and cash conversion cycle, but positive on average payment period. Also, board committees exerted a negative significant impact on average collection period and cash conversion cycle. Moreover, board independence had a significant negative impact on average inventory period and cash conversion cycle, but positive on average payment period. For board meetings, it showed a significant positive impact only on the average payment period. They concluded that firms should increase their board size, audit committee members and board independence by practicing good governance as they will ultimately have check on management to ensure that the management contrives most effective working capital management policies and acts in the best interest of the owners.

Mugo (2015) used a sample of 27 firms within 5 sectors in the Kenyan economy for the period 2009-2014 and regression analysis was utilized. They adopted 3 CG mechanisms including "board size, board meetings and board committees". The variables used for measuring the working capital management include average collection period, average

inventory period, average payment period and cash conversion cycle. The findings indicated that corporate governance had no impact on the efficiency of working capital management in Kenyan listed firms within the energy, construction and manufacturing firms.

Fiador (2016) set out a study to explore whether the internal governance characteristics as "board size, board independence and CEO duality" could exert influences on the efficacy of working capital management as a whole "cash conversion cycle", and its components: "inventory, receivables and payables". A sample of 13 non-financial companies listed on Ghana Stock Exchange was employed, with at least nine years of data from 2001 to 2012. She concluded that some characteristics of the corporate board are important in explaining the efficiency of working capital in firms with differential impacts on the various components constituting working capital management. In addition, it appears that efficient working capital management can become an outcome of effective governance structures.

Njoku (2017) used a sample of 89 Nigerian companies for one year 2013-2014. CEO tenure, CEO duality, board size and audit committee were used as independent variables to measure the influence of corporate governance, and current assets, current liabilities, current ratio and cash conversion cycle as dependent variables to measure the working capital management efficiency. Using multiple regression analysis, both board size and the audit committee size showed significant influences on current assets and current liabilities, while, none of the governance mechanisms exert any influence on the current ratio and cash conversion cycle within the Nigerian firms.

From the foregoing analysis, the previous studies provided conflicting results about the impact of each individual mechanism of the corporate governance on both the efficient management of the operating working capital component (accounts receivable, inventory and accounts payable) and the overall working capital management efficiency (cash conversion cycle and cash conversion efficiency). These conflicting results may be due to the countries specific conditions where the studies were conducted, the differences in the study period in which the previous studies tested their samples as well as using different sample sizes.

3. Hypotheses development

Based on the previous studies, the study hypotheses will be stated as follows:

For the accounts receivable management efficiency, Gill and Biger (2013) found that only the CEO duality had a significant positive impact on the accounts receivable management efficiency, while CEO tenure, board size, and audit committee showed non-significant relationships, which means that they did not influence the decisions related to the efficient management of the accounts receivable. Mugo (2015) supported (Gill and Biger, 2013) findings. Aghajari (2015) provided the same results from the Iranian companies regarding the effect of CEO duality and CEO tenure. In addition, he found that the institutional ownership had a significant negative impact on the accounts receivable management efficiency. Fiador (2016) also supported (Gill and Biger, 2013) results regarding the board size, but she found a non-significant impact of CEO duality on the accounts receivable management efficiency and also she provided evidence that there was a negative significant impact of the

proportion of the non-executive board members on the average collection period management.

On the other hand, Chaudhry and Ahmed (2015) provided evidence that board size, board committees and audit committee exerted a significant negative influence on accounts receivable management efficiency, which came in contrast with (Gill and Biger, 2013) findings. Njoku (2017) supported their findings. In addition, their results showed significant positive effects of board meetings and the proportion of the non-executive board members on accounts receivable management efficiency, while, Mugo (2015) found insignificant relationship. Further, the role of the audit committee in improving the efficient management of working capital can be seen from its primary function of monitoring the company's financial reporting process and ensuring that the company is applying the best accounting practices and assures that the financial statements express the real financial performance of the company, it is expected that the independent audit committee and the audit committee financial expertise have significant impacts on the accounts receivable management efficiency. Based on the empirical results, the first hypothesis and sub-hypotheses are stated as follows:

H_1: corporate governance mechanisms have an impact on accounts receivable management efficiency:

H_{1-1}: Board size has a non-significant impact on accounts receivable management efficiency.

H_{1-2}: Board composition has a significant impact on accounts receivable management efficiency.

H_{1-3}: CEO duality has a non-significant impact on accounts receivable management efficiency.

H$_{1-4}$: Board meetings have a non-significant impact on accounts receivable management efficiency.

H$_{1-5}$: Audit committee size has a non-significant impact on accounts receivable management efficiency.

H$_{1-6}$: Audit committee independence has a significant impact on accounts receivable management efficiency.

H$_{1-7}$: Audit committee expertise has a significant impact on accounts receivable management efficiency.

H$_{1-8}$: The institutional ownership has a significant impact on accounts receivable management efficiency.

Regarding the inventory management efficiency, Gill and Biger (2013) found a non-significant relationship between board size, CEO duality, CEO tenure and audit committee and inventory management efficiency. Fiador (2016) supported (Gill and Biger, 2013) results except for board size and she also provided evidence that there is a non-significant relationship between the proportion of the non-executive directors and the inventory management. Whereas, Aghajari (2015) found that CEO duality had a significant positive effect on inventory management. He argued that organizations need to reduce their cash cycle to a minimum level, which needs reduction in the average inventory period. In addition, he found that the institutional ownership had a significant positive impact on inventory management efficiency. Moreover, Chaudhry and Ahmed (2015) found that board size, audit committee and board independence exerted significant negative influences on inventory conversion period, while board meetings exerted a positive significant impact. In contrast, Mugo (2015) found insignificant relationship between board meetings and inventory conversion period.

