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School of Business

The impact of Corporate Governance and Firm Maturity on Working Capital
Management Efficiency: Evidence from Listed European Firms

A Thesis Submitted to

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in partial fulfillment of the requirements for

the degree of Master of Science in Finance

by Sarah Reda Kamel

under the supervision of Dr. Islam Azzam

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DEDICATION

I would like to give special thanks to my family and my dear husband for their constant support and motivation throughout my journey of writing this thesis paper. As well as, my new born baby, who was cooperative and understanding in her very own way. This thesis paper would not have been written without the many babysitting hours, which my mother, husband and sister have gratefully provided me with. I am truly thankful for having you all in my life.

ABSTRACT

The importance of studying working capital management efficiency (WCME) springs from its effect on a firm's profitability, value, and solvency. The board of directors together with the Chief Executive Officer formulate corporate policies including those concerning working capital levels, yet it is management's role to continuously monitor the various working capital components to strike an optimal balance amongst them. Accordingly, this study analyses the effect of corporate governance in overseeing management handling working capital levels. In addition, this paper studies the role of firm maturity as a determinant factor of WCME. For this purpose, the paper at hand uses 583 listed European firms from 2002 till 2013. And, it employs cross section random effect panel regression models, where various working capital characteristics are used as dependent variables. And, along with the explanatory firm maturity proxy and the corporate governance variables, we control for the effect of country and multiple firm-specific characteristics. Finally, this study suggests that both corporate governance (except for ownership concentration proxy) and firm maturity are significant factors of WCME. Yet, for some of the proxies used, we did not reach conclusive results regarding the direction of impact on working capital investment.

Keywords: Working capital; corporate governance; firm maturity; corporate life-cycle; Europe

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I. INTRODUCTION

Working capital management (WCM) in the context of this study refers to managing current assets and current liabilities to maintain an optimal balance amongst each of the working capital components. More specifically the management of the working capital components, such as, cash, inventory, accounts receivable, accounts payable, for smooth day-to-day operations. An optimal level of working capital refers to operating risk (of being unable to meet short-term obligations) and profitability (that is negatively affected when a firm invests excessively in current assets) being balanced via constantly monitoring each of the working capital components to be at appropriate levels. Firms face a trade-off when deciding on the level of working capital; working capital is needed to minimize the risk of running short on liquidity, however it is costly to hold working capital as it decreases the return on invested capital (Brigham & Daves, 2007).

The importance of efficiently managing working capital is irrefutable. Given its great significance, most of financial managers' time and effort are expended towards bringing back non-optimal levels of working capital to their optimal levels (Lamberson, 1995). Moreover, the viability of any business is dependent on its ability to efficiently manage accounts receivables, inventory, and accounts payable (Filbeck & Krueger, 2005). The level of working capital that a firm maintains affects its solvency, liquidity, and profitability (Mukhopadhyay, 2004), given the inherent tradeoff between liquidity and profitability against the risk of facing bankruptcy (Kargar & Blumenthal, 1994). To explain further, increasing a firm's profitability is at the cost of reducing its liquidity, which can lend the firm into bankruptcy. This confirms the need to achieve an optimal balance between liquidity and profitability (Smith, 1982). It is important to remember that the main objective of any firm is to maximize profits and shareholders' wealth. The level of working capital which a firm holds (i.e. working capital requirement), directly affects its available free cash flow, and thus impacts shareholders' wealth (Ganesan, 2007; Gill & Biger, 2013). Accordingly, efficient WCM can greatly reduce the required investments in operations, increase free cash flow, and consequently the firm's value (Brigham & Daves, 2007).

There is abundant theoretical and empirical studies concerning long-term financing and investment decisions, yet minimal research has been undertaken with regards to the management of short-term resources (Nazir & Afza, 2009). Moreover, most of the research studying WCM focused on its relation with a firm's profitability as a creator of shareholders' value (Palombini & Nakamura, 2012). Thus despite the importance of working capital management efficiency (WCME) for the corporate financial health, the empirical evidence on the determinants of WCM is limited (Palombini & Nakamura, 2012), particularly those related to corporate governance (Kieschnick, Laplante, & Moussawi, 2006). However, this article provides knowledge on corporations' short-term decision making, specifically insights into the determinants of WCME from the point of view of two internal factors, namely, corporate governance and firm maturity. This may provide some practical implications for the management of working capital.

Corporate governance impacts shareholders' wealth through governing the WCM policies formulated by the Chief Executive Officer (CEO) and the board of directors. In the context of this study, corporate governance is defined as "ways of bringing the interests of investors and managers into line and ensuring that firms are run for the benefit of investors" (Mayer, 1997). Business success is highly reliant on the financial executives' ability to efficiently manage the working capital components (Filbeck & Krueger, 2005). Consistently, Nazir and Afza (2009) contend that the optimum level of working capital is mainly determined by "…the methods adopted by the management.", and that continuous monitoring is thus required from managers in order to maintain the working capital components at their optimal level. Accordingly, the issue of effective corporate governance in overseeing managers is raised. The possibility for the scenario of managers not exerting their best effort to attain optimal working capital levels is blamed on the misalignment of the managers' and shareholders' interests; a typical agency problem (Kieschnick et al., 2006). Managers prefer high levels of investment in working capital to minimize the risk of bankruptcy and for the precautionary motive of holding cash, thus reducing the pressure exerted on managers to perform well (Wasiuzzaman & Arumugam, 2013). Management tend to hold on to resources and waste them on inefficient investments instead of distributing them to shareholders (Drobetz, Grüninger, & Hirschvogl, 2010). Thus, agency problems, as measured by multiple corporate governance proxies, are important determinants of the WCME. Corporate governance has a fundamental role in the efficiency of WCM through monitoring working capital policies, whereby the level of working capital components that is maintained in a firm is characterized by the policies that are formulated by the board of directors and the CEO. Thus, inefficient working capital policies induced by poor corporate governance in overseeing management, negatively affect a firm's value and shareholders' wealth (Gill & Biger, 2013).

The life-cycle stage of a firm is another term for describing a firm's maturity. Typically, firms go through start-up, growth, maturity, and decline stages, whereby their financial and economic characteristics vary accordingly (Salehi, 2013). Previous research has reported mixed results for its effect on working capital levels. Accordingly, further investigation of the impact of firm maturity on WCME is well deserved.

In line with previous studies, we study the impact of corporate governance on WCME using their characteristics as proxy variables. Corporate governance proxies used in this paper encompass CEO duality dummy, board size (Gill & Biger, 2013), board independence, audit committee independence (Kyereboah-Coleman, 2008), number of board meetings (Kamau & Basweti, 2013), and ownership concentration (Tian & Twite, 2011). As for WCME, we measure it using the following components: accounts receivable days, accounts payable days, inventory days held, cash conversion cycle (CCC) (Palombini & Nakamura, 2012), cash holdings, current ratio, and cash conversion efficiency (CCE) (Gill & Biger, 2013). To measure firm maturity we calculate the returned earnings over the total assets ratio (Lestari, 2012). Similar to Harford, Mansi, and Maxwell's (2008) rationale, since each of the measures of corporate governance may substitute for one another as a measurement of a firm's corporate governance level, using multiple measures clarifies further their differing effects on WCM. Similarly, using

multiple measures for WCME provides us with a detailed picture on the impact of corporate governance and firm maturity on the various components of WCM. Furthermore, following Gill & Biger (2013), among others, we control for sales growth, firm size, firm performance, and added the following control factors: leverage (Kamau & Basweti, 2013), industry dummies (Chiou, Cheng, & Wu, 2006), country dummies (Supatanakornkij, 2014), and payout ratio to control for their variation in the model.

Unlike previous studies, the effect of corporate governance on the efficiency of WCM has not been studied on the European region. Previous research mostly assessed the impact of one or more corporate governance components on a characteristic of WCM, specifically on corporate cash holdings. This is exemplified by the study conducted on a sample of non-financial Swiss firms that found a positive relation between CEO duality and corporate cash holdings. Also, a non-significant relation between board size and corporate cash holdings was found (Drobetz & Grüninger, 2007). Moreover, Gill and Shah (2012) using a sample of Canadian firms found that CEO duality and board size positively affect corporate cash holdings. Furthermore, Dittmar, Mahrt-Smith, and Servaes (2003) on a sample from 45 international countries found that shareholder protection (based on shareholder rights variable) influences a firm's cash level. Thus, most of the previous studies are country specific that were conducted on a single European country or on other specific country or on a set of international countries instead of an integrated area as a whole (Koralun-Bereźnicka, 2014b; Pratap Singh & Kumar, 2014; Supatanakornkij, 2014). As for firm maturity, there is a plethora of research on its impact on dividend payout policy (e.g. Lestari (2012) and Grullon, Michaely and Swaminathan (2002), etc.), yet minimal and inconclusive findings on WCM. Accordingly, this study increases our knowledge towards reaching the optimal working capital levels through investigating some of the internal factors that influence the WCM policies in European markets. In addition, the current study's findings on the determinants of WCME in European countries in relation to others conducted in other markets can serve as a comparison tool on whether European countries and other countries' working capital are driven by the same factors.

Employing a cross section random effect panel regression model on a set of 583 listed European firms from 2002 to 2013, we find that a firm's working capital policy is affected by board size, board independence, number of board meetings, CEO duality, audit committee independence, firm maturity, country-specific effects, leverage, payout ratio, sales growth, firm size, and firm profitability. However, we do not reach conclusive results for some of these factors in terms of the direction of their impact on corporate working capital levels. Also, this study found insignificant statistical results for ownership concentration as a factor of WCME.

The following section presents a brief review of previous literature on the determinants of WCM, as well as, a rich review of prior studies related to corporate governance and firm maturity as factors of WCM. Next, the conceptual framework for this research is showcased. Following is the description of the data and methodology. Finally, research

findings are discussed, and from which the conclusions and recommendations are then drawn.

II. LITERATURE REVIEW AND HYPOTHESES

This section reviews the literature on the possible determinants of WCM, and it highlights the factors that have been studied in the context of the European region. It then focuses on the literature related to each of the studied determinants of WCME, and from which we develop our hypothesis of its relation with working capital investment. We further illustrate the measurement of each factor based on previous research.

1. On the Factors Affecting WCM

There is a stream of research on individual components of working capital (cash & marketable securities, e.g. Kim, Mauer, and Sherman (1998), and trade credit, e.g. Rajan and Peterson (1997)). However, we also need to consider the joint effect of the individual WCM policies (Schiff & Lieber, 1974; Sartoris & Hill, 1983; Hill, Kelly, & Highfield, 2010; Kim & Chung, 1990). Accordingly, this section only discusses prior literature with regards to the factors affecting the overall WCM.

Although, many studies have been conducted to assess the impact of WCM policies on a firm's profitability and shareholder value (among these studies: Hyun-Han Shin and Soenen (1998); Deloof (2003); Lazaridis and Tryfonidis (2006)), relatively little prior research on the internal and external determinants of WCM exists (Palombini & Nakamura, 2012). Amongst those studies on the factors of WCM is one which has been conducted by Nunn (1981) that found that factors related to sales, production, competitive position, accounting-related variables and industry affect "permanent" working capital (defined as the sum of accounts receivable and inventories). Also, Hawawini, Viallet, and Vora (1986) concluded that there is a significant industry effect on working capital investment. Similarly, Filbeck and Krueger (2005) discovered that working capital measures change within industries across time. Moreover, Kieschnick et. al. (2006) found that corporate working capital policies are significantly influenced by industry practices, as well as, firm size, future firm sales growth, the proportion of outsider directors on its board, the current compensation of the CEO, and CEO's share ownership. Furthermore, Palombini and Nakamura (2012) assert that a firm's debt level, size, and growth rate can affect its WCM. Additionally, Lamberson (1995) explored the impact of the level of economic activity on working capital levels, and found that during economic expansion liquidity slightly increased, yet no noticeable change in liquidity was observed during economic slowdowns. Chiou et al. (2006) found that both a firm's debt ratio and operating cash flow affect its WCM. However, they found no evidence of the business cycle, industry effect, firm growth, firm performance, and firm size on WCM. Also, similar findings were reported by Hill et al. (2010) in a robustness check of working capital behavior to industry effects. As for Nazir and Afza (2008), they found that a firm's operating cycle, leverage, return on assets (ROA), industry, and Tobin's Q all significantly impacted working capital level. Moving further, Appuhami (2008) found a significant negative relationship between capital expenses and WCM. Additionally, the study found a significant positive relationship with operating and finance expenses. Also, Zariyawati, Taufiq, Annuar, and Sazali (2010) indicate that corporation's firm size, debt ratio, company growth, economic growth and inflation influence WCM.

