2020

Working Capital Management and Economic Policy Uncertainty

Jacob Kplorla Tandoh
South Dakota State University

WORKING CAPITAL MANAGEMENT AND ECONOMIC POLICY UNCERTAINTY

BY

JACOB KPLORLA TANDOH

A thesis submitted in partial fulfillment of the requirement for the degree

Master of Science

Major in Economics

South Dakota State University

2020

THESIS ACCEPTANCE PAGE

Jacob Kplorla Tandoh

This thesis is approved as a creditable and independent investigation by a candidate for the master's degree and is acceptable for meeting the thesis requirements for this degree. Acceptance of this does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

Nacasius Ujah

Advisor Date

Eluned Jones

Department Head Date

Dean, Graduate School Date

ACKNOWLEDGMENT

I am very grateful for the unmerited favor, love, and grace God Almighty has shown me throughout the beginning of this project work. My deepest gratitude goes to my mother, Cecilia Fianu, my siblings, and friends for their love, guidance, and support they gave me throughout my stay in the NESS school of Management and Economics.

My sincere appreciation also goes to my supervisor, Dr. Nacasius Ujah, for his tremendous directions, advice, support, and, most of all, encouragement given me throughput my project work writings. My in-depth gratitude goes to the rest of my committee members, Prof. Joseph Santos and Dr. Keay Myoung-Jin, for their profound comments and service. I am also grateful for the opportunity to study at South Dakota State University and the financial support I received from Prof. Eluned Jones and the NESS school of Economics and Management.

Finally, I wish to express my appreciation to Rhoda Glover-Loo and Jennifer Obeng for making time to proofread and sharing their opinion on my work. I am very grateful for their time and support.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

WORKING CAPITAL MANAGEMENT AND ECONOMIC POLICY UNCERTAINTY

JACOB KPLORLA TANDOH

2020

In the aftermath of the financial crisis, Ernst and Young (2009) working capital report note that the leading 2,000 corporations in the US and Europe can extract an up to US$1 trillion if they manage their working capital efficiently. While the existing literature documents the effects of working capital management on firm performance, there is a dearth of research between economic uncertainty and working capital management. We attempt to fill this gap by examining the effect of the economic policy uncertainty on firms' ability to manage their working capital. For this study, with over 80,000 US firm-year observation over the period 1996 through 2016, we document the following. A consistent negative association between economic uncertainty and working capital management. Economically, we interpret the result that, economic uncertainty leads firms to pursue aggressive working capital management, leading to a fourteen days improvement in working capital.

Keywords: Working capital management, Economic policy uncertainty, Financial crisis.

CHAPTER ONE

INTRODUCTION

1.1 Background

The challenges induced by Economic Policy Uncertainty (hereafter EPU) do affect corporate decision making. One of the areas is Working Capital Management (hereafter WCM), where managers intensify efforts to free up capital as the increasing cost of funds may be on the horizon. By freeing capital, we refer to the strategic decisions for internal funding, as relying on external funds in times of uncertainty can lead to additional extra cost that affects their competitiveness in the long run. Ernst and Young's (2009) working capital report note that, the leading 2,000 corporations in the US and Europe can extract up to US$1 trillion if they manage their working capital efficiently.

Froot et al. (1993) argued that firms prefer internal funds relative to external funds. Also, Wang et al. (2014) established that the use of internal funds mitigates the adverse effect of EPU on investment activities. Instead of external financing, firms can raise cash internally by managing their working capital efficiently, as reported in Ernst and Young's working capital report (2009). Ujah et al. (2020) argued that given investment opportunities, firms manage their working capital efficiently. Thus, WCM is an essential component of corporate activities that is worth studying given economic uncertainties.

WCM refer to a strategy that allows firm to efficiently utilize its current assets and current liabilities. An avenue to assess firms' WCM is the Cash Conversion Cycle (hereafter CCC). A CCC indicates the number of days firms may need to use their lines of credit and other strategic tools to meet operational obligations. By default, the CCC

consists of three main components; inventory, receivables, and payables were capital can easily be tied-up. Efficient WCM ensures that firms maintain enough cash flow to finance its operational needs. Efficient WCM increases the profitability and performance of the firm (Mohamad and Saad, 2010; Eda and Mehmet, 2009; Ching et al., 2011). By reducing days account receivables and inventory, financial managers create value for the firm. When firms extend payables, they can use the funds meant for early payment to finance other business activities to boost profitability.

A bridge between a society's economic policy and WCM remains unaddressed in the extant literature. We examine the effect of the US EPU on firms' ability to manage their working capital. For this study, we utilized over 80,000 firm-year observation for the period 1996 through 2016. Employing several regression methods, we document the following;

The results show a consistent negative association between the lagged economic uncertainty and WCM. Thus, we interpret the negative association as looming economic uncertainty decreases firms' financing days to meet operational obligations. On average, economic uncertainty leads firms to pursue an aggressive approach, leading to fourteen days of improvement in working capital. We documented this aggressive strategy as we decompose the proxy for WCM. We find that firms strategically sort for avenues to extend their payables while collecting their receivables quicker.

We further examine different scenarios to ascertain if spurious correlation and endogeneity drive our results. We find that the results do hold and are validated. For instance, we examine if cash-holding is a deterrent to economic uncertainty, the evidence

suggests that all firms engage in the aggressive strategy in times of heightened economic uncertainty. However, the effect is more severe for firms with lower cash reserves. We test if the severity of the financial crisis drives the result. The outcome proved that the magnitude of the financial crisis to dampen the aggressive strategy.

Innovations and initiatives are still ever-present in times of uncertainty. As such, economic uncertainty can engender firms to cut their capital spending (Campello et al., 2010) and reduce their investment activities (Bonaime et al., 2017; Nguyen and Phan, 2017). Thus, we investigate how firms can grow organically by using its internal resources. We discover that economic uncertainty impacts both firms that grow organically as well as those that do not. Yet, the effect is higher for firms growing organically.

Also, we examine if distress firms' response to economic uncertainty relative to non-distressed firms. Following Custódio et al. (2013), a distressed firm has an indicator that equals one based on the following condition. If the firm's return on assets (ROA) and/or Tobin's Q is below the two-digit SIC industry median ROA and/or Tobin's Q for two previous consecutive years. We find that economic uncertainty impacts both distress and non-distress firms. Nevertheless, the magnitude of the effect is more adverse for the distress firms. We conjecture that since distress firms are already financially constrained, WCM is most crucial for them. The result is consistent when we run both one-step and two-step system general methods of moments (GMM) estimation using the Arellano-Bond linear estimations to address endogeneity.

The results suggest that firms maintain an aggressive working capital strategy in times of economic uncertainty. With firms needing extra funds to finance their daily

operation, an efficient working capital can generate the required funds for operation's needs.

1.2 Research objective

The primary aim of this study is to establish a relationship between WCM and EPU. The study seeks to find out what happens to the management of working capital when there is high EPU. Some specific objectives include the following:

i. To study the relationship between each component of CCC and EPU.
ii. To investigate the behavior of firms with and without cash.
iii. To determine if the financial crisis influences the WCM approach of firms.

The research questions for the study are:

i. What is the working capital need of firms during high EPU?
ii. Do firms with cash behave differently from those without cash?
iii. Does the financial crisis influence the WCM policy of a firm?

1.3 Contribution to existing literature

This study contributes to the literature in the following ways; Firstly, EPU literature focuses mostly on corporate investment activities (Gulen and Ion, 2016; Leahy and Whited, 1996; Rodrik, 1991; Baker et al., 2016). We extend the contribution of economic uncertainty and strategic choices to WCM.

Secondly, the WCM literature focuses mostly on firm performance and profitability (Eda and Mehmet, 2009; Uyar, A., 2009; Raheman and Nasr, 2007; Ching et al., 2011). To our knowledge, few works in the extant literature explore the relationship between WCM and EPU (Dbouk et al., 2018; Cheng, 2019). However, these two papers argued that there

is a positive association between WCM and EPU, while our study shows a negative association. The different results may be due to the following: In our study, we did not consider only firms' control, but we also added macroeconomic controls to the model. We also lagged the independent variable to control for potential endogeneity, and we use a larger sample size as well.

Thirdly, our study offers managers a different narrative as the results show an inverse association between EPU and WCM. Though, when EPU is severe, like in the financial crisis, firms do engage in liberal credit-terms. Thus, managers can gauge when an appropriate working capital strategy is effective.

1.4 Thesis overview

For the purposes of this thesis, we divided this work into five chapters. Chapter 1 talks about the introduction of the study. It focuses on the general background issues relating to the study, the objectives this study will accomplish, and the contribution of the study. In chapter 2, there is a comprehensive literature review of EPU and WCM, and the conceptual model. Chapter 3 describes the research methodology of this study. This chapter also provides explanations to the variables used for the purpose of this study and discusses the empirical model and the estimation techniques adopted. The next chapter, which is the chapter 4, entails the presentation and analysis of the empirical results obtained from the investigation and estimation of the data. Finally, chapter 5 gives a summary of the main findings of the research and recommendation based on the results of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Chapter overview

The literature review is in three sections. First, we discuss WCM. Next economic policy uncertainty (EPU). We also assess the link between WCM and EPU. Finally, we discuss the conceptual framework.

2.2 Working capital management

WCM refer to a strategy that allows firms to efficiently utilize its current assets and current liabilities. WCM implies maintaining enough liquidity to meet short-term debt and expenses. WCM involves the management of short-term cash flows that is the management of the firm's receivables, inventory, cash, and payables. In this study, we use the CCC as a proxy for WCM. Richards and Laughlin (1980) defines the CCC as the number of days required to convert a dollar of cash disbursements back into a dollar of cash inflow from a firm's regular course of operations. The measurement of CCC accounts for the number of days a firm takes to sell its inventory, to collect its receivables, and to pay its payables.