Furthermore, it is expected that the independent audit committee and the audit committee financial expertise may improve the inventory management efficiency. Based on the empirical results, the second hypothesis and sub-hypotheses are stated as follows:

H_2: corporate governance mechanisms have an impact on inventory management efficiency:

H_{2-1}: Board size has a non-significant impact on inventory management efficiency.

H_{2-2}: Board composition has a non-significant impact on inventory management efficiency.

H_{2-3}: CEO duality has a non-significant impact on inventory management efficiency.

H_{2-4}: Board meetings have a non-significant impact on inventory management efficiency.

H_{2-5}: Audit committee size has a non-significant impact on inventory management efficiency.

H_{2-6}: Audit committee independence has a significant impact on inventory management efficiency.

H_{2-7}: Audit committee expertise has a significant impact on inventory management efficiency.

H_{2-8}: The institutional ownership has a significant impact on inventory management efficiency.

For the accounts payable management efficiency, (Gill and Biger, 2013) found a significant positive relationship between CEO duality and accounts payable, but non-significant relationships between CEO tenure, board size, and audit committee and accounts payable. Aghajari (2015) supported (Gill and Biger, 2013) findings. He also reported a significant negative impact of the institutional ownership on the average payment period. In contrast, Chaudhry and Ahmed (2015) reported a positive

significant impact of board size, the proportion of the non-executive board members, audit committee size and board meetings on average payment period, whereas, Fiador (2016) reported a negative significant impact of board size, the proportion of the non-executive board members. She also reported a non-significant impact of CEO duality on the payment period. As well as, it is expected that the independent audit committee and the audit committee financial expertise may improve the accounts payable management efficiency. Based on the empirical results, the third hypothesis and sub-hypotheses are stated as follows:

H_3: corporate governance mechanisms have an impact on accounts payable management efficiency:

H_{3-1}: Board size has a non-significant impact on accounts payable management efficiency.

H_{3-2}: Board composition has a significant impact on accounts payable management efficiency.

H_{3-3}: CEO duality has a non-significant impact on accounts payable management efficiency.

H_{3-4}: Board meetings have a non-significant impact on accounts payable management efficiency.

H_{3-5}: Audit committee size has a non-significant impact on accounts payable management efficiency.

H_{3-6}: Audit committee independence has a significant impact on accounts payable management efficiency.

H_{3-7}: Audit committee expertise has a significant impact on accounts payable management efficiency.

H_{3-8}: The institutional ownership has a significant impact on accounts payable management efficiency.

Regarding the cash conversion cycle management efficiency, Gill and Biger (2013) found non-significant relationships between CEO tenure, CEO duality and audit committee and cash conversion cycle, but

a negative relationship between board size and cash conversion cycle, which means board size didn't improve cash conversion cycle. (Kajananthan and Achchuthan, 2013) also revealed a non-significant impact of corporate governance practices on the cash conversion cycle. Njoku (2017) supported the previous results. He provided that CEO tenure, CEO duality, board size and audit committee size were not statistically significant and could not be used to predict variations in the cash conversion cycle. Whereas, (Aghajari, et al., 2015) findings revealed negative relationships between CEO tenure, institutional ownership and cash conversion cycle, as well as a positive impact of CEO duality on cash conversion cycle. In addition, Chaudhry and Ahmed (2015) found that board size, board independence, board committees, and audit committee had significant negative influences on cash conversion cycle and a non-significant impact of board meetings on cash conversion cycle. Mugo (2015) supported the insignificant impact of board meetings found by Chaudhry and Ahmed (2015). Based on the empirical results, the forth hypothesis and sub-hypotheses are stated as follows:

H_4: corporate governance mechanisms have an impact on cash conversion cycle management efficiency:

H_{4-1}: Board size has a non-significant impact on cash conversion cycle management efficiency.

H_{4-2}: Board composition has a significant impact on cash conversion cycle management efficiency.

H_{4-3}: CEO duality has a non-significant impact on cash conversion cycle management efficiency.

H_{4-4}: Board meetings have a non-significant impact on cash conversion cycle management efficiency.

H$_{4-5}$: Audit committee size has a non-significant impact on cash conversion cycle management efficiency.

H$_{4-6}$: Audit committee independence has a significant impact on cash conversion cycle management efficiency.

H$_{4-7}$: Audit committee expertise has a significant impact on cash conversion cycle management efficiency.

H$_{4-8}$: The institutional ownership has a significant impact on cash conversion cycle management efficiency.

Regarding the cash conversion efficiency management, Gill and Biger (2013) found a Positive relationship between CEO duality and cash conversion efficiency, which means that the CEO duality improves cash conversion efficiency management, which in turn, helps reduce working capital requirements. They also found non-significant effects of board size, audit committee and CEO tenure on cash conversion efficiency management. Aghajari (2015) provided support for (Gill and Biger, 2013) results except for the impact of CEO duality. He found that the CEO duality and institutional ownership had non-significant influences on cash conversion efficiency. In addition, it is expected that board independence, the frequency of board meetings and both the audit committee independence and financial expertise may improve the cash conversion efficiency. Based on the empirical results, the fifth hypothesis and sub-hypotheses are stated as follows:

H$_5$: corporate governance mechanisms have an impact on cash conversion efficiency management:

H$_{5-1}$: Board size has a non-significant impact on cash conversion efficiency management.

