

Roles of Working Capital Management and Corporate Tax Avoidance on Firm Performance Amid Economic Policy Uncertainty

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Abstract: : *This study examines the impact of global economic policy uncertainty (GEPU) on working capital management (WCM) and, in turn, on firm performance. This study also investigates the impact of the interaction between corporate tax avoidance (CTA) and WCM on overall firm performance. Utilising a dynamic panel data methodology with a two-step generalized method of moments (GMM) approach, the analysis encompasses a robust sample of 7,645 firms from the United States (US), 1,107 from the United Kingdom (UK), 681 from Germany, and 4,403 from China spanning the period of 2006 to 2020. This study reveals a significant negative correlation between GEPU and the cash conversion cycle (CCC). Additionally, the interaction effects between CCC and GEPU demonstrate a significant positive association with return on assets (ROA). Remarkably, the interaction between CCC and CTA consistently exerts a significant and positive impact on ROA across firms in all countries. Upon closer examination of individual countries, a distinct pattern emerges: a negative impact is discerned for US firms, in contrast to the positive impact observed for firms in the UK, Germany, and China. Therefore, the holistic optimisation of CCC and CTA presents significant potential for improved cash flow efficiency, financial stability, and enhanced firm performance.*

Keywords: Working capital management; Corporate tax avoidance; Firm performance; Economic policy uncertainty

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1. Introduction

Working capital management (WCM) has attracted increasing attention for businesses due to its sensitivity toward a firm's financial efficiency and health (Sawarni et al., 2020). WCM is a strategic approach that aims to maintain sufficient liquidity for the day-to-day operations of a business. It enables a firm to sustain its activities by effectively managing its operational expenses and short-term debts (Boisjoly et al., 2020). WCM is also found to be a significant predictor of firm performance (Boisjoly et al., 2020). For example, Lyngstadaas (2020) observes that the greater financial performance of publicly-traded firms in the United States is correlated with efficient management of working capital (WC). Hence, it is imperative for firms to efficiently manage their WC to enhance overall firm performance.

However, enhancing and sustaining the efficiency of WCM poses a constant challenge for most firms. The severity of the challenge intensifies when firms are confronted with numerous challenges, such as economic policy uncertainty (EPU). EPU stems primarily from the uncertainty of whether existing policies will change in the future or if newly formed policies will have unprecedented effects on the economy and the private sector (Baker et al., 2016). Since EPU arises from government regulatory, monetary, and fiscal policy changes, it is considered a significant stimulator of aggregate risk that the world has witnessed during several global crises (Rehman et al., 2021).

EPU wields a significant impact on the intricate dynamics of supply chains, financial liquidity, and WCM within firms. Consequently, it exerts pressure on key components of WCM like inventory, accounts receivables, accounts payables, and the cash conversion cycle (CCC). As evidenced by Dbouk et al. (2020), heightened EPU challenges accurate cost estimations for businesses, especially in predicting inventory demand. This misalignment contributes to an upward surge in daily inventory outstanding. Subsequently, a prolonged inventory turnover cycle results in unwarranted inventory backlog, storage expenses, and adverse impacts on profitability (Cheng, 2019). Moreover, the upswing in EPU exposes banks to considerable financial risk, given their susceptibility to economic policy shifts (Danisman et al., 2021). As a response, financial institutions frequently impose stricter credit access and elevate loan costs to mitigate default risk expenses (Ashraf & Shen, 2019). This tightening of lending conditions can exacerbate

financial constraints for firms, augmenting their dependence on trade credit to alleviate the financing gap. The convergence of economic literature and financial theory shows that fluctuations in aggregate economic activity can result in significant firm-level financial constraints (Bernanke et al., 1996). Financial constraints stand as a major challenge for businesses (Bhatia & Chakrabarti, 2022). However, amid these challenges, hedging strategies emerge as potent tools for navigating financial constraints (Hoberg & Moon, 2017).

Modigliani and Miller's (1958) theory posits that, in perfect capital markets, firms remain indifferent to internal versus external financing. However, market imperfections give rise to financial constraints, compelling firms to grapple with difficulties in securing external finance. This limitation stems from the challenges or high costs linked to obtaining external funds. Consequently, firms are compelled to heavily rely on internal funds, sourced from core operations or efforts to minimise tax liability (Mayberry, 2012).

