Article

Board characteristics and corporate cash holding: evidence from the UK, France and Germany

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Abstract

Purpose - Prior studies suggest that corporate cash holding will reflect firms' corporate governance environment. Consistent with this prediction, this study examines the impact of board characteristics on firms' cash holding in the UK, France, and Germany.

Methodology-Using 2805 firm-year observations between 2009 and 2019, we examine the relationship between board characteristics and corporate cash holding. We employed cash two measures of cash holdings as our dependent variables. As independent variables, we used corporate governance characteristics relevant to effective board monitoring such as board meeting, outside director, board size and board gender diversity.

Findings-We find that board characteristics influence firms' cash holdings of firms in the UK, France and Germanys. However, we document evidence of varying impacts of board monitoring on the cash holding of the UK when compared to German, and French firms, which are countries that are classifiable as bank-based economies. The result of this study is robust to alternative cash holding measures and endogeneity.

Implications- Our study provide evidence supporting the board's impact in mitigating agency conflict in shareholder-oriented and stakeholder-oriented corporate governance environments.

Originality/value- We contribute to previous works on firms' financial orientation by showing that the impact of board characteristics on corporate cash holdings varies between bank-based and market-based economies

***Keywords*:** Board characteristics; Cash holding; Bank-based economies; Market-based economies; Corporate governance

1. Introduction

The relationship between corporate board characteristics and cash holding is yet to be established by finance literature. However, one of the channels through which board characteristics influence firms' cash holding in a market-based (shareholder-oriented) economy is limiting the cash available to managers (Jensen and Meckling, 1976, Jensen, 1986). Following the earlier view of managers' plundering incentives (Berle and Means, 1932), the Anglo-Saxon literature suggests that the board is a monitoring institution (Hermalin and Weisbach, 1991) and a mechanism for internal control (Fama, 1980). Consequently, studies found that shareholders' right is inversely related to corporate cash holding (Kusnadi and Wei, 2011, Dittmar et al., 2003).

One crucial question that needs to be addressed is whether the impact of the corporate board on cash holding differs among firms in the UK, France and Germany, given the distinction between bank-based and market-based economies (Demirgüç-Kunt and Maksimovic, 2002, Ezeani et al., 2022b). Therefore, we examine whether board characteristics influence UK firms' cash holding differently than firms in France and Germany. Although our sample firms are all European firms, studies suggest variation in their financial orientation and corporate governance environment (Jackson and Moerke, 2005, Feils et al., 2018, Fauver and Fuerst, 2006, Ezeani et al., 2022a, Ezeani et al., 2022b).

The UK is a typical example of a European market-based economy alongside Ireland and Scandinavian countries. On the other hand, France, Germany, and the majority of European union countries have a bank-based environment (Demirgüç-Kunt and Levine, 1999). One unique feature of bank-based economies is firms' closeness to their lenders and weaker shareholder protection (Ezeani et al., 2022b, Bats and Houben, 2020). These factors are likely to influence firms' cash holding. Therefore, UK, France and Germany provide an attractive setting to examine how board characteristics affect corporate cash holding.

Our motive for examining the impact of board characteristics on corporate cash holding of UK, French and German firms is as follows. First, previous studies on corporate cash holding have popularised the Anglo-Saxon agency approach as a good corporate governance system (Hackethal et al., 2005) and a benchmark for evaluating the board's monitoring effectiveness. Secondly, the prevailing stakeholder approach in a bank-based environment emphasises resolving agency conflict through a collaborative approach (Ezeani et al., 2022b). In contrast to the arms-length approach in the Anglo-Saxon CG model, banks are actively involved in controlling the firms financed (Hackethal et al., 2005). Finally, studies show varying CG environments even among bank-based economies (Dore, 2005, Jackson and Moerke, 2005, Ezeani et al., 2022b).

Using 2805 firm-year observations between 2009 and 2019, we examine the impact of board characteristics on firms' cash holding in bank-based and market-based economies. We show that board characteristics are determinants of corporate cash holding across these three European countries. Specifically, our findings show that board gender diversity is inversely related to corporate cash holding among the UK, German and French firms. Similarly, board size negatively influences cash holding in the UK and France. However, it shows a positive impact on German firms' cash holding. Outside director and board meeting frequency negatively affect UK firms' cash holding but are positively related to cash holding among German and French firms. We find that board characteristics have varying impacts on firms' cash holding in the UK compared to France and Germany. This result may be due to differences in the corporate governance environment of each country. We performed an additional analysis using an alternative cash-holding proxy and documented similar evidence. After separating our sample to reflect shareholder and stakeholder CG environment, our result remains unchanged.

We also examined the impact of board characteristics on cash holding for firms with a high and low level of leverage. We find that board gender diversity, outside directors and board size constraints cash holding for under-leveraged firms in the UK, France, and Germany. Our result also shows an inverse relationship between board meeting frequency and leverage for the UK and French

firms but no relationship for German firms. We document a weak negative relationship between board gender diversity and cash holding for overleveraged firms. Surprisingly, we find a positive relationship between the outside director, board size and cash holding. T-test results show significant variation among all study variables. Overall, our study provides evidence that the impact of the board in mitigating agency conflict varies between bank-based and market-based economies.

We make the following contributions to the previous literature. First, we extend the existing literature on bank-based and market-based economies (Demirgüç-Kunt and Maksimovic, 2002, Ezeani et al., 2022b, Ezeani et al., 2022a). We document the impact of board characteristics on corporate cash holding using evidence from three major European countries (the UK, France, and Germany) with varying financial orientations.

Second, we provide evidence that board characteristics in the UK (as a market-based economy) constrain cash available to managers. This finding aligns with the agency literature (Jensen and Meckling, 1976, Jensen, 1986, Dittmar et al., 2003). We show that the UK board promotes shareholders' interests, unlike Germany and France. Finally, we find that the impact of board characteristics on cash holding depends on the financial orientation of the economy.

Our paper proceeds as follows: Section 2 discusses the institutional background and reviews relevant literature. In section 3, we outline our methodological approach. We present our main findings and robustness test in section 4. Finally, we used section 5 to conclude our study.

2. Related Literature

2.1 Institutional Background

The corporate governance (CG) model of bank-based countries such as Germany and France differs from the model used in the UK, which is a shareholder-oriented system (Ezeani et al., 2022b, Ezeani et al., 2022a). La Porta et al. (1997) pointed out that investors' rights have priority in the shareholder-oriented system, such as in the UK. In market-based economies, shareholders are directly responsible for selecting board members (Ball et al., 2000). Therefore, the

board of directors are likely to promote shareholders' interest by reducing firms' cash available to managers (Jensen, 1986), ensuring that managers do not use firms' financial resources for perquisite consumption. Due to the shareholder orientation in market-based economies, stakeholders' interest is not the board's priority.

However, most bank-based countries, such as Germany and France, have a stakeholder-oriented governance system that differentiates them from market-based systems (Ezeani et al., 2022a). In bank-based economies, firms are not entirely dependent on the stock market to raise finance since banks provide long-term and short-term funding (Levine, 2002, Bats and Houben, 2020). The prevalent CG model in bank-based economies ensures that the interests of various stakeholders are relatively balanced. This stakeholder approach in a bank-based environment ensures that agency issues are resolved collaboratively (Ezeani et al., 2021). This collaborative approach implies that firms have a less precautionary motive in bank-based economies. They work with banking industry stakeholders to provide the required monitoring (Feils et al., 2018).

The board structure also reflects the variation in the corporate governance environment of bank-based and market-based systems. Germany operates a two-tier board consisting of the management and the supervisory board (Fauver and Fuerst, 2006, Jackson and Moerke, 2005). Creditors and employees are represented through the supervisory board (Aufsichtsrat), ensuring their participation in firms' decision-making. In Germany, employee representation is guaranteed through the co-determination principle (Fauver and Fuerst, 2006), and employees' co-determination is one of the distinguishing features of the German CG approach.

French firms can adopt either a two-tier board system or a unitary system. Antal and Sobczak (2007) highlighted that the employees' involvement and collectivism are at the heart of the French firms' work council arrangement. Although the corporate governance system is stakeholder-oriented, France shifted toward a market-based system in the mid-1990. For instance, Morin (2000) pointed out the reorganisation of the stock market and the increasing role of institutional investors as

ways France tried to diversify firms' sources of finance. However, as a bank-based system, France maintained its stakeholder approach and the role of banks in firm's financing. Taking these differing corporate governance systems into consideration, it would be interesting to investigate whether the board characteristics of the firms have a similar impact on the cash holding of bank-based and market-based economies.