Firms may adopt aggressive or conservative WCM approach over a period (Weinraub and Visscher, 1998; Maxwell et al., 1998; Long et al., 1993). Firms that adopt the aggressive approach may mostly offer tight credit policy to customers, sort for earlier payment from their clients, hold minimal inventory, and negotiate for longer terms to pay their debt. On the other hand, firms may adopt a conservative approach that is offering liberal credit terms. They have high cash reserves, flexible customer credit terms, lower or no payables and high inventory. Weinraub and Visscher (1998) demonstrated that the

aggressive approach is associated with higher risk and higher returns while the conservative approach is associated with lower risk and lower returns. Filbeck and Krueger (2005) stressed on advantages of efficient WCM by examining WCM approaches. The authors found out that the WCM approaches change over time within industries.

In the extant literature, Keynesian liquidity preference theory seems to apply. The theory suggests a preference for liquidity in investment (Keynes, 1936). Sagan (1955) argues that financial managers are concerned with having funds available for short-term expenditure or investments while Uyar (2009) posited that firms with higher CCC suffer liquidity problems. Studies on WCM and financial performance or profitability turn to control for liquidity (Deloof, 2003; Lazaridis and Tryfonidis 2006; Raheman and Nasr, 2007). Evidence by Yeboah and Agyei (2012) indicates that companies that engage in aggressive WCM increase their cash holdings. Maintaining optimum liquidity position serves as the foundation for the long-term growth and plans of the firms.

Schilling (1996) argued that due to the uncertainty surrounding the business environment, firms need to maintain a minimum liquidity requirement to provide financial flexibility. The WCM policy a firm adopts has a significant impact on the minimum liquidity requirement. The author estimated a positive relationship between CCC and the minimum liquidity requirement of the firm. An increase in WCM implies a higher minimum liquidity requirement and vice versa. A higher minimum liquidity requirement implies that firms will need additional financing. Schilling (1996) advocated that allocating resources to WCM decreases the optimum liquidity position.

The aim of the management of the CCC is to improve the short-term financial performance and value of the firms. Mohamad & Saad (2010) used data from Bloomberg's Database of 172 listed companies randomly selected from Bursa Malaysia main board between 2003-2007 to run a bivariate correlation and single equation multivariate analysis and recognizes the significant impact of WCM has on the profitability and performance of firms. Eda and Mehmet (2009) and Ching et al. (2011) conducted similar studies.

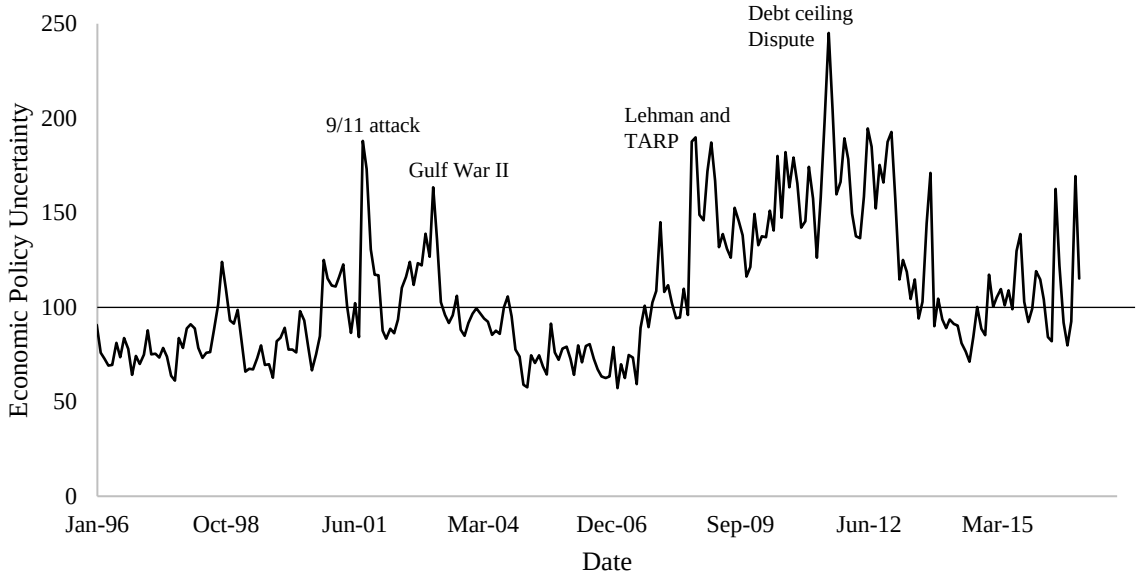
Lazaridis and Tryfonidis (2006) formulated single multivariate regression models with the gross operating profit as the response variable to examine the relationship between CCC and profitability. The results from the correlation analysis and formulated regression models suggest that there is an inverse statistical significance between profitability and the CCC (Eda and Mehmet, 2009; Uyar, A., 2009; Ching et al., 2011). By reducing receivables and inventory, firms can use the funds received for other business activities. When firms extend payable, they can use the funds meant for early payment to finance other business activities.

2.3 Economic policy uncertainty

Uncertainty is a situation where the probability of an outcome is not known. Uncertainty comes from diverse sources. Government influence in our everyday life makes EPU the driver of uncertainty in general. Friedman (1968), Rodrik (1991), Hassett and Metcalf (1999), and several others investigated the adverse economic effects caused by fiscal, monetary, and regulatory policies imposed by the government and policymakers. Rodrik (1991) used the probability of reform reversal as a proxy for policy uncertainty. The author asserts that the passage of new policy induces firms to withhold investment.

Baker et al. (2016) used information from newspaper archives to derive a more robust and feasible measure for EPU. The authors noted that with an increase in EPU, investment, and employment level falls drastically in policy-driven sectors. They argued that EPU is growing rapidly since the year 1960. Figure 1 shows the fluctuation of the EPU as measured by Baker et al. (2016). The US economy experienced its highest uncertainty in the year 2011 and its lowest in the year 2006.

Figure 1: Graph of Economic Policy Uncertainty over the period 1996 – 2016.



The graph above shows the trend of EPU over the period 1996 – 2016. The line shows a baseline of EPU of 100. We notice that the EPU exhibits an irregular up and down with the highest peak of approximately 180 occurring in the year 2011. The lowest peak is approximately 69 occurring in the year 2006.

With many triggers of recession such as the Great Depression, Gulf War I, 9/11 attacks, the credit crunch, the collapse of Lehman Brothers, the financial crisis in 2007-

2009, all were wake-up calls for policymakers and chief financial officer (CFO) about the adverse effect of EPU. By and large, the recovery from the financial crisis was not easy, stretching from 2009 to 2011. The Federal Open Market Committee (2009) and the IMF (2012 and 2013) reported that debate over government fiscal and monetary policies in the United States constituted the duration of the recovery of the financial crisis. The concern about future occurrences of recession in the US economy among CFOs is gaining momentum. The 2019 CFO survey by Duke University reported that United States CFOs are less optimum about the US economy and projected a recession in the third quarter of 2020.

Fernandez-Villaverde et al. (2015) used a quarterly frequency data sample from the period 1970-2010 and a likelihood-based approach to investigate how changes in uncertainty about future fiscal policy influence aggregate economic activity. The authors showed that policy uncertainty has a significant negative influence on economic activity. Some literature finds out that EPU negatively affects the investment activities of firms. Handley and Limão (2015) developed a dynamic, heterogeneous firm's model that forecasted that high policy uncertainty has a strong and negative influence on investment decisions and entry into new markets. The data source for their study were from several sources. Most of them from IMF International Financial Statistics (IFS) and Portuguese census (INE). Baker et al. (2016) illustrated that policy uncertainty reduces bank credit supply.

Financial managers, therefore, need to make the right decision on the WCM policy to implement to optimize the firm's profitability and increase the firm's value especially in times of high EPU.

2.4 Working capital management and economic policy uncertainty

Firms decrease their investment activities when EPU is high (Handley and Limão, 2015; Baker et al., 2016; Bonaime et al., 2017; Nguyen and Phan, 2017). Do firms benefit from the fall in investment activities? In the extant literature, the relationship between EPU and investment is determined by investment irreversibility, that is altering investments are not possible when conditions change. Kulatilaka and Perotti (1998) argued that when strategic advantage is definite, investment during periods of uncertainty is more advantageous. Uncertainty implies more investment opportunities rather than a more considerable risk. Firms can expand their share of the market to increase profitability. Nevertheless, there is a need for financial managers to consider the danger posed by market risk before making such decisions.

The reduction of investment during times of high EPU is not due to a lack of innovations and new initiatives but rather, an increased cost to a line of credit that tightens capital flows. Bordo et al. (2016) estimated an inverse relationship between the bank's credit supply and EPU. Banks cut off part of their credit supply during EPU. Banks tightening their credit supply, in turn, increases the cost of a line of credit and will further worsen the capital flow of firms. The result is a fall in investment during severe EPU.

EPU can have diverse effects on the cost of capital. Xu (2017) established that EPU increases the cost of capital and sequentially reducing innovation activities and investment opportunities. An increase in the cost of capital means extra funds needed to finance budgeting projects and investment opportunities that arise and reduces the net present value of budgeted projects. The uncertainty in the cost of capital also makes it difficult to predict the future cash flows of projects and innovations. Nevertheless, efficient WCM mitigates

the cost of capital. Ebben and Johnson (2011) revealed that aggressive WCM reduces the cost of capital. By interacting Tobin's Q with managerial talent, Ujah et al. (2020) argued that given investment opportunity, firms manage their working capital efficiently.