From the perspective of Europe as a region and not specific European countries, the empirical evidence on the determinants of WCM is limited, and to the best of our knowledge, is missing any inferences on the corporate governance and firm maturity factors. Koralun-Bereźnicka (2014b) studied a sample of firms from 9 European Union (EU) countries and 13 industries covering the period 2000 till 2009 to determine the relative significance and build a hierarchy of three selected WCM determinants. The findings provide proof that working capital is most affected by country-specific factors, followed by industrial factors then firm size. In another research study, Koralun-Bereźnicka (2014a) used a set of private firms from 9 EU countries over the period 2000-2010 and found that the relationship between several capital structure ratios and working capital ratios is influenced in terms of direction and significance by country-specificity and firm size. Moreover, Supatanakornkij (2014) also conducted a study using a panel data set of listed firms in 12 European countries covering the period from 2000 till 2007 and the results showed the significance of a company's access to external financing and ability to generate internal financing in affecting WCM. Also, the study revealed the correlation of each of profitability and fixed assets investment with a firm's WCM. In addition, the study goes beyond other studies on WCM and provides empirical comparative international evidence that the European variations in WCM are due to both direct (the author defines as real differences between countries) and indirect (refers to firm-specific determinants across countries) country effects. Furthermore, Ferreira and Vilela (2004) using a sample from the EMU countries suggest that cash holdings (only one of the characteristics we use to measure WCME) are positively affected by investment opportunity set, and are negatively affected by asset's liquidity, leverage, size, bank debt, investor protection, ownership concentration (used in the study as a measure of legal protection), and capital markets development.

2. The Studied Determinants of WCM
2.1. The Effect of Corporate Governance on WCM

The concept of corporate governance is derived from the agency theory, whereby it is assumed that managers do not always act according to the shareholders' interests. Jensen clarifies that the interests and decisions of managers are not always aligned with those of shareholders due to the irrational and opportunistic behavior of agents (i.e. managers), which thus results in agency costs and/or agency problems (as cited in Palombini & Nakamura, 2012). This conflict of interest between shareholders and managers affects company decisions concerning its working capital level (Palombini & Nakamura, 2012). This is evidenced by Dittmar et al. (2003), who found that the level of shareholder protection affects a corporation's cash level; since when access to funds is made easier, firms hold greater cash balances. Accordingly, they assert that agency problems affect corporate cash holdings. Thus, rendering the corporate governance function an important factor influencing WCME. Accordingly, as per Weir and Laing, monitoring mechanisms, along with incentive and disciplinary mechanisms, are necessary to protect shareholders' interests (as cited in Palombini & Nakamura, 2012). Moreover, Fama explains that such monitoring mechanisms aim to align the actions of agents with shareholders' interests (as cited in Palombini & Nakamura, 2012). Tirole explains that monitoring mechanisms

include a variety of instruments that include board composition, auditors, large shareholders, large creditors, investment banks, etc. (as cited in Palombini & Nakamura, 2012).This study focuses on the impact of six monitoring mechanisms, namely: CEO duality, board size, board independence, number of board meetings, audit committee independence, and ownership concentration, on WCM.

2.1.1. Board Independence

Generally, previous literature leads us to expect that the more outsiders on the board the greater the monitoring of WCM (Kieschnick et al., 2006). Fama asserts that the presence of non-executive members on the board reduces the risk of conniving arrangements and expropriation of shareholder wealth (as cited in Palombini & Nakamura, 2012). Kyereboah-Coleman (2008) contends that a key issue to address managers' opportunistic behavior, as advocated by the agency theory, is more non-executive directors on boards to reduce conflict of interest and to assure the independence of the board when monitoring management. Furthermore, Kyereboah-Coleman (2008) references the stewardship theory, explaining that for effective corporate governance non-executive directors should be involved to increase the effectiveness of the board's activities. In line with this theoretical literature, Kieschnick et al. (2006) found significant empirical evidence for the negative relation with the CCC for U.S. firms. They asserted that greater board independence leads to better management of working capital. Also, Gill, Biger, and Obradovich (2014) found that the presence of independent directors on the board shortens the CCC via shortening the inventory period. They assert that their results support the argument that greater board independence leads to better WCME and improved financial health of the firm.

On the other hand, Opler, Pinkowitz, Stulz, and Williamson's (1999) financial hierarchy model suggested that board independence has a positive relation with managerial cash holdings. Also, Palombini and Nakamura (2012) found for the Brazilian case a significantly positive relation between the participation of outside directors and working capital requirement (a proxy for WCM defined as: [accounts receivable + inventory]/ [total assets – financial assets]). The authors' finding, contrary to their expectations, suggested that greater board independence could not minimize agency costs. As for Achchuthan and Rajendran (2013), they found a non-significant relation with multiple components of WCM in Srilanka, giving no support to the argument of board independence affecting the working capital level. Also Zariyawati et al. (2010) found an insignificant negative relationship with the CCC in Malaysia, albeit their hypothesized negative relation resulting from the monitoring role of outsider directors. Similarly, Wasiuzzaman and Arumugam (2013) found on a sample of Malaysian public listed companies an insignificant negative relationship with net operating working capital, indicating that board independence is an irrelevant matter to WCM. They explain that although it is generally expected that greater board independence means more stringent monitoring mechanisms over management and thus more efficient working capital levels, there is previous literature on the ineffectiveness of independent boards in overseeing

managers given that the process of electing independent board members is mostly unclear. They further cite Cornforth labelling independent directors as "rubber stamps" and Cohen, Frazzini & Malloy calling them "cheerleaders" in support of management's decisions. Hence, the increased managerial optimism and inefficient management of corporate working capital.

Given the mixed evidence on the direction and significance of the relation between board independence and corporate working capital investment, our proposed alternative hypothesis is that board independence significantly affects WCME. As per previous studies on corporate governance, board independence is calculated as the ratio of non-executive board members to the total number of board members (Kyereboah-Coleman, 2008; Zariyawati et al., 2010; Wasiuzzaman & Arumugam, 2013; Kieschnick et al., 2006; Palombini & Nakamura, 2012; Kuan, Li, & Chu, 2011).

2.1.2. Board Size

In general, previous studies lead us to believe that the larger the board size the higher the possibility for lax monitoring of management, and accordingly less efficiency in managing corporate working capital levels (Kieschnick et al., 2006). Yermack, Lipton, and Lorsch assert that a small board of directors is more effective in decision making compared to large ones (as cited in Kyereboah-Coleman, 2008). Kyereboah-Coleman (2008) explains that according to the stewardship theory, small sized boards are more encouraged to promote effective decision making and communication. Furthermore, large boards experience high activity to overcome coordination and processing problems that render decision making difficult, as well as, making it easier for the CEO to control; this is opposite to small boards that reduce the risk of free riders (Kyereboah-Coleman, 2008). Also, Jensen, Lipton, and Lorsch contend that as boards increase in size, emphasis is put on politeness instead of truthfulness. Also, agency problems increase and accordingly the board of directors become just a symbol as opposed to actually performing their monitoring and control duties (as cited in Drobetz and Grüninger, 2007)

There is previous empirical evidence that both supports and negates the logical expectation of a positive relation with corporate working capital levels. Gill and Shah (2012) found that for Canadian firms board size positively impacts corporate cash holdings, thus confirming the expected positive relation with corporate working capital levels. Moreover, Kieschnick et al., 2006 found an insignificant positive relation between board size and CCC in U.S. firms. Similarly, Wasiuzzaman and Arumugam (2013) found an insignificant positive relation with the CCC in Malaysia. Also, Drobetz and Grüninger (2007) found an insignificant positive relationship between board size and corporate cash holdings in Switzerland. Yet, Gill and Biger (2013) found that board size has a significant negative effect on current ratio and CCC. In addition, they report non-significant relationships between board size and multiple working capital components, namely, accounts receivable days, inventory days held, accounts payable days, cash holdings, and CCE. And, unlike the expectations of Zariywati et al. (2010) for Malaysia, they found an

insignificant negative relation between board size and CCC. Also, Kamau and Basweti (2013) found in Kenya an insignificant positive relation with WCME.

Given that most of the previous research, although many with insignificant results, has found a positive relation with working capital investment, our proposed alternative hypothesis is that board size has a significant positive impact on working capital levels. Following previous literature on corporate governance, board size is calculated as the total number of board members at the end of the fiscal year (Gill & Biger, 2013; Kieschnick et al., 2006, Kyereboah-Coleman, 2008; Gill & Shah, 2012; Zariywati et al., 2010; Kuan et al., 2011; etc.).

2.1.3. CEO Duality

The effect of CEO duality on WCME is controversial. On one hand, it is argued that with dual responsibility CEOs cater for the interests of the management team and a mean of doing so is in terms of holding excess corporate liquidity (Dahya & Travlos, 2000). Kyereboah-Coleman (2008) cites that from the key issues of the agency theory is that the CEO does not chair the board to avoid the concentration of power in a single individual. It is argued that when CEO also chairs the board there is conflict of interest and greater agency costs. Jensen argues that lack of independent leadership makes it difficult for boards to take actions against failure of top management (as cited in Kyereboah-Coleman, 2008). Specifically, the conflict of interest of the board's responsibility to exercise due diligence in decision making when selecting, evaluating, and when necessary, replacing the CEO based on performance (Kyereboah-Coleman, 2008). Drobetz and Grüninger (2007) found that in Switzerland CEO duality has a significant positive effect on corporate cash holdings, thus suggesting increased agency problems. Similarly, Gill and Shah (2012) report that for Canadian firms CEO duality has a significant positive effect on corporate cash holdings, which may not be in the shareholders' best interest. They argue that this may be due to managers alleviating pressure to perform well and to allow them to invest in projects based on personal motives.

On the other hand, Kyereboah-Coleman (2008) argues that as per the stewardship theory, CEO duality grants the CEO with the opportunity to take decisions promptly without unnecessary bureaucracy and thus this theory stipulates that the CEO should chair the board. Accordingly, Gill and Biger (2013) contend that CEO duality can improve the efficiency of working capital.

Gill and Biger (2013) study American firms and they reported mixed results on working capital components; they found that CEO duality has a positive effect on accounts receivable days, accounts payable days, and CCE. They also reported non-significant relationships between CEO duality and each of the following: inventory days held, CCC, cash holdings, and current ratio. Ozkan and Ozkan (2004) were unable to detect a significant effect of CEO duality on corporate cash holdings. Also, Kamau and Basweti (2013) found insignificant positive relation with WCME in Kenya.

We measure CEO duality as a dummy explanatory variable, whereby it equals unity when a CEO doubles as chairman and zero otherwise (Kyereboah-Coleman, 2008; Drobetz & Grüninger, 2007; Gill & Biger, 2013; Kuan et al., 2011). We expect a significant positive relationship with working capital investment.