2.2 Motives for corporate cash holding

Prior studies have outlined motives for managerial cash stockpiles. These studies stated that firms' cash holding is mainly due to precaution (Doan and Iskandar-Datta, 2020, Opler et al., 1999). Other studies suggest the relevance of information asymmetry in firms' cash-holding decisions (Myers and Majluf, 1984, Kale and Noe, 1990, Obenpong Kwabi et al., 2022). From the agency theory perspective, firms' cash holding can be a source of an agency cost (Jensen, 1986, Dittmar et al., 2003).

The precautionary approach to cash holding suggests that managers build high cash reserves to launch investment projects when the firm is in a difficult financial situation (Belghitar and Khan, 2013). In line with the pecking order theory, a higher cash ratio is only relevant when internal sources are unavailable, or a firm has difficulty obtaining external finance. Consistent with this study, firms in market-based economies may likely adopt a precautionary approach to cash holding, unlike those in bank-based economies.

Transaction cost theory is another theory used in explaining firms' cash holding. This theory suggests that the cost of transactions arising from converting cash substitutes into cash can explain the corporate cash stockpile (Keynes, 2018). Anecdotal evidence suggests that firms hold cash to execute a certain transaction. These studies indicate that firms accumulate more cash when there is greater friction in acquiring external finance. Consistent with the "financial constraints" arguments, an increase in finance cost or constraint on external finance can justify holding more cash.

The agency theory is another popular theoretical framework (Al-Najjar, 2014) that can motivate corporate cash holding (Chen et al., 2020a, Dittmar et al., 2003) in an Anglo-Saxon corporate governance environment. Since managerial discretion is used in firms' cash holding, liquid asset makes it easier for managers to extract private benefits. Jensen (1986) suggests that managers are likely to misuse cash for personal benefits and build a high cash level to shield themselves from scrutiny and market discipline. Therefore, corporate cash holding may result from a conflict of interest between managers and owners.

Consistent with the agency framework, the Anglo-Saxon board will likely influence firms' cash holding by reducing cash available to managers. However, in a bank-oriented environment like France and Germany, the board does not see managers as self-interested agents (Feils et al., 2018, Vitols, 2005, Lehmann and Weigand, 2000). The prevalent (stakeholder) approach aims at a collaborative approach when resolving agency conflict (Ezeani et al., 2022b, Ezeani et al., 2022a). Banks also play an active role in firm monitoring (Feils et al., 2018), thereby reducing the agency cost of cash holding.

2.3 Board characteristics and corporate cash holding

There are various motives for managers to hold cash. Prior studies argued that managers store cash reserves for precautionary purposes and to reduce transaction costs (Doan and Iskandar-Datta, 2020). Firms' precautionary motive is to avert difficulties in gaining external finance, especially during uncertain times. In line with these motives, building a higher cash reserve level enhances the shareholders' wealth and launches investment projects when the firm is in a difficult financial situation (Belghitar and Khan, 2013). However, excessive cash holdings cause agency problems due to the separation of control and ownership. As cash is a liquid asset, it gives managers the freedom to decide when and how to spend the cash, which may lead to the extraction of private benefits (Jensen and Meckling, 1976).

Studies based on the transaction cost argument suggest that transaction costs arise due to cash conversion (Miller and Orr, 1966, Keynes, 2018). Thus, firms hold cash to reduce the cost of transactions associated with external financing and avoid cash shortfall (Keynes, 2018). This 'financial constraint' argument suggests that an increase in finance cost and the possibility of friction motivate cash holding. However, it is not yet established whether the transaction cost argument applies to firms in a different corporate governance environment due to variation in sources of finance.

Other studies based on agency considerations suggest that corporate cash holding can incur an agency cost (Jensen, 1986, Dittmar et al., 2003). At the heart of this argument is managers' ease of extraction of private benefits given a higher cash ratio. Jensen (1986) argues that managerial discretion in cash holding decisions results in the misuse of cash. Consistent with this argument, studies in the Anglo-Saxon environment suggest that agency conflict can influence corporate cash holding in market-based economies (Ozkan and Ozkan, 2004, Harford et al., 2008). In a market-based environment, the board's role is to ensure that managers do not misuse firms' resources, including liquid assets. The Anglo-Saxon corporate board mitigate managerial opportunism by ensuring that managers have fewer cash resources at their disposal (Dittmar et al., 2003). Jensen (1986) suggests that the board can use debt to reduce cash available to agents.

Despite the appeal of this agency-based argument, it is not yet known whether agency theory can explain cash holding in a bank-based environment. Studies in bank-based economies report a stakeholder-oriented approach to corporate governance (Feils et al., 2018, Dore, 2005). In this unique corporate governance system, managers are not considered self-interested agents. Also, unlike in the Anglo-Saxon environment, the board's aim is not to monitor managers but to build a stable coalition among all stakeholders (Tran, 2014). In the bank-based system, lenders play an important monitoring role and provide financial resources to firms (Ezeani et al., 2021). Unlike the unitary board in the UK, Germany has a dual board consisting of management and supervisory

board. Similarly, French firms are allowed to adopt a dual board system. Germany also has a co-determination principle through which employees can participate on the board, while French firms involve their employees through the work council. Thus, it is likely that the variation in the corporate governance environment will influence the cash holding of firms in bank-based and market-based economies.

Although prior studies recommended that the solution to resolve the agency problem is through effective monitoring by the corporate board (Fama, 1980, Rhode and Packel, 2014, Elmagrhi et al., 2017). Empirical evidence shows that the financial system has an implication on corporate governance arrangement (Ezeani et al., 2021, Chen et al., 2020b, Dore, 2005, Jackson and Moerke, 2005). Therefore, in the following section, we will discuss the impact of board characteristics on cash holding of the UK, German and French firms to develop our study's hypotheses.

2.3.1 Board gender diversity and corporate cash holding

Previous studies argue that the gender diversity of a corporate board has a positive impact on the quality of its discussion and its oversight ability (Adams and Ferreira, 2009, Gul et al., 2011, Brieger et al., 2019). It is claimed that the presence of female directors on the board improves the monitoring process of the board as they are more independent and risk-averse compared to male directors (Elmagrhi et al., 2019, Liu et al., 2020). Female directors are shown to be tough monitors and require greater accountability and fairness (Srinidhi et al., 2011). Such attributes are beneficial in mitigating agency relationships relating to cash holding. In line with these studies, we argue that gender-diverse boards will improve information flow, encourage greater openness, and limit managers' ability to accumulate excess cash. In particular, the presence of women on UK boards will result in low-risk strategies that enhance debt's disciplining effect (Jensen, 1986). This strategy restrains managers from gaining personal benefits (Ozkan and Ozkan, 2004).

However, since corporate cash holding is unlikely to result in an agency conflict, we suggest that female directors in bank-based countries oppose higher leverage. Ezeani et al. (2021) find that board gender diversity is inversely related to leverage in bank-based economies, suggesting a positive relationship with cash holding. Hence, we propose the following hypothesis:

H1: Board gender diversity is negatively related to the cash holding for the UK and positively related to cash holding among German and French firms.

Gender dimprovlbPVthThOveholdEmpconcrelat& Xiof sh2011)groupthink firms; thus womendiscussion among bmonitors (CTherefore, we propose the following hypothesis:

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One of the critical roles of outside directors is to monitor the management decisions on behalf of shareholders (Chen, 2008). To protect the interests of shareholders, the Cadbury report (1992) emphasized the need for independent directors. A board is considered independent if managers do not influence its decisions. Previous studies documented that outside director are essential in aligning managerial decisions to the interest of owners (Chen et al., 2020b, Ozkan and Ozkan, 2004, Chiang et al., 2020). For instance, the UK Cadbury Report (1992) pointed out that outside directors help in reducing agency costs.

The prevailing agency logic in the shareholder-oriented economy assumes that managers

are self-interested agents whose intention is to invest cash inefficiently (Jensen, 1986, Opler et al., 1999). Therefore, since cash holdings increase the risk of expropriation, it is expected that outside directors will reduce the level of cash holding. In line with previous studies (Kim et al., 2007, Helland and Sykuta, 2005), we argue that the outside directors in the UK will protect the interest of firms' shareholders, which implies a negative relationship with cash holding. However, in bank-based economies, the prevailing stakeholder approach emphasises resolving agency conflict through a collaborative approach (Ezeani et al., 2021) by involving all stakeholders in the monitoring process. We argue that this relationship among stakeholders will positively affect cash holding. Therefore, we propose the following hypothesis:

H_2: Outside director is positively related to cash holding among French and German firms and negatively related to the cash holding of UK firms.