There is a need to study how firms manage their working capital during EPU. Many firms have capital tied up in the form of receivables, inventory, and payables. Literature shows that CCC influences a firm's performance and profitability (Deloof, 2003; Ching et al., 2011; Raheman and Nasr, 2007). Aggressive WCM practices and policies increase the profitability and performance of firms (Mohamad and Saad, 2010; Lazaridis and Tryfonidis, 2006; Eda and Mehmet, 2009; Ching et al., 2011). A shorter CCC means more cash raised during the short-term management of the firm. WCM during EPU is challenging but worth it.

Wang et al. (2014) deliberate on how EPU affects corporate investment for Chinese listed companies. From the single equation multivariate analysis, the authors demonstrate that firms that use more internal capital will likely reduce the negative impact of policy uncertainty on corporate investment. They suggested that firms in the region of marketization need to pay attention to their internal funding. Ross et al. (2008) prove that during high EPU, firms are submissive in their credit policy to customers to increase sales.

WCM studies are scarce when it comes to the influence of EPU. In periods of EPU, some income streams become stagnant, a fall in the aggregate demand, and banks or creditors tighten their credit policies. The adverse effect of high EPU increases the cost of capital. The need to finance the extra cost of capital may lead firms to strategically improve their operations by decreasing the Days' Sales Outstanding (hereafter DSO), reduce their

Days' Sales Inventory (hereafter DSI), and possibly extend their Days Payable Outstanding (hereafter DPO). We expect an inverse relationship between EPU and CCC. However, the effect of EPU can be very severe like the period of the financial crisis. The result of such severity is the need for cash (Asch and Kaye, 1990; Richards and Laughlin, 1980) and an increase in the CCC in the short term. For this reason, we expect a positive association between EPU and the CCC during the financial crisis from the periods 2007 to 2008.

In this paper, we primarily attempt to examine the effect of economic uncertainty on WCM.

2.5 Conceptual model

In this study, we utilize Baker et al. (2016) measurement of EPU. The choice of this variable is its robustness compared to other measurements of EPU. With WCM of firms, we utilize CCC as a proxy for WCM (Deloof, 2003; Lazaridis and Tryfonidis 2006; Raheman and Nasr, 2007; Ujah et al., 2020). The estimation of CCC involves three components; DSO – account receivable, DPO – account payables, and DSI – inventory.

Trade credit is an essential concept when it comes to WCM. Account receivables and account payables are two parts of trade credit. The trade credit a firm adopts depends on the advantages for their operational, commercial or financial position (Garcia-Teruel and Martinez-Solano, 2010). Emery (1984) proposed that with the use of trade credit, firms achieve more flexibility in operations. Trade credit can serve as price discrimination for some firms (Mian and Smith, 1992). The type of business a firm is involved in determines the level of inventory at their disposal. For a firm to be competitive in the long run, the stocking inventory cost needs to be at a logical minimum (Gaur et al., 2005).

WCM is a critical component of the growth of a firm. This brings us to the two WCM policies – aggressive and conservative approaches. With the aggressive approach, firms minimize their working capital. These firms take high risks and use short term funds to finance operating expenditures and investments. The default rate of firms utilizing the aggressive approach is high. Firms that operate in an aggressive approach mostly offer tight credit policies to customers, hold minimal inventory, and negotiate for longer terms to pay their debt. With the conservative approach, firms absorb risk. Such firms have high cash reserves, flexible customer credit terms, lower or no payables, and high inventory (Weinraub and Visscher, 1998).

Another concept we want to discuss is the trade-off model. The trade-off model illustrates the need for holding cash. Studies on WCM and financial performance turn to control for liquidity as a component of profitability (Deloof, 2003; Lazaridis and Tryfonidis 2006; Raheman and Nasr, 2007). WCM affects the liquidity of the firm. A firm's liquidity position also determines the profitability of the firm. There is a trade-off between the liquidity of the firm and the firm's profitability. An increase in liquidity implies a decrease in the profitability of the firm. It is therefore important to consider the liquidity position of the firm when considering WCM.

WCM in periods of uncertainty needs adequate attention. WCM during EPU is challenging but potentially profitable. The need for extra capital may lead firms to strategically improve their operations by decreasing the DSO, reduce their DSI, and possibly extend their DPO. We expect an inverse relationship between EPU and CCC.

In periods of high EPU like the financial crisis, some income streams become stagnant which leads to a contraction in the consumption level of some households. The level of sales falls driving firms to engage in flexible credit terms. Banks and creditors tighten their credit policies forcing firms to reduce their employment level. This forces firms to increase their inventory which incurs additional costs. The result is an increase in the CCC in the short term and the need for cash (Asch and Kaye, 1989, Richards and Laughlin, 1980).

CHAPTER THREE

DATA SOURCE AND METHODOLOGY

3.1 Estimation technique

The bridge between a society's EPU and WCM remains unaddressed in the extant literature. To examine the effect of the US EPU on firms' ability to manage their working capital, we used the fixed-effect estimation technique. While lagging the independent variable obviates concern over potential endogeneity, we include firm and year fixed effect to control for unobserved heterogeneity. While the main goal of the study is investigating the relationship between the lagged EPU and WCM, we address these questions as well:

i. What is the relationship between each component of CCC and EPU?

ii. How do firms respond to EPU when we control for cash holding?

iii. What is the behavior of firms during the financial crisis?

3.2 The panel model

Based on the research question, we seek to examine the effect of EPU on firms' ability to manage working capital. To empirically investigate the question, we assume that firms WCM and EPU have a lag effect for two reasons. First, by lagging, managers can plan appropriately. Second, the lagged independent variable obviates concern over potential endogeneity. Our regression model also controls for firm and year fixed effect. The empirical model is:

$$CCC_{i,t} = \beta_0 + \beta_1\, EPU_{i,t-1} + \beta_2\, ROA_{i,t} + \beta_3\, GRO_{i,t} + \beta_4\, FA_{i,t} + \beta_5\, Size_{i,t} + \beta_6\, LEV_{i,t} + \beta_7\, VOL_{i,t} + \beta_8\, Inflation_{i,t} + \beta_9\, GDP_{i,t} + \gamma_i + \gamma_t + e_{i,t} \quad (1)$$

where CCC is cash conversion cycle which is the proxy for WCM, EPU is the economic policy uncertainty, ROA is the return on assets, GRO is the sales growth of the firm, FA is the firm's fixed assets, Size is the firm size, LEV is the leverage rate of the firm, VOL is the market volatility, Inflation is the consumer price index of United States, GDP is the natural logarithm of the annual gross domestic product per capita growth of US, γ_i and γ_t is the firm's and time fixed effects respectively, and $e_{i,t}$ is the stochastic error term.

3.3 Variable definition

3.3.1 Cash conversion cycle

In the equation in the previous section, the dependent variable is the WCM proxy – CCC. The extant literature documents several proxies for working capital. However, we adopt the CCC as a proxy for WCM (Deloof, 2003; Lazaridis and Tryfonidis 2006; Raheman and Nasr, 2007; Ujah et al., 2020). We define CCC as the difference between the summation of DSO and DSI, and DPO. The intuition is that CCC reflects firms' capacity and efficiency to use and possibly deplete their lines of credit, and other sources of working capital to meet operational needs.

3.3.2 Economic policy uncertainty

The EPU data are available through policyuncertainty.com from Baker et al. (2016) paper. Policy uncertainty, however acrimonious, remains a constant in society. Baker et al. (2016) used information on the top newspaper archives to measure EPU. The authors thoroughly search through the newspaper archive to sum up monthly reports of the triple: 'uncertainty' or 'uncertain'; 'economic' or 'economy'; and 'policy'. Baker et al. (2016) used textual analyses to derive a measure for EPU. Baker et al.'s (2016) EPU measurement is robust and validated by comparing its efficacy to other proxies of economic uncertainties.

While their data are available monthly, we convert the data to annual form by adopting Baxamusa et at.'s (2019) methodology. Thus, the lagged EPU is the weighted average of uncertainty in the past 12 months. We use the following equation:

$$EPU_{t-1} = (EPU_{y-12}*12 + EPU_{y-11}*11 + EPU_{y-10}*10 + EPU_{y-9}*9 + EPU_{y-8}*8 + EPU_{y-7}*7 + EPU_{y-6}*6 + EPU_{y-5}*5 + EPU_{y-4}*4 + EPU_{y-3}*3 + EPU_{y-2}*2 + EPU_{y-1}) / 78 \quad (2)$$

3.3.3 Control variables

The control variables include both financials and macroeconomic variables that are likely to affect the affect the relationship between WCM and EPU. These financial control variables include the return on assets (ROA) to control for profitability. ROA is the ratio of earnings before interest and taxes (EBIT) to total assets. Sales growth (Growth) controls for expansion opportunities. Growth is the change in total sales. The fixed asset (FA) controls the tangibility of firms' assets. FA is the ratio of net property plant and equipment to total assets. The firm size (Size) is the natural logarithm of the firm's total assets. Leverage (LEV) is the ratio of total debt to total assets. Several authors have used these variables extensively in the working capital related literature (Deloof, 2003; Raheman and Nasr, 2007; Lazaridis and Tryfonidis, 2006; Uyar, A., 2009; Ching et al., 2011). The market volatility (VOL) is the natural logarithm of the annual market's expectation of 30-day forward-looking volatility.