2.1.4. Number of Board Meetings

The effect of the number of board meetings on working capital efficiency is not clear. Some studies contend that board meetings are useful for shareholders' interests, thus increasing their frequency would benefit the firm. Lipton and Lorsch suggest that a main problem faced by directors in performing their duties is lack of time (as cited in Kyereboah-Coleman, 2008). In the same vein, Conger, Finegold, and Lawler propose that directors' time during board meetings is an important resource for carrying out their functions and thus improves their effectiveness (as cited in Kyereboah-Coleman, 2008). Their argument suggests that as board members meet more frequently their effectiveness in performing their job, of which includes formulating policies regarding working capital requirement, improves and thus would result in more efficient WCM. On the contrary, Vafeas and Jensen claim that board meetings are not used for meaningful discussions; it is believed that in board meetings most of the time is consumed in routine tasks and thus limiting members' ability to monitor management (as cited in Kyereboah-Coleman, 2008). Furthermore, Jensen advocates that board meetings should be inactive compared to when there is a corporate crisis (as cited in Kyereboah-Coleman, 2008).

Previous studies have been performed on the effect of board meetings on corporate working capital requirement. Kamau and Basweti (2013) research on listed firms in Kenya found no significant relationship between the number of board meetings and WCME. They note an insignificant negative correlation between the two variables. Similarly, Achchuthan and Rajendran (2013) found that in Srilanka the number of board meeting is not significantly related to WCME.

Although previous empirical evidence shows that the number of board meetings is not a determinant of WCME, yet the fact that it's a key measure of corporate governance makes it plausible to have an influence on WCME in other countries. Accordingly, we test its impact on working capital levels in Europe and expect it to have a significant impact on corporate working capital investment. As per previous literature, the number of board meetings variable is measured as the number of board meetings during the year (Kamau & Basweti, 2013; Achchuthan & Rajendran, 2013; Kyereboah-Coleman, 2008).

2.1.5. Audit Committee Independence

Audit committees function as an internal governance mechanism that work on improving the quality of a company's financial management (Kyereboah-Coleman, 2008). It is important to note that working capital policies are a subset of corporate financial management (Gill & Biger, 2013). Gill and Biger (2013) contend that an independent audit committee improves the efficiency of working capital by auditing its components and thus reduces agency problems and costs.

The effect of audit committee independence on the efficiency of WCM is yet to be tested. However, previous research has been done to test the hypothesized positive impact of audit committee characteristics on corporations. For example, Gill and Biger (2013) tested the impact of audit committee size on WCME and found non-significant relationships with each of accounts receivable days, accounts payable days, CCE, inventory days held, CCC, cash holdings, and current ratio. Kyereboah-Coleman (2008) tested the effect of the size, independence, and activity intensity of audit committees on firm performance and found that audit committee size has a significant positive effect on ROA and Tobin's Q, audit committee independence has insignificant effect on firm performance, and audit committee activity intensity has a significant positive influence on Tobin's Q and none on ROA.

Given the previous literature on the effect of audit committees on corporations, we expect that audit committee independence has a significant negative effect on working capital requirement. We measure independence as the ratio of non-executive board members on the audit committee to total number of audit committee members as stipulated by the company (Kyereboah-Coleman, 2008).

2.1.6. Ownership Concentration

Minimal research has been performed to test the significance of ownership concentration as a determinant of WCM. Palombini and Nakamura (2012) found that in the Brazilian market ownership concentration (a dummy variable that assumes ownership concentration to occur if one investor owned over 20% of the company shares) is not a statistically significant determinant of WCM. Nevertheless, they write that their results show that the nature of the relation between ownership concentration and each of the following: CCC, accounts receivable days, accounts payable days, and inventory days held, is negative, which suggests that companies with large investors can inhibit decisions concerning excess current assets beyond the company's needs. They explain that such findings might be affected by the insufficient public data in Brazil on proxies for management monitoring mechanisms.

Since, ownership concentration, as a dimension of corporate governance, is a key management monitoring mechanism of WCM (Palombini & Nakamura, 2012), we test its impact on corporate working capital levels in the European market. We especially test ownership concentration in our study since we draw data from Europe, where a high average ownership concentration is typical (La Porta, Lopez-De-Silanes, & Shleifer, 1999). Moreover, the fact that insider ownership provides executives with a motive to efficiently operate the company (Tian & Twite, 2011) leads one to expect that ownership concentration will have a significant positive relation with WCME. Also, large shareholders may overcome the free-rider problem of a corporation with many small owners who find it not worth their efforts to absorb the costs of monitoring management; large shareholders would possibly be more encouraged to monitor and thus ensure that managers are aligned with their interests to increase the value of their shares (Shleifer & Vishny, 1986). Additionally, ownership concentration is associated with better

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governance practices, whereby the alignment of insiders and outsiders is improved (Isidro & Raonic, 2012). Consistently, Ferreira and Vilela (2004) found that cash holdings are negatively affected by ownership concentration.

However, ownership concentration may be viewed as a source of agency problems, given that it grants power to those large shareholders who may have the interest to abuse minority shareholders (La Porta et al., 1999). This agency problem applies to certain European countries, where agency problems mainly arise from conflicts between controlling shareholders and minority owners, as opposed to the typical agency problem between shareholders and management (Alimehmeti & Paletta, 2012).

Given, the contradicting ideologies of monitoring and expropriation effect of ownership concentration on the efficiency of firms, we expect ownership concentration to have a significant effect on working capital levels. We measure this variable as the ratio of closely held shares to common shares outstanding (Isidro & Raonic, 2012; Tian & Twite, 2011), whereby closely held shares represents insiders' ownership stake (Leuz, Lins, & Warnock, 2010) that our source, Worldscope database, defines as officers, directors and their immediate families, shares held in trust, shares held by other companies (except shares held in a fiduciary capacity by financial institutions), shares owned by pensions or benefit plans, and shares held by individuals who own more than 5% of shares outstanding (Isidro & Raonic, 2012).

2.2. The Effect of Firm Maturity on WCM

To the best of the author's knowledge, no empirical evidence exists on the effect of firm maturity (defined as the ratio of retained earnings to total assets), on WCME. Given that in previous studies firm age has been used as a proxy of firm maturity (e.g. Julio and Ikenberry (2004) and Hauser and Thornton (2013)), we therefore use the literature regarding the impact of firm age on corporate working capital levels to derive our hypothesis of the significance of retained earnings to total assets ratio (our proxy for firm maturity) as a determinant of WCME.

Previous research tested the significance of firm age (yet it was not necessarily used to proxy firm maturity in some studies) as a determinant of WCM. Chiou et al. (2006) found that firm age, used as a representative variable for growth opportunities, is positively related to working capital requirement. They explain that young firms have greater growth opportunities, and are accordingly keener on managing their capital than older firms with more stable growth; thus, young firms keep their operation related capital and liabilities at low levels, leading to a relatively lower working capital requirement. They further elaborate that older firms have looser management and thus comparatively less efficient WCM than younger firms. In contrast, Wasiuzzaman and Arumugam (2013) found that firm age negatively affects working capital requirement. They assert that young firms need more working capital to sustain their sales growth, yet more mature firms have: less growth opportunities available that otherwise would have required financing, established relationships with customers and suppliers, and acquired

managerial experience in inventory; accordingly, older firms are likely to invest less in working capital.

Other researchers used other measures to gauge the effect of life-cycle stages on WCM. Saddour (2006) on a sample of French firms and using Tobin's Q to proxy growth opportunities found that growth companies hold more cash compared to mature companies. Yet, Salehi (2013) using sales growth, capital expenditure, and dividend payout ratio to proxy firm maturity, found that a firm's stage in the life-cycle affects the amount of working capital it holds; firms in the maturity and decline stages, which inherently have high level of operation, hold high amount of working capital relative to firms in the growth stages.

We gauge firm maturity using the ratio of retained earnings to total assets (RE/TA) as opposed to firm age, since as Bulan and Yan (2010) explain that life-cycle stages are naturally linked to firm age, yet firm age is not the only determinant of a firm's life-cycle stage. They further elaborate that the relationship between life-cycle stages and firm age is not linear and that there is no deterministic pattern of the life-cycle stages as the firm ages (Bulan & Yan, 2010). On the other hand, the RE/TA ratio shows the extent to which a firm is self-financing or dependent on external capital (Lestari, 2012; Deangelo, H., Deangelo, L., & Stulz, 2006). Deangelo et al. (2006) assert that firms with high RE/TA are more likely to be in a more mature stage, while those with low RE/TA tend to be young high-growth firms. Given the mixed literature on the direction of the effect of firm age on working capital requirement, we expect its related firm maturity measurement, namely RE/TA, to have a significant impact on working capital levels.

2.3. The Effect of Control Variables on WCM
2.3.1. Sales Growth

In line with previous literature, we use sales growth to proxy firm's future growth opportunities (Palombini & Nakamura, 2012; Baños-Caballero, García-Teruel, & Martínez-Solano, 2010; Chiou et al., 2006). While this proxy measures past growth, the underlying assumption, as per Scherr and Hulburt, is that firms' previous growth signals future growth (as cited in Baños-Caballero et al., 2010). Previous studies have suggested that sales growth affects working capital levels; Sales growth is expected to impact managerial decisions regarding their policies on inventory levels, accounts receivables, and accounts payable to meet their planned demand levels (Nunn, 1981; Kieschnick et al., 2006; Palombini & Nakamura, 2012). Accordingly it is important that we control for its effect in our study on the factors affecting WCME.

Palombini and Nakamura (2012) found that sales growth negatively affects working capital investment. They suggest that as per the pecking order theory (which according to Myers and Majluf refers to the inclination of firms to rely on internal rather than external funds for financing whereby debt is preferred over equity when in need for external financing) as companies grow their working capital decreases due to their ability to use internal funds to finance their growth. Similarly, Zariyawati et al. (2010) found that in the

Malaysian context, sales growth is inversely related to CCC, suggesting that firms with greater future growth opportunities increase their short term debt to enable them to meet future demand. Moreover, Baños-Caballero et al. (2010) found that firms with more growth opportunities invest less in working capital. On the same line, Valipour, Moradi, and Farsi (2012) using a sample of listed Iranian firms found that there is a negative relation between sales growth and CCC. Also, Hill et al. (2010) assert that as per their expectations, there is significant inverse relation between working capital requirements and lagged sales growth (the authors explain that lagged values are used to mitigate possible endogeneity problems between working capital requirements and sales growth). They show that lagged sales growth provides financing. Their findings are in line with Molina and Preve's (2009) results that sales growth is inversely related to trade credit granted and receivables. Also, that payables are directly correlated with sales growth since suppliers provide more credit with better terms to growing firms (Petersen & Rajan, 1997; Deloof & Jegers, 1999). Similarly, Cunat asserts the same effect yet for a different reason: high-growth firms tend to use trade credit to finance their growth so as to substitute for their difficulty in accessing other sources of finance (as cited in Baños-Caballero et al., 2010).

However, Kieschnick et al. (2006) found a positive relation between sales growth and working capital levels, explaining that firms tend to invest in working capital in anticipation of future sales growth. On the same line, Blazenko and Vandezande (2003) report that inventories are positively related to sales growth, since firms may build up inventory levels in anticipation of future growth opportunities. Also, Appuhami (2008) confirmed the positive relationship of sales growth with working capital requirement.

In between the opposing arguments on the effect of sales growth on WCM, some literature cites inconsistent or insignificant relationship between the variables. Chiou et al. (2006) find inconsistent results for the impact of growth opportunities, whereby firm age and sales growth variables were used as proxies, on each of net liquid balance and working capital requirement. Furthermore, Nazir and Afza (2009) report non-significant relationship between working capital requirements and sales growth. Similarly, Gill and Biger (2013), found non-significant relations between sales growth and each of their studied working capital component, namely, CCC, CCE, accounts payable days, inventory days held, accounts receivable days, current ratio, and cash holdings.