2.3.3 *Board size and corporate cash holding*

The ability of the board to monitor effectively depends on cooperation and ease of communication linked with the board size. Previous studies suggests that the board moderates managerial opportunism (Salem et al., 2020, Salem et al., 2021, Komal et al., 2021, Usman et al., 2022a, Usman et al., 2022c, Usman et al., 2022b, Tan et al., 2022). Other studies highlight the impact of the board on firms financial decisions (Ezeani et al., 2022b, Ezeani et al., 2022a, Owusu et al., 2022). Ezeani et al. (2022a) argues that the purpose of the board determines its size. Consistent with the agency theory, Steiner (1972) suggests that smaller board are more effective. The author pointed out that the coordination of the board might suffer due to larger board size. Similarly, agency theory posits that smaller boards are more efficient in monitoring roles (Pillai and Al-Malkawi, 2018). Nevertheless, larger boards may cause the information asymmetry problem that increases agency costs, leading to higher cash holdings.

Compared to the UK, the board size of Germany and France is relatively large. Therefore, board size is expected to be positively related to German and French companies' cash holdings and negatively related to UK firms' cash holding. Hence, we formulate the following hypothesis:

H_3: Board size is positively related to the cash holding of the French and German firms but negatively related to the cash holding of UK firms.

2.3.4 *Board Meetings and Corporate Cash holding*

Prior studies show that board meeting is not a vital control mechanism (Vafeas, 1999, AlHares et al., 2020). Jensen (1993) and Vafeas (1999) argue that the frequency of board meetings is not necessary for exerting control on managers since the directors spend less time on important issues. However, other studies in the Anglo-Saxon environment show that board's meeting frequency is likely to protect shareholders' interest (Brick and Chidambaran, 2010, Hsu et al., 2015). The relevance of meeting frequency is because the boards who devote more time to monitor management actions (through regular meetings) are likely to restrain managers from gaining personal benefits to the firm's detriment (Conger et al., 1998, Sharma et al., 2009).

Stakeholder groups (with different views) are represented in French and German stakeholder-oriented CG systems. Since the interest of some stakeholders (employees and creditors) are not aligned with those of shareholders, we expect that the board meeting will have a positive impact on cash holding. Therefore, we test the following hypothesis:

H_4: Board meeting is positively related to the cash holdings of the French and German firms and negatively related to the cash holding of the UK firms

3 Research Method

3.1. Data and method

Our sample is from three major European economies. France and Germany are classified as bank-based economies, while the UK is considered a market-based economy (Antoniou et al., 2008). We selected these countries due to their varying financial tradition and corporate governance environment (stakeholder and shareholder-oriented CG). Our study period is between 2009-2019 to account for recent changes in firms' corporate governance environment in these European countries.

To examine the impact of board characteristics on cash holding, we considered well-established firms in our sample. We selected FTSE 100 index for the UK sample, SDAX and MDAX, and DAX index for German firms and SBF 120 index for the French sample. Mining, utility, and financial industries are excluded to ensure the robustness of our result since these industries have specific regulations. Firms with missing variables are excluded from our sample since the panel data model used in our study relies on consecutive observation. We collected all study data from the Data Stream. GDP and Inflation data are extracted from World Bank database. Our final sample consists of 704, 902 and 1199 firm-year observations for German, French and UK firms.

3.2. Measuring Dependent and Independent Variables

3.2.1 Measurement of dependent variables

We minimised the sensitivity of explanatory variables to a particular measure of cash holding by employing two independent variables. Following previous studies (Han and Qiu, 2007, Dudley and Zhang, 2016, Florackis and Sainani, 2018), we employed cash and cash equivalent over the total assets as our primary cash holding measure. Consistent with Marwick et al. (2020), we used cash and equivalent over the net asset as an alternative measure of cash holdings.

3.2.2. Measurement of Independent Variables

As explanatory variables, we employed corporate governance characteristics relevant for efficient monitoring of the board. These variables are board meeting (BM), outside director (OUT_DR), board size (BZ) and board gender diversity (BGD). These corporate governance variables are useful for effective monitoring (Ezeani et al., 2022b). Prior studies suggest that board meeting is an important monitoring mechanism that helps in protecting the interest of shareholders (Brick and Chidambaran, 2010, Hsu et al., 2015). BM is measured as the number of yearly meetings held by the board. It is also well documented that outside directors provide effective monitoring (Chen et al., 2020b, Ozkan and Ozkan, 2004, Chiang et al., 2020). We measure OUT_DR as the percentage of non-executive directors represented on the board. Studies argue that board size influences its monitoring effectiveness (Pillai and Al-Malkawi, 2018, Ezeani et al., 2022b). BZ is calculated as the total number of directors on the board. We also controlled for board gender diversity since female directors influence the quality of board's discussion and its oversight ability (Adams and Ferreira, 2009, Gul et al., 2011, Brieger et al., 2019). We measure BGD as the the number of female directors on the board.

3.2.3. Control variables

To isolate the impact of board variables on corporate cash holding, we included other variables that are shown to influence firms' cash holding (Ozkan and Ozkan, 2004, Opler et al., 1999, Doan and Iskandar-Datta, 2020). We controlled for profitability (PROF), asset tangibility (ASTANG), firm size (FSZ), growth opportunity (GRW_OP), liquidity (LIQ), cash flow (CFLO) and leverage (LEV). We controlled for GDP growth (GDP_GR) and inflation (INF).

Prior studies suggest that profitable firms are likely to hold more cash (Venkiteshwaran, 2011, Opler et al., 1999). Consistent with the pecking order theory, we expect profitable firms to hold more cash. We also isolated the effect of tangible assets following Titman and Wessels (1988) and Rajan and Zingales (1995). They suggest that firms with tangible assets are likely to acquire less costly debt finance, implying a negative relationship between tangibility and cash holding. Consistent with Titman and Wessels (1988) study, we argue that UK, German and French firms with tangible assets are less likely to hold cash.

Regarding firm size, Opler et al. (1999) show that large firms hold less cash. The size of a firm is also considered an inverse proxy of financial distress (Rajan and Zingales, 1995). We also controlled for growth opportunity since D'Mello et al. (2008) found that firms with growth opportunities have a higher level of cash. Similarly, Doan and Iskandar-Datta (2020) show that higher cash levels help firms with growth opportunities mitigate the cost of external financing. Following Lipson and Mortal (2009) and Kling et al. (2014), we isolate the effect of liquid assets. These studies found that firms with liquidity needs increase their cash holding. We also controlled for leverage since the agency theory of free cash flow (Jensen, 1986) suggest that managerial cash holding is reduced through leverage. A firm's leverage level also indicates its ability to obtain external debt finance (Ferreira and Vilela, 2004) and suggests an inverse relationship with cash holding. The trade-off theory suggests that the benefits of a tax shield will drive firms to reduce their cash holding. In line with this argument, we controlled for the impact of firms' income tax. Finally, we controlled for cash flow following Bates et al. (2009) who argues that firms with

positive cash flow can easily accumulate cash. See appendix 1 for the measurement of control variables.

After Hausman tests, we examined the impact of board characteristics on cash flow using a fixed-effects model. The benefit of the fixed effects model is its controls for the unobserved heterogeneity (Wooldridge, 2005). We test our hypothesis using the following specification

$$CashTAit = \beta 0i + \beta 1\ BGD_{i,t} + \beta 2\ OUT\_DR_{i,t} + \beta 3\ Bz_{i,t} + \beta 4\ BM_{i,t} + Controls + \delta i + \varepsilon it \quad (1)$$

$$CashNAit = \beta 0i + \beta 1\ BGD_{i,t} + \beta 2\ OUT\_DR_{i,t} + \beta 3\ Bz_{i,t} + \beta 4\ BM_{i,t} + Controls + \delta i + \varepsilon it \quad (2)$$

Where CashTA represents cash and cash equivalents divided by total assets. CashNA is the cash and cash equivalent divided by the net assets. BGD is board gender diversity; OUT_DR is outside director; BZ is board size, and BM is board meeting. Controls represent the control variables (see table 1); δi is the firm fixed effect, and εit is a residual.

To confirm the robustness of our findings, we re-estimated equation 1 using system GMM and reported the result in table 9. Blundell and Bond (1998) maintain that the accuracy of the GMM estimates is unaffected by endogeneity and short-term panel bias. One of the advantages of the GMM system is that it employs the orthogonal condition between disturbances and the lag of explanatory variables in its estimation process. GMM system maintains its efficiency by exploiting all linear moment restrictions (Hansen, 1982). Following Blundell and Bond (1998), we controlled for heteroskedasticity using a two-step GMM. We also checked for the serial correlation issue using the Sargan test of overidentifying restriction. Finally, we controlled for the second-order autocorrelation by employing Blundell and Bond (1998) tests.