H$_{5-2}$: **Board composition has a significant impact on cash conversion efficiency management.**

H$_{5-3}$: **CEO duality has a non-significant impact on cash conversion efficiency management.**

H$_{5-4}$: **Board meetings have a significant impact on cash conversion efficiency management.**

H$_{5-5}$: **Audit committee size has a non-significant impact on cash conversion efficiency management.**

H$_{5-6}$: **Audit committee independence has a significant impact on cash conversion efficiency management.**

H$_{5-7}$: **Audit committee expertise has a significant impact on cash conversion efficiency management.**

H$_{5-8}$: **The institutional ownership has a non-significant impact on cash conversion efficiency management.**

In the Brazilian context, Palombini and Nakamura (2012) investigated the impact of board independence, the management compensation and the ownership concentration on the level of the investment in operating working capital and found that none of the governance mechanisms exert any significant impact except for the positive impact of board independence. Wasiuzzaman and Arumugam (2013) investigated the impact of board size and board independence on the operating working capital investment and reported insignificant relationships. They argued that working capital management issues may not be of importance to board of directors and so decisions made by board of directors do not influence the working capital investment of their firms.

Moreover, as introduced before, the same person who acts as CEO and the chairperson is more responsible toward the company's resources and is directly informed with the day-to-day operations and also has the adequate and the accurate information to enhance the future performance (Elsayed, 2010), therefore, it is expected that board dual leadership structure may influence the operating working capital investment policy. In addition, it is expected that the frequency of board meetings may improve the operating working capital investment policy, since decisions relating to working capital management policies are discussed at board meetings, which require the board to hold frequent meetings, set agendas for the company and obtain the necessary information to determine the optimal level of the investment in working capital (Kamau and Basweti, 2013). Further, since the independence of the audit committee members with the inclusion of financial experts increase the audit committee' effectiveness in performing its responsibilities, it is expected that the audit committee characteristics may improve the operating working capital investment policy. Furthermore, it is expected that the institutional investors may influence the level of the investment in operating working capital, since they have powerful analysts for analyzing the financial statements and evaluating their investments. Also, through their large holdings and fiduciary responsibilities, they can monitor the policies carried out by management efficiently. Based on the empirical results, the sixth hypothesis and sub-hypotheses are stated as follows:

H_6: corporate governance mechanisms have an impact on the operating working capital management investment policy efficiency:

H$_{6-1}$: Board size has a non-significant impact on the operating working capital investment policy.

H$_{6-2}$: Board composition has a non-significant impact on the operating working capital investment policy.

H$_{6-3}$: CEO duality has a significant impact on the operating working capital investment policy.

H$_{6-4}$: Board meetings have a significant impact on the operating working capital investment policy.

H$_{6-5}$: Audit committee size has a significant impact on the operating working capital investment policy.

H$_{6-6}$: Audit committee independence has a significant impact on the operating working capital investment policy.

H$_{6-7}$: Audit committee expertise has a significant impact on the operating working capital investment policy.

H$_{6-8}$: The institutional ownership has a significant impact on the operating working capital investment policy.

4. Research methodology:

4.1. Sample selection and data collection:

The study population includes all firms listed on the Egyptian stock exchange. The firms in the financial sector, banking and finance as well as the healthcare firms are excluded because of the specific nature of their activities and comparability problems. The final sample consists of 99 manufacturing firms for the 4 years from 2014 to 2017 distributed over 7 sectors including basic resources, chemicals, construction and materials, food and beverage, healthcare and pharmaceuticals, industrial goods and services and personal and household products. Annual reports and corporate governance data are purchased from the Egyptian

company for information dissemination (EGID) in case the company did not have a website or did not provide its annual report on the website. The data required for the empirical testing of research hypotheses were gathered from the financial statements, the note disclosures and the annual reports announced by the companies.

4.2. Study models:

In order to investigate the impact of corporate governance mechanisms on working capital management efficiency, multiple regression models will be estimated using panel data analysis. The Hausman test was not significant at 5 percent, thus a random effects model is more appropriate than a fixed effects model regarding models (2), (3), (4) and (6). The choice to run a pooled OLS was confirmed by statistical test on E-views package for models (1) and (5). The estimated models are as follows:

$$ACP = \beta_0 + \beta_1 BS_{it} + \beta_2 BC_{it} + \beta_3 BM_{it} + \beta_4 CD_{it} + \beta_5 ACS_{it} + \beta_6 ACI_{it} + \beta_7 ACEXP_{it} + \beta_8 INSTSH_{it} + \beta_9 FS_{it} + \beta_{10} GROW_{it} + \beta_{11} FP_{it} + \varepsilon_{it} \quad (1)$$

$$AIP = \beta_0 + \beta_1 BS_{it} + \beta_2 BC_{it} + \beta_3 BM_{it} + \beta_4 CD_{it} + \beta_5 ACS_{it} + \beta_6 ACI_{it} + \beta_7 ACEXP_{it} + \beta_8 INSTSH_{it} + \beta_9 FS_{it} + \beta_{10} GROW_{it} + \beta_{11} FP_{it} + \varepsilon_{it} \quad (2)$$

$$APP = \beta_0 + \beta_1 BS_{it} + \beta_2 BC_{it} + \beta_3 BM_{it} + \beta_4 CD_{it} + \beta_5 ACS_{it} + \beta_6 ACI_{it} + \beta_7 ACEXP_{it} + \beta_8 INSTSH_{it} + \beta_9 FS_{it} + \beta_{10} GROW_{it} + \beta_{11} FP_{it} + \varepsilon_{it} \quad (3)$$

$$CCC = \beta_0 + \beta_1 BS_{it} + \beta_2 BC_{it} + \beta_3 BM_{it} + \beta_4 CD_{it} + \beta_5 ACS_{it} + \beta_6 ACI_{it} + \beta_7 ACEXP_{it} + \beta_8 INSTSH_{it} + \beta_9 FS_{it} + \beta_{10} GROW_{it} + \beta_{11} FP_{it} + \varepsilon_{it} \quad (4)$$

$$CCE = \beta_0 + \beta_1 BS_{it} + \beta_2 BC_{it} + \beta_3 BM_{it} + \beta_4 CD_{it} + \beta_5 ACS_{it} + \beta_6 ACI_{it} + \beta_7 ACEXP_{it} + \beta_8 INSTSH_{it} + \beta_9 FS_{it} + \beta_{10} GROW_{it} + \beta_{11} FP_{it} + \varepsilon_{it} \quad (5)$$

$$OWCIP = \beta_0 + \beta_1 \, BS_{it} + \beta_2 \, BC_{it} + \beta_3 \, BM_{it} + \beta_4 \, CD_{it} + \beta_5 \, ACS_{it} + \beta_6 \, ACI_{it} + \beta_7 \, ACEXP_{it} + \beta_8 \, INSTSH_{it} + \beta_9 \, FS_{it} + \beta_{10} \, GROW_{it} + \beta_{11} \, FP_{it} + \varepsilon_{it} \quad (6)$$