Since there is no clear consensus on the relationship between sales growth and WCM, we expect sales growth to have a significant effect on working capital levels. We measure sales growth as the ratio of the difference between this year's sales and previous year's sales to previous year's sales (Valipour et al., 2012; Deloof, 2003; Nazir & Afza, 2008; Appuhami, 2008; Palombini & Nakamura, 2012; Baños-Caballero et al., 2010; Supatanakornkij, 2014).

2.3.2. Firm Size

The effect of firm size on WCM has received the attention of many authors and most studies suggest that firm size has a significant impact on corporate working capital policy and its characteristics. Accordingly, it is important to control for this variable in a study on the determinants of WCM.

With regards to small firms, previous studies have found that working capital requirement is directly correlated with the size of the firm. Padachi (2006) highlights the importance of WCM in small firms, whose limited access to long-term capital markets lends them to depend on trade credit, short-term bank loans, and owner financing to support their investment in current assets. Petersen and Rajan (1997) also claim that small firms, whose access to capital markets tends to be limited, may be financed by suppliers (trade credit) instead of financial institutions. Following the same suggestion, Hill et al. (2010) found a positive relation between firm size and working capital requirement and interpreted firm size as a representation of the degree of access to capital markets. In the same line of thought, other studies suggested that WCME is significantly affected by firm size. Kieschnick et al. (2006) hypothesized that albeit the significance of the effect of firm size on the efficiency of working capital is certain, its direction is unclear; either larger firms would possibly require more investment in working capital to support their larger sales levels, or they their size may advantage them to build relationships with suppliers that would accordingly reduce their working capital requirements. They also suggest that supply chain management requires a lot of coordination that larger firms are better able to implement than smaller firms. Their study finds that firm size is positively correlated with WCM inefficiency. On the other hand, Opler et al. (1999), Kim et al. (1998), and Drobetz and Grüninger (2007) indicated the inverse relation between firm size and cash holdings, explaining that large firms are in less need to hold cash given their ease of access to capital market financing. And they suggest that small firms should closely monitor their working capital given their limited financing options, which forces them to hold cash.

Other studies showed either mixed results regarding the effect of firm size on the efficiency of WCM or insignificant results. Gill and Biger (2013) found that firm size, a control variable, positively affects the following working capital components: current ratio, cash holdings, and accounts payable days. However, firm size has non-significant relationships with each of accounts receivable days, inventory days held, CCC, and CCE. Also, Palombini and Nakamura (2012) found that company size is negatively related to inventory days held and accounts receivable days, which they interpret to mean that large firms have less working capital levels. Thus, the authors claim that large firms are in less need to build up inventory levels, can more efficiently coordinate their supply chain than smaller firms, and have greater market power. However, they also found that firm size is negatively related to accounts payable days, which they interpret as larger firms being quicker in settling their debts. As for Nazir and Afza (2008 & 2009), they found no evidence of the effect of firm size on WCM. Chiou et al. (2006) found inconsistent results.

Following previous literature, we measure firm size as the natural logarithm of total assets (Kuan et al., 2011; Drobetz & Grüninger, 2007; Saddour, 2006; Chiou et al., 2006; Zariyawati et al., 2010; Supatanakornkij, 2014; Nazir & Afza, 2009; Baños-Caballero et al., 2010). We hypothesize that there is a significant positive relation between firm size and working capital requirements.

2.3.3. Industry Dummy

Previous literature suggests that working capital policies vary across industries. Nunn (1981) showed that industry plays a role in determining working capital practices. Similarly, Hawawini et al. (1986), Filbeck and Krueger (2005), Baños-Caballero et al. (2010), Nazir and Afza (2008 & 2009), amongst others, conclude that there is a significant industry effect on corporate WCM practices. The dependence of WCME on industry has also been shown by Kieschnick et al. (2006).

Despite the rational conviction of the effect of industry practices on WCM, some studies have found no evidence of this effect. Chiou et al. (2006) and Hill et al. (2010) have found industry effect to be insignificant in terms of its impact on WCME.

Accordingly, we control for the impact of industry practices in our study on the factors that affect WCM to capture their effect. We use industry dummies for two sectors, namely, transportation and industrial, whereby it is set to equal 1 if the firm is from the specified sector and 0 otherwise (Baños-Caballero et al., 2010; Nazir & Afza, 2009; Chiou et al., 2006). It is important to note that banking, insurance, utility, and other financial were all filtered out from our sample given the different nature of working capital in those industries. We expect industry effect to be a significant determinant of working capital levels.

2.3.4. Firm Performance

Prior studies found that firm profitability impacts working capital policies. Chiou et al. (2006) expected the negative impact of ROA on working capital levels. The authors' hypothesis was based on the belief that high performing companies have better access to outside capital, which can then be invested in more profitable investments as opposed to keeping as working capital. Moreover, Hyun-Han Shin & Soenen (1998) explain that the higher the company's return the better its WCM, given their market dominance and strong bargaining power with both customers and suppliers. On the same line of thought, Petersen and Rajan (1997) showed that profitable companies receive more trade credit from their suppliers, which accordingly would shorten the CCC for improved WCM. Also, Baños-Caballero et al. (2010) found that for SMEs ROA negatively affects CCC.

However, unlike Chiou et al. (2006) expectation, they found inconsistent results; they found that ROA positively impacts working capital requirement (a proxy for WCM). They explain that firms with excess capital may give less attention towards managing working capital, which would lead to more inventory and accounts receivable levels. At the same time they found a positive relationship with net liquid balance (another proxy for WCM), explaining that better performing companies are inclined to adopt a

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conservative WCM policy, keeping capital for emergencies. Moreover, Nazir and Afza (2008 & 2009) assert a positive impact of ROA on working capital requirement, given that profitable companies are less concerned with the efficiency of managing their working capital. As for Appuhami (2008) and Wasiuzzaman and Arumugam (2013), they report insignificant findings for the effect of company profitability on working capital investment.

Given the previous literature on the influence of firm profitability on working capital levels, we introduce the firm performance variable in our model as a control measure and expect it to have a significant impact on working capital levels. We measure firm performance as total net income before preferred dividends divided by revenues (Gill & Biger, 2013; Kamau & Basweti, 2013).

2.3.5. Leverage

Chiou et al. (2006) found that, as per their expectations, corporate debt ratio is negatively related to working capital requirement. They explain that in line with the pecking order theory explained by Myers, firms are inclined to raise funds internally prior to external sources of finance that entail issuing costs and more outside monitoring and restrictions. Thus, they assert that more debt reflects less internal funds available for operations, which would render the firm more cautious in managing its working capital so as not to worsen its short-term financing position. Also, for high levered firms it is not wise to invest costly funds in working capital, which by essence are of low return (Baños-Caballero et al., 2010). On the same wave length, Palombini and Nakamura (2012) found that leverage is positively related to accounts payable days and negatively related to CCC, working capital requirement, and inventory days held. Many other studies report similar findings on the negative effect of leverage on working capital requirement (e.g. Nazir and Afza (2009), Zariyawati et al. (2010), Nazir and Afza (2008), Wasiuzzaman and Arumugam (2013), and Baños-Caballero et al. (2010)).

Nonetheless, few studies report different findings with regards to the effect of leverage on working capital level. Appuhami (2008) reports a positive, yet insignificant effect of leverage on working capital requirement. Also, Palombini and Nakamura (2012), who although generally reported that leverage negatively impacted working capital requirement, found a positive relation between leverage and one of their measures of WCM, namely, accounts receivable days, suggesting that high debt companies tend to offer high credit terms. Moreover, Supatanakornkij (2014) explains that according to the maturity matching hypothesis, firms work towards matching their loan maturities with their asset maturities. Thus, the author expects that the effect on working capital requirement is negative with long-term debt and positive with short-term debt.

Given that most literature cites a negative effect of leverage on working capital requirement, we hypothesize the same impact. We measure corporate leverage as the ratio of total debt to common shareholders' equity (Kamau & Basweti, 2013).

2.3.6. Country Dummy

Koralun-Bereźnicka (2014b) explains that previous literature has recognized the widely accepted notion of the varying corporate capital structure based on country-specific factors, such as political effects, economic growth, legal and institutional environment, and capital market development (e.g. La Porta, Lopez-De-Silanes, Shleifer, and Vishny (1997) and Booth, Aivazian, Demirguc-Kunt, and Maksimovic (2001)). At the same time, as explained above, corporate financing decisions affect working capital policies. Thus, it is rational to expect that country-specific factors impact corporate working capital levels. Koralun-Bereźnicka (2014b) found that country specific factors majorly affect corporate working capital policies. Similarly, Supatanakornkij's (2014) results showcase that the European variations in WCM are due to both direct and indirect country effects that impact firm-specific working capital determinants. The author defines direct country effects as the real differences between countries and the indirect country effects as varying firm-specific determinants across countries. Also, Koralun-Bereźnicka (2014b) reported the same findings for the significant impact of country-specificity on working capital policy.

In line with earlier studies that found evidence for the impact of country-specific factors on working capital policies, we control for the national characteristics effects in our study on the drivers of WCM. We use country dummies for each of the 20 European countries being sampled, whereby we assign value 1 if the firm belongs to the specified European country and 0 otherwise; each country dummy absorbs the effects which are particular to that country. Based on previous literature, we hypothesize that country-effect has a significant impact on corporate working capital levels.

2.3.7. Payout Ratio

Since working capital characteristics are firm-specific, this study controls for firm-specific effects. And, as per Ferreira and Vilela (2004), the trade-off theory argues that dividend paying firms are able to raise funds at low cost by simply reducing their payout ratio compared to non-dividend paying firms who are forced to raise high cost funds from the capital markets; they expected that dividend paying firms hold less cash than non-dividend paying firms, yet found no evidence to support their hypothesis. Accordingly, we hypothesize that the higher the payout ratio the lower the corporation's working capital levels. We control for payout ratio and measure it as dividends per share divided by earnings per share.

3. Research Contribution

The theoretical and empirical literature is rich with studies concerning long-term financing and investment decisions, yet limited research exists concerning the management of short-term resources (Nazir & Afza, 2009). In addition, previous studies on WCM have mostly concentrated on its impact on firms' profitability and creating shareholders' value (Palombini & Nakamura, 2012). Albeit, WCME is important for smooth operations and increasing shareholders value, the empirical literature on the factors of WCM is sparse (Palombini & Nakamura, 2012). This especially applies on

previous studies on corporate governance as a determinant of WCM (Kieschnick et al., 2006), whereby most of the literature evaluates one or more corporate governance characteristic on a proxy of WCM, precisely on corporate cash holdings.

Given the previous review of literature, it becomes obvious that past research is inconclusive with regards to the significance and the direction of impact of most of the determinants of WCM. Also, that the effect of corporate governance on working capital levels (not only cash holdings) has been country-specific (e.g. Kieschnick et al. (2006) in USA, Palombini and Nakamura (2012) in Brazil, Gill & Biger (2013) in USA, and Kamau & Basweti (2013) in Nairobi, etc.), thus has not been studied on the European region. As for firm maturity, the literature is profuse with its impact on dividend payout policy, yet minimal and inconclusive results on WCME, and none measuring it as the ratio of retained earnings to total assets. Accordingly, this study fills this gap by assessing the impact of corporate governance and firm maturity on WCME using a sample of European companies. Thus, increasing the spread of managerial agency costs across countries, which as per Ferreira and Vilela (2004), is a more important factor of working capital than differences across companies in a given country. Moreover, it can serve as a comparison tool on whether the European region's WCM is influenced by the same factors as those of other countries via elucidating the role of the country setting on WCM. And, the results contribute to literature with regards to the internal factors that improve the efficiency of WCM, thus aiding managers in achieving optimal working capital levels.

III. CONCEPTUAL FRAMEWORK

Figure 1 below presents a graphical conceptual framework of the impact of corporate governance and firm maturity on WCME, whilst using certain control variables.