4 Results and discussion

4.1 Descriptive statistics

Table 1 shows the descriptive statistics of dependent variables, independent variables and control variables employed in the study. The overall sample indicates that, on average, cash and

cash equivalents are 12.1% of the total assets and 16.2% of net assets over the study period. French firms have a slightly higher CashTA value of 12.5% compared to 10.1% and 11.5% values of the UK and German firms, respectively, as shown in Table 1, panel A and B. The minimum value of CashNA and CashTA is zero in the UK and the full sample, which is unusual. However, this may be due to lack of data for some companies. We show that the reported CashNA value is higher for UK firms (16.7) of net assets than France and Germany.

Regarding board characteristics variables, the respective mean value of BGD is higher in Germany than in France and the UK. The reported statistics reflect the higher women board representation level in bank-based (stakeholder-oriented) economies. Also, bank-based countries have, on average, a higher number of outside directors. The descriptive statistics show that French firms have the lowest mean value of board meetings among the three countries. This low meeting frequency may be due to Viénot (1999) recommendation that the board convenes only when necessary.

…….....Insert Table 1 about here.....

…….....Insert Table 2 about here.....

Table 2 compares the mean value of CashTA, CashNa and key independent variables using T-Test. We found a significant difference among the UK, French and German samples. Following Gujarati and Porter (1999), who provided a cut-off coefficient of 80% for a severe collinearity issue, we found that the highest correlation (Coef = 0.586) is between OUT_DR and BZ (see Table 3). We used Variance Inflation Factor (VIF) to test for collinearity issue and reported the mean value of 1.16, which is below the threshold of 10 (see appendix 3). Our findings shows that there are no multicollinearity issues among our independent variables

…….....Insert Table 3 about here.....

4.2 Regression Analysis

Table 4 report the main results based on a full sample and individual countries. The dependent variable employed in our main analysis is CashTA, which is cash and marketable securities divided by total assets. Table 5 presents the result of an alternative analysis using our second proxy of cash holding, CashNA. We calculate CashNa as cash and marketable securities divided by net assets. Table 6 presents the comparative result that reflects the variation in the corporate governance environment of bank-based and market-based economies. We conducted an additional analysis by splitting our sample based on firms' degree of indebtedness, as shown in tables 7 and 8. Finally, Table 9 presents the robust results using the System GMM.

…….....Insert Table 4 about here.....

In Table 4, we present the result of the relationship between board characteristics and cash holding using CashTA as a key dependent variable. The independent variables are board gender diversity, outside director, board size, and board meetings. We controlled for firm-level factors likely to influence firms' cash holding. We find that board gender diversity is negatively related to cash holding in our sample countries. This result indicates that firms with more female representation in the board hold less cash. Although this is not consistent with our hypothesis, it suggests that more accountable female directors constrain managers' use of firms' cash resources. Srinidhi et al. (2011) and Komal et al. (2021) indicates that female directors are tough in their monitoring role and require greater accountability and fairness. Thus, we find that a gender-diverse board mitigates agency issues by limiting cash available to managers. Our result is also consistent with previous studies that show women's risk aversion (Barber and Odean, 2001, Adams and Ferreira, 2009, Komal et al., 2021).

As expected, OUT_DR is inversely related to the cash holding of UK firms but positively associated with the cash holding of German and French firms. This variation in the

estimated relationship between UK and European (French and German) firms is attributable to the differences in the roles of directors in bank-based and market-based economies. The Anglo-Saxon corporate governance literature suggests that the board is a monitoring institution (Hermalin and Weisbach, 1991). Our result is consistent with the expected role of outside directors in the market-based economies, which is to prevent managers from plundering firms resources. The positive relationship between OUT_DR and cash holding in Germany and France results from shareholder orientation in a bank-based environment. The collaborative monitoring approach in a bank-based system creates an atmosphere of trust and openness among board members.

Board size is inversely related to cash holding in UK and France but shows a positive impact on German firms' cash holding. Although the result contradicts our hypothesis, may be due to a more collaboration among the board and managers in German dual system of corporate governance. Unlike in France and UK with a unitary board, the broader representation of employees and creditors in the German dual board system creates more atmosphere of trust.

The board meeting has a negative effect on UK firms' cash holding but is positively related to the cash holding of German and French firms. This result is in line with the study's hypothesis. The literature in the Anglo-Saxon environment suggests that meeting is important in promoting the interest of shareholders (Conger et al., 1998, Sharma et al., 2009). However, the stakeholder orientation in bank-based economies is likely to account for the positive relationship in France and Germany. It implies that frequent board meetings in bank-based countries improve information sharing and cement firms' relationships with their lenders.

Using CashNA as an alternative proxy of cash holding, we examine the impact of board characteristics on corporate cash holding for the UK, German and French firms. We reported our findings in Table 5. Consistent with our main result, we find that board gender diversity is inversely related to cash holding in all countries. Outside directors have a negative relationship with cash holding in the UK. However, it shows a positive association with cash holding in France and

Germany. Board size is positively related to cash holding in Germany but shows a negative relationship in France and the UK. Similarly, the board meeting is inversely associated with cash holding in the UK but shows a positive relationship in Germany and France. Overall, our result remains unchanged after employing a different cash holding proxy.

…….....Insert Table 5 about here.....

Table 6 presents the results after dividing our sample to reflect two CG approaches (shareholder CG (UK) vs stakeholder CG (France and Germany). We confirmed an inverse relationship between board gender diversity and cash holding in all sampled countries, similar to the main result. This result may be explained by female directors' risk aversion (Elmagrhi et al., 2019, Liu et al., 2020). Outside director is positively related to cash holding in France and Germany but negatively affects UK firms. Board size is inversely related to cash holding in the UK. However, we find no relationship among German and French firms. Board meeting is positively related to cash holding in Germany and France, unlike the UK, where we document a negative relationship. Our result suggests that the impact of board characteristics on corporate cash holding depends on the environment examined.

…….....Insert Table 6 about here.....

In Tables 7 and 8, we reported an additional analysis for underleveraged and overleverage firms. We find that board gender diversity, outside director and board size constraints cash holding for under leveraged firms in France, the UK, and Germany. This relationship implies that board mechanisms are channelled towards reducing cash available to managers when firms' leverage level is low.

…….....Insert Table 7 about here.....

…….....Insert Table 8 about here.....

Board meeting is also negatively related to cash holding in the UK and France but show no relationship in Germany. We document a weak negative relationship between board gender diversity and cash holding for overleveraged firms. Surprisingly, we find a positive relationship between outside director, board size and cash holding. One possible explanation is that the board of overleverage firms may encourage cash holding to boost firms' opportunity of undertaking new project.

Tables 9 reports the robust results using GMM estimation. In line with the main result, we confirm an inverse relationship between BGD and cash holding across our study sample. Other board variables also show an inverse relationship with the cash holding of UK firms. Consistent with our main result, Outside director is positively related to German firms' cash holding. Board meeting also shows a positive relationship for firms in bank-based economies. Overall, we show that board characteristics have varying impacts on the cash holding of UK, German and French firms.

5 Conclusion

We examined the impact of board characteristics on firms' cash holding in bank-based (France and Germany) and market-based (UK) economies. This study is important because these three countries have distinct corporate governance environments and remarkable differences in their corporate governance environments. We find that board characteristics influence corporate cash holding in bank-based and market-based economies. Board gender diversity is negatively related to corporate cash holding for the UK, German, and French firms. This result implies that the presence of female board members limits cash available to managers in all countries in our sample. We also show that board size has a negative relationship with the UK and France cash holding and a positive impact on German firms' cash holding. Outside director and board meetings have an inverse relationship with cash holding of UK firms but are positively related to cash holding among German and French firms. Board meeting is inversely related to cash holding in the UK but shows a positive relationship in

Germany and France (see Table 10). We, therefore, document evidence that board characteristics have varying impacts on firms' cash holding in market-based and bank-based economies. We confirmed our main result after dividing the samples to reflect firms' corporate governance environment and employing an alternative proxy of cash holding.

Our findings contribute to previous works on firms' financial orientation by showing that the impact of board characteristics on corporate cash holdings varies between bank-based and market-based economies. Particularly, the negative relationship between BGD and cash holding has relevance for board composition and highlights the importance of board gender diversity in mitigating agency issues. The findings of this study are also beneficial to academics since it helps them to adopt a more balanced approach on how to manage agency relationship. Although we have made a significant contribution to understanding how board characteristics influence corporate cash holding by focusing on highly developed European economies, we recommend further studies using a larger sample of bank-based and market-based countries.

'The data that support the findings of this study are available from the corresponding author upon reasonable request'.