The macroeconomic control variables include inflation which measures the consumer price index. GDP is the natural logarithm of US annual gross domestic product per capita growth. This helps to control the growth rate of GDP. Firms are likely to allocate

more resources to working capital if there is an increase is GDP. There is potential correlation between GDP growth and business cycle. To minimize unobservable similarities within each year and industry classification, we control for year and firm fixed effects. Also, tests for multicollinearity follows each regression model by using the variance inflation factor. We also used the sandwich estimator to estimate a robust standard deviation. We found no evidence of multicollinearity. Appendix A contains the definition and sources for all variables.

3.4 Data source

We primarily sourced data from four sources. From COMPUSTAT, the dependent variable, WCM proxy – CCC – and financial variables as controls. From the website policyuncertainty.com, the primary independent variable, EPU. The website policyuncertainty.com house Baker et al. (2016) EPU dataset which is updated monthly. From CBOE volatility Index and the World Development Index, we gain access to the macroeconomic control variables.

3.5 Data description

For the purpose of this study, we use annual dataset from the year 1996 through to 2016. Following the pedagogical approach in the extant literature, we remove financial and utility firms. That is, firms with sic codes of 6000 through 6999 and 4900 through 4999. The exclusion of financial and utility firms yields 10,141 different firms with 91,321 annual observations. Due to the lagged EPU, we ended up with 80,092 annual observations. Furthermore, to minimize the influence of outliers, all financial variables are winsorized at 1st and 99th percentiles.

Table 1 shows the descriptive statistics for the variables used in this paper. CCC, a proxy for WCM, the mean and standard deviation are approximately 55 and 153 days, respectively. The implication is the use of working capital strategies and lines of credit to meet business operations is almost two months. However, the disparity in the sample is quite significant, as firms may need to finance business operations by almost six months. Firms such as Calmare Therapeutics Inc. and Taylor Morrison Home Corporation have their CCC as high as 465 days. Firms with enough cash may be liberal towards their clients and increase their inventory. Since financing is not inexpensive, the effect of economic uncertainty could impair financing needs.

While CCC may be high, some firms occasionally do not need to finance their working capital. Table 1 shows that some companies can finance their business operations for almost two years without the need for financing. Decoupling CCC into its three components. These are DSO, DSI and DPO. Their mean (standard deviation) are approximately 61 (47) days, 71 (91) days, and 81 (148) days respectively. Firms such as Standard Energy Corporation and Cambridge Capital Holdings Inc. extend their payables – DPO of 1022 days and can finance their business operation internally for almost two years – CCC is -738 days. This shows that these firms will not need their line of credit for approximately the next two years. The independent variable EPU, although lagged, reflects variability and uncertainty in the economy with the highest value at 180 and the lowest at 69. The mean and standard deviation of the lagged EPU is 104 and 31, respectively. Per a baseline of 100, uncertainty may be quite high at times.

Additional statistics from Table 1 show that the average profitability (ROA) of the firms is -8.4%; thus, at average, the sample firms lose almost eight cents on a dollar. Sale

growth (GROWTH) average 18.4% per year, suggesting that firm's sale grew by about thirteen cents to a dollar. The fixed assets (FA), firm's size (Size), use of debt (LEV), price volatility (VOL), inflation and natural log of gross domestic product are approximately 0.858 (0.189), 5.042 (2.393), 0.284 (0.382), 3.014 (0.271), 2.281 (0.979) and 10.76 (0.078) respectively. The result from the correlation matrix shows that the variables do not suffer from multicollinearity. The correlation matrix is appendix B.

Table 1: Descriptive Statistics

Note: *This table shows the descriptive statistics of all the variables used for the study. The table shows the mean, standard deviation, the minimum and maximum value and the quartile values. All values are annual records*

Variable	Obs	Mean	Std. Dev.	Min	Max	P 25%	P 75%
Firm variables							
CCC	91321	54.898	153.029	-738.543	465.922	13.578	113.145
DSO	91321	60.628	46.828	0.000	279.833	32.863	76.164
DSI	91321	71.237	90.619	0.000	491.179	2.949	101.402
DPO	91321	81.336	148.211	0.940	1022.718	24.923	70.286
ROA	91319	-0.084	0.463	-2.764	0.333	-0.076	0.110
GRO	80141	0.184	0.574	-0.667	3.327	-0.049	0.236
FA	91321	0.858	0.189	0.262	1.000	0.775	1.000
Size	91321	5.042	2.393	-0.766	10.307	3.411	6.710
LEV	91321	0.284	0.382	0.000	2.389	0.018	0.388
CHE	91317	0.199	0.226	-0.093	1.000	0.029	0.297
D_t	91321	0.172	0.377	0.000	1.000	0.000	0.000
OG	91321	0.501	0.500	0.000	1.000	0.000	1.000
Macroeconomics variables							
EPU_{t-1}	80141	104.244	31.403	69.230	180.176	76.377	126.268
VOL	91321	3.014	0.271	2.554	3.487	2.797	3.230
Inflation	91274	2.281	0.979	-0.356	3.839	1.586	2.931
Ln of GDP	91274	10.764	0.078	10.609	10.886	10.707	10.830

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Main regression results

Table 2 shows the primary regression results of this paper. We perform five regressions using two regression methods – fixed-effect and quantile regression models. The quartile CCC allows us to examine how firms adopting efficient WCM respond to uncertainty. The quartile normalized cash holdings highlight how firms with cash respond to EPU. We define normalized cash ratio as the ratio of cash holdings to the total assets of the firm in that year.

As stated earlier, this paper intends to examine the effect of economic uncertainty on firms' ability to manage working capital. We perform the analyses using STATA software.

Table 2: Fixed Effect Regression Results.

Dependent variable: Cash Conversion Cycle		**Cash Conversion Cycle**		**Normalized Cash Holdings**	
	Fixed Effect	**25th percentile**	**75th percentile**	**25th Percentile**	**75th Percentile**
Independent Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
EPU_{t-1}	-0.103***	-0.049	-0.053***	-0.137***	-0.066**
	(0.015)	(0.045)	(0.02)	(0.037)	(0.033)
ROA	20.452***	8.248	-27.77***	25.032**	15.332***
	(4.04)	(5.716)	(6.506)	(12.401)	(5.74)
GRO	-1.845	6.745***	-10.737***	-0.787	-3.081
	(1.315)	(2.49)	(1.861)	(3.408)	(1.882)
FA	39.011***	14.287	49.891***	63.487***	-6.439
	(6.907)	(13.956)	(9.645)	(15.714)	(16.03)
Size	20.114***	10.098***	15.388***	20.222***	18.289***
	(1.6)	(3.351)	(1.989)	(3.192)	(2.408)
LEV	-39.352***	-39.41***	-3.172	-43.897***	-29.239***
	(4.53)	(6.287)	(4.86)	(10.595)	(8.325)
VOL	-1.766	12.736**	0.515	1.313	2.22
	(1.59)	(4.976)	(1.988)	(3.185)	(4.101)
Inflation	-1.772***	-1.837*	-1.78***	-4.053***	-0.155
	(0.37)	(1.085)	(0.494)	(0.791)	(0.887)
GDP	-123.553***	7.691	-121.506***	-95.591***	-130.614***
	(11.469)	(33.497)	(15.783)	(18.851)	(28.781)
Constant	1,272.986***	-250.199	1,397.389***	955.662***	1,388.584***
	(122.524)	(364.44)	(169.414)	(198.512)	(315.333)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes	Yes
N	80,092	19,397	19,950	19,739	19,647

Adj. R^2	0.064	0.1357	0.0019	0.0755	0.0608

$***$ Significant at the 0.01 level. *$**$ Significant at the 0.05 level.* *$*$ Significant at the 0.10 level.*

4.2 There is a negative association between EPU and WCM

The results from column (1) in Table 2 show that there is a negative relationship between EPU and CCC. The coefficient is -0.103 and significant at 1% level. This implies that firms will reduce the days it takes to convert working capital into cash by approximately 14 (((0.103 x 54.898)/153.029) x 365) days. The negative association suggests that firms allocate more resources on WCM. An increase in the EPU leads to a fall in the CCC – that is aggressive WCM. The effects of EPU allow firms to seek avenues to generate funds for their operational needs. Winborg and Landström (2001) argued that by applying financial bootstrapping, firms can extend payment to banks to reduce the need for external financing. A fall in aggregate demand due to higher EPU means more competition for consumers. To gain higher market share, firms are quick to convert raw material to finish goods.

Gissler et al. (2016) show that in times of uncertainty, the forecasted availability of credit decreases. As such, financing operational needs during uncertainty increases. Similarly, since economic uncertainty is exogenous, the pressure to recoup receivables may increase, while creditors may demand early or prompt payment. But the contraction in the economy may challenge firms to strategize and allocate more resources to managing working capital efficiently: recoup more receivables, extend their payables and quickly convert raw materials to finish goods. Kulatilaka and Perotti (1998) opined that firms that have good relationships with their banks and those that generate enough resources to meet their working capital needs may use times of economic uncertainty as investment opportunities.

Also, the result in Table 2 shows that return on assets (ROA) is positively related to the CCC, affirming evidence in the extant literature. Sales growth is inversely related to the CCC. The fixed asset is positively related and statistically significant to the CCC. Firm size (Size) is positive and statistically significant. Petersen and Rajan, (1997) documents similar evidence. Also, the directionality of size is appropriate since more prominent firms can finance working capital than smaller firms (Hill et al., 2010). Leverage is statistically significant at 1% level and is inversely related to the CCC. The coefficient of leverage suggests that firms engage more in external credit to finance production after utilizing their internally generated funds.