Figure 1: Conceptual Framework

Independent variables:

Corporate Governance

- CEO Duality
- Board Size
- Board Independence
- Number of Board Meetings
- Audit Committee Independence
- Ownership Concentration

Firm Maturity

- Retained Earnings/ Total Assets

Dependent variables:

WCME

- Accounts Receivable Days
- Accounts Payable Days
- Inventory Days Held
- CCC
- Cash holdings
- Current Ratio
- CCE

Control variables:

- Sales Growth
- Firm Size
- Firm Performance
- Leverage
- Payout Ratio
- Country Dummy
- Industry Dummy

IV. METHODOLOGY

1. Data and Sample Selection

A database was built of 973 European listed companies between 2002 and 2013 (12 periods). Note that the 2001 sales data was needed to compute the sales growth for 2002. The selection of companies was drawn from Thompson Datastream ASSET4 ESG Universe Lists for the European region. ESG ASSET 4 database is a research source with global coverage for environmental, social and governance data that provides history up to 2002 for various regions, sectors, countries, and industries. Concerning Europe (Thomson Reuters code syntax for European region: LA4RGNEU), ESG ASSET 4 (as of 2014) covers for 973 listed companies from 20 European countries drawing back up till the year 2002. Based on Thomson Reuters business classification, the European Region is defined as: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, and United Kingdom. Note that all are EU countries except for: Turkey, Switzerland, and Norway. The availability of corporate governance data from ESG ASSET 4 database underlies our choice of the European firms and years being studied. More explicitly, the analysis of more European firms for a longer time span was sought, yet we were restricted with ESG ASSET4 database coverage. As for WCM component variables, firm maturity, ownership concentration (a proxy for corporate governance), and all control variables, they were obtained from Thompson Datastream.

Out of the 973 listed European companies, 583 firms were usable; in line with previous literature, we eliminated firm-years with missing values, removed utility, banking, insurance, and other financial sectors given the peculiar nature of their working capital structure (Zariyawati et al., 2010; Supatanakornkij, 2014; Kieschnick et al., 2006), as well as, their unique governance issues (Kyereboah-Coleman, 2008), and deleted any outlier values that would have otherwise created noise in our estimates. Accordingly, we obtained an unbalanced panel of 3264 firm-year observations. Our sample covers 20 European countries, namely: United Kingdom, France, Germany, Switzerland, Italy, Sweden, Spain, Netherlands, Belgium, Finland, Denmark, Turkey, Poland, Norway, Austria, Greece, Ireland, Portugal, Czech Republic, and Hungary. Table 1 showcases the firm-year distribution of our sample across the 20 European countries, whereby United Kingdom consumes the bulk of our sample (more than 40% of the total sample) and Czech Republic is the least. As for the industries covered (variable Datastream code "WC06010" for "General Industry Classification"), they are as follows: industrial and transportation, with the industrial sector contributing approximately 90% of the total filtered sample.

Table 1

Country Sample Distribution

583 Listed Non-financial Firms from 20 European Countries, 2002-2013: 3264 Firm-year Observations (unbalanced)

Country	Firm-year observations
United Kingdom	1433
France	361
Switzerland	252
Germany	240
Sweden	141
Netherlands	127
Finland	123
Italy	114
Spain	113
Belgium	69
Ireland	69
Denmark	56
Austria	52
Norway	38
Portugal	27
Turkey	21
Poland	10
Greece	10
Hungary	5
Czech Republic	3
Total	3264

2. Research Method and Description of Variables

This study examines the effect of corporate governance and firm maturity on WCME, whilst controlling for other factors of working capital. Accordingly we employ regression models using panel data from 2002 till 2013 (summarized in Appendix A).

Concerning the dependent variable WCME, following previous literature, we measure it using the CCC (Deloof, 2003; Lazaridis & Tryfonidis, 2006; Palombini & Nakamura, 2012; etc.). CCC is the time lag between the purchase of raw materials and cash collection from selling goods, and it is calculated as the sum of accounts receivable days and inventory days held less accounts payable days. It is a signal for greater working capital requirement the higher its value; thus, the shorter the CCC the more efficient the WCM (Koralun-Bereźnicka, 2014a). It is important to mention that although there are other measures for WCM, such as working capital requirement and net liquid balance proxies (Nazir & Afza, 2009; Chiou et al., 2006) and proxy indices: utilization index,

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performance index, and total efficiency index (Nazir & Afza, 2011), CCC is a standard measure in many previous studies on WCM and in corporate finance textbooks (Kieschnick et al., 2006). Moreover, we employ other proxies for WCME in order to separately explore the effect of the independent variables on each of the working capital components (Palombini & Nakamura, 2012). These proxies are: inventory days held, accounts payable days, accounts receivable days (Palombini & Nakamura, 2012), cash holdings, current ratio, and CCE (Gill & Biger, 2013). Inventory days held is calculated as the product of 365 days and the average of this year's and last year's inventories, divided by cost of goods sold (COGS), whereby the lower its value the better the WCME. Accounts payable days is measured as the product of accounts payable and 365 days divided by COGS; the higher the accounts payable days the better the WCME. The number of days accounts receivable was calculated as 365 days multiplied by the average of last year's and current year's receivables, divided by net sales or revenues. The greater the days of accounts receivable the worse is the company's WCME. Cash holdings is measured as the natural logarithm of cash (in dollar value), whereby the higher its value the worse is the firm in managing its working capital levels. Current ratio is current assets divided by current liabilities; the higher the current ratio the more conservative is the company in managing its working capital through maintaining excess buffer to cover current liabilities, thus the poorer the WCME. It is important to note that generally a low current ratio may either signal poor liquidity position or a lean working capital cycle via adopting efficient management practices; we assume the latter. CCE is the ratio of funds from operations to sales or revenues and it measures the speed by which the firm is able to convert its revenues into cash flow; the higher the CCE the better is the WCME.

As for the explanatory variables, we measure corporate governance using the following proxies: CEO duality, number of board meetings, ownership concentration, board independence, audit committee independence, and board size. CEO duality is a dummy variable that takes the value 1 if the CEO simultaneously serves as the chairman of the board and zero otherwise. Board size is the number of board members on the board at the end of the fiscal year. The number of board meetings variable represents the number of meeting held during the year. Ownership concentration is the ratio of the number of closely held shares to common shares outstanding. Board independence is the ratio of non-executive members to the total number of board members. Audit committee independence is the ratio of non-executives on the committee as stipulated by the company; we were only able to find data for what is stipulated by the company, and we assume that what the firm stipulates is what actually takes place. Moving further, we measure firm maturity as the ratio of retained earnings to total assets, whereby the higher the ratio of RE/TA the more likely that the firm is in a mature stage and vice versa for lower RE/TA.

Regarding the control variables, we measure firm size as the natural logarithm of total assets (in dollar value). We measure sales growth as the ratio of the difference between this year's sales and previous year's sales to previous year's sales. We employ industry dummies for two sectors, namely, transportation and industrial, whereby it is set to equal

1 if the firm is from the specified sector and 0 otherwise. We measure firm profitability as total net income before preferred dividends divided by revenues. We calculate corporate leverage as the ratio of total debt to common shareholders' equity. We also use country dummies for each of the 20 European countries being sampled, whereby we assign value 1 if the firm belongs to the specified European country and 0 otherwise. We measure payout ratio as dividends per share divided by earnings per share. Appendix A portrays the calculations used for each of the dependent, independent and control variables.

We tested the hypothesized effects on WCME using panel data techniques. We tested for pooled ordinary least squares (OLS), panel data with fixed effects (period and cross-section), and panel data with random effects (cross-section random only) using the economic software EViews 8. Using the redundant fixed effects-likelihood ratio and Hausman test for correlated random effects, we were able to decipher the appropriate panel data model for our data.

3. Descriptive Statistics

Summary statistics of all the variables used in our regression analysis are reported in Table 2. Note that, for comparability purposes, we transformed any percentage values into ratios and we also removed any outliers to avoid distortions.

Concerning the dependent variables used in the regression analysis, the sampled firms wait on average 79.5 days to pay their suppliers (median 56.9 days, minimum less than 1 day, and maximum 975.7 days) and they receive payment on sales after an average of 67.9 days (median 63 days, minimum 0 days, and maximum 638 days). It takes them an average of 88.8 to sell inventory (median 63 days, minimum 0 days, and maximum 982 days). The average CCC is 77.1 days (median 65.1 days, minimum -807.7 days, and maximum 834.4 days). One can notice the big range of values for each of accounts receivable days, accounts payable days, inventory days held, and CCC; this suggests that European firms vary widely in their working capital cycle. Also, it seems that for some firms the accounts payable days exceed accounts receivable days and inventory days held, thus the negative CCC for some European companies in our sample (minimum CCC is approximately -808 days). Moving further, the CCE has an equal average and a median of 0.1 (minimum -0.8 and maximum 1.3), thus for the sampled firms every ten dollars of sales, on average, generates one dollar of cash flows. The minimum CCE is -0.81, which is due to the negative funds from operations for some firms in the sample. Similarly cash holdings has an equal mean and median of 5.4 (minimum 1.6 and maximum 7.6). Current ratio is on average 1.5 (median 1.3, minimum 0.2, and maximum 10.4), meaning that on average the sampled firms have 1.5 times current assets to cover their current liabilities.

Regarding the corporate governance measures, our sample has an average and a median of 1 for audit committee independence (maximum 1 and minimum 0.3), showing that most of the sampled firms have their audit committee composed of only non-executive board members. As for board size, on average they are 11 board members (median 10,

maximum 30, and minimum 3). The average and median for CEO duality is approximately zero, thus implying that mostly for the sampled firms their CEO does not simultaneously chair the board. The ratio of non-executive board members has an average and median of 0.8 (maximum 1 and minimum 0.2), thus indicating that concerning the sampled firms, on average for every 5 board members 4 are non-executive ones; this is a high degree of independence. Regarding the number of yearly board meetings, they are on average 9 meetings (median 8, maximum 61, and minimum 2). The median and mean for ownership concentration is 0.2 (maximum 1 and minimum 0), showing that mostly closely held shared do not consume much from the outstanding common shares.

Moving on to the other independent variables, firm maturity is on average 0.2 (maximum 1.6 and minimum -3.1), indicating that relatively young firms make up our sample. Also, some firms in our sample have negative retained earnings (i.e. accumulated deficit), and thus the minimum firm maturity is -3.1. As for the control variables, leverage is on average 0.8 (median 0.6, maximum 29.2, and minimum -20.7) showing that the sampled firms are financed more by equity than debt. For some of the sampled firms they have negative common shareholders' equity; the minimum leverage value is -20.7. As for profitability, the average and median are 0.1 (maximum 2.2 and minimum -1.9), portraying that on average every 10 dollars of sales generate 1 dollar of net income. Yet, for some of the firms in the sample net income is negative, thus the minimum profitability ratio is -1.9. Furthermore, the sampled firms grow in sales, on average, by 10% from year to year (median 0.1, maximum 8.2, and minimum -1), whereby some firms in our sample have negative sales growth (minimum approximately -96%). Concerning firm size, the average and median is 6.7 (maximum 8.6 and minimum 4.9). Finally, the average and median payout ratio is 0.4 (maximum 1 and minimum zero) indicating that on average more than half of a company's earnings are retained.