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Table1: Descriptive Statistics

Panel A

		Full sample						**UK**				
	Obs	Mean	Median	Std. Dev.	min	max	Obs	Mean	Median	Std. Dev.	min	max
CashTA	2,805	0.121	0.095	0.097	0	0.489	1,199	0.101	0.091	0.099	0	0.431
CashNA	2,805	0.162	0.131	0.125	0	0.365	1,199	0.167	0.13	0.136	0	0.365
BGD	2,805	23.59	20	18.77	0	43	1,199	20.69	18.18	16.15	0	38
OUT_DR	2,805	12.54	10.75	6.91	0	16	1,199	10.46	7.14	6.95	0	14.24
BZ	2,805	26.28	16	5.33	2	56	1,199	24.8	18.2	5.679	3	48
BM	2,805	5.48	4	3.52	1	12	1,199	4.03	6.4	3.704	1	12
PROF	2,805	0.084	0.074	0.081	-0.801	0.679	1,199	0.089	0.08	0.084	-0.801	0.404
ASTANG	2,805	0.243	0.194	0.203	0.001	0.964	1,199	0.254	0.18	0.223	0.001	0.953
FSZ	2,805	15.26	14.96	1.46	6.18	19.707	1,199	14.929	14.669	1.304	12.618	17.07
GRW_OP	2,805	1.97	1.80	24.19	-12.45	69.86	1,199	1.577	2.24	35.237	-1245.37	69.86
LIQ	2,805	1.252	1.08	1.58	0	29.27	1,199	1.223	0.93	2.194	0.03	29.27
CFLO	2,805	0.056	0.042	0.021	-21.3	1.14	1,199	0.042	0.083	0.024	-0.12	1.22
TX	2,805	0.145	0.293	9.576	-466	236.333	1,199	0.087	0.298	4.898	-95	85.976
LEV	2,805	0.247	0.235	0.155	0	0.75	1,199	0.243	0.234	0.142	0	0.722
GDP_GR	2,805	0.673	0.102	1.606	-5.697	4.179	1,199	0.001	0.011	0.076	-0.187	0.102
INF	2,805	1.934	1.954	1.168	0.038	5.2	1,199	2.471	2.55	1.305	0.4	5.2

CashTA= cash and marketable securities scaled by total assets, ***CashNA***= cash and marketable securities scaled by Net assets, ***BGD***= number of female directors on the board, ***OUT_DR*** = percentage of non-executive directors on the board, ***BZ***= number of directors on the board, ***BM***= number of meetings held by the board of directors annually, ***PROF***= ratio of operating profit to total assets' Book Value, ***ASTANG***= ratio of fixed assets to total assets, ***FSZ***= natural log of sales, ***GRW_OP***= book value of liabilities plus the market value of equity divided by book value of assets, ***LIQ***= total Current Asset divided by total Current Liability, ***CFLO***=Cash flow from operation scaled by total asset, ***LEV***=Book Leverage is measured as the ratio of the book value of total debt to total assets, ***GDP_GR***= is the annual growth in gross domestic product, ***INF***= the annual Inflation rate

Table1: Descriptive Statistics

Panel B

	France					Germany				
	Obs	Mean	Median	Std. Dev.	min	max	Obs	Mean	Median	Std. Dev.	min	max
CashTA	902	0.125	0.104	0.097	0.002	0.28	704	0.115	0.093	0.095	0.003	0.48
CashNA	902	0.142	0.135	0.116	0.004	0.26	704	0.152	0.128	0.113	0.004	0.36
BGD	902	26.01	20.20	9.72	0	46	704	26.36	20	3.155	0	52
OUT_DR	902	13.46	12	3.18	0	14	704	12.7	0	2.40	0	16
BZ	902	27.5	19.92	4.555	4	53	704	29.6	22	5.941	3	63
BM	902	3.38	3	1.38	2	13	704	4.69	5	1.702	3	12
PROF	902	0.101	0.091	0.072	-0.097	0.609	704	0.055	0.046	0.075	-0.467	0.679
ASTANG	902	0.215	0.141	0.207	0.001	0.964	704	0.255	0.234	0.146	0.015	0.744
FSZ	902	15.774	15.775	1.438	13.119	19.021	704	15.315	15.086	1.607	12.18	19.257
GRW_OP	902	2.189	1.67	1.992	-5.27	16.01	704	1.756	1.247	1.587	0.068	10.51
LIQ	902	1.186	1.12	0.605	0	4.52	704	1.389	1.24	0.768	0.18	5.87
CFLO	902	0.066	0.047	0.025	-11.3	1.56	704	0.057	0.049	0.018	-1.32	1.56
TX	902	0.198	0.178	0.515	-7.407	5.602	704	0.192	0.396	18.226	-466	236.333
LEV	902	0.259	0.248	0.151	0.001	0.737	704	0.24	0.217	0.181	0	0.75
GDP_GR	902	1.154	1.388	1.478	-2.873	2.83	704	1.408	1.465	2.521	-5.697	4.179
INF	902	1.413	1.603	0.829	0.038	2.813	704	1.512	1.562	0.673	0.313	2.628

	Mean			Mean		
Variables	**UK**	**France**	T-Test	**UK**	**Germany**	**T-Test**
CashTA	0.101	0.125	0.07*	0.101	0.115	0.010**
BGD	20.69	26.01	0.021***	20.69	26.36	0.006***
OUT_DR	10.46	13.46	0.001***	10.46	12.7	0.030***
BZ	24.8	27.5	0.031***	24.8	29.6	0.001***
BM	4.03	3.38	0.001***	9.03	4.69	0.023***

Variables	(1)	(2)	(3)	(4)	(7)	(8)	(9)	(10)	(14)	(15)

(1) CashTA	1.000									
(2) BGD	-0.088*	1.000								
	(0.000)									
(3) OUT_DR	-0.155*	0.283*	1.000							
	(0.000)	(0.000)								
(4) BZ	-0.024	0.236*	0.190*	1.000						
	(0.332)	(0.000)	(0.000)							
(5) BM	-0.192*	0.193*	0.232*	0.138*						
	(0.000)	(0.000)	(0.000)	(0.000)						
(6) PROF	0.109*	0.137*	0.063*	0.001						
	(0.000)	(0.000)	(0.012)	(0.984)						
(7) ASTANG	-0.096*	-0.025	-0.050*	0.044	1.000					
	(0.000)	(0.325)	(0.046)	(0.078)						
(8) FSZ	0.071*	0.037	0.141*	0.150*	0.064*	1.000				
	(0.004)	(0.134)	(0.000)	(0.000)	(0.011)					
(9) GRW_OP	0.004	-0.007	0.018	0.005	-0.019	-0.023	1.000			
	(0.870)	(0.765)	(0.470)	(0.843)	(0.441)	(0.352)				
(10) LIQ	0.285*	-0.061*	-0.094*	-0.041	-0.105*	0.119*	0.011	1.000		
	(0.000)	(0.014)	(0.000)	(0.099)	(0.000)	(0.000)	(0.647)			
(11) CFLO	-0.029	-0.048	0.022	-0.017	0.096*	0.016	0.001	-0.023		
	(0.243)	(0.054)	(0.375)	(0.504)	(0.000)	(0.512)	(0.968)	(0.354)		
(12) TX	-0.032	0.047	0.043	-0.030	0.025	-0.036	0.000	-0.006		
	(0.198)	(0.060)	(0.086)	(0.227)	(0.311)	(0.146)	(0.998)	(0.797)		
(13) LEV	0.090*	-0.354*	-0.190*	-0.159*	0.199*	0.032	-0.043	0.032		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.197)	(0.083)	(0.198)		
(14) GDP_GR	0.016	-0.058*	-0.039	0.012	0.001	0.003	-0.037	-0.055*	1.000	
	(0.512)	(0.019)	(0.119)	(0.635)	(0.969)	(0.896)	(0.141)	(0.029)		
(15) INF	0.036	-0.208*	-0.030	0.002	0.016	-0.059*	-0.047	-0.063*	0.588*	1.000
	(0.150)	(0.000)	(0.224)	(0.952)	(0.533)	(0.018)	(0.058)	(0.011)	(0.000)	