Where:

ACP, AIP, APP: are average collection period, average inventory period, average payment period, respectively, which represent the working capital management components; CCC, CCE and OWCIP: cash conversion cycle, cash conversion efficiency, and the operating working capital investment policy, which represent the overall working capital management efficiency. BS: Board Size, BC: Board Composition, BM: Board Meetings, CD: CEO Duality, ACS: Audit Committee Size, ACI: Audit Committee Independence, ACEXP: Audit Committee Expertise, INSTSH: Institutional Shareholders, FS: Firm Size, GROW: Sales growth, FP: Financial Performance, IndDum: Industry dummy, ε_{it}: Random Error.

4.3. Variables Measurement

Table (1) shows the definitions of all dependent, independent and control variables used in study as follows:

Table (1): The operational definition of the study variables

Variable name	Symbol	Operational definition
Dependent variables		
Average collection period	ACP	$\dfrac{\text{Average trade receivables}}{\text{sales}} * 365$
Average inventory period	AIP	$\dfrac{\text{Average inventory}}{\text{cost of goods sold}} * 365$
Average payment period	APP	$\dfrac{\text{Average trade payables}}{\text{cost of goods sold}} * 365$
Cash conversion cycle	CCC	(average collection period + average inventory period- average payment period)
Cash conversion efficiency	CCE	$\dfrac{\text{cash flow from operations}}{\text{sales}}$
Operating Working capital investment policy	OWCIP	$\dfrac{\text{Net operating working capital}}{\text{Total assets}}$
Independent variables		
Board size	BS	number of directors serving on board
Board composition	BC	(number of outside directors / total number of directors)
CEO duality	CD	assigned value 1 if same person occupied the post of the chairperson and the CEO and zero for otherwise
Board meetings	BM	number of board meetings
Audit committee size	ACS	number of audit committee members
Audit committee independence	ACI	(number of outside directors / total number of audit committee members)
Audit committee expertise	ACEXP	assigned value 1 if expert members exist and zero for otherwise
Institutional ownership	INSTSH	the number of institutional shares divided by the total number of common stocks of the firm in the beginning of the cycle
Control variables		
Firm size	FS	the logarithm of total assets
Sales growth	GROW	$\dfrac{\text{current year sales-previous year sales}}{\text{previous year sales}}$
Financial performance	FP	$\dfrac{\text{net income after tax}}{\text{sales}}$

5. Research results

5.1. Descriptive statistics:

Table (2): Descriptive statistics

	Mean	Std. Deviation	Minimum	Maximum
ACP	56.2820	70.91894	.00	803.70
AIP	101.7494	69.51380	.00	537.25
APP	38.9541	31.97432	.00	198.86
CCC	109.2001	103.42111	-213.88	595.12
CCE	.0726087	.14616931	-.70359	.74213
OWCIP	.1914	.21570	-.59	.76
BS	7.7777778	2.59719637	3.00000	17.00000
BC	.7123833	.18120674	.00000	1.00000
CD	.6515152	.47709323	.00000	1.00000
BM	9.7113924	4.82566603	1.00000	28.00000
ACS	3.4671717	.98927570	.00000	7.00000
ACI	.9545094	.14522439	.00000	1.00000
ACEXP	.2424242	.42909169	.00000	1.00000
INSTSH	55.7466641	30.09517867	.00000	99.00000
FS	20.2609265	1.37638051	17.06457	23.69696
GROW	.3644555	2.53622597	-.96514	46.70270
FP	.0146848	1.05538819	-15.03402	5.51800

Table (2) presents the summary of descriptive statistics of the dependent, independent and control variables depicting the average indicators of the variables computed from the financial statement to capture the main features of the companies under study.

The average collection period is 56 days, which means that companies in the sample need approximately 56 days to collect their debts. The average inventory period recorded a mean value of 101, which shows the period that companies keep the inventory. The average payment period has a mean value of 38, which shows the length of the period that companies take to pay their suppliers. The cash conversion cycle has a mean value of 109, which shows the length of the period that companies take to get cash from their customers and settle their suppliers after purchase of raw materials. The cash conversion efficiency has a mean value of 0.07, which indicates that the operating cash flow margin represents about 7% of each Egyptian pound of sales. Positive operating cash flow enables firms to finance a positive working capital requirement. The mean value of the operating working capital investment policy (OWCIP) averaged 0.19, which means that a 19% of cash is tied up in the working capital.

Board size, over the study period, averaged approximately 7 members. Compared to the average board size of 9 members in the Nigerian companies (Njoku, 2017) and 11 members in the American companies (Gill and Biger, 2013), the companies' boards in the sample are characterized by the smaller size. The proportion of non-executive members on corporate boards, on the other hand, averaged about 70%. Further, an annual mean frequency of meetings of averaged about 9 sessions. The mean value of the dual leadership structure (CEO duality) recorded by 0.65% which means that approximately 65% of company's CEO serves as a board chairman. The audit committee, over the study period, has an annual mean size of about 3 members dominated by a high proportion of independent members averaged approximately by 95% and

24% of the audit committees had at least one financial expert. Over the study period, it could be seen that the companies have an institutional presence with approximately 55% representing the mean value of institutional shareholding. The Firm size averaged approximately 20.26. The range of sales growth rate varies widely between a minimum value of -0.96 and a maximum value of 46 with an average growth rate of 0.36 with a standard deviation of 2.5, which suggests that there are wide variations in sales growth among the companies. Furthermore, the average financial performance of the companies is 0.014 with a minimum value of -15.03 and a maximum value of 5.5, with a standard deviation of 1.05 which indicates wide variations in the companies' performance within the sample over the study period.