Table 2
Descriptive Statistics
583 Listed Non-financial Firms from 20 European Countries, 2002-2013: 3264 Firm-year
Observations (unbalanced)

	Mean	Median	Maximum	Minimum	Std. Dev.
Dependent Variables:					
Accounts Payable Days	79.5293	56.8647	975.6818	0.6376	83.6829
Accounts Receivable Days	67.8787	63.0000	638.0000	0.0000	45.6300
Inventories Days Held	88.7577	63.0000	982.0000	0.0000	107.3988
CCC	77.1071	65.0972	834.4449	-807.6818	122.6333
CCE	0.1358	0.1100	1.2721	-0.8051	0.1178
Cash Holdings	5.3656	5.3535	7.5616	1.5798	0.8082
Current Ratio	1.5306	1.3100	10.3500	0.1800	0.9474
Independent Variables:					
Audit Committee Independence	0.9917	1.0000	1.0000	0.2500	0.0557
Board Size	10.5098	10.0000	30.0000	3.0000	3.6588
Dummy CEO Duality	0.1137	0.0000	1.0000	0.0000	0.3175
Board Independence	0.7840	0.8000	1.0000	0.2222	0.1802
Number of Board Meetings	8.6397	8.0000	61.0000	2.0000	3.7543
Ownership Concentration	0.2421	0.1782	0.9896	0.0000	0.2263
Firm Maturity	0.2302	0.2235	1.6421	-3.0953	0.2834
Control Variables:					
Leverage	0.8344	0.5708	29.2479	-20.6812	1.9555
Firm Performance	0.0726	0.0618	2.1084	-1.8621	0.1431
Sales Growth	0.0988	0.0645	8.1791	-0.9596	0.3754
Firm Size	6.7045	6.6464	8.5972	4.9183	0.6463
Payout Ratio	0.3837	0.3819	1.0000	0.0000	0.2370

V. RESULTS

1. Correlation Analysis

Appendix B presents the correlation coefficients for the explanatory variables used in the regression analysis. The highest correlation recorded is between board size and firm size (correlation coefficient equals 0.6). It can be concluded that the multicollinearity problem is not a concern in our analysis.

2. Regression Analysis

To investigate the effect of corporate governance and firm maturity on WCME, we employed regression analysis. The following procedure was applied for all seven regression models. We first estimated pooled OLS regressions. Then we ran the same regressions but with fixed-effects (firm-fixed and time-fixed effects). We compared the results of both the pooled OLS and fixed-effects models. We found that many of the coefficients differed in sign and significance. Next, we ran a redundant fixed effects-likelihood ratio test to check whether the fixed effects are necessary or not. We found that restricting the cross-section and time-fixed effects to zero was not supported by the data and thus a pooled regression could not be employed. Subsequently, we estimated a random effects model (random effects along the cross-sectional dimension) by panel EGLS procedure. Again, the estimated coefficients differed from those of the fixed-effects or pooled regression models. The Hausman test, which compares the fixed and random effects, was then conducted and for all of the seven regression equations the random effects model passes the Hausman test for the unobserved random effects being uncorrelated with the independent variables (Table 3 shows the Hausman test results). Thus, the random effects model, which is by nature more efficient, is also consistent. In Table 3 we report the results from the cross-section random effects regression models only. Note that the dummy variable for Hungary is the omitted variable. Also, it is important to point out that we omitted the industry effect, albeit our initial aim to control for it in the regression models, since after filtering the data for the utility, financial, banking, and insurance sectors only the industrial and transportation sectors were remaining and of which the transportation sector consumed a negligible amount of the filtered sample. Accordingly, it was rational to disregard the industry dummies.

2.1. Corporate Governance
2.1.1. Audit Committee Independence
A moderately significant negative relation was found between the independent variable, audit committee independence, and inventory days held. This finding is consistent with the hypothesized relation, whereby higher independence of the audit committee leads to better WCME; the greater the independence of the audit committee the less inventory days for the European firms, which means less working capital tied. This is in line with Gill and Biger's (2013) assertion that independent members on the audit committee reduce agency costs via auditing the working capital components. As for the other proxy relations for WCME, none were found to be statistically significant.

2.1.2. Board Size

We found consistent results for the effect of board size on WCME. We report a slightly significant positive effect on CCE and a slightly significant negative effect on current ratio. Accordingly, this suggests that increasing the number of members on the board improves WCM and thus no agency problems result from large sized boards; in other words, the greater the number of board members the higher their monitoring effectiveness and this may possibly be interpreted as each additional member adds value to the board through additional governance of top managers. This finding opposes the expected positive impact of board size on working capital levels, yet is in line with Gill and Biger's (2013) result of its negative effect on current ratio and CCC.

2.1.3. CEO Duality

CEO duality was found to have a moderately significant positive impact on accounts receivable days, confirming Gill and Biger's (2013) findings. Also, a slightly significant positive effect was found with cash holdings. This is in line with the agency theory's perspective of CEO duality increasing corporate liquidity given the conflict of interest (Dahya & Travlos, 2000), and with the results of Drobetz and Grüninger (2007) and Gill and Shah (2012). From such findings we can deduce that CEO duality increases working capital investment for corporations in the European region. However, in support of Gill and Biger's (2013) results, we also found a slightly positive effect on accounts payable days, which would act on decreasing the CCC and thus lessening the corporate working capital levels. This is consistent with the stewardship theory on CEO duality streamlining the decision making process and thus improving the efficiency of WCM. It can therefore be interpreted that in the European region having the CEO chairing the board, on one hand, leads to high credit terms and high amount of cash tied up, and on the other hand, long payment terms with suppliers. Thus, inconsistent results were found with regards to the direction of the effect of CEO duality on the efficiency of WCM, which warrant further investigation.

2.1.4. Board Independence

A strongly significant positive impact was found on inventory days held and cash holdings. This negates most of previous literature's argument of increasing non-executives on the board leading to better WCM, and as per the stewardship theory, more stringent monitoring of management. Yet, it is consistent with Opler et al. (1999) and Palombini and Nakamura's (2012) findings of non-executive board members being unable to minimize agency costs and thus their results of increased working capital levels. In line with Wasiuzzaman and Arumugam (2013), our findings support the view of independent board members being ineffective in overseeing management due to the unclear process of electing them in the first place, which renders them just cheerleaders of management's decisions. However, we also found a strongly significant negative relation with accounts receivable days. This is consistent with the results reported in Kieschnick et al. (2006) and Gill et al. (2014) studies, whereby increased board independence shortens the CCC and thus better WCM. Therefore, we were unable to find

consistent results for the direction of the effect of board independence on working capital levels.

2.1.5. Number of Board Meetings

The number of board meetings conducted during the fiscal year were found to have a highly significant negative impact on CCE. Albeit the coefficient of the number of board meetings variable is not significantly different from zero, yet its negative sign suggests that increasing the frequency of board meetings hinders the effectiveness of board members in formulating working capital policies. This finding supports the belief of board meetings not being used for meaningful discussions and that they are mostly consumed in routine tasks that hamper monitoring of management (Kyereboah-Coleman, 2008).

2.1.6. Ownership Concentration

We report insignificant results of ownership concentration being a determinant factor of WCME in the European region; none of the proxies for WCM were found to be affected by ownership concentration. This is consistent with Palombini and Nakamura's (2012) results for the Brazilian market.

This finding is open to several interpretations. A possible explanation may lie in our proxy for ownership concentration causing measurement error. In other studies (such as Pedersen and Thomsen (1997) and Siqueira (1998) (as cited in Palombini & Nakamura, 2012)) ownership concentration was measured as a dummy variable that takes the value 1 when a single investor owned more than 20% of the company shares and zero otherwise. Also the fact that our descriptive statistics shows that the average ownership concentration is 0.2 brings doubt given La Porta et al. (1999) referencing that ownership is heavily concentrated for many European countries; yet this may be due to the time gap between this study's data and that of La Porta et al. (1999) or the fact that most of our sample mainly comes from United Kingdom and the industrial sector. Another possible interpretation is that management monitoring by large investors may in fact be an irrelevant factor of working capital levels in European firms.

2.2. Firm Maturity

A strongly significant positive effect was found on CCE, suggesting that more mature firms are better able in managing their working capital levels. This supports Wasiuzzaman and Arumugam (2013) results of the impact of firm age, which was used to proxy firm maturity, on working capital investment; more mature firms have less growth opportunities, have built relationships with customers and suppliers, and have gained experience in managing their inventory levels, all of which enable it to more efficiently manage its working capital policy. However, we also found a slightly significant positive impact on cash holdings and a strongly significant positive effect on current ratio, which negates our results concerning the effect of firm maturity on the other proxy of WCM (i.e. CCE). Yet, the positive effect on cash holdings and current ratio is in line with Chiou et al. (2006), who explained that a positive impact of firm age on working capital

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requirement is mainly due to the greater growth opportunities and tighter management that young firms possess and which render them avid for managing their working capital levels. Although this study aimed at gauging the impact of firm maturity on WCME, yet our results regarding the direction of its effect were inconclusive.

2.3. Control Variables

A few of the country dummies that have been added in our regression analysis to control for the national characteristics effect, were significant. A moderately significant positive effect on CCE was found for Czech Republic. Also, a moderately significant negative effect on cash holdings was found for Greece and Italy. In addition, for Italy a slightly significant positive effect on accounts payable days was also found. As for Portugal and Spain a slightly significant negative effect was found on current ratio, and also for Portugal a strongly significant negative effect on cash holdings was part of the regression results. Accordingly, we can deduce that for Czech Republic, Greece, Italy, Portugal, and Spain there are country-level effects. Specifically, companies operating in Czech Republic, Greece, Italy, Portugal, and Spain have more efficient management of working capital levels. Moving further through the results, leverage was found to have a moderately significant positive impact on CCC and accounts receivable days. This is contrary to our expectations that, according to the pecking order theory, highly leveraged firms have less internal funds available and thus would be more cautious in managing their working capital levels. A possible interpretation would be in the way we measured leverage using total debt as opposed to long-term debt only (for example, Appuhami (2008) measured leverage as the ratio of total long-term debt to equity and Palombini and Nakamura (2012) used long-term debt to total assets ratio); Supatanakornkij (2014) suggested that based on the maturity matching hypothesis, long-term debt negatively affects working capital requirement, yet short-term debt positively affects it. So perhaps most of the sample's debt values were of short-term nature. As for the effect of payout ratio, as expected, we found a highly significant negative effect with current ratio, indicating that the greater the portion of a firm's earnings paid out as dividends the better its management of working capital levels. This is in line with Ferreira and Vilela (2004) rationale of dividend paying firms needing less liquid assets to be tied up as they have the luxury of reducing their dividends to raise low cost funds. Concerning the impact of profitability on working capital investment, we found the following: a strongly significant positive effect on current ratio and CCE, a highly significant negative effect with CCC, and a slightly significant positive impact on accounts payable days. All of the findings, except the one which measures the impact on current ratio, of firm profitability as a determining factor of WCM signal that the more profitable the firm the better its management of its working capital investment. Our findings support Chiou et al. (2006) hypothesis of more profitable firms having better access to outside capital to be invested in profitable investments instead of locking in low return working capital investment. As well as, Baños-Caballero et al. (2010) and Petersen and Rajan's (1997) findings. Our results also support Hyun-Han Shin & Soenen's (1998) explanation of profitable firms dominating markets and being in a good stance when bargaining with customers and

suppliers, thus leading to better management of working capital. Yet, we also find that profitable firms have more conservative working capital policies, given the positive effect of firm performance on current ratio. This may lead to too much liquid assets being tied in low return investments. Moving further to the effect of sales growth, a strongly significant negative impact was found on accounts receivable days, inventory days held, and CCC. Also, a strongly significant positive effect was found on CCE and a moderately significant negative impact on current ratio. These results show that the higher a firm's sales growth the better its management of working capital. Such results are in line with many previous studies (e.g. Palombini and Nakamura (2012), Zariyawati et al. (2010), Baños-Caballero et al. (2010), Hill et al. (2010), Valipour et al. (2012), Petersen and Rajan (1997), and Deloof and Jegers (1999), etc.), and they similarly infer that high growth firms need less working capital to be tied up given the availability of internal funds to finance their growth. As for the impact of firm size, it has a strongly significant positive effect on accounts receivable days and cash holdings, and a strongly significant negative impact on current ratio. The positive impact on accounts receivable days and cash holdings indicate that large firms work with higher receivable terms and hold greater cash levels, respectively. Our findings partially support Kieschnick et al.'s (2006) findings that larger firms need to invest more in working capital to back up their higher sales levels. Yet, the effect of firm size on current ratio negates this explanation and suggests that, as per Kieschnick et al.'s (2006) hypothesis of firm size as a factor of WCM, a firm's size enables it to establish relationships with suppliers and to better manage its supply chain with its better coordination potential. Thus, the larger the firm the leaner its working capital cycle. The latter suggestion of the effect of firm size on WCME (namely, current ratio) is in line with the findings of Opler et al. (1999), Kim et al. (1998), and Drobetz and Grüninger (2007) on cash holdings being inversely related with firm size. Accordingly our mixed findings, as per Gill and Biger (2013) and Palombini and Nakamura's (2012) studies, lead us with inconclusive conclusions regarding the effect of firm size on WCME. A summary of this study's hypothesis against its findings is tabulated in Appendix C.