As such, this study posits that corporate tax avoidance (CTA), by providing additional capital to firms, could indirectly aid in mitigating the risks associated with WCM during times of EPU. The notion of using CTA as a means to bolster capital for operational needs aligns with the idea that a stronger financial position can help buffer the impacts of economic uncertainties (Ozdemir et al., 2023). Building upon this notion, Alm et al. (2019) note that firms encountering financial constraints frequently turn to participating in tax avoidance practices. Similarly, Edwards et al. (2016) reveal that financially constrained firms are more likely to evade taxes than non-financially constrained firms due to their inability to access external financing. This is primarily due to the fact that tax avoidance provides them with a means to reduce tax cash outflows during economic downturns. Tax avoidance may potentially impact a company's present and future cash flows due to its ability to reduce tax liabilities, hence increasing cash inflows (Khuong et al., 2020). If a company can find ways to reduce its taxable income, it may reinvest those savings in its core business (Minh Ha et al., 2021).

However, in comparison to the focus on WCM, several prior investigations have primarily explored the impact of CTA on distinct elements of firms' capital structure (Goh et al., 2016; Lee et al., 2023). In contrast, this study takes a novel approach, utilising CTA as a hedging technique, to explore its effects on both WCM and firm performance.

Therefore, the primary objective of this study is to explore how EPU affects WCM and subsequently impacts firm performance. Additionally, the current study investigates how the interaction between WCM and CTA influences overall firm performance.

The subsequent sections of this paper are structured as follows: Section 2 discusses existing literature and develops hypotheses. Section 3 elaborates on the research methodology. Section 4 presents the research findings in detail, while Section 5 provides a concise conclusion for the entirety of the paper.

2. Literature Review

2.2 *WCM, firm performance, and EPU*

The importance of WCM on firm performance is widely acknowledged by researchers (e.g., Braimah et al., 2021; Zariyawati & Reyad, 2022). Research shows that the adoption of WCM yields improved firm performance, which positively affects the firm's absolute and relative market value (Boisjoly et al., 2020). The impact of WCM on firm performance is manifested by its components. For instance, Fernández-López et al. (2020) state that firm profitability is negatively linked to the daily inventory outstanding (DIO), daily payable outstanding (DPO), and CCC. Correspondingly, Sawarni et al. (2020) report that inventory conversion and payable periods are inversely related to firm performance. Firm profitability is negatively associated with the receivables collection period. On the other hand, Braimah et al. (2021) indicate an inverted U-shaped association between the receivables collection period and firms' profitability. They also reveal a positive link between the payable period and profitability and a negative relation between the inventory conversion period and CCC.

Nevertheless, the established connection between WCM and firm performance might deviate during periods of EPU. In this context, existing findings may not hold true due to the variable nature of the relationship. To illustrate, recent studies have highlighted the persistently elevated levels of EPU across global markets, which has had detrimental repercussions on firm performance (Dhole et al., 2021; Iqbal et al., 2020). The heightened volatility in EPU disrupts the predictability of future cash flows for businesses, consequently impeding their capacity to forecast expected financial inflows. Consequently, a decline in firm performance ensues. Exemplifying this, Hu

and Zhang (2021) reveal that EPU stemming from events like the Covid-19 pandemic erodes investments, escalates cost of capital, and ultimately diminishes overall firm valuation. The adverse influence of EPU becomes evident in its impact on crucial performance metrics such as return on assets, return on equity, net profit margin, and Tobin's Q, all of which serve as well-established proxies for assessing firm performance (Ahsan & Qureshi, 2021; Iqbal et al., 2020).

Nonetheless, the current body of research remains insufficient to definitively ascertain the impact of WCM on firm performance during high EPU. Additionally, it is important to recognise that global economic policy uncertainty (GEPU) can significantly influence a country's economic landscape, subsequently affecting decisions surrounding WCM and, consequently, firm performance. In its measurement of WCM, this study employs the CCC. Accordingly, this study proposes the following hypotheses:

H1 There is a significant relationship between CCC and GEPU

H2 CCC causes a decline in ROA during GEPU

2.3 CTA, WCM, and firm performance

The influence of taxes on financial decision-making in corporate finance dates back to at least Modigliani and Miller (1963) and continues to the current day (Graham, 2014). Tax avoidance is connected to asymmetric cost behaviour due to the fact that tax avoidance decreases a company's tax liability and increases its cash flow. Consequently, cash tax savings may be leveraged as a source of funding to generate more internal finances (Edwards et al., 2016). Graham et al. (2014) find that businesses with limited financial resources are more likely to actively manage their tax liabilities in order to generate cash savings. Concurrently, Law and Mills (2015) note that enterprises with limited resources engage in more aggressive tax planning tactics.

Furthermore, the role of tax avoidance extends as a mechanism to safeguard a company's cash flow during tumultuous periods, especially amid macroeconomic volatility. The hypothesis put forth in this study posits that firms facing financial adversity due to GEPU may resort to corporate tax avoidance as a hedging technique against volatile cash flows. The rationale

is rooted in the direct and indirect influence of tax avoidance on both current and future cash flows, given its potential to enhance cash inflows through tax obligation reduction (Khuong et al., 2020; Machdar, 2022). Minh Ha et al. (2021) substantiate this trend by noting the growing interest among firm managers in utilising tax avoidance as a financing avenue, recognising taxes' pivotal role in an array of corporate financial decisions encompassing risk management and organisational structure.