There is insufficient evidence to suggest that the coefficient of market volatility (VOL) has a predictive influence on firms WCM. Inflation as well as Gross domestic product (GDP) is inversely related to the CCC. The coefficient of the GDP is significant at the 1% level. As such, expanding the nation's economic activities lead to aggressive WCM strategy. The improvement in the economic activities, consumer income increases, in turn, quicker payment of credit.

4.3 Firms with various working capital need respond differently to economic uncertainty

In the descriptive statistics, as Table 1, there is a significant difference between the quantiles of CCC at the 25^{th} quantile and the 75^{th} quantile. The need to finance working capital for firms at the 25^{th} quantile and below is minimal. Conversely, for firms at the 75^{th} quantile and above, there is a substantial need for working capital. Thus, we attempt to ascertain if firms in the two quantiles respond differently to economic uncertainty.

Column 2 and 3 in Table 2 shows the results of the 25th and 75th percentile respectively. On the 25th, firms' need for financing working capital is absent. There is inadequate evidence to suggest that EPU influences the WCM approach of firms in the 25th percentile. But, the narrative changes for firms in the 75th quantile and above. The association of EPU and WCM is negative and significant. Fazarri and Petersen (1993) noted that underperforming firms manage their working capital efficiently. Firms at the upper quantile efficiently manage their working capital to extract extra – internal – financing to meet their business operation.

4.4 Firms with cash respond differently to economic uncertainty

Firms may hold cash to avoid transactional cost (Keynes, 1934) or for future investment (Kim et al., 1998; Fazarri and Petersen, 1993). In the descriptive statistics, as Table 1, there is a significant difference between the quantiles of cash holding (CHE) at the 25th quantile and the 75th quantile. Mun and Jang (2015) argued that firms' WCM policy is correlated with the firms' cash level. Therefore, we expect firms at the 25th and below, and 75th quartiles and above to respond differently towards EPU. The financial need for firms in the upper quantile is minimal relative to firms in the lower quantile. We expect firms in the lower quantile to be more responsive to uncertainty.

Column 4 and 5 in Table 2 shows the results of the lower and upper percentile based on CHE respectively. While the directionality of CCC and EPU is the same, the effect of EPU to CCC for firms at the lower quantile is approximately twice the upper quantile firms. This implies that firms in the lower quantile manage their working capital more aggressive and are more responsive towards EPU. This shows that firms with enough cash have no incentives to keep more cash (Mun and Jang, 2015).

4.5 EPU effect on WCM components vary

In Table 2, the models show a statistically significant inverse relationship between EPU and WCM. However, since we derive the WCM proxy – CCC – from three components, it is possible that firms may engage in an aggressive strategy to extend their trade credits in conjunction with their collections. Here, we investigate the drivers of the aggressive strategy. Table 3 presents the estimated results.

Table 3: Looking at the working capital components

Note: *This table presents the fixed effect regression results with components of cash conversion cycle (days sales outstanding (DSO), days sales inventory (DSI) and days payables outstanding (DPO)) as the dependent variable. Column 1 has days sales outstanding (DSO) as the dependent variable. Column 2 has days sales inventory (DSI) as a dependent variable. Column 3 has days payables outstanding (DPO) as a dependent variable.*

	DSO	**DSI**	**DPO**
Independent Variables	**(1)**	**(2)**	**(3)**
EPU_{t-1}	-0.044***	-0.029***	0.026*
	(0.004)	(0.007)	(0.015)
ROA	-0.112	-2.509	-24.666***
	(0.937)	(1.713)	(4.612)
GRO	0.514	-1.508**	-0.687
	(0.43)	(0.622)	(1.496)
FA	6.564***	12.81***	-14.369*
	(1.999)	(3.755)	(7.537)
Size	6.097***	8.204***	-6.405***
	(0.478)	(0.801)	(1.742)
LEV	-5.379***	1.986	34.028***
	(0.942)	(1.767)	(4.928)
VOL	-3.776***	-1.858**	-7.94***
	(0.487)	(0.803)	(1.689)
Inflation	-0.282**	-0.856***	0.533
	(0.115)	(0.189)	(0.378)
GDP	-74.169***	-56.859***	-5.313
	(3.766)	(6.422)	(12.286)
Constant	839.403***	640.637***	189.081**
	(40.131)	(68.94)	(130.936)
Firm fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
N	80,092	80,092	80,092
Adj. R^2	0.0001	0.0031	0.136

**** Significant at the 0.01 level.* *** Significant at the 0.05 level.* ** Significant at the 0.10 level.*

From Table 3, column 1, there is a negative and significant relationship between DSO and EPU, implying that during high policy uncertainty, firms become aggressive on credit provided to customers. An aggressive strategy means financial managers persuade customers to make early payments (Petersen and Rajan, 1997; Deloof, 2003) since access to lines of credit becomes more difficult. Firms may attempt to convince its customers to make early payment.

In column 2 of Table 3, there is a negative and significant relationship between the lagged EPU and the DSI. The coefficient of the EPU is -0.029 and is significant at a 1% level. The evidence suggests that during high EPU, firms attempt to increase the rate the firm converts its raw material to finish goods (Deloof, 2003; Yang et al., 2004). Yang et al. (2004) argued that high level of uncertainty makes aggregate demand forecast unpredictable. To avoid higher inventory risk, firms reduce their raw material inventories. To prevent storage cost, firms tend to keep few inventories.

In column 3, EPU effect to DPO is positive and statistically significant at 10 percent alpha level. The result suggests that the demand for operational needs energize firms to seek avenues to extend their payables (Petersen and Rajan, 1997). This allows them to use the funds to manage operational needs. The relationship between EPU and the components of CCC explains the negative association depicted in column 1 of table 2. The fall in DSO and DSI and the increase in DPO when EPU heightens imply lower CCC, meaning firm adopt aggressive working capital strategy.

4.6 The need for working capital financing during the financial crisis and afterward

The financial crisis and its recovery period are one of the longest recessions experienced in the world. The financial crisis negatively impacted most of the economies

all over the world. Similarly, the concern about the future occurrence of recession in the US economy among chief financial officers (CFOs) is gaining momentum. The 2019 CFO survey by Duke University reported that United States CFOs are less optimistic about the US economy and projected a recession in the third quarter of 2020 – about 67 percent of CFOs made this prediction. We aim to examine the behavior of firms during the financial crisis and afterward. We sub-sampled the data into three: from 1996 to 2006, 2007 to 2008, and 2009 to 2016. Table 4 shows the results of the effect of lagged EPU on the CCC for the periods.

Table 4: Robustness in terms of 2007/2009 crisis

Note: *This table presents the fixed effect regression results with cash conversion cycle (CCC) as the dependent variable. Column 1 is the results of the regression during pre-crisis with sample of 47,799 firm years over the period 1996 - 2006. Column 2 is the results of the regression during in-crisis with sample of 7,318 firm years over the period 2007 - 2008. Column 3 is the results of the regression during post-crisis with 24,984 firm years over the period 2009 - 2016.*

	Cash Conversion Cycle		
	Pre-Crisis	**In-Crisis**	**Post-Crisis**
Independent Variables	**(1)**	**(2)**	**(3)**
EPU_{t-1}	-0.156***	1.874*	-0.053**
	(0.042)	(1.132)	(0.025)
ROA	17.620***	3.115	-5.933
	(4.499)	(15.477)	(8.44)
GRO	-0.398	-10.829**	-8.479***
	(1.53)	(4.942)	(2.836)
FA	45.285***	14.020	45.531***
	(8.036)	(26.493)	(15.01)
Size	20.169***	31.594***	28.215***
	(2.054)	(8.684)	(3.698)
LEV	-39.047***	1.894	-24.309***
	(5.028)	(14.939)	(9.047)
VOL	9.078**	78.058	9.634***
	(3.594)	(209.317)	(3.089)
Inflation	-2.615**	-91.538	-0.743
	(1.018)	(135.879)	(0.549)
GDP	-95.206***	-577.548	-13.436
	(17.411)	(566.134)	(23.35)
Constant	950.022***	6,038.443	-14.157
	(188.552)	(5,924.958)	(257.883)
Firm fixed effect	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes
N	47,790	7,318	24,984
Adj. R^2	0.0503	0.0353	0.0478

$***$ Significant at the 0.01 level. *$**$ Significant at the 0.05 level.* *$*$ Significant at the 0.10 level.*

In column 1, the model shows the result for the period before the crisis. We find EPU to have an inverse relationship and statistically significant as well. As EPU increases, the CCC falls, suggesting that firms engage in aggressive WCM before the financial crisis in 2007.

During the financial crisis, the effect is quite the opposite. Fernandez-Corugedo et al. (2011) argued that firms make changes to their WCM policy anytime there is a macroeconomic shock. The result in column 2 of Table 4 shows how firms respond to EPU. There is a positive and significant relationship between EPU and CCC at 10 percent alpha level, suggesting that, there is the need for extra funding. Nilsen (2002), Bordo, et al, (2016) and Gissler et al. (2016) forecasted a fall in bank loans to firms during severe uncertainty. The severity of the financial crisis engender firms to engage in conservative WCM approaches to maintain their clients (Yang, 2011), increase sales (Long et al., 1993; Deloof and Jegers, 1996), access goods and raw material from their suppliers (Deloof, 2003; Raheman and Nasr, 2007) and funds from creditors and the banks (Bordo, et al, 2016).