Table 3
Regression Results
Panel EGLS (Cross-section random effects) for the effect of Corporate Governance and Firm Maturity on WCME
583 Listed Non-financial Firms from 20 European Countries, 2002-2013: 3264 Firm-year Observations (unbalanced)

Regression Equation	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Accounts Receivable Days	Accounts Payable Days	Inventory Days Held	CCC	CCE	Current Ratio	Cash Holdings
Constant	46.547	56.174	99.725	108.228	0.214	4.474	-0.540
	(1.46)	(0.94)	(1.29)	(1.21)	(3.01)***	(6.86)***	(-1.33)
Audit Committee Independence	-5.184	-15.171	-28.387	-18.032	-0.007	-0.136	-0.057
	(-0.85)	(-1.03)	(-2.17)**	(-0.93)	(-0.31)	(-0.72)	(-0.43)
Board Size	0.314	0.517	-0.151	-0.345	0.001	-0.011	0.005
	(1.50)	(1.06)	(-0.33)	(-0.53)	(1.75)*	(-1.77)*	(1.16)
Dummy CEO Duality	3.474	6.122	0.042	-3.462	-0.004	0.065	0.056
	(2.50)**	(1.83)*	(0.01)	(-0.79)	(-0.78)	(1.52)	(1.87)*
Board Independence	-11.358	8.612	27.500	2.969	-0.020	-0.005	0.266
	(-2.68)***	(0.85)	(3.01)***	(0.22)	(-1.35)	(-0.04)	(3.00)***
Number of Board Meetings	0.171	-0.062	0.467	0.601	-0.002	-0.004	0.001
	(1.46)	(-0.22)	(1.85)	(1.63)	(-4.85)***	(-1.00)	(0.50)
Ownership Concentration	0.862	-6.077	3.034	11.091	-0.001	-0.061	-0.072
	(0.33)	(-0.99)	(0.54)	(1.35)	(-0.16)	(-0.79)	(-1.37)
Firm Maturity	-1.587	-5.434	2.560	7.927	0.030	0.315	0.075
	(-0.80)	(-1.16)	(0.60)	(1.27)	(4.45)***	(5.36)***	(1.89)*
Leverage	0.369	-0.160	0.531	0.990	0.000	-0.006	0.001
	(2.42)**	(-0.43)	(1.63)	(2.04)**	(-0.35)	(-1.29)	(0.27)
Payout Ratio	0.497	-1.746	-2.819	-2.269	0.002	-0.150	-0.049
	(0.30)	(-0.44)	(-0.80)	(-0.44)	(0.26)	(-2.96)***	(-1.39)
Firm Performance	-2.119	12.549	-11.919	-25.849	0.247	0.383	-0.026
	(-0.86)	(2.11)**	(-2.25)	(-3.29)***	(28.20)***	(4.98)***	(-0.48)
Sales Growth	-5.752	0.053	-6.813	-12.255	0.024	-0.061	0.015
	(-7.50)***	(0.03)	(-4.15)***	(-5.04)***	(8.70)***	(-2.53)**	(0.91)

Table 3 (continued)

Regression Equation	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Accounts Receivable Days	Accounts Payable Days	Inventory Days Held	CCC	CCE	Current Ratio	Cash Holdings
Firm Size	5.910	6.090	5.450	3.046	-0.006	-0.291	0.865
	(3.18)***	(1.52)	(1.32)	(0.54)	(-1.17)	(-6.21)***	(28.78)***
Dummy Austria	-12.403	5.019	-67.669	-84.207	-0.057	-0.776	-0.393
	(-0.39)	(0.09)	(-0.86)	(-0.96)	(-0.87)	(-1.29)	(-1.08)
Dummy Belgium	-12.722	-19.184	-60.129	-52.487	-0.041	-0.863	-0.262
	(-0.41)	(-0.34)	(-0.78)	(-0.62)	(-0.64)	(-1.47)	(-0.74)
Dummy Czech Republic	23.877	-22.390	-124.826	-77.815	0.212	0.168	0.185
	(0.48)	(-0.25)	(-1.01)	(-0.57)	(2.09)**	(0.18)	(0.33)
Dummy Denmark	-3.363	-16.151	1.081	14.654	-0.022	-0.801	-0.143
	(-0.11)	(-0.29)	(0.01)	(0.17)	(-0.35)	(-1.37)	(-0.40)
Dummy Finland	-5.277	-41.337	-32.462	3.793	-0.081	-0.745	-0.226
	(-0.17)	(-0.76)	(-0.43)	(0.05)	(-1.30)	(-1.30)	(-0.65)
Dummy France	24.258	17.094	-35.376	-25.997	-0.033	-0.745	-0.100
	(0.83)	(0.32)	(-0.49)	(-0.32)	(-0.55)	(-1.34)	(-0.29)
Dummy Germany	-6.177	-27.542	-60.148	-37.423	-0.063	-0.582	-0.019
	(-0.21)	(-0.52)	(-0.83)	(-0.46)	(-1.04)	(-1.04)	(-0.06)
Dummy Greece	-50.190	-51.916	-83.188	-80.179	-0.049	-0.888	-0.971
	(-1.35)	(-0.78)	(-0.90)	(-0.78)	(-0.65)	(-1.26)	(-2.27)**
Dummy Ireland	-30.765	-7.570	-63.703	-87.458	-0.001	-0.696	0.105
	(-0.98)	(-0.13)	(-0.82)	(-1.01)	(-0.02)	(-1.17)	(0.29)
Dummy Italy	17.775	103.067	-48.004	-132.188	-0.027	-0.796	-0.762
	(0.59)	(1.90)*	(-0.64)	(-1.60)	(-0.43)	(-1.39)	(-2.20)**
Dummy Netherlands	-8.927	-27.390	-53.667	-36.294	-0.045	-0.718	0.101
	(-0.30)	(-0.51)	(-0.73)	(-0.44)	(-0.72)	(-1.26)	(0.30)

Table 3 (continued)

Regression Equation	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Accounts Receivable Days	Accounts Payable Days	Inventory Days Held	CCC	CCE	Current Ratio	Cash Holdings
Dummy Norway	-6.264	-49.152	-81.956	-37.464	-0.008	-0.583	0.008
	(-0.20)	(-0.86)	(-1.05)	(-0.43)	(-0.13)	(-0.97)	(0.02)
Dummy Poland	-0.921	-24.738	-79.389	-54.986	-0.086	-0.621	-0.195
	(-0.03)	(-0.41)	(-0.96)	(-0.60)	(-1.24)	(-0.97)	(-0.50)
Dummy Portugal	-41.689	-30.598	-84.179	-94.825	-0.069	-1.197	-1.142
	(-1.22)	(-0.50)	(-1.00)	(-1.01)	(-0.98)	(-1.86)*	(-2.92)***
Dummy Spain	22.907	60.691	-49.348	-84.862	-0.025	-0.972	-0.254
	(0.76)	(1.12)	(-0.66)	(-1.03)	(-0.41)	(-1.70)*	(-0.73)
Dummy Sweden	-4.831	-43.647	-44.656	-4.365	-0.041	-0.778	-0.247
	(-0.16)	(-0.81)	(-0.61)	(-0.05)	(-0.66)	(-1.37)	(-0.72)
Dummy Switzerland	-8.703	-24.759	-16.273	0.686	-0.041	-0.140	0.140
	(-0.29)	(-0.46)	(-0.22)	(0.01)	(-0.67)	(-0.25)	(0.41)
Dummy Turkey	-15.716	-43.336	-81.565	-53.105	-0.042	-0.587	-0.414
	(-0.48)	(-0.73)	(-1.00)	(-0.59)	(-0.61)	(-0.94)	(-1.09)
Dummy United Kingdom	-18.736	-18.417	-43.308	-43.869	-0.029	-0.771	-0.024
	(-0.64)	(-0.35)	(-0.60)	(-0.55)	(-0.48)	(-1.39)	(-0.07)
Hausman Test for Random Effects (Chi-Square)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman Test for Random Effects (p-values)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Durbin-Watson (DW) test	1.141	1.456	1.026	1.282	1.746	1.454	1.502
R-squared	0.058	0.041	0.020	0.028	0.255	0.054	0.293
Adjusted R-squared	0.049	0.032	0.011	0.018	0.247	0.045	0.286

Note: For the seven regression models the dependent variables are accounts receivable days, accounts payable days, inventory days held, CCC, CCE, current ratio, and cash holdings, respectively. All variables are defined in Appendix A. t-statistics are reported within parenthesis, whereby *** represents significant at 1% level, ** represents significant at 5% level, * represents significant at 10% level. Hungary is the omitted variable in all regressions.

VI. CONCLUSION

This study contributes to the literature pertaining to the determinants of WCME via assessing the impact of each of firm maturity and corporate governance variables on CCC and other characteristics of WCME. The desire to study the efficiency of managing working capital springs from its importance, to the extent that it may determine the fate of a firm; working capital policies affect firms' solvency, liquidity, and profitability and as evidenced from real experience: poor management of working capital contributed to Kmart's bankruptcy (Kieschnick et al., 2006). After reviewing the existing literature, we found that most researchers have explored the factors of working capital on individual country basis as opposed to regional coverage, and none measuring the impact of corporate governance and firm maturity on the European region as a whole. Also, most of these studies explored cash holdings in specific instead of other characteristics of WCME. Moreover, few studies have investigated the effect of corporate governance and firm maturity on working capital levels. From the analysis of 583 listed European firms from the period 2002 to 2013, the empirical results support the argument that corporate governance (except for the ownership concentration proxy) and firm maturity do in fact influence WCME in the European region. The results also confirm that the determinants used as control variables are indeed factors of corporate working capital investment, with the exception of a number of country dummies. However, our results do not necessarily show the direction of the impact for all the factors assessed. More specifically, we found inconsistent results for the effect of the following: board independence, CEO duality, firm maturity, and firm size on WCME. As for board size, audit committee independence, firm performance, sales growth, and payout ratio all improve the management of working capital levels. And the number of board meetings and leverage worsen the WCM situation. The evidence found suggests that monitoring of management aids in striking an optimal working capital balance, as well as, managers themselves considering firm-specific (internal) factors in order to more efficiently manage working capital levels.

This study found a few limitations that may be addressed in future research. We suggest alternative means of controlling the effect of the industry sector on WCM. Also, incorporating external factors (such as economic activity) as control variables would further enhance estimations. Moreover, we suggest adding proxies for managerial incentives and disciplinary mechanisms as part of the corporate governance characteristics, in spite of the limitations of corporate governance data. Finally, for more robust results, one can only use long-term debt in the leverage ratio, as explained above, to control for the impact of debt on working capital levels, as well as, use other proxies for ownership concentration.