Table 3 Pairwise correlations – Panel B- (France)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) CashTA	1.000														
(2) BGD	-0.108*	1.000													
	(0.001)														
(3) OUT_DR	-0.016	0.742*	1.000												
	(0.610)	(0.000)													
(4) BZ	0.051	0.441*	0.465*	1.000											
	(0.112)	(0.000)	(0.000)												
(5) BM	-0.074*	0.496*	0.326*	0.366*	1.000										
	(0.021)	(0.000)	(0.000)	(0.000)											
(6) PROF	-0.037	0.213*	0.204*	0.098*	0.206*	1.000									
	(0.249)	(0.000)	(0.000)	(0.002)	(0.000)										
(7) ASTANG	-0.101*	-0.200*	-0.244*	-0.085*	-0.143*	0.036	1.000								
	(0.002)	(0.000)	(0.000)	(0.008)	(0.000)	(0.260)									
(8) FSZ	0.053	0.173*	0.156*	0.353*	0.108*	-0.209*	-0.135*	1.000							
	(0.095)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)								
(9) GRW_OP	0.013	0.062	0.078*	-0.018	0.086*	0.346*	0.093*	-0.197*	1.000						
	(0.677)	(0.052)	(0.014)	(0.572)	(0.007)	(0.000)	(0.003)	(0.000)							
(10) LIQ	-0.027	-0.051	-0.021	-0.048	-0.004	-0.033	-0.061	-0.067*	0.024	1.000					
	(0.401)	(0.113)	(0.502)	(0.134)	(0.889)	(0.307)	(0.056)	(0.036)	(0.459)						
(11) CFLO	-0.038	-0.083*	-0.075*	-0.008	-0.035	-0.098*	-0.063*	0.122*	-0.110*	0.019	1.000				
	(0.229)	(0.009)	(0.018)	(0.794)	(0.269)	(0.002)	(0.050)	(0.000)	(0.001)	(0.551)					
(12) TX	0.032	-0.098*	-0.068*	-0.042	0.003	0.014	0.005	-0.024	0.042	0.021	-0.012	1.000			
	(0.321)	(0.002)	(0.032)	(0.185)	(0.923)	(0.662)	(0.878)	(0.457)	(0.184)	(0.510)	(0.704)				
(13) LEV	-0.107*	-0.559*	-0.578*	-0.434*	-0.440*	-0.180*	0.330*	-0.302*	0.021	-0.010	0.074*	-0.001	1.000		
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.512)	(0.763)	(0.021)	(0.967)			
(14) GDP_GR	-0.033	-0.127*	-0.160*	-0.023	0.007	-0.005	0.005	-0.043	0.006	0.037	0.014	0.054	0.031	1.000	
	(0.298)	(0.000)	(0.000)	(0.481)	(0.838)	(0.885)	(0.881)	(0.173)	(0.846)	(0.249)	(0.654)	(0.093)	(0.329)		
(15) INF	-0.047	-0.053	-0.053	0.062	-0.051	0.008	0.017	-0.051	-0.051	-0.007	-0.007	-0.001	0.014	0.464*	1.000
	(0.137)	(0.099)	(0.096)	(0.052)	(0.110)	(0.798)	(0.594)	(0.108)	(0.111)	(0.827)	(0.836)	(0.982)	(0.672)	(0.000)	

Table 3 Pairwise correlations – Panel C- (Germany)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) CashTA	1.000														
(2) BGD	-0.053	1.000													
	(0.128)														
(3) OUT_DR	0.098*	0.384*	1.000												
	(0.005)	(0.000)													
(4) BZ	0.079*	0.266*	0.586*	1.000											
	(0.023)	(0.000)	(0.000)												
(5) BM	-0.058	0.065	0.045	0.109*	1.000										
	(0.095)	(0.060)	(0.199)	(0.002)											
(6) PROF	0.056	0.211*	0.220*	0.273*	0.067	1.000									
	(0.106)	(0.000)	(0.000)	(0.000)	(0.056)										
(7) ASTANG	-0.016	-0.008	-0.087*	-0.136*	0.023	-0.132*	1.000								
	(0.645)	(0.819)	(0.012)	(0.000)	(0.507)	(0.000)									
(8) FSZ	-0.049	-0.076*	0.073*	0.098*	0.102*	-0.013	-0.066	1.000							
	(0.163)	(0.028)	(0.036)	(0.005)	(0.003)	(0.703)	(0.059)								
(9) GRW_OP	-0.030	-0.148*	-0.197*	-0.179*	-0.093*	-0.156*	-0.035	-0.082*	1.000						
	(0.381)	(0.000)	(0.000)	(0.000)	(0.007)	(0.000)	(0.310)	(0.019)							
(10) LIQ	0.084*	-0.049	0.144*	0.100*	-0.081*	0.091*	0.111*	0.039	-0.120*	1.000					
	(0.016)	(0.163)	(0.000)	(0.004)	(0.020)	(0.009)	(0.001)	(0.256)	(0.001)						
(11) CFLO	-0.168*	-0.087*	0.075*	0.064	0.055	-0.010	0.022	0.249*	-0.131*	0.056	1.000				
	(0.000)	(0.012)	(0.032)	(0.064)	(0.114)	(0.764)	(0.528)	(0.000)	(0.000)	(0.104)					
(12) TX	-0.011	0.025	0.008	0.010	0.014	0.007	0.028	0.081*	-0.024	0.026	0.005	1.000			
	(0.741)	(0.477)	(0.813)	(0.776)	(0.678)	(0.837)	(0.427)	(0.020)	(0.494)	(0.454)	(0.895)				
(13) LEV	0.005	-0.335*	-0.288*	-0.489*	-0.166*	-0.395*	0.125*	-0.084*	0.169*	-0.101*	0.077*	-0.071*	1.000		
	(0.884)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.015)	(0.000)	(0.004)	(0.027)	(0.040)			
(14) GDP_GR	-0.006	-0.008	-0.035	-0.027	0.018	0.006	0.008	-0.004	0.011	-0.004	-0.021	0.003	0.017	1.000	
	(0.870)	(0.816)	(0.321)	(0.444)	(0.614)	(0.866)	(0.825)	(0.903)	(0.745)	(0.902)	(0.538)	(0.924)	(0.619)		
(15) INF	-0.023	-0.161*	-0.137*	-0.074*	0.004	-0.069*	0.008	-0.019	0.141*	-0.018	-0.025	0.023	0.063	0.410*	1.000
	(0.509)	(0.000)	(0.000)	(0.033)	(0.908)	(0.047)	(0.822)	(0.581)	(0.000)	(0.599)	(0.474)	(0.514)	(0.072)	(0.000)	

CashTA= cash and marketable securities scaled by total assets, ***CashNA***= cash and marketable securities scaled by Net assets, ***BGD***= number of female directors on the board, ***OUT_DR*** = percentage of non-executive directors on the board, ***BZ***= number of directors on the board, **BM**= number of meetings held by the board of directors annually, ***PROF***= ratio of operating profit to total assets' Book Value, ***ASTANG***= ratio of fixed assets to total assets, ***FSZ***= natural log of sales, ***GRW_OP***= book value of liabilities plus the market value of equity divided by book value of assets, ***LIQ***= total Current Asset divided by total Current Liability, ***CAPEX***=Capital Expenditure scaled by total asset, ***CFLO***=Cash flow from operation scaled by total asset, ***LEV***=Book Leverage is measured as the ratio of the book value of total debt to total assets, ***GDP_GR***= is the annual growth in gross domestic product, ***INF***= the annual Inflation rate

Table 4: Regression Result (CashTA)

Variables	Full- Sample	UK	France	Germany
BGD	-0.004	-0.006	-0.021	-0.007
	(0.09) ***	(0.08) ***	(0.02) ***	(0.07) ***
OUT_DR	0.001	-0.003	0.005	0.002
	(0.031) ***	(0.001) ***	(0.022) **	(0.043) ***
BZ	-0.008	-0.001	-0.002	0.004
	(0.079) **	(0.050) ***	(0.033) *	(0.058) **
BM	0.003**	-0.005	0.004	0.001
	(0.045) ***	(0.016) ***	(0.011) **	(0.009) ***
PROF	-0.025	-0.065	-.041	0.004
	(0.002) ***	(0.007) ***	(0.012) *	(0.09) ***
ASTANG	-0.028	-0.029	-.084	0.056
	(0.011) ***	(0.031) **	(0.032) ***	(0.005) *
FSZ	0.006	0.003	0.007	-0.003
	(0.080)*	(0.035) *	(0.028) ***	(0.017)
GRW_OP	-0.021	0.034	0.008	-0.002
	(0.004)	(0.028)	(0.040)	(0.021)
LIQ	0.005	(0.004)	-0.004	-0.003
	(0.096) ***	(0.012) ***	(0.081)	(0.014)
CFLO	0.012	0.041	0.001	0.073
	(0.062) ***	(0.018) **	(0.028) **	(0.093) ***
TX	0.008	-0.001	0.005	0.001
	(0.03)	(0.015)	(0.047)	(0.039)
LEV	-0.009	-0.002	-0.066	-0.014
	(00.67) ***	(0.013) ***	(0.007) *	(0.056)**
GDP_GR	-0.001	-	-	-
	(0.046) *	-	-	-
INF	0.002	-	-	-
	(1.061)	-	-	-
Constant	0.086	0.005	0.096	0.054
	(0.002) ***	(0.001) ***	(0.003) ***	(0.050) ***
R-squared	0.1146	0.3155	0.1607	0.1496
Hausman Prob> chi2	0.001	0.001	0.002	0.001