In column 3, we illustrate the results for the post-crisis period. We find the aftermath of the crisis being that firms, on average, have revert to aggressive strategy. That is, EPU is inverse and statistically significant. However, EPU's effect is relatively smaller compared to the result of the pre-financial crisis. Kesimli and Günay (2011) argued firms will continue to adopt a more efficient WCM as they did previously.

4.7 The effect of EPU varies for distress vs. non-distress firms

Are distress firms more likely to negotiate short-term financing? We conjecture that to minimize failure rate, lending organizations are open to negotiations, thus, extending the credit life of distress firms. The extant literature suggests that financial distress makes firms

more efficient (Brown et al., 1992; Ofek, 1993). Wilner (2000), and Jaggi and Lee (2002) argued that distress firms convince lenders to give concessions, which helps the firms during their financial difficulties. Molina and Preve (2009) suggest that distress firms are more likely to reduce trade credits relative to non-distressed firms.

While constrained firms may have the room to negotiate their trade credits, their size and market share may play a pivotal role in credit extension. Also, given financial constraints, distress firms may not face adverse impact as their working capital financing is already in flux. Thus, non-distress firms may suffer more from economic uncertainty. Nonetheless, we suspect that the effect of policy uncertainty will vary for distress and non-distress firms.

In this section, we examine the behavior of distress and non-distress firms towards WCM. We generate two subsamples, that is, distress firms and non-distress firms. To classify firms as distress versus non-distress firm, we follow Custódio et al., (2013) definition, where distress firms carries an indicator that equals one if the firm's ROA or Tobin's Q is below the two-digit SIC industry median ROA or Tobin's Q for two previous consecutive years

Table 5: Controlling for Distress firms

Note: *This table presents the regression results with cash conversion cycle (CCC)*

Dependent Variable	**Distress base on ROA and Tobin's Q**		**Distress base on ROA**		**Distress base on Tobin's Q**	
Cash conversion cycle	**Distress**	**Non-Distress**	**Distress**	**Non-Distress**	**Distress**	**Non-Distress**
Independent Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
EPU_{t-1}	-0.115***	-0.098***	-0.128***	-0.067***	-0.095***	-0.115***
	(0.032)	(0.015)	(0.034)	(0.013)	(0.02)	(0.02)
ROA	18.139**	18.294***	25.071***	-29.91***	11.371*	19.786***
	(7.822)	(4.725)	(5.032)	(7.061)	(6.613)	(4.917)
GRO	-5.342	-0.144	2.217	-4.726***	-9.325***	0.716
	(4.664)	(1.406)	(1.842)	(1.465)	(3.321)	(1.522)
FA	64.173***	32.816***	72.518***	13.571**	44.053***	37.535***
	(18.355)	(7.446)	(11.97)	(7.21)	(11.719)	(8.556)
Size	26.993***	19.295***	24.853***	9.906***	22.763***	20.739***
	(3.456)	(1.748)	(2.646)	(1.734)	(2.647)	(2.027)
LEV	-38.352***	-38.177***	-54.403***	4.714	-30.625***	-43.235***
	(10.779)	(4.843)	(5.949)	(4.636)	(8.022)	(5.304)
VOL	-1.534	1.232	1.2003	-0.124	0.631	1.196
	(3.541)	(1.755)	(3.665)	(1.355)	(2.182)	(2.199)
Inflation	-0.274	-1.718***	-1.832**	-1.062***	-0.673	-1.834***
	(0.791)	(0.4)	(0.818)	(0.31)	(0.494)	(0.521)
GDP	-132.63***	-124.018***	-161.954***	-80.583***	-103.073***	-140.185***
	(28.738)	(12.821)	(25.877)	(10.783)	(15.661)	(16.813)
Constant	1,343.814***	1,283.306***	1,652.763***	882.565***	1,046.638***	1,444.695
	(315.329)	(136.065)	(282.838)	(113.535)	(171.071)	(177.801)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes

Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	15,647	64,445	32,052	48,040	30,942	49,150
Adj. R^2	0.0538	0.0656	0.1305	0.0003	0.0156	0.0923

*** Significant at the 0.01 level. *** Significant at the 0.05 level.* ** Significant at the 0.10 level.*

Table 5 presents the results. In columns (1) and (2), we measure distress using both the ROA and Tobin's Q. In column (1), which represents distress firms, EPU is negative and significant. EPU in column (2), that is, non-distress firms are also negative and significant. However, the magnitude effect of EPU on WCM is higher for distress.

In columns (3) and (4), we define distress firms based on ROA only. Again, the result shows that the magnitude of the effect of EPU on WCM for distress firms is almost twice that of non-distress firms. Finally, in columns (5) and (6), we define distress firms based on Tobin'Q only. While the directionality of the result is consistent, the magnitude effect of EPU on WCM is higher for non-distress firms. We interpret the effect here based on the investment opportunities for firms. That is, firms with better investment opportunities, are more likely to effectively engage in efficient WCM.

The results suggest that distress firms are more responsive to EPU relative to non-distress firms. But when distress firms are measured base on the market share, distress firms become less responsive towards EPU relative to non-distress firms. The results show that distress firms manage their working capital efficiently in times of policy uncertainty relative to non-distress firms.

4.8 Organic growth firms' response differently to EPU

The working capital policy a firm undertake may depend on their growth strategy. One of the strategies is growing organically. An organic growth employ firms to use internally generated fund by plowing back into the firm's operations. Since organic growth firms generate capital internally, we expect them to be more efficient in managing working capital. In defining organic growth firms, Faleye and Mkrtchyan (2019) consider: net investment in operations for a specific year as:

$$NIOPS_t = (CAPEX_t - SPPE_t - DEP_t) + (NOWC_t - NOWC_{t-1})$$

where NIOPS is net investment in operations, CAPEX is capital expenditure, SPPE is the sales of property, plant and equipment, DEP is depreciation expense and NOWC is the net working capital. We normalized NIOPS by revenue. We considered firms with normalized NIOPS greater than zero, as firms growing organically. To examine how firms practicing organic growth strategy respond to EPU, we generate two sub-sample: organic and non-organic growth firms.

Table 6: Controlling for organic growth strategy

Note: *This table presents the regression results with cash conversion cycle (CCC) as the dependent variable. Here, we separate the data into two subsamples: firms practicing organic growth strategy presented in column (1) and firms that do not practice organic growth strategy presented in column (2). Standard deviations are in parentheses below coefficients.*

	Cash Conversion Cycle	
	Organic growth	**Non-organic growth**
Independent Variables	**(1)**	**(2)**
EPU_{t-1}	-0.137***	-0.065***
	(0.019)	(0.021)
ROA	11.887	25.936***
	(7.897)	(5.155)
GRO	-3.12	-3.885*
	(1.932)	(2.084)
FA	24.39***	48.862***
	(8.794)	(9.379)
Size	16.96***	22.772***
	(1.933)	(2.084)
LEV	-19.84***	-48.158***
	(6.476)	(5.369)
VOL	4.074*	-0.663
	(2.12)	(2.429)
Inflation	-2.533***	-0.758
	(0.486)	(0.556)
GDP	-91.529***	-155.277***
	(14.488)	(105.348)
Constant	945.001***	1,606.309***
	(154.063)	(1167.143)
Firm fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
N	40,654	39,438
Adj. R^2	0.0215	0.1040

**** Significant at the 0.01 level.*
*** Significant at the 0.05 level.*
** Significant at the 0.10 level.*

Column 1 and 2 shows the regression result for the two subsamples. The results show that there is a negative association between EPU and CCC in both samples. But, the magnitude of the effect of EPU is almost twice that of firms that do not engaged in organic growth strategy. The results suggest that firms engaged in organic growth strategy are more responsive to the effect of EPU.

4.9 Further robustness test – GMM estimation results

We run several dynamic panel models using the system GMM estimation proposed by Arellano and Bover (1995) as well as Blundell and Bond (1998). Similar to Procasky and Ujah (2016), we lagged the dependent variable as an independent variable, control for fixed effects to address the potential endogeneity of all independent variables in the equation as instrumental variables to determine the significance of EPU. Columns 1 and 2 of Table 7 are the one-step GMM results, while columns 3 and 4 are the two-stage GMM results. EPU is consistent in all the four regression results. There is a negative association between EPU and CCC.

Table 7: Further tests using GMM estimation

Note: *This table presents the GMM estimation using the Arellano-Bond linear dynamic panel-data estimation results. Here, the cash conversion cycle is the dependent variable. Column 1 and 2 are the one-step GMM results while column 3 and 4 are the two-stage GMM results.*

	Cash Conversion Cycle			
Independent Variables	**(1)**	**(2)**	**(3)**	**(4)**
CCC_{t-1}	0.359***	0.409***	0.0378***	0.444***
	(0.020)	(0.028)	(0.023)	(0.029)
CCC_{t-2}		0.031**		0.034**
		(0.014)		(0.014)
EPU_{t-1}	-0.101***	-0.084***	-0.038***	-0.035***
	(0.018)	(0.018)	(0.012)	(0.012)
ROA	1.884	3.282	4.218	7.158
	(4.681)	(5.623)	(4.551)	(5.514)
GRO	-4.641**	-4.832**	-5.089***	-5.828***
	(1.846)	(2.319)	(1.801)	(2.216)
FA	25.025***	17.831*	15.498**	9.737
	(8.540)	(9.288)	(7.636)	(7.969)
Size	23.522***	21.775***	22.370***	22.204***
	(2.480)	(2.965)	(2.236)	(2.587)
LEV	-17.386***	-15.623***	-16.047***	-15.086***
	(5.486)	(5.968)	(5.383)	(5.623)
VOL	0.143	0.516	-1.217	-0.047
	(1.610)	(1.662)	(1.179)	(1.211)
Inflation	-0.490	-0.365	-0.355	-0.488*
	(0.352)	(0.361)	(0.261)	(0.262)
GDP	-168.627***	-154.012***	-105.738***	-96.314***
	(19.027)	(21.875)	(13.858)	(15.607)
Constant	1,727.135***	1,576.311***	1,061.037***	954.587***
	(203.870)	(235.639)	(148.091)	(167.301)
Firm fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
N	68,096	58,919	68,096	58,919

⁎⁎⁎ Significant at the 0.01 level. *⁎⁎ Significant at the 0.05 level.* *⁎ Significant at the 0.10 level.*

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Overview

While there is a growing concern over government policies, the advent of the financial crisis demonstrates that nations are more interdependent on one another. Recovering from the financial crisis was painful and stretched over a long period, as reported by the Federal Open Market Committee (2009) and the IMF (2012, 2013). The yielding result is that policy uncertainty is now a ubiquitous phrase among scholars and practitioners.

