How Do Chief Financial Officers Influence Corporate Cash Policies?

Chris Florackis[†] and Sushil Sainani*

Journal of Corporate Finance, Forthcoming

Abstract

This paper examines the extent to which Chief Financial Officers (CFOs) affect corporate cash holding policies. We construct an index (CFO index) that enables us to distinguish between "strong" and "weak" CFOs based on their ability to *influence* firm outcomes. We find that firms with strong CFOs hold substantially less cash than firms with weak CFOs, *ceteris paribus*. Importantly, the CFO effect documented in our study goes beyond the effect caused by the Chief Executive Officer (CEO) on cash holdings. Our findings provide the first direct empirical evidence that firms with strong CFOs are well positioned to hold less cash due to their relatively weak precautionary motive and superior ability to raise external financing during periods of financial stress. Consistent with an agency explanation, our results also show that strong CFOs fulfil a monitoring role in firms with higher agency costs.

JEL classification: G30, G32.

Keywords: Cash Holdings; Chief Financial Officer; CFO; Corporate Governance; Debt Issuance

✡ We would like to thank the editors (Douglas Cumming and Stuart Gillan) and two anonymous reviewers, which greatly improved the manuscript. We also thank Johannes Bersch, Cláudia Custódio, Marc Deloof, Ran Duchin, Andrew Ellul, Bill B. Francis, Mohamed Ghaly, Halit Gonenc, Udi Hoitash, Christodoulos Louca, Dev Mishra, Shawn Mobbs, Abdul Mohamed, Neslihan Ozkan, Ajay Patel, Dimitris Petmezas, Amedeo Pugliese, Raghavendra Rau, Kostas Stathopoulos, Yutong Xie, Ania Zalewska and conference/seminar participants at the EFMA Merton H. Miller Doctoral Students Seminar 2015 (Amsterdam), FMA European Conference 2016 (Helsinki), FMA Annual Meeting 2016 (Las Vegas), Multinational Finance Society 2016 (Stockholm), Portsmouth-Fordham Banking and Finance Conference 2016 (Portsmouth), World Finance Conference 2017 (Cagliari), Antwerp University, the University of Liverpool and the University of Manchester for their valuable feedback.

[†]Corresponding Author, Department of Accounting and Finance, University of Liverpool Management School, UK. ☎ +44(0)151 7953807; ✉ c.florackis@liv.ac.uk

*Department of Accounting and Finance, University of Liverpool Management School, UK. ☎ +44(0)151 7949942; ✉ s.sainani@liv.ac.uk

Electronic copy available at: https://ssrn.com/abstract=2932832

1 Introduction

In recent years, the role of the Chief Financial Officer (CFO) has evolved considerably and has expanded beyond the traditional controllership and compliance functions. Despite competing priorities, liquidity management is commonly placed at the top of the CFO agenda. A global survey of CFOs from 29 countries reveals that three of the four most highly ranked functions that create firm value are activities related to corporate liquidity management (see Lins et al., 2010).[1]

Cash holdings provide an important means through which firms ensure liquidity (Almeida et al., 2014), especially during periods of financial stress and limited access to credit (Campello et al., 2011). The extant literature focuses almost exclusively on the role of CEOs and how they affect corporate cash and other financial policies.[2] For example, Bertrand and Schoar (2003) look at CEOs' managerial styles; Liu and Mauer (2011) focus on CEO compensation incentives; Custódio and Metzger (2014) study CEOs' financial industry expertise; Bernile et al. (2017) analyze CEOs' early-life disaster experience; Deshmukh et al. (2017) focus on CEO optimism; and Ferris et al. (2017) examine CEO social capital.

This study extends prior research by focusing on CFOs, who have received much less attention in the literature, and sheds light on the question of how they matter to corporate financial policies. In particular, we firstly analyze the effect of CFOs on cash holding policies. In order to reconcile some of our findings on cash holdings, we also examine the extent to which CFOs facilitate access to external finance, especially during crisis periods, as well as the CFO effect on other corporate financial and investment policies.

A key feature of our study is the construction of an index (rendered, CFO index), which attempts to capture the ability of the CFO to *influence* key financial policies. To construct

[1] Several recent surveys involving global CFOs highlight the prominent role of liquidity management, especially in the nearly 10 years since the financial crisis. For example, according to the 2014 Michael Page's "CFO and Financial Leadership Barometer", 48.2% of a sample of 2,847 global financial leaders specify cash and liquidity management as a top company priority. The findings of several other surveys lead to similar conclusions. See e.g., "Strategic Priorities for UK businesses", Chartered Institute of Management Accountants and Robert Half Management Resources, 2010; "The Value of the Modern CFO: Board Directors' Perspective", Singapore CFO Institute and the ACCA, 2012; "Building the CFO Function: Roles and Responsibilities", Singapore CFO Institute and Singapore Management University, 2012.

[2] In the spirit of Opler et al. (1999), we refer "corporate cash policy" to the amount of assets held by a corporation in a liquid form; that is, cash and marketable securities. Precautionary-based (see e.g., Bates et al., 2009), transaction-based (see e.g., Opler et al., 1999) and agency-based motives (see e.g., Jensen, 1986) determine the way firms design their cash policy and the amount of cash and marketable securities held.

Electronic copy available at: https://ssrn.com/abstract=2932832

our measure, we draw on the literature concerning the association between managerial characteristics and firm outcomes, and in particular, on studies that aim to conceptualize and measure the power and influence of boards and their directors (see e.g., Hambrick, 1989; D'Aveni, 1990; Finkelstein, 1992; Pettigrew and McNulty, 1995; Golden and Zajac, 2001; Castanias and Helfat, 2001; Adner and Helfat, 2003; Adams and Ferreira, 2007; Güner et al., 2008; Masulis and Mobbs, 2011; Bedard et al., 2014). Our index is constructed by combining six CFO-specific attributes which, as analytically discussed in Section 2.2, directly relate to the capacity of the CFO to exert influence over corporate decisions. These are: (1) board membership; (2) outside board directorship; (3) seniority (as proxied by age and/or tenure); (4) level of financial expertise; (5) pay status (if the CFO is among the top three paid executives); and (6) relative pay status (compared to the CEO). Based on the CFO index, we distinguish firms into those with strong (or more influential) CFOs and those with weak (or less influential) CFOs.[3]

We empirically investigate the effect of CFOs on corporate cash decisions using a large sample of UK firms over the period 1998 to 2011. The UK provides a unique setting for our empirical investigation. The first motivation behind examining a UK sample is the well-documented surge in the cash holdings of UK firms during that period and the resulting concerns of investors and policy-makers about possible adverse consequences for investment returns and economic growth.[4] Furthermore, CFOs in the UK, also commonly referred to as finance directors, are perceived to play a more important strategic role as illustrated by the fact that they sit on the board of directors in the vast majority of firms (above 85% in our sample). This particularly high percentage is in contrast to the US experience, where only

[3]In Section 2.2, we consider additional CFO attributes but they do not add significantly to the information contained in the benchmark version of the CFO index.

[4]For instance, a recent article in the *Financial Times* entitled "UK Companies Sit on Giant Piles of Cash" states that "The net cash position of FTSE 100 companies has risen from £12.2 billion in 2008 to £73.9 billion in 2013. These large cash piles, which are earning low returns, has increased shareholder concerns, who want companies to raise dividends, boost investment or pursue mergers and acquisitions to increase returns." (Published on: September 29, 2013). Another recent article in the *Financial Times* entitled "Carney's Salutary Change of Mind" states that "were (UK) companies to continue hoarding cash rather than investing, economic growth may well disappoint" (Published on: February 12, 2014).

Electronic copy available at: https://ssrn.com/abstract=2932832

about 11% of CFOs hold board positions.[5,6] The presence of CFOs in non-executive advisory boards outside their own firm is also remarkable in the case of the UK market (more than 25% in our sample).

Our study reports several important findings. Our main analysis demonstrates a significant negative association between our CFO index and cash holdings, which suggests that firms with strong CFOs (i.e., high values of the CFO index) hold less cash, *ceteris paribus*. We verify the robustness of this finding through a series of tests. We firstly acknowledge that the influence of CFOs on cash holding decisions may be constrained by the countervailing influence of CEOs, especially in firms where CEOs are more likely to retain the decision-making authority over corporate policies within their control and delegate less to other high ranking executives - such as the CFO (see e.g., Adams et al., 2005; Graham et al., 2015). We provide suggestive evidence that the documented effect of CFOs on cash holdings goes beyond the effect caused by CEOs. In particular, we find that the CFO effect is not only observable in firms in which these policies are likely to be delegated to the CFO, but, importantly, also in firms in which financial policies are more likely to be driven by the CEO.

We then address the issue of endogeneity that may be driving our results. We document that our results remain robust to the inclusion of CEO-, board- and ownership-level controls and they also hold after controlling for fixed effects (such as firm, CEO and CFO). These tests alleviate potential concerns that our results are driven by omitted variable bias and/or unobserved time-invariant heterogeneity. We then deal with potential simultaneity issues due to matching (e.g., boards may appoint CFOs with particular characteristics that best fits their firms cash policies). We present several tests to show that endogenous CFO-firm matching is unlikely to drive our results. We first employ a propensity score matching technique. In this analysis, we compare firms with strong CFOs with a matched sample of

[5]For example, a recent study by Mobbs (2018) reports that only about 11% of CFOs in US firms held a board position over the period 1997-2014.

[6]The CFO presence on boards is not entirely surprising in the UK given that the UK Corporate Governance Code encourages an appropriate balance of executive and non-executive directors on the board. For example, Principle B.1 of the Financial Reporting Council (2016) report states that "The board should include an appropriate combination of executive and non-executive directors (and, in particular, independent non-executive directors) such that no individual or small group of individuals can dominate the boards decision taking." Whereas, the corporate governance and major reforms in the US promote board independence as a practice that enhances board effectiveness (e.g., Sarbanes-Oxley Act of 2002). A recent article published in the *Wall Street Journal* makes a similar point (see "A Waste of a Board Seat" (Published on: October 15, 2012)).

Electronic copy available at: https://ssrn.com/abstract=2932832

peer firms with weak CFOs that are similar in terms of several observable firm characteristics. The analysis indicates that the firms with strong CFOs hold significantly less cash than otherwise similar firms with weak CFOs. We find similar results after eliminating from the sample all cases for which a CFO−firm matching is more likely (e.g., we drop firm-years in which CFOs are newly appointed). We then exploit a sample of firms experiencing most likely exogenous turnovers from weak to strong CFOs and vice-versa. We find that such turnovers are associated with significant changes in cash holdings. In particular, turnovers from weak to strong CFOs (strong to weak CFOs) are associated with a significant decline (rise) in cash holdings. Finally, we adopt an instrumental variable (IV) approach, using the number of financial experts sitting on *other* firms' boards where the CFO also serves as a non-executive director (termed as "NOFE") as a potential instrument for our CFO index. The results confirm our primary findings.

We consider two explanations for the negative association between cash holdings and our CFO index. The first one lies in the lower precautionary demand for cash holdings (see e.g., Han and Qiu, 2007; Bates et al., 2009; Lins et al., 2010) that strong CFO firms might have. If strong CFOs have a higher ability in accessing external finance and/or the marginal value of cash is lower in their firm, they are expected to be less inclined to hoard cash. These effects are expected to be particularly strong for financially unconstrained firms due to their lower precautionary demand for cash (see e.g., Han and Qiu, 2007). We find that the negative relation between cash holdings and the CFO index is, indeed, more pronounced for the sample of unconstrained firms. This implies that strong CFOs in firms with better access to external finance are likely to have a weaker precautionary motive, which may explain their tendency to hold less cash. We then demonstrate in a more formal way that strong CFOs are better able to raise debt (external finance) in times of financial crisis, which may induce them to avoid cash hoarding and to adopt more aggressive cash and other financial/investment policies.[7] We also analyze whether the value of cash holdings is affected by a CFO's decision to accumulate more cash. We find that the value of cash is significantly

[7]Further analysis clearly shows that strong CFOs are more likely to pay dividends and to invest in R&D and in acquiring other firms (see Section 4.2).

Electronic copy available at: https://ssrn.com/abstract=2932832

lower in strong CFO firms than in weak CFO firms. Interestingly, this result is only detected in the sample of unconstrained firms, which indicates that shareholders may recognize the weaker need of such firms to hoard cash and hence consider it less important. A second, not mutually exclusive, explanation relates to the monitoring role that strong CFOs might play (agency explanation). Sub-sample analysis, which includes firms partitioned by severe financial constraints and agency costs proxies, provides support for the agency explanation and the CFOs' monitoring function in the governance process.

This paper contributes to the empirical literature investigating how managerial traits relate to corporate policies (see e.g., Bertrand and Schoar, 2003; Malmendier and Tate, 2005; Chava and Purnanandam, 2010; Malmendier et al., 2011; Hirshleifer et al., 2012; Custódio and Metzger, 2014; Graham et al., 2015; and Ferris et al., 2017). Most of the existing literature primarily focuses on how CEO characteristics affect corporate cash and other financial policies (see e.g., Liu and Mauer, 2011; Custódio and Metzger, 2014; Bernile et al., 2017; and Deshmukh et al., 2017). Despite their importance, there is little empirical evidence on the effect of CFOs on corporate cash policies, which may go beyond the effects caused by CEOs. We extend this limited strand of literature by looking at the importance of CFOs and developing an index that attempts to capture their ability to influence financial decisions. Our paper is related to and builds on the studies of Chava and Purnanandam (2010), Dittmar and Duchin (2015), Hoitash et al. (2016) and Mobbs (2018). Chava and Purnanandam (2010) find that CEO risk incentives are more important than CFO risk incentives in determining cash holding decisions. Dittmar and Duchin (2015) show that the CFOs who have experienced distressing situations in previous firms tend to follow more conservative cash policies. Hoitash et al. (2016) find that accountant CFOs are less likely to engage in external financing (only in high-growth industries), while the accounting background of CFOs does not seem to be significantly associated with cash holdings. Mobbs (2018) documents that firms with their CFOs on the board face fewer financial restrictions, and hence they save less cash.

Our study complements and extends the above studies in at least two important ways. First, rather than focusing on a particular CFO characteristic, we construct a comprehensive

Electronic copy available at: https://ssrn.com/abstract=2932832

index that attempts to capture more effectively the ability of a CFO to influence financial decision-making. We argue that while individual CFO-specific attributes such as board membership and outside board experience are important, they should be regarded as simultaneous and complementary. This is because it is most likely the combination of these attributes that determines whether a CFO's ability to influence a financial policy is actually realized. For example, while serving on the board of directors matters, a CFO's prospect of influencing cash policies also depends on other characteristics that determine his/er will and skill to convincingly argue their positions and exert influence. Second, we attempt to provide rational explanations for why firms with strong CFOs hold less cash. To the best of our knowledge, the present study is the first to provide evidence on the weaker precautionary motive for holding cash for firms with strong CFOs. We also provide evidence supporting the monitoring role of strong CFOs in firms exposed to higher agency problems.

The remainder of the paper is organized as follows. Section 2 describes our data, variable construction and presents summary statistics. In Section 3, we present our main empirical results and deal with the endogeneity issue. Section 4 provides more evidence and offers possible explanations for our main findings. Finally, Section 5 concludes.

2 Sample Collection and Construction of Variables

2.1 Data Sources

Our dataset combines information from several sources. The variables used for creating the CFO index are obtained from BoardEx. We use the BoardEx summary file to track the CFOs of all UK listed companies. We identify CFOs based on the data item "individual role" and by pinpointing the following titles: CFO, chief financial officer, finance director (FD), group finance director (GFD) and executive director (finance).[8,9] Board characteristics

[8] UK firms do not uniformly use the title of CFO. Many firms use other equivalent titles, such as Finance Director (FD) or Group Finance Director (GFD), to designate the head of the finance department. For ease of exposition, the common term CFO is used in this study.

[9] The CFO (or Finance Director) and the treasurer positions are two separate levels of financial positions in most UK public corporations (in the US, the treasurer is usually designated the CFO). The CFO is commonly a full board member with a complete oversight and control of an organization's finance function, whereas the treasurer is seen principally as the head of the treasury department, without the broader responsibilities. The treasurer typically reports directly to the office of the CFO (along side other functional heads in finance such as the accountant, the financial controller, and the compliance officer) (The Treasurer, 2001).

Electronic copy available at: https://ssrn.com/abstract=2932832

are also obtained from BoardEx while ownership information is gathered from Thomson Reuters (Ownership and Profiles). Firm characteristics and accounting information are from Thomson Reuters - DataStream. Following prior literature on the subject, we exclude all financial and utility firms from the analysis. Observations with missing values are also excluded from the final sample. All continuous variables are winsorized at their 1st and 99th percentiles to reduce the influence of outliers. Our final sample covers the period 1998−2011 and contains 8,509 firm-year observations for 1,564 firms listed on the London Stock Exchange. Our sample starts in 1998 because this is the first year of BoardEx coverage. The Appendix provides detailed variable definitions.

2.2 Construction of the CFO Index

We construct an index that is based on several CFO-specific characteristics and attempts to capture the extent to which a CFO exerts influence over corporate cash policies. We consider six variables as potential attributes of our index. The first is *CFO Executive Director*, a dummy variable that identifies whether the CFO is an executive director or not.[10] We expect that CFOs who hold board positions in their company to have high structural power; that is, their senior positions in the organizational hierarchy enable them to establish stronger links with the CEO and other board members due to their frequent meetings and interactions, thus increasing their capacity to influence board decision making (Adams and Ferreira, 2007; Bedard et al., 2014). Executive directors are also expected to exert considerable influence over key corporate policies given their firm-specific knowledge and understanding about the firm's purpose (Fama and Jensen, 1983).

An executive's potential authority to exert influence is enabled by his/er experience, expertise, knowledge and skills (Castanias and Helfat, 2001; Adner and Helfat, 2003). We use the following variables to capture CFOs' human capital: *CFO Financial Expertise*, a dummy variable that identifies whether the CFO holds a professional certification in accounting (e.g., ACA, FCA or CMA) or financial analysis (e.g., CFA) or not. Drawing on the findings of prior literature on the financial expertise of directors (see e.g., Güner et al., 2008), we expect CFOs

[10] In the UK, an executive director is a member of the board who holds a senior management position in the company.