5.2. Correlation analysis:

The Pearson's correlation analysis is used to measure the association between the working capital management variables and the corporate governance mechanisms. It is also used as a tool in detecting the multicollinearity problem when the correlation between independent variables is close to either -1 or $+1$ (Afrifa, 2010). The Pearson's correlation matrix is shown in table (3) and it shows that there is no multicollinearity problem between variables. Also the Durbin-Watson (DW) statistics indicate that there is no autocorrelation problem. The variance inflation factor (VIF), as appear has been less than ten for each variable, which suggests that there is no multicollinearity problem.

Table (3): Correlation matrix

	ACP	AIP	APP	CCC	CCE	OIP	BS	BC	CD	BM	ACS	ACI	ACE	INST	FS	SG	FP
ACP	1																
AIP	.150**	1															
APP	.189**	.130**	1														
CCC	.806**	.583**	-.15**	1													
CCE	-.072	-.024	-.021	-.062	1												
OIP	.033	.313**	-.003	.187**	-.051	1											
BS	-.069	-.117*	-.15**	-.059	.045	-.124*	1										
BC	.046	.028	-.011	.056	-.001	-.076	.392**	1									
CD	.060	-.13**	.063	-.043	-.073	-.104*	-.028	-.081	1								
BM	.060	-.059	.111*	-.023	.047	-.036	-.082	-.060	.365**	1							
ACS	-.20**	-.072	-.039	-.18**	.033	-.117*	.150**	.102*	.051	.219**	1						
ACI	-.19**	-.032	-.030	-.15**	.108*	.137**	.067	.052	-.032	-.022	.167**	1					
ACE	.087	-.054	.013	.038	-.030	.081	-.031	.047	.030	.087	.072	.104*	1				
INS	-.21**	-.20**	-.024	-.26**	.046	-.019	.108*	.080	.105*	.152**	.275**	.139**	.058	1			
FS	-.17**	-.081	-.077	-.15**	.109*	-.27**	.315**	.073	-.006	.131**	.241**	.198**	-.013	.329**	1		
SG	-.029	-.029	.001	-.038	-.031	-.022	.032	.004	-.051	.011	-.015	-.004	-.010	-.102*	.089	1	
FP	-.36**	-.125*	-.39**	-.20**	.238**	-.054	.059	-.013	-.019	-.003	.047	.135**	-.068	.009	.176**	.002	1

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

5.3. Regression results:

The value of the adjusted R^2 shows to what extent the independent variables explain the variation in the dependent variable. In order to determine whether the null hypothesis should be rejected or confirmed, the p-values measures the significance of the variables coefficients. Table (4) shows a summary of the hypotheses testing results:

Table (4): Summary of the hypotheses testing results

Variable	Coefficient	Standard error	P-value	VIF
Panel A: corporate governance and accounts receivables (R^2= 0.41, Adjusted R^2= 0.39, F-significance= 0.000, DW= 2.07)				
BS	-1.003069	0.826038	0.2254	1.357
BC	-5.942578	10.51420	0.5723	1.216
CD	-7.871940	4.560829	0.0852	1.163
BM	0.922011	0.467452	0.0494	1.262
ACS	-12.95941	2.398436	0.0000	1.174
ACI	-153.1817	18.19672	0.0000	1.092
ACEXP	14.12881	4.656468	0.0026	1.040
INSTSH	-0.403948	0.077981	0.0000	1.250
FS	-5.353428	1.572412	0.0007	1.370
GROW	0.306181	0.928895	0.7419	1.039
FP	-0.046184	1.849474	0.9801	1.067
Panel B: corporate governance and inventory (R^2= 0.27, Adjusted R^2= 0.25, F-significance= 0.000, DW= 1.86, Hausman-test P-value=0.22)				
BS	-2.482174	1.403487	0.0778	1.356
BC	-18.23521	17.32092	0.2931	1.224
CD	6.091396	6.816901	0.3721	1.149
BM	1.912880	0.714129	0.0077	1.236
ACS	0.443820	3.450677	0.8977	1.170

ACI	-0.713518	24.64246	0.9769	1.053
ACEXP	8.342653	6.691136	0.2133	1.032
INSTSH	0.082824	0.111938	0.4598	1.187
FS	0.287022	2.691064	0.9151	1.334
GROW	-0.958260	1.495878	0.5222	1.033
FP	-28.16433	2.480498	0.0000	1.053

Panel C: corporate governance and accounts payable (R^2= 0.06, Adjusted R^2= 0.03, F-significance= 0.018, DW= 1.93, Hausman-test P-value=0.40)

BS	-1.579310	0.854770	0.0656	1.384
BC	20.30199	10.99985	0.0658	1.229
CD	-7.074962	3.827590	0.0654	1.153
BM	0.704398	0.385096	0.0683	1.258
ACS	-4.366030	1.836833	0.0180	1.197
ACI	-10.34246	12.94681	0.4250	1.133
ACEXP	-2.624531	3.847598	0.4956	1.049
INSTSH	0.133650	0.065889	0.0433	1.256
FS	2.455073	1.511708	0.1053	1.451
GROW	-0.093822	0.563320	0.8678	1.043
FP	-4.585115	3.786208	0.2268	1.162