Note: ***CashTA***= cash and marketable securities scaled by total assets, ***CashNA***= cash and marketable securities scaled by Net assets, ***BGD***= number of female directors on the board, OUT_DR= percentage of non-executive directors on the board, ***BZ***= number of directors on the board, ***BM***= number of meetings held by the board of directors annually, ***PROF***= ratio of operating profit to total assets' Book Value, ***ASTANG***= ratio of fixed assets to total assets, ***FSZ***= natural log of sales, GRW_OP = book value of liabilities plus the market value of equity divided by book value of assets, ***LIQ***= total Current Asset divided by total Current Liability, ***CAPEX***=Capital Expenditure scaled by total asset, ***CFLO***=Cash flow from operation scaled by total asset, ***LEV***=Book Leverage is measured as the ratio of the book value of total debt to total assets, ***GDP_GR***= is the annual growth in gross domestic product, ***INF***= the annual Inflation rate. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Alternative Analysis (CashNA)

Variables	Full- Sample	UK	France	Germany
BGD	-0.003	-0.081	-0.051	-0.001
	(0.018) ***	(0.004) ***	(0.007) **	(-2.28)***
OUT_DR	0.002	-0.001	0.032	0.057
	(0.24) **	(0.003) *	(0.89) **	(1.55) **
BZ	-0.007	-0.053	-0.062	0.009
	(0.08)**	(0.035) **	(0.03) **	(0.060) *
BM	0.014	-0.003	0.005	0.001
	(0.019) ***	(0.075) *	(0.001) *	(0.28)**
PROF	0.05	0.119	-0.056	0.031
	(0.026) **	(0.003) ***	(0.081)	(0.045)
Astang	-0.045	-0.049	-0.098	0.068
	(0.025) ***	(0.003) ***	(0.060) ***	(0.009) **
FSZ	0.004	0.006	0.004	-0.002
	(0.086) **	(0.009) **	(0.85) ***	(0.044) **
GRW_OP	0.002	0.005	-0.001	-0.001
	(0.08)	(0.10)	(0.052)	(0.02)
LIQ	0.011	0.012	-0.003	-0.007
	(0.020) ***	(0.05) ***	(0.41) *	(0.075)*
CFLO	0.008	0.003	0.043	0.009
	(0.07) ***	(0.01) *	(0.062) **	(0.003)**
TX	-0.001	-.0002	-0.005	-0.001
	(0.94)	(0.36)	(0.88)	(0.56)
LEV	-0.002	-0.007	-0.074	-0.033
	(0.12) **	(0.31) *	(-1.63) **	(1.06) *
GDP_GR	-0.001	-	-	-
	(0.003)**	-	-	-
INF	0.002	-	-	-
	(1.54)	-	-	-
Constant	0.010	0.113	0.019	0.017
	(0.014) ***	(0.079) ***	(0.056) ***	(2.37) ***
R-squared	0.1907	0.3982	0.1034	0.1272
Hausman Prob> chi2	0.001	0.001	0.002	0.001

Note: CashTA= cash and marketable securities scaled by total assets, CashNA= cash and marketable securities scaled by Net assets, BGD= number of female directors on the board, OUT_DR= percentage of non-executive directors on the board, BZ= number of directors on the board, BM= number of meetings held by the board of directors annually, PROF= ratio of operating profit to total assets' Book Value, ASTANG= ratio of fixed assets to total assets, FSZ= natural log of sales, GRW_OP = book value of liabilities plus the market value of equity divided by book value of assets, LIQ= total Current Asset divided by total Current Liability, CAPEX=Capital Expenditure scaled by total asset, CFLO=Cash flow from operation scaled by total asset, LEV=Book Leverage is measured as the ratio of the book value of total debt to total assets, GDP_GR= is the annual growth in gross domestic product, INF= the annual Inflation rate. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Sensitivity Analysis (CashTA)

Variables	Shareholder (UK)	Stakeholder CG (France + Germany)
BGD	-0.004	-0.001
	(0.78) ***	(0.09) **
OUT_DR	-0.003	0.001
	(0.025) ***	(0.97) ***
BZ	-0.001	-0.001
	(0.015) **	(0.32)**
BM	-0.002	0.002
	(0.16) ***	(0.03) ***
PROF	0.065	-0.03
	(0.47) ***	(0.88) **
Astang	-0.029	-0.037
	(0.41) **	(1.44)
FSZ	0.003	0.002
	(1.76) **	(0.63) ***
GRW_OP	0.001	0.001
	(0.42) ***	(0.24) ***
LIQ	(0.004)	-0.003
	(0.12) ***	(0.82)
CFLO	0.041	0.002
	(0.18)	(0.37)
TX	-0.001	0.001
	(0.50)	(0.23)
LEV	-0.002	-0.024
	(0.13) **	(0.16)*
GDP_GR	-	0.001
	-	(0.09)
INF	-	-0.006
	-	(-2.37)***
Constant	0.105	0.137
	(0.50) ***	(0.07) ***
R-squared	0.3155	0.1397
Hausman Prob> chi2	0.001	0.001

Note: CashTA= cash and marketable securities scaled by total assets, CashNA= cash and marketable securities scaled by Net assets, BGD= number of female directors on the board, OUT_DR= percentage of non-executive directors on the board, BZ= number of directors on the board, BM= number of meetings held by the board of directors annually, PROF= ratio of operating profit to total assets' Book Value, ASTANG= ratio of fixed assets to total assets, FSZ= natural log of sales, GRW_OP = book value of liabilities plus the market value of equity divided by book value of assets, LIQ= total Current Asset divided by total Current Liability, CAPEX=Capital Expenditure scaled by total asset, CFLO=Cash flow from operation scaled by total asset, LEV=Book Leverage is measured as the ratio of the book value of total debt to total assets, GDP_GR= is the annual growth in gross domestic product, INF= the annual Inflation rate. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Additional Analysis - Underleveraged Firms (CashNA)

Variables	Full- Sample	UK	France	Germany
BGD	-0.045	-0.061	-0.071	-0.051
	(0.29)***	(0.68)***	(0.70) ***	(-0.26) ***
OUT_DR	-0.061	-0.021	-0.101*	-0.091*
	(0.20)	(1.37) ***	(1.10)	(0.62)
BZ	-0.001	-0.001	-0.001**	-0.001**
	(0.39)	(0.10) *	(0.17)	(0.19)
BM	-.002	-0.003	-0.003	0.001
	(0.74) ***	(0.98) ***	(0.47) ***	(0.33)
PROF	0.017	0.137	0.012	-0.042
	(0.57)	(3.17)***	(0.21) **	(0.78) *
ASTANG	-0.028	-0.022	-0.100	0.076
	(1.74) *	(1.32)	(1.56)	(1.44)
FSZ	0.002	0.004	0.007	0.008
	(0.80)	(1.41)	(1.15)	(0.14)
GRW_OP	0.002	0.002	0.001	-0.005
	(0.92)	(1.34)	(0.48)	(-1.77)*
LIQ	0.007	0.007	-0.002	-0.005
	(0.68) ***	(0.39) ***	(0.35)	(0.52)
CFLO	0.017	0.013	0.065	0.008
	(0.60)	(0.56)	(0.45) ***	(0.54) ***
TX	-0.001	0.004	0.008	-0.001
	(0.32)	(0.26)	(1.55)	(-0.24)
LEV	-0.035	-0.007	-0.005	-0.0305
	(1.22)	(0.17)	(0.08)	(0.71)
GDP_GR	-0.001	-	-	-
	(-0.86)	-	-	-
INF	-0.001	-	-	-
	(-0.28)	-	-	-
Constant	0.12	0.048	0.066	0.129
	(0.93) ***	(0.12) ***	(0.61) ***	(0.33) ***
R-squared	0.1189	0.2796	0.1130	0.1299
Hausman Prob> chi2	0.001	0.001	0.002	0.001

Note: CashTA= cash and marketable securities scaled by total assets, CashNA= cash and marketable securities scaled by Net assets, BGD= number of female directors on the board, OUT_DR= percentage of non-executive directors on the board, BZ= number of directors on the board, BM= number of meetings held by the board of directors annually, PROF= ratio of operating profit to total assets' Book Value, ASTANG= ratio of fixed assets to total assets, FSZ= natural log of sales, GRW_OP = book value of liabilities plus the market value of equity divided by book value of assets, LIQ= total Current Asset divided by total Current Liability, CAPEX=Capital Expenditure scaled by total asset, CFLO=Cash flow from operation scaled by total asset, LEV=Book Leverage is measured as the ratio of the book value of total debt to total assets, GDP_GR= is the annual growth in gross domestic product, INF= the annual Inflation rate. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Additional Analysis - Overleveraged Firms (CashNA)