Electronic copy available at: https://ssrn.com/abstract=2932832

with financial expertise to have more influence on financial policies; *CFO Outside Director*, a dummy variable that identifies whether the CFO holds an outside directorship or not. From a labor market perspective, Fama and Jensen (1983) argue that holding an outside directorship is an indication of an executive's greater reputation as an expert in decision-making in his/er own firm. Based on this argument, Masulis and Mobbs (2011) argue that the enhanced labor market reputation of these executives not only increases their credibility and influence on their own board, but also makes them less reliant on their CEOs for career advancements. This in turn enables them to be less susceptible to CEO influence; instead, they act as a counter-power, enhancing board discipline over CEOs. We thus expect that a CFO with an outside board membership is likely to be more influential in board decision making; and *CFO Seniority*, the age of the CFO. The logic behind including CFO seniority in our index is as follows. In order to influence a firm's strategic decision, executives require sufficient capabilities, experiences and confidence to act and/or take a stance in the boardroom that challenges the CEO. These qualities and leadership skills accumulate over time and are more likely to be present among senior members of the top management team (Finkelstein and Hambrick, 1996). Consistent with this reasoning, Golden and Zajac (2001) find that older board members are more likely to influence changes in their firm's strategic policies.[11]

Recognizing that the power dynamics within boardrooms affect the decision-making process and board outcomes (see e.g., Raheja, 2005; Acharya et al., 2011), we include two variables in our CFO index that capture the extent to which the CFO is in a powerful position with respect to the CEO (and other executives). The first variable, *CFO Relative Pay*, is defined as the ratio of the CFO's total compensation, excluding equity-based awards, to the CEO's total compensation.[12] Second, we use the variable *CFO Top 3*, a dummy variable that identifies whether the CFO is among the top three highest-paid executives of the firm. As argued in Finkelstein (1992), a manager's compensation is considered to be an important measure of his/er power derived from his/er structural position within the firm. Furthermore, a significant portion of executives' compensation also reflects their outside opportunity

[11] We also use tenure instead of age and get similar results (See Section A.5 of the Internet Appendix).

[12] As a robustness test, we include equity-based compensation in the calculation of CFO relative pay as an alternative measure and the inferences remain the same (see Section A.5 of the Internet Appendix for details).

Electronic copy available at: https://ssrn.com/abstract=2932832

wage, which in turn is determined by the managerial labor market based on their influence within the firm (Fama, 1980). This suggests that while highly paid non-CEO executives are likely to have greater influence over corporate decisions, they also have stronger incentives to exert monitoring on entrenched CEOs. Ellul and Yerramilli (2013) use similar measures to capture the power or influence of the Chief Risk Officer (CRO) within the organization.

We employ principal component analysis (PCA) to create our measure "CFO Index".[13] The main advantage of using PCA is that it enables us to combine the six variables mentioned above into a one-dimensional index, which attempts to capture more effectively the ability of the CFO to influence corporate financial policies. By doing so, we control for the potential multicollinearity problem that may arise when several CFO characteristics are included independently in a model.

Panel A of Table 1 presents the results from the PCA, which yields one component with an eigenvalue greater than one.[14] This principal component captures 58.95% of the total variance in our data and has an eigenvalue of 3.53. The corresponding component loadings are also reported in this panel. As expected, all six variables used positively contribute to the CFO index. We use this index to classify CFOs into two categories, those with scores greater than the yearly median value of the CFO index (perceived as "Strong" or "More-Influential" CFOs) and those with scores lower than the yearly median value of the CFO index (perceived as "Weak" or "Less-Influential" CFOs). In Panel B of Table 1, we present the correlation matrix of CFO variables used to construct the CFO index. Importantly, the results show a strong positive correlation among most of the variables. For instance, the strong correlation between *CFO Top 3* and *CFO Executive Director* indicates that CFOs who are among the top three highest-paid executives in their firm are more likely to sit on boards. Similarly, senior and more qualified CFOs are more likely to earn higher compensation. Overall, the high correlations among key CFO characteristics justify the use of PCA for constructing the

[13] PCA has been used extensively in recent studies for variables reduction purposes. Ellul and Yerramilli (2013), for example, use PCA to construct an index based on 6 variables to measure the strength of CROs and risk management committee at bank holding companies. Florackis and Ozkan (2009) use PCA to combine 9 corporate governance attributes to construct a managerial entrenchment index, which captures the extent to which managers have the ability and incentives to expropriate wealth from shareholders.

[14] An eigenvalue greater than one indicates that the extracted component can explain more variance, i.e., it has more explanatory power than any one of the original variables by itself.

Electronic copy available at: https://ssrn.com/abstract=2932832

CFO index.

For robustness purposes, as discussed in Section 3.1, we extend/modify the set of attributes that comprise our CFO index by using the following alternative measures: *CFO Tenure*, defined as the number of years that the CFO has been with the firm; *CFO Co-option*, a dummy variable that identifies whether the CFO was appointed into the current position *before* the current CEO took office and 0 otherwise; *CFO Relative Tenure*, defined as the ratio of the CFO's tenure to the CEO's tenure and *CFO Pay Slice*, defined as the ratio of the CFO's total annual compensation to the aggregate of total top five executives' compensation. The results suggest that none of these variables adds significantly to the information contained in the benchmark version of our index.

2.3 Validation of the CFO Index

We now proceed to perform a few tests to assess the extent to which the CFO index reflects CFOs' ability to influence board matters. First, we compare the average values of the CFO index for the case of successful and less successful CFOs, as identified *ex post*. By looking at CFO turnovers, we classify as "successful CFOs" those CFOs who were promoted to the CEO position in their own or another company and as "less-successful CFOs" those who were replaced from the CFO position following poor financial performance in their firm (i.e., bottom tercile in industry-adjusted ROA). We expect the value of the CFO index to be higher for the case of successful CFOs. The results reported in Panel C of Table 1 show that the average value of the CFO index is significantly higher in firms with successful CFOs than those with less-successful CFOs. The mean and median differences in the CFO index across the two sub-samples are statistically significant at the 5% level.

As a second validation test, we manually check the profiles of CFOs who have scored very highly in our CFO index and examine whether CFOs with high scores correspond to high-profile CFOs who made the news with their achievements. We find several examples across our sample that confirm the accuracy of our CFO index. A good example of a strong CFO is Keith Williams, whose index score is above the 90th percentile in the distribution in 2010. Keith Williams served as the CFO and executive director of British Airways Plc.

Electronic copy available at: https://ssrn.com/abstract=2932832

from 2006 to 2011. He also has been a non-executive director of Transport for London (TFL) since 2008 and Iberia SA airlines since 2009. Mr. Williams is a chartered accountant with the Institute of Chartered Accountant in England and Wales (ICAEW). In 2010, he won the Finance Director of the Year Award. An article in *Financial Director* stated that "Keith is a phenomenal financial director (FD) who has maintained a very strong finance function for the business through the last couple of torrid years."[15] In 2011, Keith Williams was promoted to CEO of British Airways.

Another good example of a strong CFO is Richard Pennycook, who scores above the 90th percentile in our CFO index. Richard Pennycook served as the CFO and executive director of Morrisons Plc. from 2005 to 2013. It is widely recognized that Richard Pennycook was responsible for turnaround of Morrisons after the financial trouble of 2005 when the takeover of Safeway Plc. and decline in market share led to a collapse in firm profits. An article in *CFO Magazine* stated that "Richard Pennycook has helped yet another company out of trouble−after cost cuts and an overhaul of the Morrisons brand, the chains' profits are rising and cash is being handed back to shareholders."[16] In 2013, Richard Pennycook was presented with the Finance Director Lifetime Achievement Award.[17] Recently, another article in *The Guardian* stated that "He's a details man, as he proved in a successful spell as finance director of Morrison Plc."[18,19]

[15] See "Keith Williams: BA's Mr Nice" in *Financial Director* (Published on: December 20, 2010).

[16] See "Leadership in Finance: Morrisons' Richard Pennycook" in *CFO Magazine* (Published on: May 7, 2009).

[17] See "Business Finance Awards 2013: The Winners" in *Financial Director* (Published on: March 07, 2013).

[18] See "Richard Pennycook was the best, or perhaps only, man for top Co-op job" in *The Guardian* (Published on: September 4, 2014).

[19] Other examples from the list of CFOs whose index score is above the 90th percentile include Dr. Byron E. Grote and John George Bason. Dr. Byron E. Grote served as the CFO and executive director of British Petroleum (BP) Plc. in 2002-2011. He also served as a non-executive director of Unilever Plc since 2006, vice-chairman of UK HM Treasury in 1998-2000 and economic advisor to the UK government in 2002-2005. He was the highest paid executive in BP Plc. after CEO Dr. Anthony Bryan Hayward. John George Bason serves as the CFO and executive director of Associated British Food Plc. (1999-present). John George Bason is the only executive in the firm who holds a board position other than the CEO. He also serves as a non-executive director of Compass Group Plc. (2011-present). He is a Chartered Accountant from ICAEW. He was also the second highest paid executive within the firm. In 2011, John G. Bason was short-listed as FTSE-100 Finance Director of the Year in the FD' Excellence Awards after a continuous strong financial performance of the group (See "Associated British Food's Bason's career pointing in the right direction" in *Financial Director*, Published on: May 18, 2011)

Electronic copy available at: https://ssrn.com/abstract=2932832

2.4 Summary Statistics

Panel A of Table 2 provides key descriptive statistics. We find that 85.1% of CFOs in our sample hold a board position and 25.7% of CFOs also sit on outside boards. The average CFO is 46 years old and has a firm tenure of 3.1 years. Furthermore, 75.6% of CFOs are among the top three highest-paid executives in their firm and 73.5% of CFOs in our sample have a chartered qualification. The mean and median cash holdings are 15.2% and 7.8%, respectively. The average firm in our sample reported total assets worth £1160 million, and also had a market capitalization of £967 million, a market-to-book ratio of 2.07, and a leverage ratio of 18%. The statistics presented in Table 2 also show that 54.4% of firms in our sample pay an annual dividend and 32.8% of them invest in research and development (R&D). The board-level data show that the composition of the board is well balanced between executive and non-executive directors (i.e., board independence equals 52.7%). The average board size in our sample is 6.8 directors.

Figure 1 illustrates the evolution of cash holdings in strong and weak CFO firms over our sample period. The cash holdings increased across each sub-sample but the increase is more pronounced for the case of weak CFO firms. The gap in cash holdings between strong and weak CFO firms is more evident in the latter years of our sample. Panel B of Table 2 reveals important differences in cash holdings between strong and weak CFO firms. The mean (median) cash holdings is 16.10% (8.50%) for the firms with weak CFOs, and 11.90% (6.40%) for firms with strong CFOs. The t- and Wilcoxon-tests reject the null hypothesis of equal means (medians) between the two samples at the 1% level. As shown in Panel B, we find similar results using industry-adjusted and industry- and size-adjusted measures of cash holdings. Overall, our preliminary analysis provides some initial evidence that strong CFO firms tend to hold less cash than weak CFO firms.

3 Do CFOs Affect Cash Holdings?

This section establishes the relationship between the CFO index and cash holdings, disentangles the effect of CFOs from that of CEOs on cash holdings, and addresses potential endogeneity problems using a variety of methods.

Electronic copy available at: https://ssrn.com/abstract=2932832

3.1 Benchmark Results

Table 3 presents the regression results on the relationship between cash holdings and our CFO index. The baseline specification (Model 1) is a simple ordinary least squares panel regression with standard errors clustered at the firm level to account for within-firm correlations. The dependent variable is cash holdings, defined as the ratio of cash and marketable securities to total assets.[20] Our main independent variable of interest is the CFO index. All independent variables including our CFO index are lagged by one year. Model 1 also includes the firm-level controls suggested by Opler et al. (1999) and year/industry fixed effects.[21] Analytical definitions for these variables are provided in the Appendix. The results, as presented in Table 3, support a negative association between the CFO index and cash holdings. This suggests that firms with strong CFOs (i.e., high values of the CFO index) hold a lower level of cash holdings, *ceteris paribus*. The economic magnitudes of these findings are also significant. For instance, a one standard deviation increase in the CFO index (1.884) is associated with a 6.20% decrease in cash holdings relative to the sample mean of 0.152.[22] The coefficients on firm-level characteristics are consistent with the findings of Opler et al. (1999) for US firms. We find that the coefficients on market-to-book, R&D, cash flow volatility and capital expenditure are positive and statistically significant, which suggest that firms with higher cash flow volatility, better investment opportunities and higher R&D expenditures hold more cash. To the contrary, the coefficients on firm size, dividend, net working capital and leverage are negative and statistically significant, which indicate that large, dividend paying and highly leveraged firms hold less cash.

In Model 2 of Table 3, we include an additional set of CEO-, ownership- and board-level controls and check whether the negative relationship between the CFO index and cash holdings remains robust. The CEO-level controls include those used in other studies (see e.g., Custódio and Metzger, 2014). These are: the natural logarithm of the CEO age, its

[20] For robustness purposes, we provide additional evidence in Section A.1 of the Internet Appendix using two alternative measures of cash holdings, namely cash to sales ratio and the industry-adjusted cash to sales ratio.

[21] We check the robustness of our results using alternative cash specifications that include the firm level controls proposed by Bates et al. (2009) and Oler and Picconi (2014) (see Section A.2 of the Internet Appendix).

[22] In Section A.3 of the Internet Appendix, we estimate our baseline specification after replacing the CFO index with each of the six individual CFO components. Such analysis allows for an assessment of the economic significance of each of the individual components on the cash holdings. However, the results in Model 7 of Table A.3 also raise the possibility of multicollinearity when all six components are added simultaneously in the model.

Electronic copy available at: https://ssrn.com/abstract=2932832

square term to account for possible non-linearity between CEO age and cash holdings, CEO tenure, and CEO sex. Following Harford et al. (2008), we also include ownership and board-level controls such as executive ownership, non-executive ownership, institutional ownership, board size and board independence. We find the coefficient estimate for the CFO index continues to be negative and statistically significant at the 1% level based on the results of Model 2.[23]

In Model 3 of Table 3, we re-estimate our more general specification with firm fixed effects, which controls for firm-specific unobserved time-invariant characteristics that might drive the relationship between our CFO index and cash holdings. The estimates continue to show a negative effect of the CFO index on cash holdings. This further eliminates our concern that the firm-level unobserved heterogeneity could be driving our main results. In Models 4 and 5, we run a similar specification but with CEO and CFO fixed effects, respectively. We are doing so because Bertrand and Schoar (2003) document that managers' fixed effects significantly matter for corporate financial policies. Our results show that in both cases the coefficient on the CFO index continues to indicate a negative effect on cash holdings.[24] Finally, following Opler et al. (1999), we report the results from a Fama and MacBeth (1973) regression in Model 6.[25] We find that the coefficient on the CFO index continues to remain negative and statistically significant. Taken together, the evidence in Table 3 supports a strong negative association between the CFO index and cash holdings.[26,27]

3.2 CFO versus CEO Effects

Our findings thus far suggest that CFOs significantly influence cash holding decisions. One potential concern with this interpretation, however, is that there might be several firms in

[23] We also test for presence of multicollinearity. None of the correlations are high enough to create the collinearity issues for our multivariate analysis. Our estimated mean Variance Inflation Factor (VIF) is 1.32.

[24] CEO sex is excluded from the model that includes CEO fixed effects for reasons of collinearity.

[25] The Fama and MacBeth (1973) approach helps to eliminate the cross-correlation in the residuals and produces standard errors that are robust to year effects.

[26] In addition to the static panel data models, we also consider dynamic panel data models using the GMM estimators of Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). An analytical discussion on how these methods are implemented is provided in Section A.4 of the Internet Appendix. Our results, as presented in Table A.4, verify a negative and statistically significant association between our CFO index and cash holdings.

[27] In Section A.5 of the Internet Appendix, we provide additional evidence based on a set of modified CFO indexes. In all cases, the results corroborate our main findings that strong CFOs hold significantly less cash, *ceteris paribus*.

Electronic copy available at: https://ssrn.com/abstract=2932832

our sample in which the decision-making power is centralized in the hands of *powerful* CEOs (Adams et al., 2005), who make most of the major decisions, including those concerning corporate liquidity.[28] We draw upon Graham et al. (2015) in arguing that the degree to which a CEO retains formal decision-making authority and *delegates* the real decision-making control over to other top executives − such as the CFO − depends on firm characteristics such as the size and complexity of operations, and the CEO's knowledge of a given policy.[29] If our sample includes a large number of firms with powerful and possibly dominant CEOs, this undermines our findings about the important role played by CFOs, which may be driven by a small number of observations (CEO dominance hypothesis).

In this section, we perform subsample analysis to investigate the extent to which the capacity of CFOs to influence cash policies is constrained by the countervailing influence and will of CEOs. Based on the CEO dominance hypothesis, one would expect the negative effect of the CFO index on cash holdings to be less pronounced (if at all) for firms whose CEOs are either more powerful or less willing to delegate liquidity decisions to their CFOs. Accordingly, we first split our sample into sub-samples of firms with High (Low) CEO power. In particular, Panel A of Table 4, we use the following three measures of CEO power: *CEO Co-option*, a dummy variable that indicates whether the CFO was appointed into the current position *after* the current CEO took office. We draw the idea of co-option as a measure of CEO power from Coles et al. (2014); *CEO Relative Pay*, defined as the ratio of the CEO's total compensation to the CFO's total compensation; and *CEO Pay Slice*, defined as the ratio of the CEO's total annual compensation to the aggregate of total top five executives' compensation (see Bebchuk et al., 2011). The first two measures capture the relative power of the CEO over the CFO while the latter, his/er relative power vis-á-vis the board. For *CEO Co-option*, firms in which the current CFO was hired after (before) the current CEO's appointment are categorized as high (low) CEO power firms. For *CEO Relative Pay* and

[28] Adams et al. (2005) argue that the decision-making authority is more likely to be centralized in the hands of CEOs when they are more powerful. Thus, enabling them to consistently exert their will and influence key decisions in their firms, even when such decisions are opposed by other senior executives.