Policy uncertainty may have a dual effect on business acquisitions and operations. The existing literature and debate reflect a negative impact on society. The 2013 World Economic Outlook Report suggests that US policy uncertainty leads to lower investment and output in some countries. Baker et al., (2016) argued that in policy sensitive sectors, policy uncertainty might reduce employment level. Ernst and Young (2009) working capital report note that the leading 2,000 corporations in the US and Europe can extract a total of US$1 trillion when they manage their working capital efficiently. We examine the effect of EPU on firms' ability to manage their working capital over the period 1996 through 2016.

The results demonstrate a consistent negative association between the lagged EPU and WCM. Thus, we interpret the negative association as EPU decreases firms' financing days to meet operational obligations. Typically, heightened economic uncertainty leads firms to pursue aggressive WCM, leading to a fourteen days improvement in working

capital. We documented this aggressive strategy as we decompose the proxy for WCM. We find that firms strategically sort for an avenue to extend their payables and collect their receivables quicker.

The results are also robust to the controlling of the effect of cash-holding, the financial crisis, growth strategy, and to examine the effect of distress. Furthermore, we address potential endogeneity by performing system GMM estimation; the methodology validates the results. This study contributes to the extant literature in the following ways. First, EPU literature focuses mostly on corporate investment activities. We extend the contribution of economic uncertainty and strategic choices of firms.

Second, the WCM literature focuses mostly on firm performance and profitability. We extend the working capital literature by investigating the effect of economic uncertainty. Econometrically, our result is robust as we control for macroeconomic conditions and potential endogeneity. Thirdly, our study offers managers a different narrative as the results show an inverse association between EPU and WCM. Though, when EPU is severe, like in the financial crisis, firms do engage in liberal credit-terms. Thus, managers can gauge when an appropriate working capital strategy is effective.

APPENDIX A: VARIABLE DEFINITION

Variables	Definitions	Source
Firm variables		
CCC	(Accounts receivables / Sales × 365) + (Inventories / Purchases × 365) – (Accounts payable / Purchases × 365)	Compustat
DSO	Accounts receivables/Sales × 365	Compustat
DSI	Inventories/Purchases × 365	Compustat
DPO	Accounts payable/Purchases × 365	Compustat
ROA	Measured as the ratio of earnings before interest and taxes to total assets.	Compustat
Growth	Measured as the difference between the current and previous sales divided by the previous sales	Compustat
FA	Fixed asset is the ratio of the firm tangible assets to total assets	Compustat
Size	The natural logarithm of the firm's total assets.	Compustat
Leverage	The ratio of total debt to total assets.	Compustat
Distress	An indicator that equals one if the firm's ROA or Tobin's Q is below the two-digit SIC industry median ROA or Tobin's Q for two consecutive previous years.	Compustat
CHE	Normalize cash holdings measured as cash holdings divided by total assets	Compustat
Organic Growth	We define a firm as practicing organic growth strategy if the normalized net investment in operations is greater than zero in that year.	Compustat
Economic variable		
EPU_{t-1}	It is the previous year economic policy uncertainty which is calculated as $\left[\sum_{i=1}^{12} i * (Policy\ Uncertainty_{(y-i)})\right] / 78$ where the policy uncertainty = monthly record of EPU in a year.	Baker et al. (2016)
Volatility	This is the natural logarithm of the annual market's expectation of 30-day forward-looking volatility	CBOE volatility Index
Inflation	Measures the consumer price index.	World Development Indicators
GDP	The natural logarithm of the nation's annual gross domestic product per capita growth.	World Development Indicators

APPENDIX B: CORRELATION MATRIX

Note: *This table shows the Pearson correlation of all the variables used for the study. The total number of samples used for the study is 120,973 over the period 1996- 2016. The bold values show that the correlation coefficients are significant at 5% level.*

	CCC	EPU_{t-1}	DSO	DSI	DPO	ROA	Growth	FA	Size	LEV	VOL	Inflation	GDP	D_{t-1}
CCC	**1.000**													
EPU_{t-1}	**0.010**	**1.000**												
DSO	**0.170**	**-0.065**	**1.000**											
DSI	**0.502**	**0.060**	**0.017**	**1.000**										
DPO	**-0.666**	**0.007**	**0.214**	**0.157**	**1.000**									
ROA	**0.306**	**-0.056**	**0.007**	**-0.052**	**-0.388**	**1.000**								
Growth	**-0.052**	**-0.083**	**0.071**	**-0.012**	**0.077**	**-0.009**	**1.000**							
FA	**0.035**	**-0.075**	**-0.120**	**0.162**	**0.040**	**-0.111**	**-0.017**	**1.000**						
Size	**0.165**	**0.082**	-0.004	**-0.082**	**-0.253**	**0.531**	**-0.055**	**-0.290**	**1.000**					
LEV	**-0.175**	**0.083**	**-0.080**	**0.011**	**0.182**	**-0.262**	**-0.027**	**-0.079**	**-0.049**	**1.000**				
VOL	**0.042**	**0.086**	-0.002	**0.080**	**0.007**	**-0.055**	**-0.013**	**0.073**	**-0.070**	**0.041**	**1.000**			
Inflation	**0.015**	**-0.287**	**0.007**	**0.050**	**0.021**	**-0.044**	**0.072**	**0.026**	**-0.044**	-0.005	**-0.139**	**1.000**		
GDP	**-0.020**	**0.381**	**-0.037**	**-0.020**	-0.004	**-0.010**	**-0.044**	**-0.246**	**0.200**	**0.060**	**-0.318**	**-0.172**	**1.000**	
D_{t-1}	**-0.014**	**-0.044**	**-0.096**	**-0.052**	**-0.058**	**-0.028**	**-0.144**	**0.170**	**-0.078**	**0.007**	**0.023**	**-0.110**	-0.001	**1.000**

REFERENCES

Arellano, M. and Bover, O. (1995), "Another look at the instrumental variable estimation of error-components models", *Journal of Econometrics,* 68(1), pp. 29-51.

Asch, D. and Kaye, G. R. (1990), "Financial planning: modelling methods and techniques", Kogan Page.

Baker, S. R., Bloom, N. and Davis, S. J. (2016), "Measuring economic policy uncertainty", *The Quarterly Journal of Economics,* 131(4), pp.1593-1636.

Baxamusa, M., Datta, S. and Jha, A. (2019), "Does policy uncertainty reduce the number of strategic alliances?"

Blundell, R. and Bond, S. (1998), "Initial conditions and moment restrictions in dynamic panel data models", *Journal of Econometrics,* 87(1), pp. 115-143.

Bonaime, A., Gulen, H. and Ion, M., (2018), "Does policy uncertainty affect mergers and acquisitions?", *Journal of Financial Economics,* 129(3), pp. 531-558.

Bordo, M. D., Duca, J. V. and Koch, C. (2016), "Economic policy uncertainty and the credit channel: Aggregate and bank level US evidence over several decades", *Journal of Financial Stability,* 26, pp. 90-106.

Brown, D., James, C. and Ryngaert, M. (1992), "The effects of leverage on operating performance: an analysis of firms' responses to poor performance", working paper, University of Florida Gainesville, Florida.

Campello, M., Graham, J. R. and Harvey, C. R. (2010), "The real effects of financial constraints: Evidence from a financial crisis", *Journal of Financial Economics,* 97(3), pp. 470-487.

Ching, H. Y., Novazzi, A. and Gerab, F. (2011), "Relationship between working capital management and profitability in Brazilian listed companies", *Journal of Global Business and Economics*, 3(1), pp.74-86.

Cheng, X. (2019). "The Impact of Economic Policy Uncertainty on the Efficiency of Corporate Working Capital Management—The Evidence from China", *Modern Economy,* 10(3), pp. 811-827.

Custódio, C., Ferreira, M. A. and Matos, P. (2013). "Generalists versus specialists: Lifetime work experience and chief executive officer pay", *Journal of Financial Economics,* 108(2), pp. 471-492.

Dbouk, W., Moussawi-Haidar, L. and Jaber, M. (2018), "The Detrimental Effect of Economic Policy Uncertainty on Firms' Working Capital".

Deloof, M. (2003), "Does working capital management affect profitability of Belgian firms?", *Journal of Business Finance and Accounting*, 30(3-4), pp. 573-588.

Deloof, M. and Jegers, M. (1996), "Trade credit, product quality, and intragroup trade: some European evidence", *Financial Management*, pp. 33-43.