Variables	Full- Sample	UK	France	Germany
BGD	-0.068	-0.072	-0.001	-0.001
	(-2.88) *	(-3.98) *	(-2.06)	(-1.91) *
OUT_DR	0.051	0.047	0.043	0.001
	(0.83) **	(1.73)	(0.23) **	(0.37) **
BZ	0.031	0.006	0.009	0.072
	(1.03) **	(0.27) ***	(1.14) ***	(1.65) **
BM	-0.002	-0.003	-0.004	0.002
	(2.60)	(0.85)	(0.92)	(0.68)
PROF	0.053	0.057	-0.069	0.092
	(1.68)*	(1.52)	(-0.73)	(1.19)
Astang	-0.037	-0.052	-0.051	0.087
	(0.25) **	(0.59) ***	(1.52)	(1.39)
FSZ	0.004	0.003	0.007	-0.004
	(1.58)	(0.87)	(1.49)	(0.99)
GRW_OP	-0.001	-0.001	-0.001	0.004
	(0.35)	(0.58)	(0.14)	(1.39)
LIQ	0.005	0.005	0.007	0.004
	(0.77) ***	(0.35) ***	(1.01)	(0.37)
CFLO	0.019	0.024	0.067	0.003
	(0.52)	(0.61)	(0.36)	(0.54)
TX	0.001	-0.001	-0.017	0.001
	(0.17)	(0.34)	(1.90) **	(0.49)
LEV	-0.019	-0.018	-0.157	-0.05
	(0.12)	(0.54) **	(-2.81) ***	(1.42) **
GDP_GR	-0.002	-	-	-
	(-1.56)	-	-	-
INF	0.004	-	-	-
	(2.08)**	-	-	-
Constant	0.065	0.136	0.14	.118
	(0.66) ***	(0.31) ***	(0.71) ***	(0.52) ***
R-squared	0.1146	0.3155	0.1607	0.1496
Hausman Prob> chi2	0.001	0.001	0.002	0.001

Note: CashTA= cash and marketable securities scaled by total assets, CashNA= cash and marketable securities scaled by Net assets, BGD= number of female directors on the board, OUT_DR= percentage of non-executive directors on the board, BZ= number of directors on the board, BM= number of meetings held by the board of directors annually, PROF= ratio of operating profit to total assets' Book Value, ASTANG= ratio of fixed assets to total assets, FSZ= natural log of sales, GRW_OP = book value of liabilities plus the market value of equity divided by book value of assets, LIQ= total Current Asset divided by total Current Liability, CAPEX=Capital Expenditure scaled by total asset, CFLO=Cash flow from operation scaled by total asset, LEV=Book Leverage is measured as the ratio of the book value of total debt to total assets, GDP_GR= is the annual growth in gross domestic product, INF= the annual Inflation rate. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Robustness Test – (GMM)

Variables	Full- Sample	UK	France	Germany
Lag (1)	0.377***	0.373***	0.303***	0.266***
	(0.032)	(0.033)	(0.035)	(0.029)
BGD	-0.045	-0.061	-0.029	-0.013
	(0.78) ***	(0.01) **	(0.31) **	(0.72) ***
OUT_DR	0.007	-0.004	0.034	0.021
	(0.12) **	(0.09) ***	(0.28)	(0.16)
BZ	-0.013	-0.062	-0.026	0.017
	(0.70) **	(0.11) **	(0.78) *	(0.20) ***
BM	0.012	-0.083	0.002	0.003
	(0.61) ***	(0.28) ***	(0.52) ***	(0.15) *
PROF	-0.046	-0.024	-0.038	-0.076
	(1.67) *	(0.68)	(0.59)	(1.37)
ASTANG	-0.001	-0.012	0.151	0.001
	(0.06)	(0.55)	(0.81) *	(0.01)
FSZ	0.001	-0.002	0.011	-0.008
	(0.05)	(0.65)	(0.59)	(0.35)
GRW_OP	0.001	0.001	-0.002	0.001
	(1.23)	(1.11)	(0.62)	(0.03)
LIQ	0.001	0.001	0.006	-0.016
	(0.99)	(0.89)	(0.82)	(1.28)
CFLO	0.072	0.025	0.039	0.006
	(0.01) ***	(0.36) ***	(0.75)	(0.44)
TX	0.071	-0.031	0.0221	0.031
	(0.52)	(0.53)	(0.16)	(0.44)
LEV	-0.021	-0.003	-0.046	-0.034
	(0.98)	(0.10)	(0.66)	(0.96)
GDP_GR	-0.001	-	-	-
	(-1.10)	-	-	-
INF	0.003	-	-	-
	(0.03) **	-	-	-
Constant	-0.017	0.157	-0.094	0.199
	(0.21) ***	(0.92) ***	(0.83) ***	(0.07) **
Sargan	0.313	0.221	0.305	0.262
AR1	0.135	0.129	0.120	0.115
AR2	0.248	0.231	0.208	0.209

Note: CashTA= cash and marketable securities scaled by total assets, CashNA= cash and marketable securities scaled by Net assets, BGD= number of female directors on the board, OUT_DR= percentage of non-executive directors on the board, BZ= number of directors on the board, BM= number of meetings held by the board of directors annually, PROF= ratio of operating profit to total assets' Book Value, ASTANG= ratio of fixed assets to total assets, FSZ= natural log of sales, GRW_OP = book value of liabilities plus the market value of equity divided by book value of assets, LIQ= total Current Asset divided by total Current Liability, CAPEX=Capital Expenditure scaled by total asset, CFLO=Cash flow from operation scaled by total asset, LEV=Book Leverage is measured as the ratio of the book value of total debt to total assets, GDP_GR= is the annual growth in gross domestic product, INF= the annual Inflation rate. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Summary of coefficient signs of main result				
	ALL SAMPLE	UK	France	Germany
BGD	Negative	Negative	Negative	Negative
OUT_DR	Positive	Negative	Positive	Positive
BZ	Negative	Negative	Negative	Positive
BM	Positive	Negative	Positive	Positive

Appendix 1: Variable Definitions.

Variable type	Variable (name)	Definition and measurement
Dependent variable	**CashTA** (Cash holding)	Cash and marketable securities scaled by total assets
	CashNA (Cash holding)	Cash marketable securities scaled by Net assets
Independent variables	**BGD** (Board gender diversity)	Board Gender Diversity, which is the number of female directors on the board
	OUT_DR (Outside director)	The percentage of non-executive directors on the board
	BZ (Board size)	Board Size, which is the number of directors on the board
	BM (Board meeting)	Number of meetings held by the board of directors annually
Control variables	**PROF** (Profitability)	Profitability, which is the ratio of operating profit to total assets' Book Value
	ASTANG (Asset tangibility)	The ratio of fixed assets to total assets
	FSZ (Firm size)	The natural log of sales
	GRW_OP (Growth opportunity)	The book value of liabilities plus the market value of equity divided by book value of assets
	LIQ	Total Current Asset divided by total Current Liability

	(Liquidity)	
	CFLO (Cash flow)	Cash Flow from operation scaled by total asset
	TX (Tax)	Current income tax divided by income before tax
	LEV (Leverage)	The ratio of the book value of total debt to total assets.
Country – effect - variables	**GDP_GR** (GBD Growth)	Gross Domestic Product, which is the annual growth in gross domestic product
	INF (Inflation)	Inflation, which is the annual Inflation Rate

Appendix 2: Sample selection criteria: 2009-2019

The initial Firm-year observation of non-financial firms	UK	France	Germany
	1287	979	770
Less: Firm-year with missing data	88	77	66
Final firm-year observations	1199	902	704
Total Observation	2805		

Appendix 3: Variance inflation factor

	VIF	1/VIF
OUT_DR	1.378	0.726
BGD	1.364	0.733
LEV	1.31	0.763
BZ	1.276	0.784
BM	1.208	0.828
INF	1.143	0.875
GDP_GR	1.128	0.887
FSZ	1.122	0.891
LIQ	1.1	0.909
PROF	1.074	0.931
ASTANG	1.07	0.935
CFLO	1.053	0.95
GROW_OP	1.005	0.995
TX	1.005	0.995
Mean VIF	1.16	

Additional analysis requested by reviewer 1 (which we do not intend to include in our paper)