[29] Graham et al. (2015) argue that CEOs are less likely to delegate decisions when they themselves are more knowledgeable (e.g., having an MBA degree), although not so much in firms that are difficult to manage by a sole decision-maker (e.g., large and complex firms) and therefore require more human capital input from other top executives.

Electronic copy available at: https://ssrn.com/abstract=2932832

CEO Pay Slice, we assign firms to the high (low) CEO power group if their value lies above (below) the yearly median value of each measure of CEO power.

Additionally, in Panel B of Table 4, we split the sample into sub-samples of firms with a "High-Degree" and "Low-Degree" of CEO delegation. Motivated by Graham et al. (2015), we use three proxies to measure the degree of delegation in firms: *Size*, as measured by sales revenue; *Mergers and Acquisitions* (M&A) *Activity*, a dummy variable that indicates whether the firm completed at least one acquisition in a given year or not and *Knowledge*, a dummy variable that indicates whether CEO has a Master of Business Administration (MBA) degree. We classify firms into the high (low) degree of delegation group if they have above (below) median yearly sales or they have (have not) completed at least one acquisition in the previous year or they are led by CEOs without (with) an MBA degree.

Table 4 presents the results from the estimation of our cash models for the above sub-groups. As expected, we find that the coefficient on the CFO index is negative and statistically significant for the sub-groups of firms in which financial policies are likely to be delegated to the CFO (low CEO power and high degree of delegation). Importantly, this negative relation is also observed in subgroups of firms in which these policies are more likely to be driven by the CEO (high CEO power and low degree of delegation). As a matter of fact, the coefficients on the CFO index are not statistically different across the high/low CEO power and high/low degree of delegation subgroups. Collectively, these results reject the CEO dominance hypothesis and instead suggest that the CFO effect we document in this study goes beyond the effect caused by the CEO.

3.3 Dealing with Endogeneity

A major concern with our causal interpretation of the relation between our CFO index and cash holdings is the endogeneity problem, which arises from three basic sources. The first is *omitted variables*, which refers to variables that are likely to affect corporate cash holdings and should be included in the vector of explanatory variables, but they are not because they are not directly observable. The second is *simultaneity or reverse causality*, which occurs when it can be argued that either X causes Y or that Y causes X. For example, in the

Electronic copy available at: https://ssrn.com/abstract=2932832

context of our study, it is likely that boards may appoint CFOs with particular characteristics that best fit their firms financial strategy (including cash holding policies), which creates a matching problem. The third is *measurement error*, which occurs when an analysis includes variables that may be measured imperfectly because they are not directly observable and hence they are difficult to quantify (such as the CFO index developed in our study).

In the previous section, we tried to address the omitted variable bias by including a wide range of CEO-, board- and firm-level controls in our cash specification. We also controlled for firm-, CEO- and CFO-fixed effects to deal with omitted *time-invariant* variables that may lead to a spurious correlation between our CFO index and cash holdings. However, the inclusion of fixed effects does not address the endogeneity problem if there are *time-variant* factors, such as firm/managerial preferences, that may affect both the dependent and key explanatory variable. In this section, we address the aforementioned endogeneity concerns in three ways. We first use a propensity score matching (PSM) approach. We then employ two methods that rely on a source of exogenous variation for indentification, namely, a difference-in-difference and an instrumental variables estimation.[30]

3.3.1 Propensity Score Matching

To address the endogenous CFO-firm matching concern discussed above, we employ a propensity score matching technique as proposed by Rosenbaum and Rubin (1983). This method allows us to compare the cash holdings of two groups of firms that are similar in terms of observable firm characteristics except that one is run by strong CFOs (treatment group) and the other by weak CFOs (control group). This helps isolate the effect of CFOs on cash holdings. We implement this procedure in two stages. In the first stage, we use a logistic regression to calculate the probability (i.e., propensity score) that a firm with given characteristics has a strong CFO. More specifically, we calculate the probability of being a strong CFO firm as a function of firm size, market-to-book, net working capital, capital expenditure, R&D, dividend, cash flow, cash flow volatility and leverage. In the second stage, we use

[30] As argued in Roberts and Whited (2013), the techniques aimed at addressing endogeneity concerns are classified into two groups: (i) those that rely more on modelling assumptions (e.g. panel data and matching methods) and (ii) those that rely on a source of exogenous variation.

Electronic copy available at: https://ssrn.com/abstract=2932832

the calculated propensity scores to match each strong CFO firm with that of a similar firm with a weak CFO. In doing so, we use the nearest-neighbour matching technique without replacement (as suggested by Leuven and Sianesi, 2003).[31] We find close matches for 1,561 strong CFO firm-year observations. Our final panel includes 3,122 observations.

In Panel A of Table 5, we present the results from a covariate balance test, which assesses whether the average values of covariates (firm-level determinants) are similar across treatment (strong CFO) and control (weak CFO) firms.[32] The results show that all the mean differences in firm characteristics between treatment and control firms are not statistically significant. This ensures that the two sub-samples are similar with respect to various observable firm-level characteristics.

We then report the average cash holdings for our treatment (strong CFO) and control (weak CFO) firms in Panel B of Table 5. The results show that the average cash holdings in strong CFO firms is 13.09% (about £151.84 million in cash and equivalents) as compared to 14.45% (about £167.62 million in cash and equivalents) in similar firms with weak CFOs. The mean difference in cash holdings is statistically significant at the 1% level. Consistent with our univariate findings in Panel B of Table 2, the result suggests that strong CFO firms hold less cash than weak CFO firms. We also re-examine the difference in (mean) cash holdings between the two group of firms after removing all the firm-year observations in which a CFO's tenure is three years or less (i.e., newly appointed CFOs). The effects of manager-firm matching on a firm's outcome are particularly stronger when a manager is newly appointed (Hirshleifer et al., 2012). We find that the average cash holdings continue to remain significantly lower for the case of strong CFO firms. Overall, these findings mitigate potential concerns that our finding of a negative association between the CFO index and

[31] To ensure an accurate matching, we require that (i) the maximum difference between the propensity scores of the two groups does not exceed 0.01 in absolute terms, and (ii) the treated and control observations match exactly on industry and year.

[32] In addition to the t-tests, we also report the normalized differences to assess the economic differences in matching covariates (see e.g., Hoitash et al., 2012). The normalized difference is calculated as the difference in means for treatment and match groups divided by the square root of the average of the group variances. A normalized difference of 0.25 or less indicates an acceptable balance (Imbens and Wooldridge, 2009). Similarly, all normalized differences are less than 0.25, indicating that economic differences in covariates between the two groups of firms are also negligible.

Electronic copy available at: https://ssrn.com/abstract=2932832

cash holdings are due to CFO-firm matching.[33]

3.3.2 Evidence from CFO Turnovers

An alternative setting to isolate the effect of CFOs on corporate cash policies is to focus on firms that experience a CFO turnover from a weak to a strong CFO (or vice-versa) and observe the corresponding change in cash holdings. Ideally, we would observe turnovers that occur for purely exogenous reasons (e.g., sudden death of a CFO). Understandably, we could only identify a very small number of purely exogenous CFO turnovers in our sample. Therefore, we analyze a sub-sample of firms where CFO turnovers are likely to be exogenous, but we cannot ignore the fact that some of them may not be. We start our analysis with identifying firms that experienced a turnover from a weak to a strong CFO and vice-versa. We exclude from our sample turnovers that are likely to have occurred for endogenous reasons (e.g., forced turnovers). To identify forced turnovers, we conduct Bloomberg news searches over a three-year period around CFO turnovers, examining all the articles and press releases that allows us to determine the reason for each CFO turnover. We assign a CFO turnover to a forced category if the article suggests that the CFO was "fired" by the board or had "resigned" after the firm reported annual loss. As firms' press releases on CFO changes are often less informative, we create an alternative category called "suspected forced" CFO turnovers, which are excluded from the analysis.[34]

After excluding potentially endogenous turnovers, we end up with a sample of likely exogenous turnovers, which have occurred voluntarily for the following reasons: (i) to pursue other career opportunities, (ii) early retirement, i.e., before the age of 60, (iii) resigned to join a new firm, or (iv) appointed as a CEO at another firm (see e.g., Fee et al., 2013; Dittmar

[33] A potential limitation of propensity score matching techniques is that when used on its own, it cannot solve the endogeneity problem because it does not rely on a clear source of exogenous variation for identification. For example, it does not address endogeneity when selection occurs on unobservables (see Roberts and Whited, 2013 for a detailed discussion).

[34] We assign turnover events in this category if (i) a firm's industry-adjusted accounting performance as measured by return on assets (ROA) falls into the lowest tercile in the pre-turnover year, or (ii) a firm facing severe financial constraints as measured by industry-adjusted total debt (and interest coverage ratio) falls into the top (bottom) tercile in the pre-turnover year, or (iii) a firm's stock market performance as measured by excess returns falls into the lowest tercile in the pre-turnover year, or (iv) a firm has a high level of agency costs as measured by asset turnover (i.e., asset turnover falls into the lowest tercile of the sample distribution in the pre-turnover year), or (v) if the turnover occurs during a crisis period. The boards are more likely to deliberately change their managers in crisis periods (Fee et al., 2013).

Electronic copy available at: https://ssrn.com/abstract=2932832

and Duchin, 2015). We expect a decline in the level of cash holdings when a weak CFO is replaced by a strong CFO. Conversely, we expect an increase in cash holdings when a strong CFO is replaced by a weak CFO. To isolate confounding effects on cash holdings, we compare turnover firms (treatment group) with no-turnover firms (control group) that are similar in terms of a series of observable characteristics such as firm size, market-to-book, net working capital, capital expenditure, R&D, dividend, cash flow, cash flow volatility and leverage.

Panel A of Table 6 presents the results for the case when firms experience a turnover from a weak to a strong CFO. In the pre-turnover period, we find no significant difference in cash holdings between the treatment and control firms when run by weak CFOs, suggesting they hold similar levels of cash. By contrast, the results indicate that in the post-turnover period, the cash holdings of treatment firms were 5.5 percentage points lower than in the comparison sample of control firms. The difference between the two groups is statistically significant at the 1% level. Most importantly, we find that the decline in average cash holdings from pre- to post-CFO turnover was 7.3 percentage points, which is over and beyond what was observed during the same period among otherwise similar firms with no CFO turnovers. This difference is also statistically significant at the 1% level. The results suggest that a turnover from a weak to a strong CFO is associated with a significant decline in cash holdings. In Panel B of Table 6, we repeat the analysis by looking at firms experiencing a turnover from a strong to a weak CFO. Consistent with our expectations, the results indicate a 6.3 percentage points increase in average cash holdings from pre- to post-CFO turnover, which is over and beyond what was observed during the same period among otherwise similar firms with no CFO turnovers. Overall, these results provide further evidence supporting the negative link between the CFO index and cash holdings.

3.3.3 IV Estimation

To further address the potential endogeneity concerns, this section provides evidence based on instrumental variable (IV). For the IV approach, we need an instrument that satisfies the criteria of relevance (i.e., correlated with the CFO index) and exclusion (i.e., no direct

Electronic copy available at: https://ssrn.com/abstract=2932832

effect on the cash holding decisions except through the CFO index) from both a theoretical and econometric perspective as recommended by Larcker and Rusticus (2010). To identify a suitable instrument, we focus on the financial expertise of the directors connected to the CFO. In particular, we use the number of financial expert directors sitting on *other* firms' boards where the CFO also serves as a non-executive director (termed as "Number of Financial Experts" (NOFE)) as a potential instrument for our CFO index.[35] Based on the findings of the literature on director networks, we hypothesize that the higher the number of financial experts connected to the CFO, the higher the value for the CFO index. This is because CFOs are likely to realize positive "externalities" from their enhanced professional network (Dichev et al., 2013). For instance, informal conversations in their network of financial experts can facilitate finance-specific human capital through the transfer and exchange of knowledge from one expert to another (Geletkanycz et al., 2001; Inkpen and Tsang, 2005). We thus expect to find a positive association between the number of financial experts and the CFO index. The number of financial experts theoretically satisfies both the relevance and exclusion requirements as we cannot identify any economic reasons that would lead us to expect an association between NOFE and cash holdings, other than through our CFO index.

Our two-stage approach is implemented as follows. In the first stage, the CFO Index is regressed against NOFE and all the controls used in our baseline specification in Model 1 of Table 3. In the second stage, we use the predicted values estimated from the first stage regression as a proxy for our CFO index, taking into account the possible selection of appointing a strong CFO, and the similar firm-level controls. Models 1 and 2 of Table 7 presents the results from the first and second stage regression, respectively. As shown in Model 1, the coefficient on NOFE is positive and statistically significant in the first stage regression. This indicates that the number of financial experts in the CFO's network have an impact on the CFO index. To further assess the validity of our instruments, we also report Kleinbergen-Paap rank Wald F-statistic for a weak instrument at the end of the first stage

[35] To ensure that the exclusion criteria is satisfied, we exclude all financial expert connections who also sit on the board of directors at the CFO's current firm (i.e., interlocking financial expert directors).

Electronic copy available at: https://ssrn.com/abstract=2932832

regression (Model 1). The F-stat is 718.09 (above the cut-off value suggested by Stock et al., 2002), which suggests that we can reject the null hypothesis that the instruments is weak. In the second stage regression (Model 2), we find that the predicted effect of the CFO index on cash holdings continues to remain negative and statistically significant.[36,37]

4 Why Do Firms with Strong CFOs Hold Less Cash?

The analysis so far has shown that firms with strong CFOs hold less cash, all else being equal. In this section, we offer two plausible explanations for our findings, which lie on strong CFOs' weaker precautionary motive for holding cash as well as the monitoring role that they seem to play in firms with higher agency problems.

4.1 Financial Constraints, Precautionary Motives and Agency Costs

Prior literature provides evidence on the precautionary motive for holding cash (see e.g., Bates et al., 2009), which seems to be stronger for financially constrained firms (see e.g., Han and Qiu, 2007). A recent survey study by Lins et al. (2010) also shows that CFOs make liquidity decisions primarily based on precautionary reasons. Following this line of enquiry, we conjecture that if strong CFO firms hold less cash due to their weaker precautionary incentives for cash, then this behaviour should be particularly strong for financially unconstrained firms. We therefore re-estimate our baseline Model 1 from Table 3 on sub-samples of financially constrained and unconstrained firms. We use the following three measures of financial constraints: total debt, interest coverage ratio and the KZ index (Kaplan and Zingales, 1997). Analytical definitions for these variables are provided in the Appendix. We

[36] One caveat on the IV approach is that, like all other methods used to address endogeneity, faces the trade-off between external and internal validity (see Roberts and Whited, 2013 for a detailed discussion). A further limitation of the IV approach is that in addition to the CFO index, there might be more endogenous regressors. As Roberts and Whited (2013) note, *"inference about all the regression coefficients can be compromised if one can find instruments for only a subset of the endogenous variables."*

[37] We acknowledge that the methods above, when properly implemented, help mitigate reasonably well endogeneity arising from omitted variables and simultaneity. However, they cannot tackle endogeneity arising from measurement error. For example, as Roberts and Whited (2013) note, finding instruments for measurement error in corporate finance is more difficult for finding instruments for simultaneity problems. We are aware of potential measurement error problems in our analysis and we attempt to partly address them by checking the robustness of our results using a series of alternative proxies for our dependent variable (see Section A.1 of the Internet Appendix) and key explanatory variable (See Section A.5 of the Internet Appendix). We obviously acknowledge that the use of alternative proxies is not a panacea for resolving error-in-variable problems.

Electronic copy available at: https://ssrn.com/abstract=2932832

separate firms into constrained and unconstrained groups by using values for each of the three proxies in year t-1. For debt ratio and the KZ index we assign firms to the financially constrained (unconstrained) group if their value lies above (below) the yearly median value of each measure of financial constraints. For interest coverage ratio, firms with a high (above median) interest coverage ratio are assigned to the financially unconstrained group and the remaining ones to the financially constrained one.

Panel A of Table 8 presents the regression results. We find that, under all constraints criteria, the coefficient on the CFO index is consistently negative and statistically significant at conventional levels for the case of financially unconstrained firms. Conversely, the coefficient on the CFO index is consistently insignificant for constrained firms.[38] These results imply that strong CFOs in firms with better access to external finance (unconstrained) seem to hoard less cash. In Panel B of Table 8, we also report the normalized differences in means of our financial constraint proxies between strong and weak CFO firms. The normalized differences of all three proxies of financial constraints are well below the threshold of 0.25. This suggests that the economic differences in the financial constraint proxies between strong and weak CFO firms are negligible.[39] This rules out any concerns that the results in Panel A of Table 8 are driven by non-random matching between strong CFO (weak CFO) firms and financially unconstrained (constrained) firms.

An alternative (not mutually exclusive) explanation relates to the ability/incentives of strong CFOs to serve a monitoring role in their firms (agency explanation). We conjecture

[38] As discussed below, this may be explained by the disciplinary role of debt in constrained firms, which makes CFOs' monitoring role less important.

[39] We acknowledge that, in equilibrium, our CFO index should be higher in the sample of financially unconstrained firms. This is because strong CFOs improve financial decision making and firm' overall financial health. However, it is possible that firms experiencing operational and financial trouble may appoint strong CFOs to help them execute a turnaround strategy. Indeed, after carefully inspecting our data, we identified several such cases in our sample. For example, Andrew Lewis, who is a strong CFO according to our index, was appointed in 2008 by Avon Rubber, a financially troubled company at the time, as a new Group Finance Director to turn it around and restore to strong growth. Following a successful career of about 8 years at Avon Rubber, which was combined with prestigious awards (e.g. Finance Director of the Year Award at the Quoted Company Awards in 2016 and the Young Finance Director of the Year Award at the ICAEW Finance Directors Excellence Awards in 2011), he joined Chemring in 2017 at the time when the company was struggling as a result of a debt overload. See "Andrew Lewis moves to Chemring as group FD" in *Economia* (Published on: December, 2016). Another recent example of a strong CFO who was appointed by a company in serious trouble is the case of Allan Stewart, who joined Tesco, the largest retail grocer in the UK, at a period of declining sales, drop in market share and a high debt burden (among others). See article, Tesco's turnaround king, *Association of Chartered Certified Accountants* (ACCA), 2016. This possibly explains (at least partly) why the average values of our financial constraints proxies are not statistically different in the samples of weak and strong CFO firms. We thank an anonymous reviewer for encouraging us to conduct such analysis.