VII. RECOMMENDATIONS

Our results lead us to conclude that for better management of WCME a firm should increase its board size, audit committee independence, payout ratio, profitability, and sales growth. As well as, decrease the number of board meetings and leverage. Moreover, operating in one of the following countries: Czech Republic, Greece, Italy, Portugal, and Spain, leads to more efficient management of working capital levels. However, with regards to ownership concentration, it seems to be an unrelated factor of WCME. Finally, we are unable to conclude what the effect of each of the following: CEO duality, board independence, firm maturity, and firm size, on WCME, given their inconclusive effects on the WCM characteristics.

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Regression Equations and Description of Variables

Regression Equations

$AR_{i,t} = \alpha + \beta_1 CD_{i,t} + \beta_2 BS_{i,t} + \beta_3 BI_{i,t} + \beta_4 BM_{i,t} + \beta_5 ACI_{i,t} + \beta_6 OC_{i,t} + \beta_7 FM + \beta_8 SG_{i,t} + \beta_9 FS_{i,t} + \beta_{10} FP_{i,t} + \beta_{11} L_{i,t} + \beta_{12} P_{i,t} + \sum_{i=1}^{19} \alpha_i C_{i,t} + \mu_{i,t}$

$INV_{i,t} = \alpha + \beta_1 CD_{i,t} + \beta_2 BS_{i,t} + \beta_3 BI_{i,t} + \beta_4 BM_{i,t} + \beta_5 ACI_{i,t} + \beta_6 OC_{i,t} + \beta_7 FM + \beta_8 SG_{i,t} + \beta_9 FS_{i,t} + \beta_{10} FP_{i,t} + \beta_{11} L_{i,t} + \beta_{12} P_{i,t} + \sum_{i=1}^{19} \alpha_i C_{i,t} + \mu_{i,t}$

$AP_{i,t} = \alpha + \beta_1 CD_{i,t} + \beta_2 BS_{i,t} + \beta_3 BI_{i,t} + \beta_4 BM_{i,t} + \beta_5 ACI_{i,t} + \beta_6 OC_{i,t} + \beta_7 FM + \beta_8 SG_{i,t} + \beta_9 FS_{i,t} + \beta_{10} FP_{i,t} + \beta_{11} L_{i,t} + \beta_{12} P_{i,t} + \sum_{i=1}^{19} \alpha_i C_{i,t} + \mu_{i,t}$

$CCC_{i,t} = \alpha + \beta_1 CD_{i,t} + \beta_2 BS_{i,t} + \beta_3 BI_{i,t} + \beta_4 BM_{i,t} + \beta_5 ACI_{i,t} + \beta_6 OC_{i,t} + \beta_7 FM + \beta_8 SG_{i,t} + \beta_9 FS_{i,t} + \beta_{10} FP_{i,t} + \beta_{11} L_{i,t} + \beta_{12} P_{i,t} + \sum_{i=1}^{19} \alpha_i C_{i,t} + \mu_{i,t}$

$CH_{i,t} = \alpha + \beta_1 CD_{i,t} + \beta_2 BS_{i,t} + \beta_3 BI_{i,t} + \beta_4 BM_{i,t} + \beta_5 ACI_{i,t} + \beta_6 OC_{i,t} + \beta_7 FM + \beta_8 SG_{i,t} + \beta_9 FS_{i,t} + \beta_{10} FP_{i,t} + \beta_{11} L_{i,t} + \beta_{12} P_{i,t} + \sum_{i=1}^{19} \alpha_i C_{i,t} + \mu_{i,t}$

$CR_{i,t} = \alpha + \beta_1 CD_{i,t} + \beta_2 BS_{i,t} + \beta_3 BI_{i,t} + \beta_4 BM_{i,t} + \beta_5 ACI_{i,t} + \beta_6 OC_{i,t} + \beta_7 FM + \beta_8 SG_{i,t} + \beta_9 FS_{i,t} + \beta_{10} FP_{i,t} + \beta_{11} L_{i,t} + \beta_{12} P_{i,t} + \sum_{i=1}^{19} \alpha_i C_{i,t} + \mu_{i,t}$

$CCE_{i,t} = \alpha + \beta_1 CD_{i,t} + \beta_2 BS_{i,t} + \beta_3 BI_{i,t} + \beta_4 BM_{i,t} + \beta_5 ACI_{i,t} + \beta_6 OC_{i,t} + \beta_7 FM + \beta_8 SG_{i,t} + \beta_9 FS_{i,t} + \beta_{10} FP_{i,t} + \beta_{11} L_{i,t} + \beta_{12} P_{i,t} + \sum_{i=1}^{19} \alpha_i C_{i,t} + \mu_{i,t}$

where i = 1, 2, 3,…, n (number of firms) and t = 1, 2, 3, …, T (number of years).

Dependent Variables	***Measurement***
Accounts Receivable Days ($AR_{i,t}$)	365 / (Net Sales or Revenues / Average of Last Year's and Current Year's Receivables)
Accounts Payable Days ($AP_{i,t}$)	365/ (Cost of Goods Sold/ Accounts Payable)
Inventory Days held ($INV_{i,t}$)	365 / (Cost of Goods Sold (excluding Depreciation) / (Average of Last Year's and Current Year's Inventories)
Cash Conversion Cycle ($CCC_{i,t}$)	Accounts Receivable Days + Inventory Days Held – Accounts Payable Days
Cash holdings ($CH_{i,t}$)	Log of Cash
Current Ratio ($CR_{i,t}$)	Total Current Assets / Total Current Liabilities
Cash Conversion Efficiency ($CCE_{i,t}$)	Funds from Operations / Net Sales or Revenues

Independent (explanatory) variables	
CEO Duality ($CD_{i,t}$)	Assigned value 1 if the CEO simultaneously chairs the board and 0 for otherwise
Board Size ($BS_{i,t}$)	The total number of board members at the end of the fiscal year
Board Independence ($BI_{i,t}$)	The ratio of non-executive board members to total number of board members
Number of Board Meetings ($BM_{i,t}$)	The number of board meetings during the year

Regression Equations and Description of Variables

Audit Committee Independence (ACI $_{i,t}$)	The ratio of non-executive board members on the audit committee to total audit committee members as stipulated by the company
Ownership Concentration (OC $_{i,t}$)	Number of Closely Held Shares / Common Shares Outstanding
Firm Maturity (FM $_{i,t}$)	Retained Earnings/ Total Assets
Control Variables	
Sales Growth (SG $_{i,t}$)	(Current Year Sales – Previous Year Sales) / Previous Year Sales
Firm Size (FS $_{i,t}$)	Log of Total Assets
Firm Performance (FP $_{i,t}$)	Net Income Before Preferred Dividends / Revenue
Leverage (L $_{i,t}$)	Total Debt/ Common shareholders' equity
Payout Ratio (P $_{i,t}$)	Dividends Per Share / Earnings Per Share
Industry Dummy (I $_{i,t}$)	Assigned value 1 if the company is from the specified Industry and 0 for otherwise
Country Dummy (C $_{i,t}$)	Assigned value 1 if the company is from the specified country and 0 for otherwise

Notes: $\mu_{i,t}$ - the error term; Industry Dummy has been omitted, since only two industries were left after filtering the data; Dummy for Hungary is the omitted variable in all regressions.

Appendix B

Correlation Analysis
583 Listed Non-financial Firms from 20 European Countries, 2002-2013: 3264 Firm-year Observations

	Audit Committee Independence	Board Size	Leverage	Dummy CEO Duality	Firm Maturity	Board Independence	Board Meetings	Ownership Concentration	Payout Ratio	Profit Margin	Sales Growth	Firm Size
Audit Committee Independence	1											
Board Size	0.0177	1										
Leverage	0.0001	0.0915	1									
Dummy CEO Duality	-0.0787	0.1973	0.0367	1								
Firm Maturity	-0.0316	-0.0636	-0.1322	-0.0700	1							
Board Independence	0.0031	0.2319	0.0008	0.0474	-0.0322	1						
Number of Board Meetings	0.0190	-0.1306	0.0445	-0.0284	-0.0548	-0.0867	1					
Ownership Concentration	-0.0739	0.2003	0.0518	0.1088	-0.0640	0.1778	-0.0313	1				
Payout Ratio	-0.0040	0.0215	-0.0126	0.0023	0.1015	-0.0315	-0.0323	-0.0834	1			
Profit Margin	-0.0175	-0.0411	-0.0402	-0.0203	0.3515	-0.0280	-0.1118	-0.0167	0.0724	1		
Sales Growth	0.0087	-0.0294	0.0109	0.0081	-0.0083	-0.0315	-0.0130	-0.0052	-0.0594	0.0630	1	
Firm Size	-0.0150	0.5716	0.1292	0.1689	0.0076	0.3788	-0.0448	0.0271	0.0271	-0.0119	0.0102	1

Appendix C

Summary of Hypothesis and Results

		Proxies for the dependent variable WCME						
		Accounts Receivable Days	Accounts Payable Days	Inventory Days Held	CCC	CCE	Current Ratio	Cash Holdings
Independent variables								
Audit Committee Independence	Hypothesis	-	+	-	-	+	-	-
	Result	Insignificant	Insignificant	-	Insignificant	Insignificant	Insignificant	Insignificant
Board Size	Hypothesis	+	-	+	+	-	+	+
	Result	Insignificant	Insignificant	Insignificant	Insignificant	+	-	Insignificant
Dummy CEO Duality	Hypothesis	+	-	+	+	-	+	+
	Result	+	+	Insignificant	Insignificant	Insignificant	Insignificant	+
Board Independence	Hypothesis	Significant	Significant	Significant	Significant	Significant	Significant	Significant
	Result	-	Insignificant	+	Insignificant	Insignificant	Insignificant	+
Number of Board Meetings	Hypothesis	Significant	Significant	Significant	Significant	Significant	Significant	Significant
	Result	Insignificant	Insignificant	Insignificant	Insignificant	-	Insignificant	Insignificant
Ownership Concentration	Hypothesis	Significant	Significant	Significant	Significant	Significant	Significant	Significant
	Result	Insignificant results for all WCME measures						
Firm Maturity	Hypothesis	Significant	Significant	Significant	Significant	Significant	Significant	Significant
	Result	Insignificant	Insignificant	Insignificant	Insignificant	+	+	+

Appendix C (continued)

Summary of Hypothesis and Results

Control variables								
Payout Ratio	Hypothesis	-	+	-	-	+	-	-
	Result	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	-	Insignificant
Firm Performance	Hypothesis	Significant	Significant	Significant	Significant	Significant	Significant	Significant
	Result	Insignificant	+	Insignificant	-	+	+	Insignificant
Sales Growth	Hypothesis	Significant	Significant	Significant	Significant	Significant	Significant	Significant
	Result	-	Insignificant	-	-	+	-	Insignificant
Firm Size	Hypothesis	+	-	+	+	-	-	+
	Result	+	Insignificant	Insignificant	Insignificant	Insignificant	-	+
Leverage	Hypothesis	-	+	-	-	+	+	-
	Result	+	Insignificant	Insignificant	+	Insignificant	Insignificant	Insignificant
Country Dummy	Hypothesis	Significant	Significant	Significant	Significant	Significant	Significant	Significant
	Result	Insignificant	Italy +	Insignificant	Insignificant	Czech Republic +	Portugal & Spain -	Greece, Italy & Portugal -
Industry Dummy	Hypothesis	Significant	Significant	Significant	Significant	Significant	Significant	Significant
	Result				Omitted			

Note:
We omitted the industry effect, although we initially aimed to control for it in the regression models. After filtering the data for the utility, financial, banking, and insurance sectors, only the industrial and transportation sectors were remaining and of which the transportation sector consumed a negligible amount of the filtered sample. Accordingly, it was rational to disregard the industry dummies.