Panel D: corporate governance and cash conversion cycle (R^2= 0.10, Adjusted R^2= 0.07, F-significance= 0.000, DW= 1.93, Hausman-test P-value=0.15)

BS	2.375446	0.669530	0.0004	1.342
BC	-45.76765	10.97733	0.0000	1.215
CD	6.128603	6.135193	0.3185	1.159
BM	0.293080	0.986881	0.7667	1.240
ACS	-2.852962	3.247392	0.3802	1.238
ACI	-92.42887	36.28793	0.0113	1.111
ACEXP	13.62722	6.819228	0.0464	1.047
INSTSH	-0.439584	0.095339	0.0000	1.232

FS	-13.26713	1.225210	0.0000	1.382
GROW	-1.642669	0.158303	0.0000	1.037
FP	-9.789365	3.281162	0.0030	1.122
Panel E: corporate governance and cash conversion efficiency (R^2= 0.63, Adjusted R^2= 0.61, F-significance= 0.000, DW= 1.98)				
BS	0.003621	0.001722	0.0363	1.425
BC	-0.085160	0.021512	0.0001	1.276
CD	0.028761	0.007722	0.0002	1.199
BM	-5.18E-05	0.000770	0.9464	1.265
ACS	0.021997	0.003711	0.0000	1.262
ACI	-0.032364	0.028256	0.2529	1.111
ACEXP	-0.013655	0.008269	0.0996	1.055
INSTSH	0.000314	0.000142	0.0278	1.300
FS	0.013165	0.003110	0.0000	1.485
GROW	-0.021604	0.007012	0.0022	1.048
FP	0.335087	0.016536	0.0000	1.139
Panel F: corporate governance and operating working capital investment policy (R^2= 0.15, Adjusted R^2= 0.13, F-significance= 0.000, DW= 1.96, Hausman-test P-value=0.11)				
BS	0.013357	0.004329	0.0022	1.355
BC	-0.236401	0.056253	0.0000	1.214
CD	-0.020593	0.021498	0.3387	1.164
BM	-0.001732	0.002265	0.4448	1.258
ACS	-0.012683	0.010504	0.2280	1.183
ACI	-0.132482	0.079135	0.0949	1.096
ACEXP	0.011324	0.021329	0.5958	1.035
INSTSH	0.000649	0.000352	0.0657	1.232
FS	-0.057895	0.007936	0.0000	1.381
GROW	0.002776	0.001737	0.1109	1.033
FP	0.008109	0.006289	0.1981	1.055

5.3.1. Regression results of model (1):

From table (4)-Panel A, the value of the adjusted $R^2 = 0.398$, which means that the independent variables explained 39% of the variation in the dependent variable (ACP). Also, the model is highly significant (F-sig = 0.00). The results of the regression model (1) reveal that board size (p-value = 0.2>0.05) do not exert any significant impact on the efficient management of the accounts receivables, which proves H_{1-1}. The results also show that board independence (p-value = 0.5>0.05) exerts insignificant impact on the efficient management of the accounts receivables; therefore, H_{1-2} is rejected. The results also reveal that CEO duality (p-value = 0.08>0.05) do not exert any significant impact on the efficient management of the accounts receivables, which proves H_{1-3}. Also, there is a positive significant impact of board meetings (p-value = 0.04<0.05) on the efficient management of the accounts receivable, which does not improve the average collection period, therefore, H_{1-4} is rejected. This result is consistent with (Chaudhry and Ahmed, 2015) findings. The results also show there is a negative significant impact of the audit committee size (p-value = 0.00<0.05) on the accounts receivable management efficiency, which means that H_{1-5} is rejected. In addition, the audit committee independence (p-value = 0.00<0.05) has a negative significant impact on the accounts receivable management efficiency, which means that H_{1-6} is accepted. These results imply that when the size of the audit committee increases and become more independent, the period that the company collects its receivables decreases, hence, improving the accounts receivable management efficiency. This result comes inconsistent with (Gill and Biger, 2013) results, whereas it supports (Chaudhry and Ahmed, 2015) findings. The regression results also reveal

that there is a positive significant impact of the audit committee expertise (p-value = 0.00<0.05) on the efficient management of the accounts receivables, which means that H_{1-7} is accepted. This result implies that as the number of the audit committee' expert members increase, the average collection period increases, hence, it does not improve the efficient management of the accounts receivable. The institutional ownership (p-value = 0.00<0.05) also showed a negative significant impact on the accounts receivable management efficiency, which means that H_{1-8} is accepted. This result implies that when the percentage of the institutional ownership increases, the average collection period decreases, which improves the accounts receivable management efficiency. This result supports the findings of (Aghajari et al., 2015).

5.3.2. Regression results of model (2):

From table (5)-Panel B, the value of the adjusted R^2 = 0.25, which means that 25% of the variation in the dependent variable (AIP) is explained by the independent variables. Also, the model is highly significant (F-sig = 0.00). The random effect model (2) shows that board size (p = 0.07 > 0.05) has a negative insignificant impact on the inventory management efficiency; therefore, H_{2-1} is accepted. Board size exerted the same impact in the American manufacturing firms of (Gill and Biger, 2013), whereas it exerted a negative significant impact on the average inventory period according to Chaudhry and Ahmed (2015) and Fiador (2016). It also shows that board composition (p = 0.29 > 0.05) exerts a negative insignificant impact on the inventory management efficiency; therefore, H_{2-2} is accepted. This result supports the findings of Palombini & Nakamura, (2012) and Fiador (2016) who found the same effect. The CEO duality exhibits a positive insignificant impact on the inventory