Electronic copy available at: https://ssrn.com/abstract=2932832

that financially unconstrained firms are usually those that are exposed to higher agency costs and hence they have higher monitoring needs. To the contrary, financially constrained firms usually experience lower agency costs of carrying cash (see e.g., Hart, 1995 and Luo, 2011). Based on the evidence of Table 8 that CFOs matter in financially constrained firms, we can claim that our findings are also consistent with the agency explanation. For completeness, we provide further sub-sample analysis by partitioning our sample by both financial constraints and agency costs. In particular, in Panels A-C of Table 9, we partition the sample of constrained (C) and unconstrained (UC) firms based on the following three measures of agency costs: (i) asset turnover ratio (see Ang et al., 2000 and Singh and Davidson III, 2003), with firms with above (below) median asset turnover ratio classified as low (high) agency cost firms; (ii) the ratio of selling, general and administration (SG&A) to total sales (see Singh and Davidson III, 2003 and Florackis and Ozkan, 2009), with firms with below (above) median SG&A ratio classified as low (high) agency cost firms; and (iii) a measure of excess cash holdings (calculated as the deviation from optimal cash holdings as determined by Opler's et al., 1999 model),[40] with firms with excess cash classified as high agency cost firms.

Our results, as presented in Table 9 show that, within unconstrained firms, the negative effect of strong CFOs on cash holdings is driven by the sub-sample of firms that are exposed to higher agency costs. This further supports the view that strong CFOs fulfill a monitoring role in such firms. For the case of constrained firms, the effect of CFOs on cash holdings is less pronounced and insignificant in our full-sample estimates and most of the subsamples considered. This is in line with the view that financial constraints themselves play a disciplinary role in cash dissipation, which perhaps makes CFOs' monitoring role less important.[41]

4.2 Access to Finance and Other Corporate Policies

In the present section, we firstly investigate in a more direct way whether firms with strong CFOs have better access to external financing. In addition to our full-sample analysis,

[40] In the spirit of Jensen (1986), we treat excess cash holdings as a proxy of agency problems of free cash flow.
[41] We thank an anonymous reviewer for suggesting to consider this alternative explanation.

Electronic copy available at: https://ssrn.com/abstract=2932832

we also focus and pay particular attention on the recent credit crisis of 2008−2009, which provides an interesting setting. This is because, during a period of financial stress, firms are more likely to be financially constrained due to a significant shortage in credit supply and availability of external funds (Campello et al., 2010; Campello et al., 2011; Crespí and Martín-Oliver, 2015). In particualr, we estimate the following model:

$$\begin{aligned} \textit{Debt Issue}_{i,t} = \beta_0 + \beta_1\ \textit{CFO Index}_{i,t-1} + \beta_2\ \textit{Crisis 2008}-\textit{2009} + \\ \beta_3\ (\textit{CFO Index}_{i,t-1}\ \text{x}\ \textit{Crisis 2008}-\textit{2009}) + \Sigma\gamma_k\ \textit{Controls}_{i,t-1} + \nu_{i,t} \end{aligned} \quad (1)$$

Debt Issue is a dummy variable that takes the value of one if the firm issues "New Debt" in a given year and zero otherwise. This is debt issued minus debt retired from fiscal year t-1 to t. The dummy variable *"Crisis 2008−2009"* takes the value of one for the years 2008 and 2009, and zero otherwise. The main explanatory variable of interest is the interaction term, $\textit{CFO Index}_{i,t-1}$ x *Crisis 2008−2009*. This interaction term intends to capture the ability of strong CFO firms to raise external finance in times of crises.

Table 10 presents the results. The results of Model 1, which only includes the $\textit{CFO Index}_{i,t-1}$, *Crisis 2008−2009* and the interaction term, show that the coefficient of *Crisis 2008−2009* is negative and statistically significant at the 1% level, suggesting a significant tightening in the availability of credit during the financial crisis. Focusing on our main variable of interest, we find that the coefficient on $\textit{CFO Index}_{i,t-1}$ and *Crisis 2008−2009* interaction is positive and significant. One interpretation of this finding is that the significant negative effect of the crisis dummy on debt issuance is less pronounced for strong CFO firms. In Model 2 of Table 10, we find similar results after controlling for the same set of firm -, board-, ownership- and CEO-level characteristics, as in our more general cash specification of Table 3. The results suggest that strong CFO firms have better access to external finance even under tighter credit conditions, which may weaken their motive for holding cash. Overall, these results are consistent with the view that the firms with strong CFOs may have a weaker precautionary motive and as a result they may follow more aggressive cash policies (hold less cash).

Electronic copy available at: https://ssrn.com/abstract=2932832

In addition to their access to external financing, as analytically discussed in Section A.6 of our Internet Appendix, we also examine the effect of strong CFOs on other corporate (financial and investment) policies. In exploring these policies, we draw on the findings of prior literature on the association between managerial characteristics and firm outcomes (e.g., Custódio and Metzger, 2014; Dittmar and Duchin, 2015), and in particular, on the importance of CFOs' role in shaping key corporate policies (e.g., Bertrand and Schoar, 2003; Graham et al., 2013; Graham et al., 2015). More specifically, we investigate the relationship between our CFO index and the following six policies: firm leverage, debt maturity, dividend policy, capital expenditure, R&D investment and M&A activity. We find that strong CFOs invest more in R&D and M&A, and are more likely to pay dividends. These findings are consistent with our reasoning that strong CFOs may have weaker precautionary motive for holding cash, which may explain their "aggressive" behaviour when it comes to R&D, M&A and payout policies.[42]

4.3 The Value of Cash in Firms with Strong CFOs

Our results so far imply that the firms with strong CFOs hold less cash because they may have better access to external financing. In this section, we focus on the value of cash holdings in strong CFO firms. We conjecture that if these firms have access to external means of financing, then shareholders might place a lower value on their cash holdings. To investigate this, we follow the methodology developed by Faulkender and Wang (2006) to measure the marginal value of cash holdings in strong and weak CFO firms. To do so, we extend Faulkender and Wang's (2006) excess return model by including $Strong\ CFO_{i,t-1}$ and an interaction term $Strong\ CFO_{i,t-1}$ x $\Delta Cash_{i,t}$. In particular, we estimate the following regression model:

[42] We thank an anonymous reviewer for suggesting us to examine the effect of strong CFOs on other corporate policies.

Electronic copy available at: https://ssrn.com/abstract=2932832

$$
\begin{aligned}
r_{i,t} - R^{B}_{i,t} = \alpha &+ \beta_1 \frac{\Delta Cash_{i,t}}{MV_{i,t-1}} + \beta_2 \frac{\Delta Earning_{i,t}}{MV_{i,t-1}} + \beta_3 \frac{\Delta Net\ Assets_{i,t}}{MV_{i,t-1}} + \beta_4 \frac{\Delta R\&D_{i,t}}{MV_{i,t-1}} \\
&+ \beta_5 \frac{\Delta Interest\ Expense_{i,t}}{MV_{i,t-1}} + \beta_6 \frac{\Delta Dividend_{i,t}}{MV_{i,t-1}} + \beta_7 \frac{Cash_{i,t-1}}{MV_{i,t-1}} \\
&+ \beta_8 Leverage_{i,t} + \beta_9 \frac{New\ Financing_{i,t}}{MV_{i,t-1}} + \beta_{10} \frac{Cash_{i,t-1}}{MV_{i,t-1}} \text{ x } \frac{\Delta Cash_{i,t}}{MV_{i,t-1}} \\
&+ \beta_{11} Leverage_{i,t} \text{ x } \frac{\Delta Cash_{i,t}}{MV_{i,t-1}} + \beta_{12} Strong\ CFO_{i,t-1} \\
&+ \beta_{13} Strong\ CFO_{i,t-1} \text{ x } \frac{\Delta Cash_{i,t}}{MV_{i,t-1}} + error_{i,t} \qquad (2)
\end{aligned}
$$

where, $\Delta X_{i,t}$ indicates the change in the variable X of firm i from year t-1 to t. All the independent variables except $Strong\ CFO_{i,t-1}$ and Leverage are scaled by lagged market value of equity, MV_{t-1}. Analytical definitions for all variables are provided in the Appendix. The dependent variable is the excess stock return, $r_{i,t} - R^{B}_{i,t}$, where, $r_{i,t}$ is the stock return from year t-1 to t and $R^{B}_{i,t}$ is the stock i's benchmark return over the same period.[43] The key variable in the equation is $Strong\ CFO_{i,t-1}$ x $\Delta Cash_{i,t}$. $StrongCFO_{i,t-1}$ is a dummy variable that equals to one if the CFO index value is greater than the median value of the CFO index across all firms in the given year, and zero otherwise. $\Delta Cash_{i,t}$ is change in cash holdings from year t-1 to t. The coefficient (β_{13}) on this interaction term represents the difference in the marginal value of one pound between strong CFO firms and weak CFO firms. We include the same control variables as in Faulkender and Wang (2006).

We first present the results (Column 1 of Table 11) from estimating our regression model (Equation (2)) on the entire sample. We find that the coefficient on the interaction term, $Strong\ CFO_{i,t-1}$ x $\Delta Cash_{i,t}$ is negative and statistically significant at the 1% level. As reported in Panel B (Column 1) of Table 11, we find that the marginal value of £1 of cash for strong CFO firms is £0.62, whereas the value of extra £1 of cash for weak CFO firms is £0.89. These results indicate that the marginal value of £1 increase in cash for firms

[43] To construct benchmark portfolio returns, we use the 25 Fama−French portfolios formed on size and book-to-market. We then match benchmark returns to actual returns by grouping each firm-year observation into one of the 25 Fama−French portfolios based on the intersection between size and book-to-market. The stock return of the corresponding Fama-French portfolio is regarded as the benchmark return for that firm-year observation.

Electronic copy available at: https://ssrn.com/abstract=2932832

with strong CFOs is valued 27 pence *less* than in firms with weak CFOs. This confirms our conjecture that the market places a lower value on an extra pound of cash for strong CFO firms possibly because they have better access to external finance as compared to their weaker counterparts.[44,45]

To gain further insights into the observed negative relation, we split the sample into subsamples of financially constrained and unconstrained firms based on each of three proxies of financial constraint discussed in Section 4.1. The studies by Faulkender and Wang (2006) and more recently by Denis and Sibilkov (2009) show that cash holdings are less valuable for firms that have easier and cheaper access to outside funds. Accordingly, we expect that the negative association between strong CFO firms and value of cash holdings to be particularly pronounced for financially unconstrained firms, which are generally characterized by a weak precautionary motive. As expected, our results show that the interaction between $Strong\ CFO_{i,t-1}$ and change in cash holdings ($\Delta Cash_{i,t}$) is negative, though not consistently significant, only for the case of financially unconstrained firms. This further supports our conjecture that shareholders may recognize the weaker need of such firms to hoard cash and hence consider it less important (precautionary motive explanation).

Conversely, we find that the interaction term is positive and statistically significant at conventional levels for financially constrained firms under all three constraints criteria. These results imply that strong CFOs in financially constrained firms help increase the value of cash holdings to their shareholders when such firms are more likely to face financial constraints (see calculations in Panel B of Table 11).

[44] To calculate the marginal value of cash holdings, we use the coefficient estimates of four items (i.e., $Strong\ CFO_{i,t-1}$ x $\Delta Cash_{i,t}$, $\Delta Cash_{i,t}$, $Cash_{i,t-1}$ X $\Delta Cash_{i,t}$, $Leverage_{i,t}$ X $\Delta Cash_{i,t}$). The calculation is as follows: the mean firm has cash holdings (lagged) equal to 14.67% of the market capitalization of equity, and the mean leverage ratio (i.e. debt to debt plus the market capitalization of equity) is 18.89%. Therefore, the marginal value of £1 (based on the estimates in Full Sample, Column 1 of Table 11) to shareholders in strong CFO firms is £0.62 [= 1.134 + (-0.271) + (-0.174 x 14.67%) + (-1.104 x 18.89%)], whereas the value of extra cash for weak CFO firms is £0.89.

[45] Halford et al. (2016) proposed a modification to the regression framework developed by Faulkender and Wang (2006) to estimate the value of cash holdings. They argue that the sensitivity of stock price to the various component of new financing (i.e., sale of stock, purchase of stock, debt issuance and debt repurchase) is likely to vary and therefore should be included separately in the regression model. In untabulated tests, we incorporate this modification and re-estimate the regression models of Table 11. We find that our results are robust to this modification.

Electronic copy available at: https://ssrn.com/abstract=2932832

5 Conclusion

This study investigates the effect of CFOs on corporate cash policies. We construct an index that attempts to capture the ability of the CFO to *influence* firm outcomes. This index is based on a set of CFO-specific attributes such as board membership, outside board directorship, seniority (as proxied by age and/or tenure), level of financial expertise, pay status (if the CFO is among the top three paid executives) and relative pay status (compared to the CEO). Based on this index, we distinguish companies into those with strong (or more influential) CFOs and those with weak (or less influential) CFOs.

We examine the effect of CFOs on cash holdings using a large sample of UK firms and find that firms with strong CFOs hold less cash, *ceteris paribus*. Importantly, the negative effect documented in our study goes beyond the effect caused by the CEO. We provide evidence that suggests that strong CFOs matter to corporate cash policies independently of whether or not their firms are led by powerful and possibly dominant CEOs. These results are robust to the inclusion of CEO-, board- and ownership-level characteristics, alternative model specifications, managerial and firm fixed effects, alternative cash model specifications, alternative measures of the CFO index and various tests that address endogeneity. Lastly, we provide possible explanations for the negative association between the CFO index and cash holdings. Our analysis shows that firms with strong CFOs are well positioned to hold less cash due to their weaker precautionary motive. Strong CFOs also seem to play a monitoring role in their firms, which is demonstrated by the fact that they reduce cash holdings only in firms with higher agency costs.

The complexity of the finance function demands a deep understanding of the traits that make a good CFO. The present study puts forward the case that while several CFO-specific attributes such as board membership, outside board experience and financial expertise are important, they should be regarded as simultaneous and complementary. The insight of our study that strong CFOs are less susceptible to CEO influence, and as a result they have the ability to shape key corporate policies, has important implications for policymakers and practitioners of corporate governance. Our findings, for example, may be helpful in future deliberations and debates about the internal functioning and effectiveness of boards, and the

Electronic copy available at: https://ssrn.com/abstract=2932832

changing role of the CFO. They also have important economic implications by suggesting that the appointment of strong CFOs can help companies avoid unnecessary cash hoarding, an action that may boost investment and strengthen business and economic activity.

We suggest two potentially fruitful avenues for future research. First, to examine how strong CFOs dissipate (excess) cash (e.g., whether they can help prevent value-destroying M&A deals). Second, to consider alternative explanations that account for the effect of CFO behavioural traits (e.g., overconfidence) on corporate cash policies (see e.g., Malmendier et al., 2016).

Electronic copy available at: https://ssrn.com/abstract=2932832

References

Acharya, V. V., Myers, S. C., Rajan, R. G., 2011. The internal governance of firms. *The Journal of Finance* 66 (3), 689–720.

Adams, R. B., Almeida, H., Ferreira, D., 2005. Powerful CEOs and their impact on corporate performance. *The Review of Financial Studies* 18 (4), 1403–1432.

Adams, R. B., Ferreira, D., 2007. A theory of friendly boards. *The Journal of Finance* 62 (1), 217–250.

Adner, R., Helfat, C. E., 2003. Corporate effects and dynamic managerial capabilities. *Strategic Management Journal* 24 (10), 1011–1025.

Almeida, H., Campello, M., Cunha, I., Weisbach, M. S., 2014. Corporate liquidity management: A conceptual framework and survey. *Annual Review of Financial Economics* 6 (1), 135–162.

Ang, J. S., Cole, R. A., Lin, J. W., 2000. Agency costs and ownership structure. *Journal of Finance* 55 (1), 81–106.

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte carlo evidence and an application to employment equations. *The Review of Economic Studies* 58 (2), 277–297.

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

Bates, T. W., Kahle, K. M., Stulz, R. M., 2009. Why do US firms hold so much more cash than they used to? *The Journal of Finance* 64 (5), 1985–2021.

Bebchuk, L. A., Cremers, K. M., Peyer, U. C., 2011. The CEO pay slice. *Journal of Financial Economics* 102 (1), 199–221.

Bedard, J. C., Hoitash, R., Hoitash, U., 2014. Chief financial officers as inside directors. *Contemporary Accounting Research* 31 (3), 787–817.

Bernile, G., Bhagwat, V., Rau, P. R., 2017. What doesn't kill you will only make you more risk-loving: Early-life disasters and CEO behavior. *The Journal of Finance* 72 (1), 167–206.

Bertrand, M., Schoar, A., 2003. Managing with style: The effect of managers on firm policies. *The Quarterly Journal of Economics* 118 (4), 1169–1208.

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

Campello, M., Giambona, E., Graham, J. R., Harvey, C. R., 2011. Access to liquidity and corporate investment in Europe during the financial crisis. *Review of Finance* 16 (2), 323–346.

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

Castanias, R. P., Helfat, C. E., 2001. The managerial rents model: Theory and empirical analysis. *Journal of Management* 27 (6), 661–678.

Electronic copy available at: https://ssrn.com/abstract=2932832

Chava, S., Purnanandam, A., 2010. CEOs versus CFOs: Incentives and corporate policies. *Journal of Financial Economics* 97 (2), 263–278.

Coles, J. L., Daniel, N. D., Naveen, L., 2014. Co-opted boards. *The Review of Financial Studies* 27 (6), 1751–1796.

Crespí, R., Martín-Oliver, A., 2015. Do family firms have better access to external finance during crises? *Corporate Governance: An International Review* 23 (3), 249–265.

Custódio, C., Metzger, D., 2014. Financial expert CEOs: CEO's work experience and firm's financial policies. *Journal of Financial Economics* 114 (1), 125–154.

D'Aveni, R. A., 1990. Top managerial prestige and organizational bankruptcy. *Organization Science* 1 (2), 121–142.

Denis, D. J., Sibilkov, V., 2009. Financial constraints, investment, and the value of cash holdings. *The Review of Financial Studies* 23 (1), 247–269.