Temporary tax avoidance, as highlighted by these researchers, is one of the most significant sources of financing for corporate operations. From these considerations, it is evident that tax avoidance offers advantages from a variety of perspectives, such as shareholders increasing their assets in the form of dividends and companies having more funds to service debt and expand working capital. Hence, the efficient use of WCM helps firms to perform better. Businesses need to have effective WCM in place to guarantee their survival and growth over the long term and increase their performance and shareholders' value (Lyngstadaas, 2020).

Past studies demonstrate that CTA is pervasive and can have a positive impact on corporate value (Zhang et al., 2016), financing costs (Graham & Tucker, 2006), and capital structure (Lee et al., 2023). A considerable body of existing literature demonstrates the positive impact of CTA. According to Blouin (2014), tax avoidance may increase cash flows and net profit after tax, which is advantageous for shareholders. Graham et al. (2014) note that a larger percentage of CEOs of publicly-traded businesses feel that tax planning tactics aid in boosting earnings per share (EPS). By analysing large panel data from US firms, Blaylock (2016) demonstrates that tax avoidance remains significantly positively linked to future operating performance even in firms with comparatively poor governance. Additionally, there is no consistent evidence that tax avoidance implementation correlates with excessive or suboptimal investment decisions. Further, Houlder (2010) show that tax reduction may help a company retain more of its earnings.

Moreover, the practical effect of CTA is to increase shareholder value, making it an important business strategy, particularly for large corporations (Armstrong et al., 2015). Ling and Wahab (2019) demonstrate that because taxes account for a significant amount of the cash flow of the focal company, the transfer of funds from the state to shareholders should improve the wealth of shareholders. The findings of Goh et al. (2016) and Guenther et al. (2017) indicate that shareholders see tax avoidance positively, which may

be attributable to the fact that it results in tax savings. Concurrently, Drake et al. (2019) assert that investors place a positive value on tax avoidance strategies.

However, prior studies have mainly delved into the influence of taxes on a spectrum of corporate decisions, including internal capital allocation (Desai et al., 2004), maintenance of cash reserves (Foley et al., 2007), implementation of hedging strategies (Graham & Rogers, 2002), and integration of risk (Ljungqvist et al., 2017). While some studies have explored the impact of CTA on firm value, there remains a dearth of research examining the relationship between CTA and CCC in relation to its impact on ROA. This study aims to bridge this gap through the formulation of the following hypothesis:

H3 The interaction between CCC and CTA significantly impacts ROA

3. Methodology

3.1 Sampling and data collection

The study's sample includes a comprehensive analysis of 7,645 firms from the US, 1,107 firms from the UK, 681 firms from Germany, and 4,403 firms from China. The selection was based on the country of headquarters and exchange, spanning the period from 2006 to 2020. To initiate the study, data on the global economic policy uncertainty index was gathered from the Economic Policy Uncertainty Index website, which provides access to Baker et al.'s (2016) news-based GEPUI index, which has been widely utilised by esteemed researchers in recent years (Ashraf & Shen, 2019; Dbouk et al., 2020; Reyad et al., 2022). Additionally, all financial data for the study was sourced from DataStream (Thomson Reuters Refinitiv Eikon).

3.2 Measurements of the variables

3.2.1 Working capital management

This study measures WCM using the CCC and its components. The CCC is a frequently used indicator of WCM because it measures the number of days

it takes a company to convert its inventory and accounts receivable into cash, less the number of days it takes to pay its suppliers (Boisjoly et al., 2020; Hossain & Zariyawati, 2022).

$$CCC = DSO + DIO - DPO \quad (1)$$

$$CCC = \left(\frac{\text{Account Receivables}}{\text{Sales}} \times 365 \right) + \left(\frac{\text{Inventory}}{\text{COGS}} \times 365 \right) - \left(\frac{\text{Account Payables}}{\text{COGS}} \times 365 \right) \quad (2)$$

3.2.2 Global economic policy uncertainty

This study measures GEPU using Baker et al.'s (2016) global EPU index. The computation of GEPU follows the methodology established by Attig et al. (2021) and Gulen and Ion (2016), wherein it is derived as the natural logarithm of the 12-month arithmetic mean of the EPU index.

3.2.3 Corporate tax avoidance

Tax avoidance is measured by the effective tax rate (ETR). ETR is an appropriate measure to assess firms' tax avoidance behavior because it captures both permanent and temporary tax avoidance strategies (Aronmwan & Okaiwele, 2020).

$$ETR = \frac{(\text{Total Tax Expense} - \text{Deferred Tax Expense})}{\text{Pretax Income}} \quad (3)$$

3.2.4 Firm performance

Profitability is a commonly used metric for evaluating a firm performance that essentially determines a firm's success or failure. The study uses ROA to measure the firm's profitability. ROA is calculated by dividing net income by total assets (Hu & Zhang, 2021).