Ebben, J. J. and Johnson, A. C. (2011), "Cash conversion cycle management in small firms: Relationships with liquidity, invested capital, and firm performance", *Journal of Small Business and Entrepreneurship,* 24(3), pp. 381-396.

Eda, O. and Mehmet, S. (2009), "Relationship between efficiency level of working capital management and return on total assets in ISE", 4(10), *International journal of Business and Management* pp.109-114.

Emery, G. W. (1984). A pure financial explanation for trade credit. Journal of financial and quantitative analysis, 19(3), 271-285.

Ernst and Young, (2009), "All tied up - Working capital management report 2009", available at: https://www.eytas.co.jp/tas-library/reports/2009/pdf/All-tied-up.pdf (accessed 4th February 2019)

Faleye, O. and Mkrtchyan, A. (2019), "Build, Buy, or Partner? The Relative Performance of an Acquisitive Strategy. The Relative Performance of an Acquisitive Strategy", Northeastern U. D'Amore-McKim School of Business Research Paper, (3094885).

Fazari, S. M. and Petersen, B. C. (1993), "Working capital and fixed investment: new evidence on financing constraints", *The RAND Journal of Economics,* pp. 328-342.

Federal Open Market Committee, (2009), "Minutes of the December 2009 Meeting", available at: http://www.federalreserve.gov/monetarypolicy/ (accessed at 6th February 2019)

Fernandez-Corugedo, E., McMahon, M., Millard, S. and Lukasz R. (2011), "Understanding macroeconomic effects of working capital in the United Kingdom", working paper No. 422, Bank of England.

Fernández-Villaverde, J., Guerrón-Quintana, P., Kuester, K. and Rubio-Ramírez, J. (2015), "Fiscal volatility shocks and economic activity", *American Economic Review*, 105(11), pp. 3352-3384.

Filbeck, G., & Krueger, T. (2005). Industry Related Differences in Working Capital Management: Mid-American. *Journal of Business* 20(2): 11-18.

Friedman, M. (1968), "The Role of Monetary Policy", *American Economic Review*, 58. repr. in M. Friedman (1969), pp. 102-110.

Froot, K. A., Scharfstein, D. S. and Stein, J. C. (1993), "Risk management: Coordinating corporate investment and financing policies", *The Journal of Finance*, 48(5), pp. 1629-1658.

Gaur, V., Fisher, M. L., & Raman, A. (2005). An econometric analysis of inventory turnover performance in retail services. Management science, 51(2), 181-194.

García-Teruel, P. J., & Martinez-Solano, P. (2010). Determinants of trade credit: A comparative study of European SMEs. International Small Business Journal, 28(3), 215-233.

Gissler, S., Oldfather, J. and Ruffino, D. (2016), "Lending on hold: Regulatory uncertainty and bank lending standards", *Journal of Monetary Economics*, 81, pp. 89-101.

Graham, J. (2018), "CFO Survey: Recession Likely by Year-End 2019", available at: https://www.fuqua.duke.edu/duke-fuqua-insights/cfo-survey-december-2018 (accessed at 10th August 2019)

Gulen, H. and Ion, M. (2016), "Policy uncertainty and corporate investment", *Review of Financial Studies,* 29(3), pp. 523-564.

Handley, K. and Limao, N. (2015), "Trade and investment under policy uncertainty: Theory and firm evidence", *American Economic Journal: Economic Policy,* 7(4), pp.189-222.

Hassett, K. A. and Metcalf, G. E. (1999), "Investment with uncertain tax policy: Does random tax policy discourage investment", *The Economic Journal*, 109(457), pp. 372-393.

Hill, M. D., Kelly, G. W. and Highfield, M. J. (2010), "Net operating working capital behavior: A first look", *Financial Management*, 39(2), pp. 783-805.

International Monetary Fund. Research Dept, (2012), "World economic outlook, October 2012: Coping with high debt and sluggish growth", Oxford University Press.

International Monetary Fund. Research Dept. (2013), "World economic outlook, April 2013: Hopes, Realities, Risks", Oxford University Press.

Jaggi, B. and Lee, P. (2002), "Earnings management response to debt covenant violations and debt restructuring", *Journal of Accounting, Auditing and Finance,* 17(4), pp. 295-324.

Kesimli, I.G. and Gunay, S.G. (2011), "The impact of the global economic crisis on working capital of real sector in Turkey", *Business and Economic Horizons,* Vol. 4 No. 1, pp.52- 69.

Keynes, J. M. (1936), "The General Theory of Employment, Interest and Money (London, 1936)", Keynes: The General Theory of Employment, Interest and Money1936.

Kim, C. S., Mauer, D. C. and Sherman, A. E. (1998), "The determinants of corporate liquidity: Theory and evidence", *Journal of Financial and Quantitative Analysis*, 33(3), pp. 335-359.

Lazaridis, I. & Tryfonidis, D. (2006), "Relationship between working capital management and profitability of listed companies in the Athens stock exchange", *Journal of Financial Management and Analysis*, 19(1).

Leahy, J. V. and Whited, T. M. (1996), "The effect of uncertainty on investment: Some stylized Facts", *Journal of Money, Credit and Banking*, 28(1), pp. 64-83.

Long, M. S., Malitz, I. B. and Ravid, S. A. (1993), "Trade credit, quality guarantees, and product marketability", *Financial management*, pp. 117-127.

Maxwell, C. E., Gitman, L. J. and Smith, S. A. (1998), "Working capital management and financial-service consumption preferences of US and foreign firms: a comparison of 1979 and 1996 preferences", *Financial Practice and Education*, 8, pp. 46-52.

Mian, S. L., & Smith Jr, C. W. (1992). Accounts receivable management policy: theory and evidence. The Journal of Finance, 47(1), 169-200.

Mohamad, N. E. A. B. and Saad, N. B. M. (2010), "Working capital management: The effect of market valuation and profitability in Malaysia", *International Journal of Business and Management*, 5(11), pp. 140-147.

Molina, C. A. and Preve, L. A. (2009), "Trade receivables policy of distressed firms and its effect on the costs of financial distress", *Financial Management,* 38(3), pp. 663-686.

Mun, S. G. and Jang, S. S. (2015), "Working capital, cash holding, and profitability of restaurant firms", *International Journal of Hospitality Management,* 48, pp. 1-11.

Nguyen, N. H. and Phan, H. V. (2017), "Policy uncertainty and mergers and acquisitions", *Journal of Financial and Quantitative Analysis,* 52(2), pp. 613-644.

Nilsen, J. H. (2002), "Trade credit and the bank lending channel", *Journal of Money, Credit and Banking,* pp. 226-253.

Ofek, E. (1993), "Capital structure and firm response to poor performance: An empirical analysis", *Journal of Financial Economics,* 34(1), pp. 3-30.

Petersen, M. A. and Rajan, R. G. (1997), "Trade credit: Theories and evidence", *The Review of Financial Studies,* 10(3), pp. 661-691.

Procasky, W. J., & Ujah, N. U. (2016). Terrorism and its impact on the cost of debt. *Journal of International Money and Finance*. 60, pp. 253-266.

Raheman, A. and Nasr, M. (2007), "Working capital management and profitability–case of Pakistani firms", *International Review of Business Research Papers,* 3(1), pp. 279-300.

Richards, V. D. and Laughlin, E. J. (1980), "A cash conversion cycle approach to liquidity analysis", *Financial Management,* pp. 32-38.

Rodrik, D. (1991), "Policy uncertainty and private investment in developing countries", *Journal of Development Economics,* 36(2), pp. 229-242.

Ross, S. A., Westerfield, R. and Jordan, B. D. (2008), "Fundamentals of corporate finance". Tata McGraw-Hill Education.

Sagan, J. (1955), "Toward a theory of working capital management", *The Journal of Finance,* 10(2), pp. 121-129.

Schilling, G. (1996), "Working capital's role in maintaining corporate liquidity", *TMA Journal,* 16(5), pp. 4-7.

Ujah, N., Tarkom, A. and Okafor, C. (2018), "Working Capital Management and Managerial Talent", working paper.

Uyar, A. (2009), "The relationship of cash conversion cycle with firm size and profitability: an empirical investigation in Turkey", *International Research Journal of Finance and Economics,* 24(2), pp. 186-193.

Wang, Y., Chen, C. R. and Huang, Y. S. (2014), "Economic policy uncertainty and corporate investment: Evidence from China", *Pacific-Basin Finance Journal*, 26, pp. 227-243.

Weinraub, H. J. and Visscher, S. (1998), "Industry practice relating to aggressive conservative working capital policies", *Journal of Financial and Strategic Decision,* 11(2), pp. 11-18.

Wilner, B. S. (2000), "The exploitation of relationships in financial distress: The case of trade credit", *The Journal of Finance,* 55(1), pp. 153-178.

Winborg, J. and Landström, H. (2001), "Financial bootstrapping in small businesses: Examining small business managers' resource acquisition behaviors", *Journal of Business Venturing*, 16(3), pp. 235-254.

Xu, Z. X. (2017), "Economic policy uncertainty, cost of capital, and corporate innovation", Unpublished working Paper. New York University.

Yang, B., Burns, N. D. and Backhouse, C. J. (2004), "Management of uncertainty through postponement", *International Journal of Production Research*, 42(6), pp. 1049-1064.

Yang, X. (2011), "The role of trade credit in the recent subprime financial crisis", *Journal of Economics and Business*, 63(5), pp. 517-529.

Yeboah, B. and Agyei, S. K. (2012), "Working capital management and cash holdings of banks in Ghana.", *European Journal of Business and Management*, 4(13), pp. 120-130.