Deshmukh, S., Goel, A. M., Howe, K. M., 2017. Do CEO beliefs affect corporate cash holdings? SSRN working paper. Available at SSRN: https://ssrn.com/abstract=2566808 or http://dx.doi.org/10.2139/ssrn.2566808.

Dichev, I. D., Graham, J. R., Harvey, C. R., Rajgopal, S., 2013. Earnings quality: Evidence from the field. *Journal of Accounting and Economics* 56 (2), 1–33.

Dittmar, A., Duchin, R., 2015. Looking in the rearview mirror: The effect of managers' professional experience on corporate financial policy. *The Review of Financial Studies* 29 (3), 565–602.

Ellul, A., Yerramilli, V., 2013. Stronger risk controls, lower risk: Evidence from US bank holding companies. *The Journal of Finance* 68 (5), 1757–1803.

Fama, E. F., 1980. Agency problems and the theory of the firm. *Journal of Political Economy* 88 (2), 288–307.

Fama, E. F., Jensen, M. C., 1983. Separation of ownership and control. *The Journal of Law and Economics* 26 (2), 301–325.

Fama, E. F., MacBeth, J. D., 1973. Risk, return, and equilibrium: Empirical tests. *Journal of Political Economy* 81 (3), 607–636.

Faulkender, M., Wang, R., 2006. Corporate financial policy and the value of cash. *The Journal of Finance* 61 (4), 1957–1990.

Fee, C. E., Hadlock, C. J., Pierce, J. R., 2013. Managers with and without style: Evidence using exogenous variation. *The Review of Financial Studies* 26 (3), 567–601.

Feng, M., Ge, W., Luo, S., Shevlin, T., 2011. Why do CFOs become involved in material accounting manipulations? *Journal of Accounting and Economics* 51 (1), 21–36.

Ferris, S. P., Javakhadze, D., Rajkovic, T., 2017. CEO social capital, risk-taking and corporate policies. *Journal of Corporate Finance* 47, 46–71.

Finkelstein, S., 1992. Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal* 35 (3), 505–538.

Finkelstein, S., Hambrick, D. C., 1996. Strategic leadership: Top executives and their effects on organizations. *West Publishing Company*.

Electronic copy available at: https://ssrn.com/abstract=2932832

Florackis, C., Ozkan, A., 2009. The impact of managerial entrenchment on agency costs: An empirical investigation using UK panel data. *European Financial Management* 15 (3), 497–528.

Geletkanycz, M. A., Boyd, B. K., Finkelstein, S., 2001. The strategic value of CEO external directorate networks: Implications for CEO compensation. *Strategic Management Journal* 22 (9), 889–898.

Golden, B. R., Zajac, E. J., 2001. When will boards influence strategy? Inclination× power= strategic change. *Strategic Management Journal* 22 (12), 1087–1111.

Graham, J. R., Harvey, C. R., Puri, M., 2013. Managerial attitudes and corporate actions. *Journal of Financial Economics* 109 (1), 103–121.

Graham, J. R., Harvey, C. R., Puri, M., 2015. Capital allocation and delegation of decision-making authority within firms. *Journal of Financial Economics* 115 (3), 449–470.

Güner, A. B., Malmendier, U., Tate, G., 2008. Financial expertise of directors. *Journal of Financial Economics* 88 (2), 323–354.

Halford, J. T., McConnell, J. J., Sibilkov, V., Zaiats, N. S., 2016. Cash regimes and the marginal value of cash. SSRN working paper, Available at SSRN: https://ssrn.com/abstract=2761699.

Hambrick, D. C., 1989. Guest editor's introduction: Putting top managers back in the strategy picture. *Strategic Management Journal* 10 (S1), 5–15.

Han, S., Qiu, J., 2007. Corporate precautionary cash holdings. *Journal of Corporate Finance* 13 (1), 43–57.

Harford, J., 1999. Corporate cash reserves and acquisitions. *The Journal of Finance* 54 (6), 1969–1997.

Harford, J., Mansi, S. A., Maxwell, W. F., 2008. Corporate governance and firm cash holdings in the US. *Journal of Financial Economics* 87 (3), 535–555.

Hart, O., 1995. Corporate governance: some theory and implications. T*he Economic Journal* 105 (430), 678–689.

Hirshleifer, D., Low, A., Teoh, S. H., 2012. Are overconfident CEOs better innovators? *The Journal of Finance* 67 (4), 1457–1498.

Hoitash, R., Hoitash, U., Johnstone, K. M., 2012. Internal control material weaknesses and CFO compensation. *Contemporary Accounting Research* 29 (3), 768–803.

Hoitash, R., Hoitash, U., Kurt, A. C., 2016. Do accountants make better Chief Financial Officers? *Journal of Accounting and Economics* 61 (2), 414–432.

Imbens, G. W., Wooldridge, J. M., 2009. Recent developments in the econometrics of program evaluation. *Journal of Economic Literature* 47 (1), 5–86.

Inkpen, A. C., Tsang, E. W., 2005. Social capital, networks, and knowledge transfer. *Academy of Management Review* 30 (1), 146–165.

Jensen, M. C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review* 76 (2), 323–329.

Kaplan, S. N., Zingales, L., 1997. Do investment-cash flow sensitivities provide useful mea-

Electronic copy available at: https://ssrn.com/abstract=2932832

sures of financing constraints? *The Quarterly Journal of Economics* 112 (1), 169–215.

Larcker, D. F., Rusticus, T. O., 2010. On the use of instrumental variables in accounting research. *Journal of Accounting and Economics* 49 (3), 186–205.

Leuven, E., Sianesi, B., 2003. Stata module to perform full mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing. *Statistical Software Components* 432001.

Lins, K. V., Servaes, H., Tufano, P., 2010. What drives corporate liquidity? An international survey of cash holdings and lines of credit. *Journal of Financial Economics* 98 (1), 160–176.

Liu, Y., Mauer, D. C., 2011. Corporate cash holdings and CEO compensation incentives. *Journal of Financial Economics* 102 (1), 183–198.

Luo, M., 2011. A bright side of financial constraints in cash management. *Journal of Corporate Finance* 17 (5), 1430–1444.

Malmendier, U., Pezone, V., Zheng, H., 2016. Managerial duties and managerial biases. *University of California at Berkeley Working Paper*.

Malmendier, U., Tate, G., 2005. CEO overconfidence and corporate investment. *The Journal of Finance* 60 (6), 2661–2700.

Malmendier, U., Tate, G., Yan, J., 2011. Overconfidence and early-life experiences: The effect of managerial traits on corporate financial policies. *The Journal of Finance* 66 (5), 1687–1733.

Masulis, R. W., Mobbs, S., 2011. Are all inside directors the same? Evidence from the external directorship market. *The Journal of Finance* 66 (3), 823–872.

Mobbs, S., 2018. Firm CFO board membership and departures. *Journal of Corporate Finance* 51, 316–331.

Oler, D. K., Picconi, M. P., 2014. Implications of insufficient and excess cash for future performance. *Contemporary Accounting Research* 31 (1), 253–283.

Opler, T., Pinkowitz, L., Stulz, R., Williamson, R., 1999. The determinants and implications of corporate cash holdings. *Journal of Financial Economics* 52 (1), 3–46.

Pettigrew, A., McNulty, T., 1995. Power and influence in and around the boardroom. *Human Relations* 48 (8), 845–873.

Raheja, C. G., 2005. Determinants of board size and composition: A theory of corporate boards. *Journal of Financial and Quantitative Analysis* 40 (2), 283–306.

Roberts, M. R., Whited, T. M., 2013. Endogeneity in empirical corporate finance. In: *Handbook of the Economics of Finance*. Vol. 2. Elsevier, pp. 493–572.

Rosenbaum, P. R., Rubin, D. B., 1983. The central role of the propensity score in observational studies for causal effects. *Biometrika* 70 (1), 41–55.

Singh, M., Davidson III, W. N., 2003. Agency costs, ownership structure and corporate governance mechanisms. *Journal of Banking & Finance* 27 (5), 793–816.

Stock, J. H., Wright, J. H., Yogo, M., 2002. A survey of weak instruments and weak identification in generalized method of moments. *Journal of Business & Economic Statistics* 20 (4), 518–529.

Electronic copy available at: https://ssrn.com/abstract=2932832

Appendix

Data Definitions

CFO Characteristics	
CFO Executive Director	Dummy variable coded 1 if the CFO sits on the board of directors and 0 otherwise.
CFO Outside Director	Dummy variable coded 1 if the CFO sits on at least one outside board and 0 otherwise.
CFO Seniority	The age of the CFO in years.
CFO Financial Expertise	Dummy variable coded 1 if the CFO has a chartered qualification in accounting or financial analysis (Chartered Accountant (CA), Associate Chartered Accountant (ACA), Fellow Chartered Accountant (FCA), Chartered Financial Analyst (CFA), Chartered Management Accountant (CMA) and Chartered Secretary) and 0 otherwise.
CFO Top 3	Dummy variable coded 1 if the CFO is among the three highest paid executives and 0 otherwise.
CFO Relative Pay	Ratio of the CFO's total compensation, excluding equity-based awards, to the CEO's total compensation.
CFO Tenure	Number of years that the CFO has been with the firm.
CFO Co-option	Dummy variable coded 1 if the CFO was appointed into the current position *before* the current CEO took office and 0 otherwise.
CFO Relative Tenure	Ratio of the CFO's tenure to the CEO's tenure.
CFO Pay slice	Ratio of the CFO's total annual compensation to the aggregate of total top five executives' compensation. Following Feng et al. (2011), if BoardEx discloses less than five executives, we assume the undisclosed executives receive the same pay as the lowest paid executive among those disclosed.
CFO Index	First principal component from a principal component analysis based on the following variables: CFO executive director, CFO outside director, CFO seniority, CFO financial expertise, CFO top 3 and CFO relative pay.
Mod. CFO Index (1)	First principal component from a principal component analysis based on the following variables: CFO executive director, CFO outside director, CFO tenure, CFO financial expertise, CFO top 3 and CFO relative pay.
Mod. CFO Index (2)	First principal component from a principal component analysis based on the following variables: CFO executive director, CFO outside director, CFO tenure, CFO financial expertise, CFO top 3, CFO relative pay and CFO co-option.
Mod. CFO Index (3)	First principal component from a principal component analysis based on the following variables: CFO executive director, CFO outside director, CFO relative tenure, CFO financial expertise, CFO pay slice and CFO relative pay.
Number of Financial Experts (NOFE)	Number of financial expert directors (i.e. have a chartered qualification in accounting or financial analysis, are in finance-related roles such as CFOs, finance directors or equivalent, or current CEOs with past CFO experience) in BoardEx sitting on *other* firms' board where the CFO also serves as a non-executive director.
Firm Characteristics	
Return on Assets (ROA)	Ratio of earnings before interest, taxes, depreciation and amortization (EBITDA) to total assets.
Cash Holdings	Ratio of cash and marketable securities to the book value of total assets.
Industry adjusted Cash Holdings	Cash holdings minus yearly median industry level of cash holdings.
Industry-size adjusted Cash Holdings	Cash holdings minus yearly median industry and size level of cash holdings.
Firm Size	Natural log of book value of total assets.
MV	The market value of equity.
Net Assets	Total assets minus cash and marketable securities.
Net Working Capital	Net working capital minus cash divided by net assets.
Capital Expenditure (Capex)	Ratio of capital expenditures to net assets.
Research and Development (R&D)	Dummy variable coded 1 if firms invest in R&D and 0 otherwise. Firms that do not report R&D expenses are considered to be firms with no R&D expenses.

Electronic copy available at: https://ssrn.com/abstract=2932832

Appendix (Continued)

Cash-to-Sales	Ratio of cash and marketable securities to sales, as in Harford (1999)
Industry adjusted Cash-to-Sales	Cash-to-sales minus yearly median industry level of cash-to-sales.
Dividend	Dummy variable coded 1 if a firm pays dividend in current year and 0 otherwise.
Market-to-Book Ratio	Ratio of the book value of assets minus the book value of equity plus the market value of equity to the book value of assets.
Cash Flow	Earnings after interest, common dividends and taxes but before depreciation divided by net assets.
Leverage	Ratio of long term debt plus short term debt to total assets.
Cash Flow Volatility	Standard deviation of the firm's cash flow over the prior ten-years period.
Board and Ownership Characteristics	
Board Size	Number of members sitting on the board of directors.
Board Independence	Ratio of number of non-executive directors to the total number of directors.
Executive Ownership	Proportion of equity owned by executive directors.
Non-executive Ownership	Proportion of equity owned by non-executive directors.
Institutional Ownership	Proportion of equity owned by all institutional investors with at least 3% stake.
CEO Characteristics	
CEO Age	Natural log of the CEO age.
CEO Tenure	Natural log of number of years the CEO has been with the firm.
CEO Co-option	Dummy variable coded 1 if the CFO was appointed into the current position *after* the current CEO took office and 0 otherwise.
CEO Relative Pay	Ratio of the CEO's total compensation, excluding equity-based awards, to the CFO's total compensation.
CEO Pay Slice	Ratio of the CEO's total annual compensation to the aggregate of total top five executives' compensation. Following Feng et al. (2011), if BoardEx discloses less than five executives, we assume the undisclosed executives receive the same pay as the lowest paid executive among those disclosed.
Size (Sales Revenue)	Natural log of sales revenue.
Mergers and Acquisitions Activity	Dummy variable coded 1 if a firm completes one or more acquisition in a given year and 0 otherwise.
CEO Knowledge	Dummy variable coded 1 if the CEO has a masters of business administration (MBA) degree and 0 otherwise.
Other Firm Characteristics	
Acquisition	Dummy variable coded 1 if a firm acquires assets in current year and 0 otherwise.
Cash From Operations	Ratio of cash from operation to net assets.
Sales Growth	Ratio of current net sales minus prior year net sales to prior year net sales.
Firm Age	Natural log of the number of years the firm has DataStream data, calculated as the difference between the firm's fiscal year less the date that the firm was included in the DataStream dataset (plus one).
Tax Burden on Foreign Income	The variable is calculated following Oler and Picconi's (2014) "alternative tax on repatriating earnings" variable defined as: (Foreign pre-tax income x UK Corporate tax rate of 20 %) less foreign income taxes paid divided by net assets.
Financial Constraints	
Debt	Total debt$_t$/Market Value$_t$
Interest Coverage Ratio	Earnings Before Interest and Taxes$_t$/Total Interest Expense Ratio$_t$
Kaplan-Zingales (KZ) Index	KZ = -1.002 * (Cash flow$_t$/Property, Plant and Equipment$_{t-1}$) + 0.283 * Tobins Q$_t$ + 3.139 * (Total debt/Total capital$_t$) 39.368 * (Dividend Paid$_t$ / Property, Plant and Equipment$_{t-1}$) 1.315 * (Cash holdings$_t$/ Property, Plant and Equipment$_{t-1}$)
Agency Costs	
Asset Turnover Ratio	Ratio of total sales to total assets.
SG&A Ratio	Ratio of selling, general and administrative expenses to total sales (SG&A)
Excess Cash holdings	Deviation from optimal cash holdings as determined by Opler's et al., 1999 model.

Electronic copy available at: https://ssrn.com/abstract=2932832

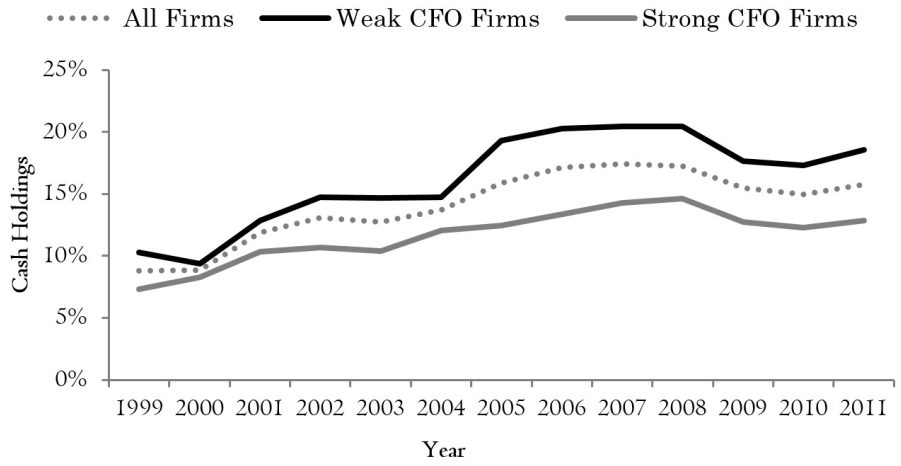
Appendix (Continued)

Value of Cash	
$r_{i,t}$	Stock return from fiscal year t-1 to t
$R^B_{i,t}$	Stock i's benchmark return over fiscal year t-1 to t. The benchmark portfolio is one of the 25 Fama and French portfolios formed on size and book-to-market ratio.
Excess Return	$r_{i,t} - R^B_{i,t}$
MV	Market value of equity at year t-1 computed as price multiplied by shares outstanding.
Cash	Cash and marketable securities in year t.
ΔX	Compact notation for the 1-year change, $X_t - X_{t-1}$.
ΔEarning	Change in earnings before extraordinary items from year t-1 to t.
ΔR&D	Change in R&D expenses from year t-1 to t.
ΔInterest Expense	Change in interest expenses from year t-1 to t.
ΔDividend	Change in cash dividend paid from year t-1 to t.
Leverage	Total debt to debt plus market value of equity in time period t.
New Financing	Net new equity issued (equity issues minus repurchase) plus net new debt issue (debt issued minus debt retired).

Electronic copy available at: https://ssrn.com/abstract=2932832

Figure 1
Evolution of Cash Holdings in Strong and Weak CFO Firms

This figure depicts the evolution of average cash holdings in strong and weak CFO firms over the period 1999−2011. Strong CFO firms (grey line) are those firms whose CFO Index is greater than the median CFO Index across all firms in year t. Weak CFO firms (black line) are those firms whose CFO Index is lower than the median CFO Index across all firms in year t. The dotted line shows the average cash holdings of all firms in our sample. The CFO Index is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. Cash holdings is measured as the ratio of cash and marketable securities to the book value of total assets.