3.2.5 Control variables

Sales growth (SG) is the percentage increase or decrease in sales that occurs over a certain time period (Reyad et al., 2022). Leverage (LEV) accounts for the influence of debt financing on working capital by calculating the cost

of debt relative to equity. Leverage is the ratio of total debt over total assets (Dbouk et al., 2020). The firm size (SIZE) is equal to the natural logarithm of the total assets of a firm (Attig et al., 2021).

3.4 Estimation technique and models

The study employs a quantitative data analysis approach using panel data methodology in STATA 15. The panel data methodology provides a variety of methods for investigating relationship among variables, including ordinary least squares (OLS), fixed-effects models (FE), random-effect models (RE), and generalised method of moments (GMM). The data analysis in this research begins with the utilisation of the following OLS model as the baseline regression model.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon_{i,t} \quad (4)$$

Where Y indicates the dependent variable; β represents the estimated coefficient; X represents all the independent variables; and $\varepsilon_{i,t}$ indicates error term.

OLS regression, the most common form of linear regression, estimates correlation between variables under specific assumptions, requiring linearity, independence of observations, and continuous dependent variables. Yet, endogeneity can lead to biased and inconsistent parameter estimates. However, recognising the potential endogeneity issues associated with OLS regression, this research aims to address this concern by employing the Durbin–Wu–Hausman test. The Durbin–Wu–Hausman test is a widely recognised diagnostic tool used to assess the endogeneity of individual regressors (Janot et al., 2016). If the results of the Durbin–Wu–Hausman test indicate the presence of endogeneity in the OLS model, this study is prepared to adopt an alternative estimation methodology that can provide more robust and consistent estimates compared to OLS.

Therefore, to address these concerns, the current study utilises a two-step system GMM estimation approach, with dynamic panel models offering superior performance in cases of endogeneity, induced by reverse causality or omitted variables, compared to OLS, FE, and RE models (Leszczensky & Wolbring, 2022). The rationale behind this approach is that the two-step GMM estimator eliminates unobservable individual effects through first-

order differencing. Additionally, it incorporates lagged instrumental variables to account for the correlation between the difference in the dependent variable and the error term (Blundell & Bond, 1998).

According to Blundell and Bond (1998), the first-differenced GMM estimator proposed by Arellano and Bover (1995) may suffer from bias and imprecision when the series exhibit high persistence or when the variance of the individual-specific impact is substantial compared to the error variance. Hence, this study adopts Blundell and Bond's (1998) two-step GMM estimation approach, which has been demonstrated to be more efficient and robust. The dynamic panel model is presented below.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon_{it} \quad (5)$$

Where $Y_{i,t}$ indicates the dependent variable for firm i at the time t ; $Y_{i,t-1}$ indicates the lag term of the dependent variable; β represents the estimated coefficient; X_i represents all the independent variables for firm i at the time t ; α_i represents time-invariant unobserved heterogeneity; and $\varepsilon_{i,t}$ represents idiosyncratic error.

3.4.1 Empirical models

The research models are meticulously structured in accordance with the study's objectives and hypotheses. The current study begins with below OLS models as the baseline regression models.

$$CCC = \beta_0 + \beta_1 GEPU + \beta_2 SG + \beta_3 LEV + \beta_4 SIZE + \varepsilon_{it} \quad (6)$$

$$ROA = \beta_0 + \beta_1 CCC * GEPU + \beta_2 SG + \beta_3 LEV + \beta_4 SIZE + \varepsilon_{it} \quad (7)$$

$$ROA = \beta_0 + \beta_1 CCC + \beta_2 CTA + \beta_3 CCC * CTA + \beta_4 SG + \beta_5 LEV + \beta_6 SIZE + \varepsilon_{it} \quad (8)$$

Here, equations 6 to 8 chronologically represent the three hypotheses of the study. However, the current study postulates that the OLS models will be subject to endogeneity issues. Hence, this study will employ an endogeneity test. If the OLS model contains endogeneity issues, this study will develop the following models using Blundell and Bond's (1998) two-step system GMM estimation.

$$CCC_{i,t} = \beta_0 + \beta_1 CCC_{i,t-1} + \beta_2 GEPU + \beta_3 SG + \beta_4 LEV + \beta_5 SIZE + \alpha_i + \varepsilon_{i,t} \quad (9)$$

Equation 9 aims to examine the impact of GEPU on CCC. Here, $CCC_{i,t}$ is the dependent variable; $CCC_{i,t-1}$ is the lagged dependent variable; $GEPU$ indicates independent variable; and $\beta_4, \beta_5, \beta_6$ indicate the estimated coefficient of control variables (sales growth, leverage, and firm size).