management efficiency; therefore, H$_{2-3}$ is accepted. This result found support in (Gill and Biger, 2013 and Fiador, 2016) findings. The results also reveal that there is a significant positive impact of board meetings (p-value = 0.00<0.05) on the average inventory period; therefore, H$_{2-4}$ is rejected. The results imply that an increase in the board meetings increases the average inventory period, which leads to the inefficient management of the inventory. The results also show that the audit committee size (p = 0.89> 0.05) exhibits a positive insignificant impact on the inventory management efficiency; therefore, H$_{2-5}$ is accepted. The same effect was shown in the American manufacturing firms of (Gill and Biger, 2013), whereas the larger audit committee improved the inventory management efficiency in the Pakistani manufacturing firms of (Chaudhry and Ahmed, 2015). Also, the audit committee independence (p = 0.97 > 0.05) exerts a negative insignificant impact on the inventory management efficiency; therefore, H$_{2-6}$ is rejected. For the audit committee expertise (p = 0.21 > 0.05), the results indicate that there is a positive insignificant impact of audit committee expertise on the inventory management efficiency; therefore, H$_{2-7}$ is rejected. By investigating the impact of the institutional ownership, the findings revealed a positive insignificant impact of institutional ownership (p = 0.45> 0.05) on the inventory management efficiency; therefore, H$_{2-8}$ is rejected. This result come consistent with (Aghajari, 2015) findings.

5.3.3. Regression results of model (3):

From table (5)-Panel C, the value of the adjusted R^2 = 0.03, which means that 3% of the variation in the dependent variable (APP) is explained by the independent variables. Also, the model is significant (F-sig = 0.01). The random effect model (3) reveals that board size (p = 0.06

> 0.05) has a negative insignificant impact on the accounts payable management efficiency; therefore, H_{3-1} is accepted. The results also show that board composition (p = 0.06 > 0.05) indicates has a positive significant impact on the accounts payable management efficiency; therefore, H_{3-2} is accepted. The CEO duality (p = 0.06 > 0.05) has a negative insignificant impact on the accounts payable management efficiency; therefore, H_{3-3} is accepted. Also, the intensity of board meetings (p = 0.68 > 0.05) show a positive insignificant impact on the accounts payable management efficiency; therefore, H_{3-4} is accepted. For the audit committee characteristics, only the audit committee size (p = 0.01 < 0.05) exhibits a significant negative impact on the accounts payable management efficiency; therefore, H_{3-5} is rejected. This result implies that larger audit committee leads to decrease the average payment period, hence the inefficient accounts payable management. But in fact prolonging the payment period is not always the perfect situation as the company may try to get benefit from the discount offered by the suppliers or make swift payment for cost reasons, which lead to decreasing the average payment period and increase the company's profitability. This result comes in contrast with the insignificant impact of the audit committee size on the accounts payable management efficiency in the American manufacturing firms of (Gill and Biger, 2013). For the audit committee independence (p = 0.42 > 0.05), the results indicate that there is a non-significant negative impact of audit committee independence on the accounts payable management efficiency; therefore, H_{3-6} is rejected, as well as, the of audit committee expertise (p = 0.49 > 0.05) has a non-significant negative impact on the accounts payable management efficiency, which means that H_{3-7} is rejected. In addition, the institutional ownership exerts a positive significant impact (p-value = 0.04<0.05) on

the average payment period; therefore, H_{3-8} is accepted. It means that the increase in the presence of the institutional investors improves the accounts payable management efficiency. This result comes inconsistent with the significant negative impact of the institutional ownership on the accounts payable management efficiency in the Iranian corporations of (Aghajari et al., 2015).

5.3.4. Regression results of model (4):

From table (5)-Panel D, the value of the adjusted $R^2 = 0.075$, which means that 7% of the variation in the dependent variable (CCC) is explained by the independent variables. Also, the model is highly significant (F-sig = 0.00). The random effect regression model (4) shows a significant positive impact of the board size (p-value = 0.00<0.05) on the cash conversion cycle; therefore, H_{4-1} is rejected. This means that larger boards increase the cash conversion cycle. This result is in contrast with the findings of Gill and Biger (2013) and Chaudhry and Ahmed (2015) who reported negative relationships. Also, the result comes inconsistent with the insignificant impact found by (Fiador, 2016 and Njoku, 2017). The results also show that there is a negative significant impact of board independence (p-value = 0.00<0.05) on the length of the cash conversion cycle; therefore, H_{4-2} is accepted. This means that as boards become more independent the cash conversion cycle decreases, hence improved efficiently. This result comes consistent with (Palombini and Nakamura, 2012; Chaudhry and Ahmed, 2015 and Fiador, 2016). For the other board characteristics, CEO duality (p-value = 0.3>0.05) and board meetings (p-value = 0.7>0.05) do not exert any significant impact on the efficient management of the cash conversion cycle, which means that, H_{4-3} and. H_{4-4} are accepted.

In addition, the audit committee size does not exert any significant impact (p = 0.38 > 0.05) on the cash conversion cycle; therefore, H_{4-5} is accepted. The results also reveal that there is a negative significant impact of the audit committee independence (p-value = 0.01<0.05) and the cash conversion cycle; therefore, H_{4-6} is accepted. This result means that when the audit committee becomes more independent, the cash conversion cycle decreases, hence improving the working capital management efficiency. Whereas, the presence of the audit committee financial experts exert a positive significant impact (p-value = 0.04<0.05) on the cash conversion cycle, which means that the audit committee financial expertise don't improve the working capital management efficiency; therefore, H_{4-7} is accepted. Further, the high presence of the institutional investors exerts a negative significant impact (p-value = 0.00<0.05) on the cash conversion cycle, which improves the working capital management efficiency; therefore, H_{4-8} is accepted. The same result was found by (Aghajari et al., 2015).