Electronic copy available at: https://ssrn.com/abstract=2932832

Table 1
Construction of the CFO Index

Panel A presents the results from a principal component analysis (PCA) based on the following CFO attributes: CFO executive director, CFO outside director, CFO seniority, CFO financial expertise, CFO top 3 and CFO relative pay. CFO index is the first principal component obtained from the PCA. Component loadings of the first component, the eigenvalue and the proportion of variance explained by the first component is presented. **Panel B** reports the correlation coefficients among the CFO attributes. **Panel C** presents a validation test, which compares the mean and median (in brackets) values of the CFO index for the case of successful and less successful CFOs, as identified ex post. Successful CFOs are those who took the CEO role in their own or another company, while less successful CFOs are those who were replaced from the CFO position following poor financial performance in their firm (i.e. bottom tercile in industry-adjusted ROA). The t-statistic is for the difference in means and the Wilcoxon-test is for the difference in medians between successful and less successful CFOs. p-values are reported in parentheses. ** denotes statistical significance at the 5% level. Analytical definitions for all variables are provided in the Appendix.

Panel A: Principal Component Analysis (PCA)

Principal Component	Components	Component loadings
CFO Index	CFO Executive Director	0.50
	CFO Outside Director	0.18
	CFO Seniority	0.49
	CFO Financial Expertise	0.42
	CFO Top 3	0.43
	CFO Relative Pay	0.30
Eigenvalue	3.53	
Proportion Explained	58.95 %	

Panel B: Correlation Among CFO Attributes

	1	2	3	4	5	6
1. CFO Executive Director	1.000					
2. CFO Outside Director	0.260	1.000				
3. CFO Seniority	0.931	0.276	1.000			
4. CFO Financial Expertise	0.746	0.177	0.695	1.000		
5. CFO Top 3	0.727	0.182	0.693	0.531	1.000	
6. CFO Relative Pay	0.449	0.107	0.431	0.333	0.399	1.000

Panel C: Validation of the CFO Index

	Less Successful CFOs	Successful CFOs	t-statistics (p-values)	Wilcoxon z-test (p-values)
CFO Index	0.69	0.93	−2.464**	−2.298**
	[0.79]	[0.97]	(0.014)	(0.021)
No. of CFOs	183	115	-	-

Electronic copy available at: https://ssrn.com/abstract=2932832

Table 2
Descriptive Statistics

This table presents descriptive statistics for the key variables used in our analysis. Analytical definitions for all variables are provided in the Appendix. **Panel A** presents the summary statistics. The final sample consists of 9,655 firm-year observations on CFO characteristics between 1998-2011. Of these observations, 8,509 firm-years have complete information on firm- and CEO-level controls, while 6,353 firm years have available information on ownership measures. **Panel B** presents a univariate comparison of the mean and median (in brackets) cash holdings of the weak CFO and strong CFO firms. Strong CFO firms are those firms whose CFO index is greater than the median CFO index across all firms in year t. Weak CFO firms are those whose CFO index is lower than the median CFO index across all firms in year t. The CFO index is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. The t-statistic is for the difference in means and the Wilcoxon-test is for the difference in medians. p-values are reported in parentheses. *** denote statistical significance at the 1% level, respectively.

Panel A: Summary Statistics

	Mean	Median	S.D.	25%	75%
CFO Executive Director	0.851	1.000	0.356	1.000	1.000
CFO Outside Director	0.257	0.000	0.437	0.000	1.000
CFO Seniority	46.470	46.000	7.070	41.000	51.000
CFO Financial Expertise	0.735	1.000	0.442	0.000	1.000
CFO Top3	0.756	1.000	0.429	1.000	1.000
CFO Relative Pay	0.541	0.552	0.620	0.000	0.713
CFO Index	−0.002	0.788	1.884	−0.121	1.122
Cash Holdings	0.152	0.078	0.192	0.027	0.194
Firm Size	11.198	11.041	2.310	9.557	12.713
Total Assets (in £ millions)	1159.282	62.380	3542.169	22.043	500.500
MV (in £ millions)	966.948	85.500	2918.337	19.260	425.440
Net Working Capital	−0.027	−0.008	0.363	−0.127	0.123
Capital Expenditure	0.057	0.032	0.075	0.012	0.070
R&D	0.328	0.000	0.470	0.000	1.000
Dividend	0.544	1.000	0.498	0.000	1.000
Market-to-Book	2.074	1.429	2.102	1.061	2.177
Cash Flow	−0.150	0.052	0.810	−0.059	0.102
Leverage	0.180	0.131	0.201	0.005	0.279
Cash Flow Volatility	0.250	0.059	0.543	0.024	0.180
Board Size	6.817	6.000	2.498	5.000	8.000
Board Independence	0.527	0.500	0.153	0.400	0.625
Executive Ownership	0.080	0.011	0.139	0.001	0.095
Non-Executive Ownership	0.035	0.001	0.082	0.000	0.020
Institutional Ownership	0.202	0.171	0.177	0.045	0.317
CEO Age (log)	3.915	3.932	0.155	3.807	4.025
CEO Tenure (log)	1.012	1.099	1.153	0.336	1.825

Panel B: Univariate Comparison

	Weak CFO Firms	Strong CFO Firms	t-statistics (p-values)	Wilcoxon z-test (p-values)
Cash Holdings	0.161 [0.085]	0.119 [0.064]	11.343*** (0.000)	9.687*** (0.000)
Industry adj. Cash holdings	0.069 [0.001]	0.033 [−0.008]	10.197*** (0.000)	7.543*** (0.000)
Industry-size adj. Cash holdings	0.051 [0.001]	0.030 [−0.001]	6.513*** (0.000)	4.008*** (0.000)

Electronic copy available at: https://ssrn.com/abstract=2932832

Table 3
CFOs and Cash Holdings

This table presents the results from several regressions on the relationship between cash holdings and our CFO Index. In Models 1 and 2, we use an ordinary least squares (OLS) regression with standard errors clustered at the firm level. In Models 3, 4 and 5, we add firm, CEO and CFO fixed effects, respectively. In Model 6, we use a Fama-MacBeth (1973) regression approach. In our baseline Model 1, we extend the Opler's et al. (1999) cash model by adding our CFO Index as an additional explanatory variable. In Models 2-6, we add board-, ownership- and CEO-specific characteristics. The dependent variable is defined as the ratio of cash and marketable securities to the book value of total assets. The CFO Index variable is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. All independent variables are lagged by one year. Analytical definitions for all variables are provided in the Appendix. Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CFO Index	−0.005***	−0.004***	−0.004***	−0.006***	−0.003**	−0.005***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Firm Size	−0.007***	−0.007***	−0.017***	−0.011***	−0.012***	−0.007***
	(0.002)	(0.001)	(0.003)	(0.004)	(0.003)	(0.001)
Net Working Capital	−0.102***	−0.110***	−0.156***	−0.173***	−0.172***	−0.122***
	(0.013)	(0.011)	(0.008)	(0.008)	(0.008)	(0.016)
Capital Expenditure	0.181***	0.188***	0.265***	0.239***	0.221***	0.154***
	(0.037)	(0.035)	(0.030)	(0.032)	(0.031)	(0.031)
R&D	0.029***	0.030***	−0.009	−0.009	0.011	0.030***
	(0.006)	(0.004)	(0.008)	(0.008)	(0.008)	(0.003)
Dividend	−0.020***	−0.027***	−0.009*	−0.013**	−0.014**	−0.029***
	(0.006)	(0.004)	(0.006)	(0.006)	(0.006)	(0.007)
Market to Book	0.005**	0.004**	−0.005***	−0.005***	−0.003**	0.005**
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
Cash Flow	−0.059***	−0.068***	−0.045***	−0.037***	−0.034***	−0.068***
	(0.006)	(0.006)	(0.004)	(0.004)	(0.004)	(0.007)
Leverage	−0.291***	−0.291***	−0.238***	−0.253***	−0.240***	−0.274***
	(0.019)	(0.013)	(0.013)	(0.015)	(0.014)	(0.017)
Cash Flow Volatility	0.033***	0.040***	0.007	0.013**	0.003	0.041***
	(0.007)	(0.007)	(0.005)	(0.006)	(0.006)	(0.006)
Board Size	-	0.002**	−0.004***	−0.004***	−0.003***	0.001*
	-	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Board Independence	-	0.044***	0.005	0.014	0.015	0.033***
	-	(0.014)	(0.017)	(0.020)	(0.019)	(0.008)
Executive Ownership	-	0.001***	0.001**	0.001**	0.001**	0.001***
	-	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Non-Executive Ownership	-	0.000	0.000	0.000	0.000	0.000
	-	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Institutional Ownership	-	0.000***	0.000***	0.000***	0.000**	0.000***
	-	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CEO Age	-	−0.196	−1.197**	−2.853*	0.093	−0.314
	-	(0.484)	(0.508)	(1.467)	(0.558)	(0.712)
CEO Age^2	-	0.018	0.148**	0.391*	−0.016	0.034
	-	(0.062)	(0.065)	(0.230)	(0.072)	(0.091)
CEO Tenure	-	0.002	−0.002	−0.001	−0.003	0.002
	-	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
CEO Sex	-	−0.040***	0.004	-	−0.045***	−0.056***
	-	(0.014)	(0.015)	-	(0.017)	(0.017)
Intercept	0.213***	0.707	2.788***	5.502**	0.231	0.965
	(0.030)	(0.942)	(0.991)	(2.326)	(1.085)	(1.366)
Observations	8,509	6,353	6,353	6,353	6,353	6,353
R^2	0.401	0.410	0.212	0.813	0.817	0.453
Year FE	Yes	Yes	Yes	Yes	Yes	No
Industry FE	Yes	Yes	No	Yes	Yes	Yes
Firm FE	No	No	Yes	No	No	No
CEO FE	No	No	No	Yes	No	No
CFO FE	No	No	No	No	Yes	No

Electronic copy available at: https://ssrn.com/abstract=2932832

Table 4
CEO versus CFO Effects

The table shows whether the relationship between the CFO index and cash holdings is affected by firms with powerful CEOs and lower degree of delegation decisions. In **Panel A**, we split firms into high and low CEO power groups based on the following three criteria: CEO Co-option, CEO Relative Pay and CEO Pay Slice. In **Panel B**, we split firms into high degree and low degree of delegation groups based on the following three criteria: Size (as measured by sales revenue), Mergers and Acquisitions (M&A) Activity and CEO Knowledge. The dependent variable is defined as the ratio of cash and marketable securities to the book value of total assets. The CFO Index variable is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. We show results using our baseline specification (Model 1 from Table 3). All independent variables are lagged by one year (unreported for brevity). Analytical definitions for all variables are provided in the Appendix. We run OLS regressions by adding year and industry fixed effects in all regressions. Standard errors are robust to heteroscedasticity (reported in parentheses). *** and ** denote statistical significance at the 1% and 5% levels, respectively.

Panel A: CEO Power

	CEO Co-option		**CEO Relative Pay**		**CEO Pay Slice**	
	High CEO Power	Low CEO Power	High CEO Power	Low CEO Power	High CEO Power	Low CEO Power
CFO Index	−0.004**	−0.009***	−0.005***	−0.007***	−0.007***	−0.006***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)
Observations	4,910	2,348	3,288	3,304	3,681	3,684
R^2	0.397	0.365	0.370	0.423	0.408	0.417
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Subsample comparison of coefficients on CFO Index						
Chi Squared	1.91		0.40		0.34	
p-values	0.162		0.526		0.558	

Panel B: Degree of Delegation

	Size		**M&A Activity**		**CEO Knowledge**	
	High Degree	Low Degree	High Degree	Low Degree	High Degree	Low Degree
CFO Index	−0.003***	−0.005***	−0.003**	−0.006***	−0.006***	−0.005**
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.003)
Observations	4,055	4,454	2,623	5,886	6,634	935
R^2	0.257	0.385	0.325	0.413	0.410	0.355
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Subsample comparison of coefficients on: CFO Index						
Chi Squared	1.22		1.17		0.03	
p-values	0.268		0.278		0.864	

Electronic copy available at: https://ssrn.com/abstract=2932832

Table 5
Propensity Score Matching

This table presents the results from the propensity score matching analysis for treatment (strong CFO) and control (weak CFO) firm-year observations. The treatment (strong CFO) group includes those firms whose CFO index is in the top tercile of the CFO index across all firms in year t. The control (weak CFO) group includes those firms whose CFO index is in the bottom tercile of the CFO index across all firms in year t. **Panel A** presents the results from a covariate balance test, which assesses whether the average values of covariates (firm-level determinants) are similar across treatment (strong CFO) and control (weak CFO) firms. The t-statistic and the normalized difference is for the difference in means between strong and weak CFO firms. The normalized difference is calculated as the difference in means for treatment and match groups divided by the square root of the average of the group variances. A normalized difference of 0.25 or less indicates an acceptable balance (Imbens and Wooldridge, 2009). In **Panel B**, we compare the mean cash holdings of strong CFO firms with control firms. The CFO index variable is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. Cash holding is defined as the ratio of cash and marketable securities to the book value of total assets. The propensity score is estimated as a logit function of firm size, market-to-book ratio, net working capital, capital expenditure, research and development, dividend, cash flow, cash flow volatility and leverage. Analytical definitions for all variables are provided in the Appendix. We match each strong CFO firm to a weak CFO firm using nearest neighbor without replacement subject to caliper (i.e. maximum difference in propensity score) of 0.01 using psmatch2, a STATA function written by Leuven and Sianesi (2003). We did exact matching on industry and year. psmatch2 allows imposing common support condition by dropping treatment observations whose p-score is higher than the maximum or less than the minimum p-score of the controls. To test the differences in means between the two samples (i.e. strong CFO firms and matched weak CFO firms), we use bootstrapped standard errors (reported in brackets) based on 50 replications. *** and ** denote statistical significance at the 1% and 5% levels, respectively.

Panel A: Covariate Balance Test

	Strong CFO Firms	Weak CFO Firms	t-stats	Normalized Diff.
Firm Size	11.581	11.491	1.131	0.029
Net Working Capital	−0.009	−0.016	0.618	0.016
Capex	0.055	0.052	1.481	0.037
R&D	0.356	0.349	0.412	0.010
Dividend	0.608	0.594	0.767	0.019
Market-to-Book	1.774	1.855	−1.549	−0.039
Cash Flow	−0.083	−0.098	0.658	0.017
Leverage	0.187	0.180	1.074	0.027
Cash Flow Volatility	0.195	0.214	−1.115	−0.028

Panel B: Propensity Score Matching

	Obs.	Strong CFO Firms (Treatment)	Weak CFO Firms (Control)	Difference	z-test (Bootstr. s.e.)
All CFOs	3,122	13.09%	14.45%	-1.36%***	-2.97(0.004)
CFOs (Tenure >3 Years)	808	9.29%	11.26%	-1.97%**	-2.17(0.009)

Electronic copy available at: https://ssrn.com/abstract=2932832

Table 6
Evidence From CFO Turnovers

Panel A presents mean differences in cash holdings between treatment firms (i.e. experiencing a turnover from a weak to a strong CFO) and control firms (i.e. those that are always run by weak CFOs). **Panel B** presents mean differences in cash holdings between treatment firms (i.e. experiencing a turnover from a strong to a weak CFO) and control firms (i.e. those that are always run by strong CFOs). Strong CFO firms are those firms whose CFO index is greater than the median CFO index across all firms in year t. Weak CFO firms are those whose CFO index is lower than the median CFO index across all firms in year t. The CFO Index is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. Cash holding is defined as the ratio of cash and marketable securities to the book value of total assets. The propensity score is estimated as a logit function of firm size, market-to-book ratio, net working capital, capital expenditure, research and development, dividend, cash flow, cash flow volatility and leverage. Analytical definitions for all variables are provided in the Appendix. We match each treatment group to a control group using nearest neighbor without replacement subject to caliper (i.e. maximum difference in propensity score) of 0.05 using psmatch2, a STATA function written by Leuven and Sianesi (2003). We did exact matching on industry and year. psmatch2 allows imposing common support condition by dropping treatment observations whose p-score is higher than the maximum or less than the minimum p-score of the controls. *** and ** denote statistical significance at the 1% and 5% levels, respectively.