$$ROA_{i,t} = \beta_0 + \beta_1 ROA_{i,t-1} + \beta_2 CCC * GEPU + \beta_3 SG + \beta_4 LEV + \beta_5 SIZE + \alpha_i + \varepsilon_{i,t} \quad (10)$$

The GMM model in equation 10 will examine the effect of the CCC on ROA during GEPU using the interaction between CCC and GEPU. In this model, $ROA_{i,t}$ is the dependent variable; $ROA_{i,t-1}$ is the lagged dependent variable; and $CCC * GEPU$ is the interaction variable.

$$ROA_{i,t} = \beta_0 + \beta_1 ROA_{i,t-1} + \beta_2 CCC + \beta_3 CTA + \beta_4 CCC * CTA + \beta_5 SG + \beta_6 LEV + \beta_7 SIZE + \alpha_i + \varepsilon_{i,t} \quad (11)$$

In equation 11, the above model adds the interaction variable $CCC * CTA$ to examine their effect on ROA . Here, CTA as a hedging technique used to examine how its association with CCC influence ROA .

4. Results and Discussions

4.1 Descriptive statistics

Table 1 displays the descriptive statistics for all variables encompassed in the research. As evident from the table, variations in the observations of each variable arise due to instances of missing data in specific years. Notably, the majority of variables exhibit standard deviation (SD) values that are lower than their respective mean values, indicative of data clustering around the mean. In contrast, the variable CTA stands out with a higher SD compared to its mean, pointing to data dispersion extending beyond the mean.

Table 1: Descriptive Statistics

Variable	Observation	Mean	Std. Dev.	Minimum	Maximum
ROA	66,512	3.690	0.588	-2.158	4.636
CCC	67,620	4.362	1.033	-0.699	6.191
GEPU	67,660	4.929	0.364	4.394	5.520
CTA	66,509	6.623	6.734	-2.463	22.541
SG	66,062	3.747	0.613	-1.109	5.095
LEV	66,479	3.427	0.766	0.000	5.111
SIZE	66,525	18.661	2.157	11.728	26.653

Note: Variables used in this table are return on assets (ROA), cash conversion cycle (CCC), global economic policy uncertainty (GEPU), corporate tax avoidance (CTA), sales growth (SG), leverage (LEV), and firm size (SIZE).

4.2 *Correlation matrix*

Preceding the empirical estimation, the study undertakes a correlation analysis to scrutinise the structure and extent of interrelationships among the variables. Presented in Table 2, the correlation coefficients reveal relatively modest values for certain explanatory variables, indicating a limited degree of association between them. Notably, when independent variables exhibit lower correlation, the potential for encountering multicollinearity issues diminishes. Nevertheless, it is noteworthy that this study identifies a strong correlation between CCC and ROA. It is important to underscore that relying solely on correlation analysis is insufficient to establish a causal relationship. Consequently, to delineate a causal connection between independent and dependent variables, more advanced econometric techniques are requisite.

Table 2: Correlation Matrix

	ROA	CCC	GEPU	CTA	SG	LEV	SIZE
ROA	1.000						
CCC	0.125	1.000					
GEPU	-0.093	-0.083	1.000				
CTA	-0.023	-0.019	-0.019	1.000			
SG	0.140	0.255	-0.154	0.007	1.000		
LEV	0.003	0.046	-0.069	0.063	0.109	1.000	
SIZE	0.088	0.146	0.014	-0.072	0.127	0.023	1.000

Note: Variables used in this table are return on assets (ROA), cash conversion cycle (CCC), global economic policy uncertainty (GEPU), corporate tax avoidance (CTA), sales growth (SG), leverage (LEV), and firm size (SIZE).

4.3 Regression analysis

4.3.1 Baseline regression analysis

This study begins its empirical analysis with an OLS baseline regression analysis (Table 3) to determine whether the OLS models' findings are susceptible to endogeneity problems. However, the first model, as illustrated in Table 3, reports a significantly negative relationship between GEPU and the CCC, indicating a preference among firms to shorten their CCC periods during heightened GEPU. Additionally, the result from Model 2 reveals a positive correlation between the interaction variable CCC*GEPU and ROA, signifying that the CCC exacerbates the negative impact of GEPU on firms' ROA. Furthermore, within this context, the interaction of CCC and CTA exhibits a significantly positive association with ROA (Model 3).