5.3.5. Regression results of model (5):

From table (5)-Panel E, the value of the adjusted R^2 = 0.61, which means that 61% of the variation in the dependent variable (CCE) is explained by the independent variables. Also, the model is highly significant (F-sig = 0.00). The pooled regression model (5) provides a positive significant impact of board size (p-value = 0.03<0.05) on the cash conversion efficiency management; therefore, H_{5-1} is rejected. The results imply that as board size increases the rate of the operating cash flow margin increases, hence improving the company's liquidity position. This result is inconsistent with Gill and Biger (2013) who reported non-significant relationships. The results also reveal that there is a negative

significant impact of board composition (p-value = 0.00<0.05) on the cash conversion efficiency as boards become more dominated by the independent directors, the rate of the operating cash flow margin decreases, which leads to the inefficient management of the cash conversion efficiency; therefore, H_{5-2} is accepted. The CEO duality (p-value = 0.00<0.05) also shows a positive significant impact on the cash conversion efficiency management; therefore, H_{5-3} is rejected, which means that the dual leadership structure improves the cash conversion efficiency. The same result was found by Gill and Biger (2013) in the American manufacturing firms, but it comes inconsistent with Aghajari (2015) who reported a non-significant relationship in the Iranian corporations. In addition, board meetings show insignificant impact (p =0.94> 0.05) on the cash conversion efficiency; therefore, H_{5-4} is rejected.

The audit committee size (p-value = 0.00<0.05) shows a positive significant impact on the cash conversion efficiency; therefore, H_{5-5} is rejected. This result comes inconsistent with Gill and Biger (2013) who reported a non-significant relationship. Regarding the other audit committee characteristics, the audit committee independence (p = 0.25 > 0.05) and the audit committee expertise (p =0.09 > 0.05) exert insignificant impacts on the cash conversion efficiency; therefore, H_{5-6} and H_{5-7} are rejected. The institutional ownership (p-value = 0.02<0.05) has a significant positive impact on the cash conversion efficiency management; therefore, H_{5-8} is rejected, as the percentage of the institutional investors increase, the cash conversion efficiency increases. This result is inconsistent with Aghajari (2015) who reported a non-significant relationship.

5.3.6. Regression results of model (6):

From table (5)-Panel F, the value of the adjusted $R^2 = 0.13$, which means that 13% of the variation in the dependent variable (OWCIP) is explained by the independent variables. Also, the model is highly significant (F-sig = 0.00). The random effect regression model (6) shows a positive significant impact of the board size (p-value = 0.00<0.05) in explaining the variations in the operating working capital investment policy; therefore, H_{6-1} is rejected. This result does not find support in the existing literature as Wasiuzzaman and Arumugam (2013) reported an insignificant relationship. The results also reveal a negative significant impact of board composition (p-value = 0.00<0.05) on the operating working capital investment policy; therefore, H_{6-2} is rejected. Palombini and Nakamura (2012) reported the same result for the Brazilian firms. Wasiuzzaman and Arumugam (2013) reported an insignificant relationship. The results also reveal that the CEO duality (p =0.33> 0.05) has a non-significant negative impact on the operating working capital management investment policy, which come against the study expectations; therefore, H_{6-3} is rejected. Also, the intensity of board meetings (p =0.44 > 0.05) has a non-significant negative impact of board meetings on the operating working capital management investment policy; therefore, H_{6-4} is rejected. In addition, the audit committee characteristics don't exert any significant impact on the operating working capital management investment policy; therefore, H_{6-5}, H_{6-6} and H_{6-7} are rejected. Moreover, the results reveal that there is a non-significant positive impact of institutional ownership (p =0.06> 0.05) on the operating working capital management investment policy; therefore, H_{6-8} is rejected.

6. Summary and conclusion

The current study aims at providing evidence from the Egyptian context on the impact of the corporate governance mechanisms on working capital management efficiency. For the analysis purposes, a sample of 99 manufacturing listed firms were selected and tested for the period of 4 years from 2014- 2017. The regression results show that the direction and the extent of impact of the governance mechanisms depend on the efficiency measure being examined. In regard with the board characteristics, the results show that smaller boards don't influence the management of the operating components of the working capital. However, they improve the overall working capital management efficiency. When such boards are dominated by non-executive directors, they improve only the cash conversion cycle. Also, the CEO duality doesn't exert any influence on the efficient management of working capital components as well as the overall working capital measures except for the cash conversion efficiency. The intensity of the board meetings doesn't improve the efficient management of the accounts receivable and the inventory. This result come against the argument of (Vafeas, 1999; cited by Ntim and Osei, 2011) that the frequency of board meetings enables the directors to have more time for discussion and setting strategies, which are translated into improvements in profitability, assets efficiency and the firm's day-to-day operations. Further, in regard with the audit committee characteristics, the results show that larger audit committees improve both the accounts receivable management efficiency and the cash conversion efficiency but they don't improve the accounts payable management efficiency. According to the descriptive results, the companies in the sample are characterized by small audit committee,

therefore, increasing the audit committee size is recommended to improve the efficient management of working capital. In addition, the independent audit committees improve only the accounts receivable management efficiency and the cash conversion cycle, whereas, the audit committee financial expertise doesn't improve the efficient management of the accounts receivable and the cash conversion cycle. Finally, the institutional ownership improve both the efficient management of the operating working capital components and the overall working capital management measures except for the inventory management and the operating working capital investment policy. Finally, the institutional ownership improves both the efficient management of the operating working capital components and the overall working capital management measures except for the inventory management and the operating working capital investment policy. From the foregoing analysis, it is evident that corporate governance mechanisms have an impact on the working capital management efficiency.

6.1.Future studies

The results of this study provide opportunities for future research. The first suggestion is to investigate the impact of the corporate governance mechanisms on the company's internal policies regarding the working capital management. The second suggestion is to examine different measures of the working capital management such as the working capital management index used in Kamau and Basweti (2013) or use a corporate governance index. The third suggestion is to examine the current research issue across a longer time period and using a larger sample.

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