Panel A: Weak to Strong CFO Turnovers (Obs.=1146)

	Mean Cash Holdings	Difference	Robust s.e.
Pre-Turnover Cash holdings			
Treatment Firms (weak CFOs)	18.7%		
Control Firms (weak CFOs)	16.9%	1.8%	0.021
Post-Turnover Cash holdings			
Treatment Firms (strong CFOs)	12.2%		
Control Firms (weak CFOs)	17.7%	-5.5%***	0.013
Diff.-in-Diff. (Post minus Pre-turnover)		-7.3%***	0.025

Panel B: Strong to Weak CFO Turnovers (Obs.= 550)

	Mean Cash Holdings	Difference	Robust s.e.
Pre-Turnover Cash holdings			
Treatment Firms (strong CFOs)	11.7%		
Control Firms (strong CFOs)	13.1%	-1.4%	0.020
Post-Turnover Cash holdings			
Treatment Firms (weak CFOs)	16.3%		
Control Firms (strong CFOs)	11.4%	4.9%***	0.017
Diff.-in-Diff. (Post minus Pre-turnover)		6.3%**	0.027

Electronic copy available at: https://ssrn.com/abstract=2932832

Table 7
IV Estimations

This table reports the results from an IV estimation on the relationship between cash holdings and our CFO index. We use the number of financial experts (NOFE) as a potential instrument for our CFO index. NOFE is defined as the number of financial expert directors (i.e. Chartered Accountants, CFOs, and CEOs with past CFO experience) sitting on *other* firms' boards where the CFO also serves as a non-executive director. The results of the first stage regression are presented in Model 1 and the results of the second stage regression are presented in Model 2. The CFO Index variable is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. Standard errors are robust to heteroskedasticity (reported in parentheses). Analytical definitions for all variables are provided in the Appendix. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Two-Stage IV Estimation		
	Model 1	Model 2
Predicted CFO Index	-	−0.006*
	-	(0.003)
NOFE	0.235***	-
	(0.008)	-
Two stage estimation	First Stage	Second Stage
No. of observations	8,127	8,127
Centered R^2	0.186	0.318
Firm-level controls	Yes	Yes
Industry FE	Yes	Yes
Year FE	Yes	Yes
Kleinbergen-Paap rK Wald F-statistic (p-values)	718.09 (0.000)	-
(Stock-Yogo critical values: 10%/15%)	(16.38/8.96)	-

Electronic copy available at: https://ssrn.com/abstract=2932832

Table 8
The Effects of Financial Constraints

Panel A presents the results on the relationship between cash holdings and our CFO index across financially constrained and unconstrained firms. We split firms into financially constrained and unconstrained groups based on the following three criteria: total debt, interest coverage, KZ-index (Kaplan and Zingales, 1997). We use letter (C) for constrained firms and (UC) for unconstrained firms. The dependent variable is defined as the ratio of cash and marketable securities to the book value of total assets. The CFO Index variable is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. **Panel B** reports the normalized differences in the mean of the financial constraint proxies between strong and weak CFO firms. The normalized difference is the difference in means for strong and weak CFO group divided by the square root of the average of the group variances. A normalized difference of 0.25 or less indicates an acceptable balance between the two groups (Imbens and Wooldridge, 2009). All independent variables are lagged by one year. Analytical definitions for all variables are provided in the Appendix. We run OLS regressions by adding year and industry fixed effects in all specifications. Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Financial Constraint Proxies

	Total Debt		Interest Coverage		KZ-Index	
	(C)	(UC)	(C)	(UC)	(C)	(UC)
CFO Index	0.000	−0.008***	−0.002	−0.003**	0.000	−0.011***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Firm Size	0.001	−0.013***	0.000	−0.006***	0.000	−0.014***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Net Working Capital	−0.067***	−0.136***	−0.062***	−0.121***	−0.053***	−0.153***
	(0.005)	(0.008)	(0.007)	(0.007)	(0.007)	(0.008)
Capital Expenditure	0.033*	0.245***	0.293***	0.008	0.173***	0.355***
	(0.020)	(0.036)	(0.033)	(0.029)	(0.026)	(0.042)
R&D	0.015***	0.036***	0.036***	0.011***	0.030***	0.016***
	(0.003)	(0.006)	(0.005)	(0.004)	(0.004)	(0.005)
Dividend	−0.021***	−0.013**	−0.033***	−0.030***	−0.043***	−0.026***
	(0.003)	(0.007)	(0.005)	(0.005)	(0.004)	(0.006)
Market-to-Book	0.001	0.002*	0.003**	0.015***	0.002*	0.005***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Cash flow	−0.032***	−0.056***	−0.066***	0.043***	−0.074***	−0.059***
	(0.003)	(0.004)	(0.004)	(0.009)	(0.004)	(0.005)
Leverage	−0.040***	−0.510***	−0.196***	−0.241***	−0.170***	−0.315***
	(0.008)	(0.027)	(0.011)	(0.012)	(0.010)	(0.015)
Cash Flow Volatility	0.012***	0.036***	0.027***	0.068***	0.017***	0.059***
	(0.003)	(0.005)	(0.005)	(0.007)	(0.005)	(0.006)
Intercept	0.039**	0.299***	0.132***	0.160***	0.112***	0.264***
	(0.019)	(0.042)	(0.024)	(0.022)	(0.019)	(0.043)
Observations	4,282	4,227	3,469	3,507	3,721	3,726
R^2	0.185	0.380	0.383	0.296	0.379	0.437
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: Normalized Differences

	Weak CFO Firms	Strong CFO Firms	Norm. diff
Total Debt	0.342	0.388	−0.046
Interest Coverage Ratio	4.99	7.260	−0.069
KZ-Index	−17.659	−13.778	−0.064

Electronic copy available at: https://ssrn.com/abstract=2932832

Table 9
Financial Constraints and Agency Costs

This table presents the results on the relationship between cash holdings and our CFO index across financially constrained unconstrained firms with high (low) agency costs. We split firms into financially constrained and unconstrained groups based on the following three criteria: total debt, interest coverage, KZ-index (Kaplan and Zingales, 1997). We use letter (C) for constrained firms and (UC) for unconstrained firms. Firms with the ratio of total sales to total assets (asset turnover) above (below) the median are classified as firms with low (high) agency costs (Panel A). Firms with the ratio of selling, general and administrative expenses to total sales (SG&A) below (above) the median are classified as firms with low (high) agency costs (Panel B). Firms with the ratio of abnormal cash holdings to total assets below (above) the median are classified as insufficient (excess) cash firms (Panel C). Abnormal cash holdings are derived using estimates from Opler et al. (1999). The dependent variable is defined as the ratio of cash and marketable securities to the book value of total assets. The CFO Index variable is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. All independent variables (untabulated) are lagged by one year. Analytical definitions for all variables are provided in the Appendix. We run OLS regressions by adding year and industry fixed effects in all specifications. Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Asset Turnover Ratio

	Total Debt				**Interest Coverage**				**KZ Index**			
	C		**UC**		**C**		**UC**		**C**		**UC**	
	High Agency	Low Agency	High Agency	Low Agency	High Agency	Low Agency	High Agency	Low Agency	High Agency	Low Agency	High Agency	Low Agency
CFO Index	−0.001	0.002	−0.010***	−0.003*	−0.004**	0.003*	−0.006***	0.000	−0.001	0.002	−0.011***	−0.009***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)
Observations	1,956	2,326	2,045	2,182	1,718	1,701	1,204	2,303	1,781	1,940	1,442	2,284
R^2	0.207	0.201	0.424	0.319	0.428	0.345	0.265	0.345	0.427	0.342	0.526	0.390
Panel B: SG&A Expenses Ratio												
CFO Index	0.001	0.000	−0.008***	−0.004	−0.002	−0.002	−0.005*	0.000	−0.000	−0.000	−0.014***	−0.003
	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)
Observations	1,122	2,168	1,946	1,362	1,381	1,338	987	1,861	1,233	1,711	1,439	1,578
R^2	0.230	0.151	0.359	0.288	0.373	0.224	0.321	0.308	0.392	0.221	0.469	0.334
Panel C: Excess Cash Holdings												
CFO Index	0.000	−0.000	−0.007***	0.000	−0.001	0.001	−0.007***	0.001**	0.000	0.001*	−0.012***	0.000
	(0.001)	(0.000)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Observations	1,556	2,726	1,915	2,312	1,337	2,132	1,299	2,208	1,213	2,508	1,738	1,988
R^2	0.609	0.271	0.572	0.318	0.732	0.395	0.637	0.381	0.741	0.366	0.689	0.446

Electronic copy available at: https://ssrn.com/abstract=2932832

Table 10
CFOs and Access to Finance

This table shows whether strong CFOs are better able to raise new debt during the financial crisis of 2008−2009. The dependent variable is debt issues, which is a dummy variable that equals to 1 if the firm issues new debt in year t, and 0 otherwise. New debt issues are debt issued minus debt retired. The CFO index variable is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. Crisis 2008−2009 is a dummy variable coded 1 for years 2008 and 2009 and 0 otherwise. The main variable of interest is the interaction of the CFO Index with the Crisis 2008−2009 dummy. All independent variables are lagged by one year. Analytical definitions for all variables are provided in the Appendix. We run probit regressions by adding year and industry fixed effects in all specifications. Standard errors are robust to heteroscedasticity (reported in parentheses). ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Model 1	Model 2
CFO Index	0.057***	−0.008
	(0.009)	(0.015)
Crisis 2008−2009	−0.900***	−0.366***
	(0.178)	(0.091)
CFO Index x Crisis 2008−2009	0.031*	0.067**
	(0.019)	(0.028)
Firm Size	-	0.119***
	-	(0.016)
Net Working Capital	-	−0.294***
	-	(0.069)
Capital Expenditure	-	1.107***
	-	(0.258)
R&D	-	−0.109**
	-	(0.043)
Dividend	-	0.012
	-	(0.051)
Market-to-Book	-	−0.018
	-	(0.012)
Cash Flow	-	−0.060
	-	(0.076)
Cash Flow Volatility	-	−0.033
	-	(0.047)
Board Size	-	−0.009
	-	(0.011)
Board Independence	-	−0.058
	-	(0.152)
Executive Ownership	-	−0.001
	-	(0.002)
Non-executive Ownership	-	0.001
	-	(0.002)
Institutional Ownership	-	−0.001
	-	(0.001)
CEO Age	-	8.570
	-	(5.624)
CEO Age^2	-	−1.112
	-	(0.720)
CEO Tenure	-	0.003
	-	(0.017)
CEO Sex	-	0.378***
	-	(0.126)
Intercept	0.163	−18.460*
	(0.180)	(10.967)
Observations	9,615	5,865
Pseudo R^2	0.039	0.061
Industry FE	Yes	Yes
Year FE	Yes	Yes

Electronic copy available at: https://ssrn.com/abstract=2932832

Table 11
The Value of Cash for Strong CFO Firms

Panel A presents the results on the value of cash holdings for strong CFO firms following the methodology of Faulkender and Wang (2006). Panel B presents the marginal value of £1 for strong and weak CFO firms. We split firms into financially constrained and unconstrained groups based on the following three criteria: total debt, interest coverage and the KZ-index (Kaplan and Zingales, 1997). Strong CFO Firm is a dummy variable that equals 1 if the CFO index is greater than the median CFO index across all firms in year t, and 0 otherwise. The CFO index is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2. The (C) in the table refers to constrained firms and (UC) refers to unconstrained firms. The dependent variable is Excess Return, which is defined as $r_{i,t}$–$R^B_{i,t}$, where $r_{i,t}$ is the stock return from year t-1 to t and $R^B_{i,t}$ is the stock i's benchmark return over the same period. The benchmark portfolio is one of the 25 Fama−French portfolios based on size and book-to-market. All independent variables except Strong CFO Firm and Leverage are scaled by the lagged market value of equity (MV_{t-1}). Cash is cash plus marketable securities. $\Delta Cash_{i,t}$ represents change in cash holding from year t-1 to t. We include the interaction variables to interact $\Delta Cash_{i,t}$ with Strong CFO Firm as our main variable of interest. Analytical definitions for all variables are provided in the Appendix. We run OLS regressions by adding year and industry fixed effects in all specifications. Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A

	Full Sample	Total Debt		Interest Coverage Ratio		KZ-Index	
		(C)	(UC)	(C)	(UC)	(C)	(UC)
Strong CFO Firm	0.047***	0.015	0.044	0.019	0.003	0.044*	0.049**
	(0.016)	(0.022)	(0.027)	(0.023)	(0.022)	(0.024)	(0.022)
Strong CFO Firm x ΔCash	−0.271***	0.297**	−0.388**	0.693***	−0.014	0.326**	−0.240
	(0.100)	(0.144)	(0.171)	(0.182)	(0.209)	(0.164)	(0.158)
ΔCash	1.134***	0.633***	1.145***	0.740***	0.793***	0.854***	0.963***
	(0.097)	(0.154)	(0.170)	(0.211)	(0.225)	(0.156)	(0.168)
ΔEarning	0.273***	0.260***	0.253***	0.330***	0.728***	0.230***	0.345***
	(0.029)	(0.035)	(0.059)	(0.053)	(0.079)	(0.040)	(0.057)
ΔNet Assets	0.146***	0.170***	0.159***	0.192***	0.175***	0.210***	0.142***
	(0.019)	(0.023)	(0.042)	(0.028)	(0.046)	(0.028)	(0.033)
ΔR&D	1.162***	0.469	0.525	1.041	1.503	0.932	0.280
	(0.442)	(0.729)	(0.662)	(0.987)	(0.962)	(0.642)	(0.624)
ΔInterest Expense	−1.521***	−0.496	1.287	−1.257**	−4.272***	−1.433**	1.327
	(0.456)	(0.495)	(1.735)	(0.610)	(1.385)	(0.613)	(0.906)
ΔDividend	−0.397	−1.417***	1.455	−0.701	1.424*	−0.722	−0.434
	(0.455)	(0.520)	(0.975)	(0.572)	(0.760)	(0.654)	(0.617)
Cash	0.321***	0.346***	0.314***	0.397***	0.294***	0.437***	0.233***
	(0.041)	(0.058)	(0.069)	(0.072)	(0.075)	(0.070)	(0.056)
Leverage	−0.287***	−0.486***	−1.005***	−0.182***	−0.295***	−0.260***	−0.437***
	(0.042)	(0.062)	(0.166)	(0.069)	(0.105)	(0.061)	(0.074)
New Financing	−0.097***	−0.232***	0.034	−0.321***	−0.130	−0.292***	−0.150**
	(0.033)	(0.041)	(0.069)	(0.053)	(0.090)	(0.048)	(0.058)
Cash x ΔCash	−0.174	−0.265	0.141	−0.551**	−0.704**	−0.230	0.075
	(0.124)	(0.181)	(0.221)	(0.234)	(0.354)	(0.212)	(0.223)
Leverage x ΔCash	−1.104***	−0.493*	−1.136	−1.394***	−0.248	−0.911***	−0.876**
	(0.190)	(0.262)	(0.751)	(0.345)	(0.805)	(0.311)	(0.394)
Intercept	0.247**	0.233*	0.192	0.120	0.266*	0.015	0.411***
	(0.104)	(0.125)	(0.176)	(0.083)	(0.139)	(0.093)	(0.150)
Observations	8,108	3,220	3,228	2,061	2,063	2,948	2,957
R^2	0.088	0.104	0.109	0.121	0.125	0.102	0.099
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: The Value of £1							
Strong CFO Firms	£0.62	£0.79	£0.56	£1.08	£0.62	£0.97	£0.56
Weak CFO Firms	£0.89	£0.50	£0.94	£0.39	£0.64	£0.64	£0.80

Electronic copy available at: https://ssrn.com/abstract=2932832

Internet Appendix: How Do Chief Financial Officers Influence Corporate Cash Policies?

Chris Florackis[†] and Sushil Sainani

Abstract

In this Internet Appendix, we offer supplementary results for our paper "How Do Chief Financial Officers Influence Corporate Cash Policies". More specifically, we check the robustness of our findings using a GMM estimator as well as alternative cash specifications, alternative measures of cash holdings and three modified versions of our CFO index. To fully understand and further analyze how CFOs affect firm outcomes, we (i) provide additional evidence on how individual CFO attributes affect cash holdings and (ii) examine the CFO effect on other financial and investment corporate policies.

[†]Corresponding Author, Department of Accounting and Finance, University of Liverpool Management School, UK. Email addresses: c.florackis@liv.ac.uk (Chris Florackis), s.sainani@liv.ac.uk (Sushil Sainani).

Electronic copy available at: https://ssrn.com/abstract=2932832

A.1 Alternative Measures of Cash Holdings

In this section, we employ alternative measures of cash holdings to ensure that our main results are not driven by the choice of the cash holdings variable. The results are presented in Table A.1. In Panel A, the dependent variable is defined as the ratio of cash and marketable securities to sales, as in Harford (1999). In Panel B, we use the industry-adjusted measure of cash to sales ratio (cash holdings), as in Harford et al. (2012). The results in Panels A and B of Table A.1 are qualitatively similar to our main findings (see Table 3 of our paper).

A.2 Alternative Cash Estimation Models

Our baseline cash specification (see Model 1 of Table 3 of our paper) is based on Opler et al. (1999), who developed one of the most widely used cash models in the literature. In this section, we check the robustness of our main finding to using alternative cash models that include the firm-level controls proposed by Bates et al. (2009) and Oler and Picconi (2014). Bates et al. (2009) adds an acquisition variable to the Opler's et al. (1999) model to control for the fact that firms tend to reduce their cash balance in acquisitions. Oler and Picconi (2014) also make several modifications to Opler's et al. (1999) cash model, such as replacing cash flow with cash flow from operations, adding firm age, tax burden on foreign income and sales growth and removing leverage and market-to-book. Analytical definitions for these variables are provided in the Appendix.

Table A.2 presents the results. In Models 1 and 2, we extend the benchmark models proposed by Bates et al. (2009) and Oler and Picconi (2014), respectively, by adding our CFO index as an additional explanatory variable. The results in Models 1 and 2 remain consistent with our main finding in our paper. The coefficient on the CFO index is consistently negative and statistically significant at the 1% level in both models. The results on the control variables suggested by Bates et al. (2009) and Oler and Picconi (2014) are in line with their findings. Last, in Model 3 of Table A.2, we present evidence that our results remain robust to the use of a Tobit regression that controls for the zero censored observations in cash holdings. Overall, our primary findings are robust to alternative specifications suggested by other prior studies on cash holdings.

Electronic copy available at: https://ssrn.com/abstract=2932832

A.3 CFOs and Cash holdings: Index Components

In this section, we re-estimate our baseline specification (Model 1 of Table 3) after replacing our CFO index with each of the six CFO index components namely, CFO executive director (Model 1), CFO outside director (Model 2), CFO seniority (Model 3), CFO financial expertise (Model 4), CFO top 3 (Model 5) and CFO relative pay (Model 6). Analytical definitions of all these variables are provided in the Appendix.

The results, as presented in Table A.3, show that all of the six components are negatively and significantly associated with cash holdings. The economic magnitudes of these findings are also relevant. For instance, CFO board membership (outside board membership) is associated with 2.3 (0.7) percentage-point decrease in the cash holdings.

In Model 7 of Table A.3, we add all of them in the model and find that the standard errors increase substantially and hence t-ratios decline in all cases. This is likely to be driven by the multicollinearity problem. Indeed, we have estimated the variable inflation factor in Model 7 and it seems to be very high (VIF = 17.35). These results further justify the use of a composite index, rather than individual components, for measuring the CFO ability to influence firm outcomes.

A.4 Evidence from GMM Estimations

In this section, we estimate the following dynamic cash model:

$$Cash\ holdings_{i,t} = \beta_1\ Cash\ holdings_{i,t-1} + \beta_2\ CFO\ Index_{i,t-1} + \Sigma\gamma_k Firm\ Controls_{i,t} + \alpha_i + \alpha_t + \nu_{i,t} \quad (1)$$

Using a GMM estimator and in particular Arellano and Bond's (1991) two-step approach. The first step efficiently eliminates any unobservable individual effects (α_i) through first differencing. The second step estimates the first-differenced equation using GMM, which enables the use of lagged values of cash holdings, CFO index and other endogenous firm controls as possible instruments. The lags used in our GMM specification are reported in the notes of Table A.4.