Table 3: OLS Regression Analysis

Variables	Model 1 DV: CCC	Model 2 DV: ROA	Model 3 DV: ROA
GEPU	-0.133*** (0.011)		
CCC			-0.013*** (0.003)
CCC*GEPU		0.007*** (0.001)	
CTA			-0.052*** (0.002)
CCC*CTA			0.012*** (0.007)
SG	0.382*** (0.006)	0.115*** (0.004)	0.105*** (0.004)
LEV	0.021*** (0.005)	-0.010*** (0.003)	-0.009*** (0.003)
SIZE	0.055*** (0.002)	0.017*** (0.001)	0.015*** (0.001)
Constant	2.532*** (0.069)	2.830*** (0.024)	3.110*** (0.026)
Endogeneity test (Durbin-Wu-Hausman) P-value	0.000	0.000	0.000

Notes: Standard errors are in parentheses ***p < 0.01, **p < 0.05, *p < 0.1. Variables used in this table are return on assets (ROA), cash conversion cycle (CCC), global economic policy uncertainty (GEPU), corporate tax avoidance (CTA), sales growth (SG), leverage (LEV), and firm size (SIZE).

However, it is crucial to acknowledge that relying solely on the OLS results is not appropriate due to the identified endogeneity concerns, as confirmed by the Durbin-Wu-Hausman test. A significant result in the Durbin-Wu-Hausman test for an explanatory variable indicates its endogenous nature and its association with the residuals or error term. As shown in Table 3, the null hypothesis of the Durbin-Wu-Hausman test is rejected, providing evidence of the presence of an endogeneity issue within the empirical model. Therefore, alternative estimation techniques are necessary to obtain more reliable and unbiased estimates.

4.3.2 Two-step system GMM analysis

This study adopts a robust approach to address endogeneity concerns by employing dynamic panel data regression analysis with a two-step system GMM estimation. The current study includes first-order AR(1) correlations, second-order AR(2) correlations, and the Hansen test to validate the two-step system GMM estimation method. The Hansen test of overidentifying restrictions measures the validity of instruments and determines whether models have been accurately defined. First- and second-order serial correlations are measured by AR(1) and AR(2), respectively.

Models 1 and 2 correspond to the first and second hypotheses of the study. The results obtained through the GMM estimation consistently support the study's first hypothesis, which suggests a significantly negative relationship between GEPU and CCC (Table 4). This finding indicates that as GEPU levels increase, businesses tend to accelerate the conversion of their WC investments into cash. This strategic response is driven by the fact that firms often face capital constraints during periods characterised by high GEPU (Bloom et al., 2018). Furthermore, a closer examination of Model 2 in Table 4 reveals an interesting insight: the interaction term CCC*GEPU shows a positive correlation with ROA. The positive correlation between the interaction term CCC*GEPU and ROA suggests that the combined effect of CCC and GEPU has a detrimental influence on ROA. When CCC lengthens, it indicates that a company takes more time to convert its WC investments into cash. This implies that the company has higher WC requirements, which can tie up resources and potentially reduce profitability. Additionally, when GEPU is high, it signifies increased uncertainty in global economic policies, which can further impact a company's operations and profitability.

Table 4: GMM Estimates for Models 1 and 2

Variables	Model 1 DV: CCC	Model 2 DV: ROA
L.CCC	0.738*** (0.045)	
L.ROA		1.900*** (0.133)
GEPU	-0.057*** (0.014)	
CCC*GEPU		0.007*** (0.002)
SG	0.164*** (0.011)	0.076*** (0.012)
LEV	-0.016** (0.007)	0.050*** (0.015)
SIZE	0.042*** (0.003)	-0.043*** (0.005)
Constant	0.067 (0.190)	-3.205*** (0.501)
AR(1) P-value	0.000	0.000
AR(2) P-value	0.792	0.736
Hansen Test P-value	0.257	0.668

Notes: Standard errors are in parentheses ***p < 0.01, **p < 0.05, *p < 0. Cash conversion cycle (CCC) is the dependent variable in Model 1; L.CCC is the lagged CCC (lagged dependent variable); return on assets (ROA) is the dependent variable in Model 2; L.ROA is the lagged ROA (lagged dependent variable); CCC*GEPU is the interaction variable between cash conversion cycle (CCC) and global economic policy uncertainty (GEPU); sales growth (SG), leverage (LEV), and firm size (SIZE) are control variables. First- and second-order serial correlations are measured by AR(1) and AR(2), respectively; the Hansen test of overidentifying restrictions measures the validity of instruments and determines whether models have been accurately defined.

Therefore, when CCC interacts with GEPU, it exacerbates the negative impact on ROA. In other words, as both CCC lengthens and GEPU rises, the negative effect on ROA becomes more pronounced. This highlights the importance of effectively managing WC and adapting to economic uncertainties to maintain a healthy level of profitability.

The study's third hypothesis suggests that the interaction between CCC and CTA significantly affects ROA. Consistently, the current study reveals that CCC*CTA has a significant positive impact on ROA, as evidenced in Table 5. This means that when both CCC and CTA are present, they

contribute to an increase in the ROA. The positive association suggests that the combination of these variables has a beneficial effect on the financial performance of the entity being studied. Accordingly, when the CCC and CTA strategies align effectively, a synergistic effect can emerge. A company that efficiently manages its WC requirements while also implementing intelligent tax avoidance tactics can reap dual benefits. The cash saved through tax reduction strategies can be utilised to optimise WC, thereby further improving the cash conversion cycle.

Table 5: GMM Estimates for Model 3

Variables	Model 3 DV: ROA
L.ROA	0.278 (0.188)
CCC	-2.521*** (0.913)
CTA	-2.014*** (0.717)
CCC*CTA	0.445*** (0.159)
SG	0.078*** (0.025)
LEV	0.082** (0.036)
SIZE	-0.031** (0.015)
Constant	14.183*** (4.895)
AR(1) P-value	0.000
AR(2) P-value	0.128
Hansen Test P-value	0.441

Notes: Standard errors are in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Return on assets (ROA) is the dependent variable in Model 3; L.ROA is the lagged ROA (lagged dependent variable); CCC*CTA is the interaction variable between cash conversion cycle (CCC) and corporate tax avoidance (CTA); sales growth (SG), leverage (LEV), and firm size (SIZE) are control variables. First- and second-order serial correlations are measured by AR(1) and AR(2), respectively; The Hansen test of overidentifying restrictions measures the validity of instruments and determines whether models have been accurately defined.

In simpler terms, by effectively managing taxes, a company can increase its cash flows, which, in turn, positively impacts its ability to finance WC needs and other operational requirements. This enhanced cash flow can contribute to an improved ROA. This finding highlights the importance of integrating WCM and tax strategies to enhance a company's financial performance. By aligning these two aspects, firms can unlock potential synergies that lead to improved profitability and overall financial health. This relationship is underpinned by the concept that strategic tax management can effectively curtail tax payments as a fraction of pre-tax revenue, fostering augmented cash inflows and, subsequently, fortifying overall profitability (Blouin, 2014; Goh et al., 2016).

The existing body of research accentuates these notions further, demonstrating the pervasiveness of CTA and its multi-dimensional impact. Previous studies reported its positive influence on corporate value (Kim et al., 2011), financing costs (Graham & Tucker, 2006), and capital structure (Lee et al., 2023). As highlighted by Blouin (2014), tax avoidance strategies possess the potential to amplify cash flows and net post-tax profits, thereby positively impacting firm value. Graham et al. (2014) suggest that a notable proportion of CEOs within publicly traded enterprises perceive tax planning manoeuvres as instrumental in augmenting earnings per share (EPS). An exhaustive analysis of extensive panel data from US firms by Blaylock (2016) substantiates that the positive association between tax avoidance and future operational performance persists, even within firms characterised by comparatively weaker governance structures.

These findings encapsulate the notion that tax avoidance bolsters corporate performance through amplified cash flows that, in turn, facilitate the financing of working capital needs. Consequently, firms can adeptly strike equilibrium between liquidity and profitability by adroitly employing tax avoidance strategies. This concurs with the trade-off theory, which advocates that superior firm performance necessitates a trade-off between liquidity and profitability (Dakua, 2019; Myers & Majluf, 1984).

However, the findings presented in Table 5, which cover the entire study sample, do not offer a conclusive outcome. In order to obtain a more comprehensive understanding, it is essential to analyse the results on a country-by-country basis. Therefore, to explore the specific dynamics within individual countries, Table 6 has been included.

Table 6: Country-Specific Results

Model 3	DV: Return on assets (ROA)			
	US	UK	Germany	China
L.ROA	0.755*** (0.044)	0.537*** (0.104)	-0.054 (0.093)	0.190 (0.177)
CCC	1.297** (0.691)	-0.004** (0.002)	-1.783*** (0.622)	-0.078** (0.033)
CTA	0.604** (0.262)	-0.120*** (0.042)	-1.236*** (0.002)	-3.137** (1.458)
CCC*CTA	-0.134** (0.058)	0.001** (0.001)	0.510*** (0.180)	0.023** (0.010)
SG	0.065*** (0.015)	0.209*** (0.044)	-0.192 (0.158)	0.106*** (0.025)
LEV	0.141*** (0.024)	-0.063*** (0.024)	0.529** (0.222)	-0.117*** (0.037)
SIZE	-0.033** (0.015)	0.084*** (0.018)	-0.089 (0.055)	-0.058*** (0.020)
Constant	-5.102** (2.245)	0.163 (0.311)	5.077*** (0.949)	14.832*** (5.634)
AR(1) P-value	0.007	0.009	0.009	0.024
AR(2) P-value	0.292	0.264	0.202	0.181
Hansen test P-value	0.546	0.690	0.146	0.514

Notes: Standard errors are in parentheses ***p < 0.01, **p < 0.05, *p < 0.1. Return on assets (ROA) is the dependent variable in Model 3; L.ROA is the lagged ROA (lagged dependent variable); CCC*CTA is the interaction variable between cash conversion cycle (CCC) and corporate tax avoidance (CTA); sales growth (SG), leverage (LEV), and firm size (SIZE) are control variables. First- and second-order serial correlations are measured by AR(1) and AR(2), respectively; The Hansen test of overidentifying restrictions measures the validity of instruments and determines whether models have been accurately defined.

In the context of US-based firms, when CCC and CTA interact with each other, it leads to a negative effect on ROA (Table 6). According to the result, when US-based firms simultaneously engage in CTA and have a longer CCC, it results in a decrease in their ROA. This result indicates that the combination of these two factors has a detrimental impact on the financial performance of US-based firms. It emphasises the significance of considering both the efficiency of cash conversion and the extent of CTA when evaluating the overall profitability of these firms.

This deviation from the general outcome in Table 5 can be attributed to several factors. US-based entities that engage in tax avoidance may encounter elevated equity costs (Goh et al., 2016) and increased expenses associated with debt (Dhawan et al., 2020). Tax-avoidant firms might face higher costs of equity capital due to investors perceiving them as riskier, and they may also experience higher borrowing costs as lenders view them as more risky borrowers. These heightened financial costs can undermine the benefits derived from tax savings, ultimately resulting in US firms' reduced profitability.

Contrary to US firms, firms in the UK, Germany, and China show a positive correlation between CCC*CTA and ROA (Table 6). The divergent outcomes can be attributed to various factors. In the UK, the legality of tax avoidance and the availability of tax evasion schemes for corporate entities may explain the differences (Sikka, 2015). In China, the government's proactive implementation of 'tax and fee reduction' initiatives has reduced the tax burden on domestic firms, promoting economic well-being and market confidence (Han et al., 2021). Germany's high uncertainty avoidance score, indicating a strong inclination to mitigate uncertainty, is noteworthy. In the context of EPU, German firms may face decision-making difficulties and postpone investments. Adopting CTA as a hedging strategy becomes a pragmatic approach to manage associated risks.

Therefore, it is crucial to consider these country-specific factors when analysing the relationship between CCC*CTA and ROA. This is because there is a growing interest among firm managers in utilising tax avoidance as a means of funding essential business operations (Minh Ha et al., 2021). The heightened attention towards tax avoidance is driven by the recognition that taxes have a significant impact on corporate financial decisions, including risk management and organisational structure (Zhang et al., 2018). As a result, modern firm managers acknowledge the potential benefits of using tax avoidance as a source of financing for their operations. Taxes play a pivotal role in various financial decisions, and by directing tax savings into investments, firms can strengthen their value and ultimately achieve improved performance.

5. Conclusion

Managing working capital effectively and its subsequent impact on firm performance become crucial considerations amid global economic policy

uncertainty. This study seeks to investigate how GEPU affects WCM practices and firm performance.

The study reveals a significant and negative correlation between GEPU and the CCC. As GEPU levels increase, businesses tend to expedite the conversion of working capital investments into cash as a strategic response to the uncertain economic environment. Additionally, the interaction term $CCC*GEPU$ shows a positive correlation with ROA, indicating that the interaction between CCC and GEPU has a detrimental effect on ROA, highlighting the complexities of managing WC under heightened economic uncertainty.

Furthermore, the research explores the impact of the interaction between CTA and WCM on firm performance. The study consistently demonstrates that the interaction term $CCC*CTA$ has a significant and positive impact on ROA. When the CCC aligns with effective tax avoidance strategies, a synergistic effect emerges. Firms that effectively manage working capital while employing prudent tax avoidance tactics can benefit from both reduced taxes and optimized WC, leading to improved efficiency in the CCC and overall ROA.

However, it is crucial to note that these findings pertain to the entire sample encompassing the USA, the UK, Germany, and China. When scrutinising the influence of the $CCC*CTA$ interaction on ROA at the country level, a nuanced scenario unfolds. The research reveals a negative impact of this interaction on ROA for US firms, whereas there is a positive impact for firms in the UK, Germany, and China.

In conclusion, the interaction between the CCC and CTA significantly influences a firm's ROA, with strategic management enhancing liquidity, cash flows, and profitability. However, achieving this balance requires a cautious approach that considers both short-term gains and long-term sustainability, particularly amid economic uncertainty. Consequently, during market volatility, businesses may resort to tax avoidance strategies to bolster working capital and enhance firm performance, highlighting the significance of supportive tax policies during periods of global economic policy uncertainty. Thus, this study contributes to the literature on operational hedging through corporate tax avoidance.

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