Electronic copy available at: https://ssrn.com/abstract=2932832

Model 1 of Table A.4 presents the results from the difference GMM estimation. The dependent variable is cash holdings. We employ the same set of firm controls that we used in our baseline Model 1 of Table 3 in the main body of the paper. The results indicate that the coefficient on the CFO index continues to be negative and statistically significant at the 5% level. To test the consistency of these estimates, we perform Hansen's (1982) J test of over-identifying restrictions under the null that instruments are valid. The validity of instruments also depends on the absence of high second order serial correlation in the error term. Therefore, we also report the *m2* statistic developed by Arellano and Bond (1991) to test for the existence of second order serial correlation in first difference residuals.[1] The Hansen J-statistic yields a p-value of 0.167, which means that we cannot reject the null hypothesis that our instruments are valid. The results in Model 1 of Table A.4 also reveal a *m2* statistic with a p-value of 0.301, which suggests that we cannot reject the null hypothesis of no second order serial correlation.

We also employ the system GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998), which includes equations in both levels and differences in the estimation procedure. The system GMM estimator helps control for time-invariant unobserved heterogeneity, simultaneity and the dynamic relationship between current values of explanatory variables and past values of cash holdings (see e.g., Wintoki et al., 2012). Model 2 of Table A.4 presents the results from the two-step system GMM estimation. We find that the coefficient of the CFO index retains its negative sign and is statistically significant at the 10% level. The Hansen (1982) J-test supports the validity of the additional moments conditions utilized in the two-step system GMM and the *m2* statistic test further confirms the absence of second order serial correlation in the error term.

A.5 Alternative Measures of the CFO Index

In this section, we assess the robustness of our results after replacing our benchmark CFO index with three modified CFO indexes. In the first modified CFO index (Models 1 and 2, in Panel B of Table A.5), we replace *CFO Relative Pay* with a variable of CFO relative pay

[1] First differencing Equation (1), makes first difference residuals denoted as $\Delta\nu_{i,t}$ mathematically correlated to $\Delta\nu_{i,t-1}$ through a shared term $\nu_{i,t-1}$, thus, in transformed model negative first order serial correlation is expected.

Electronic copy available at: https://ssrn.com/abstract=2932832

that *includes* equity-based compensation. We also replace *CFO Seniority* with *CFO Tenure*, which is defined as the number of years that the CFO has been with the firm, respectively. Zajac and Westphal (1996) argue that an executive's (the CFO, in our case) influence on firm decisions also increases with his/er experience and knowledge about the firm's resources, operations and risks.

In the second modified CFO index (Models 3 and 4, in Panel B of Table A.5), we extend our benchmark CFO index by including *CFO Co-option*, a dummy variable that indicates whether the CFO was appointed into the current position *before* the current CEO took office or not. We use CFO co-option as an additional attribute to measure CFOs' independence from the CEO in decision-making. We draw upon the idea of CEO co-option from Coles et al. (2014). Following Landier et al. (2013), we argue that CFOs who joined the firm before the current CEO was appointed are more likely to be "independent from the CEO" in exercising their own preferences.

In the third modified CFO index (Models 5 and 6, Panel B of Table A.5), we use two alternative measures that could also reflect the CFO's relative importance or power within the top management team. We replace *CFO Seniority* with *CFO Relative Tenure*, defined as the ratio of the CFO's tenure to the CEO's tenure (see Westphal and Zajac, 1995). We also replace *CFO Top 3* with *CFO Pay Slice*, which is defined as the ratio of the CFO's total annual compensation to the aggregate of total top five executives' compensation (see Bebchuk et al., 2011). Detailed definitions of all variables used for the construction of our modified CFO indexes are provided in the Appendix.

Our results of the principal component analysis, as presented in Panel A of Table A.5 strongly suggest that none of these alternative CFO-specific variables add significantly to the information contained in the benchmark version of the index. To the contrary, the proportions explained by the modified CFO indexes are actually lower. Nevertheless, the results, as presented in Panel B, verify a negative association between each of the modified CFO indexes and cash holdings.

Electronic copy available at: https://ssrn.com/abstract=2932832

A.6 The Effect of CFOs on Other Corporate Policies

This section provides evidence on the relation between CFO index and leverage, defined as the ratio of long term debt plus short term debt to total assets (Model 1), debt maturity, defined as the ratio of long term debt to total debt (Model 2); dividend policy, which is a dummy variable that indicates whether a firm pays dividend in current year or not (Model 3); capital expenditure, defined as the ratio of capital expenditures to net assets (Model 4); R&D investment, which is a dummy variable that indicates whether a firm invest in R&D in a given year or not (Model 5) and M&A activity, which is a dummy variable whether a firm completes at least one acquisition in a given year or not (Model 6). Models 1, 2 and 4 are estimated using ordinary least squares regressions with standard errors clustered at the firm level, whereas Models 3, 5 and 6 are estimated using logit regressions.

These results, as presented in Table A.6, show that firms with strong CFOs (i.e., high values of the CFO index) are more likely to distribute (pay) dividends. Regarding investment policies, we find that firms with strong CFOs are more likely to invest in research and development and in acquiring other firms. However, we do not find any evidence that would suggest firms with strong CFOs are committed more heavily on debt, or in particular, towards long term debt. This perhaps is explained by the fact that, in addition to their ability/influence, several CFO behavioural traits and risk-taking incentives seem to matter in explaining capital structure decisions (see e.g., Malmendier et al., 2016 and Chava and Purnanandam, 2010). Finally, our findings that strong CFOs hold less cash, invest more in R&D, are more likely to pay dividends and engage into M&A deals is consistent with our reasoning about a weaker precautionary motive that strong CFOs may have.

Electronic copy available at: https://ssrn.com/abstract=2932832

References

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte carlo evidence and an application to employment equations. *The Review of Economic Studies* 58 (2), 277–297.

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

Bates, T. W., Kahle, K. M., Stulz, R. M., 2009. Why do US firms hold so much more cash than they used to? *The Journal of Finance* 64 (5), 1985–2021.

Bebchuk, L. A., Cremers, K. M., Peyer, U. C., 2011. The CEO pay slice. *Journal of Financial Economics* 102 (1), 199–221.

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

Chava, S., Purnanandam, A., 2010. CEOs versus CFOs: Incentives and corporate policies. *Journal of Financial Economics* 97 (2), 263–278.

Coles, J. L., Daniel, N. D., Naveen, L., 2014. Co-opted boards. *The Review of Financial Studies* 27 (6), 1751–1796.

Hansen, L. P., 1982. Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the Econometric Society* 50 (4), 1029–1054.

Harford, J., 1999. Corporate cash reserves and acquisitions. *The Journal of Finance* 54 (6), 1969–1997.

Harford, J., Mansi, S. A., Maxwell, W. F., 2012. Corporate governance and firm cash holdings in the US. In: Corporate governance. Springer, pp. 107–138.

Landier, A., Sauvagnat, J., Sraer, D., Thesmar, D., 2013. Bottom-up corporate governance. *Review of Finance* 17, 161–201.

Malmendier, U., Pezone, V., Zheng, H., 2016. Managerial duties and managerial biases. *University of California at Berkeley Working Paper*.

Oler, D. K., Picconi, M. P., 2014. Implications of insufficient and excess cash for future performance. *Contemporary Accounting Research* 31 (1), 253–283.

Opler, T., Pinkowitz, L., Stulz, R., Williamson, R., 1999. The determinants and implications of corporate cash holdings. *Journal of Financial Economics* 52 (1), 3–46.

Westphal, J. D., Zajac, E. J., 1995. Who shall govern? CEO/board power, demographic similarity, and new director selection. *Administrative Science Quarterly*, 60–83.

Wintoki, M. B., Linck, J. S., Netter, J. M., 2012. Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics* 105 (3), 581–606.

Zajac, E. J., Westphal, J. D., 1996. Who shall succeed? How CEO/board preferences and power affect the choice of new CEOs. *Academy of Management Journal* 39 (1), 64–90.

Electronic copy available at: https://ssrn.com/abstract=2932832

Table A.1
Alternative Measures of Cash Holdings

This table presents additional results on the relationship between cash holdings and our CFO Index using two alternative measures of cash holdings. In Panel A, the dependent variable is defined as the ratio of cash and marketable securities to sales, as in Harford (1999). In Panel B, industry-adjusted measure of cash to sales ratio (cash holdings), as in Harford et al. (2012). The industry-adjusted measure is calculated as cash to sales ratio (cash holdings) minus the median industry level of the cash to sales ratio. In Models 1 and 2 of Panels A-B, we use an ordinary least squares (OLS) regression with standard errors clustered at the firm level. In Models 3, 4 and 5 of Panels A-B, we add firm, CEO and CFO fixed effects, respectively. In Model 6, we use a Fama-MacBeth (1973) regression approach. In our baseline Model 1 of Panels A-B, we extend the Opler's et al. (1999) cash model by adding our CFO Index as an additional explanatory variable. In Models 2-6 of Panels A-B, we add board-, ownership- and CEO-specific characteristics. The CFO Index variable is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2 of our paper. All independent variables are lagged by one year. Analytical definitions for all variables are provided in the Appendix. Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Cash to Sales Ratio (Cash Holdings)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CFO Index	−0.017***	−0.017***	−0.019***	−0.020***	−0.011**	−0.018***
	(0.007)	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)
Observations	8,116	6,165	6,165	6,165	6,165	6,165
R^2	0.365	0.374	0.098	0.825	0.846	0.419
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	No	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	No	Yes	Yes	Yes
Firm FE	No	No	Yes	No	No	No
CEO FE	No	No	No	Yes	No	No
CFO FE	No	No	No	No	Yes	No

Panel B: Industry-adjusted Cash to Sales Ratio (Cash Holdings)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CFO Index	−0.017***	−0.017***	−0.020***	−0.021***	−0.011**	−0.018***
	(0.007)	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)
Observations	8,116	6,165	6,165	6,165	6,165	6,165
R^2	0.310	0.322	0.102	0.809	0.831	0.374
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	No	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	No	Yes	Yes	Yes
Firm FE	No	No	Yes	No	No	No
CEO FE	No	No	No	Yes	No	No
CFO FE	No	No	No	No	Yes	No

Electronic copy available at: https://ssrn.com/abstract=2932832

Table A.2
Alternative Cash Estimation Models

This table presents additional results on the relationship between cash holdings and our CFO index. The dependent variable is defined as the ratio of cash and marketable securities to the book value of total assets. The CFO index variable is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2 of our paper. In Model 1, we extend the cash model of Bates et al. (2009) by adding CFO index as an additional explanatory variable. In Model 2, we extend the cash model of Oler and Picconi (2014) by adding CFO index as an additional explanatory variable. We run OLS regressions in Models 1 and 2. In Model 3, we re-estimate Model 2 using a Tobit regression, as in Oler and Piconni (2014). All independent variables are lagged by one year. Analytical definitions for all variables are provided in the Appendix. Standard errors are reported in parentheses. Industry and year fixed effects are included in all specifications. ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Model 1	Model 2	Model 3
CFO Index	−0.005***	−0.003***	−0.003***
	(0.001)	(0.001)	(0.001)
Firm Size	−0.006***	−0.013***	−0.013***
	(0.001)	(0.001)	(0.001)
Net Working Capital	−0.103***	−0.042***	−0.042***
	(0.005)	(0.005)	(0.005)
Capital Expenditure	0.173***	0.249***	0.257***
	(0.023)	(0.025)	(0.025)
R&D	0.029***	0.035***	0.036***
	(0.003)	(0.004)	(0.004)
Dividend	−0.017***	0.001	0.002
	(0.004)	(0.004)	(0.004)
Cash Flow Volatility	0.034***	0.038***	0.039***
	(0.004)	(0.004)	(0.004)
Market-to-Book	0.005***	-	-
	(0.001)	-	-
Cash Flow	−0.058***	-	-
	(0.003)	-	-
Leverage	−0.290***	-	-
	(0.008)	-	-
Acquisition	−0.018***	-	-
	(0.003)	-	-
Cash From Operations	-	−0.080***	−0.080***
	-	(0.004)	(0.004)
Sales Growth	-	−0.003	−0.002
	-	(0.002)	(0.002)
Firm Age	-	−0.017***	−0.017***
	-	(0.003)	(0.003)
Tax Burden on Foreign	-	0.015***	0.016***
	-	(0.005)	(0.005)
Intercept	0.204***	0.177**	0.170**
	(0.024)	(0.070)	(0.071)
Observations	8,368	8,204	8,204
R^2	0.402	0.299	-
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Electronic copy available at: https://ssrn.com/abstract=2932832

Table A.3
CFOs and Cash Holdings: Index Components

This table presents the results from several regressions on the relationship between cash holdings and the six attributes of our CFO Index. The dependent variable is defined as the ratio of cash and marketable securities to the book value of total assets. All independent variables are lagged by one year. Analytical definitions for all CFO attributes are provided in the Appendix. Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
CFO Executive Director	−0.023***	-	-	-	-	-	0.011
	(0.005)	-	-	-	-	-	(0.013)
CFO Outside Director	-	−0.007*	-	-	-	-	−0.003
	-	(0.003)	-	-	-	-	(0.004)
CFO Seniority	-	-	−0.000***	-	-	-	−0.000*
	-	-	(0.000)	-	-	-	(0.000)
CFO Financial Expertise	-	-	-	−0.016***	-	-	−0.008
	-	-	-	(0.004)	-	-	(0.005)
CFO Top 3	-	-	-	-	−0.013***	-	−0.003
	-	-	-	-	(0.003)	-	(0.005)
CFO Relative Pay	-	-	-	-	-	−0.009***	−0.004
	-	-	-	-	-	(0.002)	(0.003)
Observations	8,509	8,509	8,509	8,509	8,509	8,509	8,509
R^2	0.401	0.399	0.401	0.400	0.400	0.400	0.401
Firm-Level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Electronic copy available at: https://ssrn.com/abstract=2932832

Table A.4
GMM Estimations

This table presents the results from the dynamic panel GMM estimation. In Model 1, we report the results of the Arellano and Bond (1991) difference-GMM estimator, whereas in Model 2, we report the results from Arellano and Bover (1995) and Blundell and Bond (1998) system-GMM estimator. The dependent variable is defined as the ratio of cash and marketable securities to the book value of total assets. For the difference equations, we employ three lags (in levels) for the lagged dependent variable and four lags for CFO index and other firm controls as instruments. For system equations, we employ three lags (in first difference) for the lagged dependent variable and four lags for CFO index and other firm controls as an additional instruments for system-GMM estimations. The Hansen test of over-identification is under the null hypothesis that all instruments are valid. *m2* is the test statistic for the second order (AR2) serial correlation in the first-differenced residuals, under the null hypothesis of no serial correlation. We use the STATA command xtabond2 created by Roodman (2009) to produce GMM estimates based on a two-step GMM estimator that produces standard errors that are robust to heteroskedasticity (reported in parentheses). We use the Windmeijer's standard error correction method (Windmeijer, 2005). Analytical definitions for all variables are provided in the Appendix. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

GMM Estimation		
	Model 1	Model 2
Cash Holdings$_{t-1}$	0.307***	0.368***
	(0.028)	(0.027)
CFO Index	−0.005**	−0.003*
	(0.002)	(0.001)
Estimation method	Difference GMM	System GMM
No. of observations	6,798	8,488
Hansen J-statistic for over-identification (p-value)	437.62 (0.167)	378.61 (0.217)
m2 z-statistic (p-value)	1.04 (0.301)	1.51 (0.130)
Year FE	Yes	Yes
Firm-level controls	Yes	Yes

Electronic copy available at: https://ssrn.com/abstract=2932832

Electronic copy available at: https://ssrn.com/abstract=2932832

Table A.5
Modified CFO Index and Cash holdings

Panel A presents key results from the principal component analysis conducted to construct our modified CFO indexes. Eigenvalues and proportion of variance explained by each Modified CFO Index (1), (2) and (3) are presented. **Panel B** presents the results on the relationship between cash holdings and three modified CFO indexes, which are constructed as analytically explained in Section A.5. The control variables in Models 1, 3 and 5 are similar to those in our baseline Model 1 of Table 3 of our paper (unreported for brevity). The control variables in Models 2, 4 and 6 are similar to those in Model 2 of Table 3 (unreported for brevity). The dependent variable is defined as the ratio of cash and marketable securities to the book value of total assets. All independent variables are lagged by one year. Analytical definitions for all variables are provided in the Appendix. We run OLS regressions by adding year and industry fixed effects in all regressions. Standard errors are reported in parentheses. *** denote statistical significance at the 1% levels.

Panel A: Principal Component Analysis

	Eigenvalue	Proportion Explained	Eigenvalue	Proportion Explained	Eigenvalue	Proportion Explained
Modified CFO Index (1)	2.84	47.43 %	-	-	-	-
Modified CFO Index (2)	-	-	3.76	53.75 %	-	-
Modified CFO Index (3)	-	-	-	-	2.81	47.03 %

Panel B: Modified CFO Index and Cash Holdings

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Modified CFO Index (1)	−0.006***	−0.005***	-	-	-	-
	(0.002)	(0.002)	-	-	-	-
Modified CFO Index (2)	-	-	−0.005***	−0.004***	-	-
	-	-	(0.002)	(0.001)	-	-
Modified CFO Index (3)	-	-	-	-	−0.005***	−0.004***
	-	-	-	-	(0.002)	(0.001)
Observations	8,503	6,420	8,332	6,209	8,267	6,187
R^2	0.407	0.418	0.398	0.405	0.406	0.421
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Other Controls	No	Yes	No	Yes	No	Yes

Electronic copy available at: https://ssrn.com/abstract=2932832

Table A.6
CFOs and Other Corporate Policies

This table presents the results from regressions on the relationship between CFO Index and six corporate policies. The dependent variables are leverage, the ratio of total debt to total assets (Model 1); debt maturity, the ratio of long term debt to the sum of debt in current liabilities and long term debt (Model 2); dividend policy, a dummy variable coded 1 if a firm pays a dividend in current year and 0 otherwise (Model 3); capital expenditure, the ratio of capital expenditures to net assets (Model 4); research and development (R&D) investment, a dummy variable coded 1 if firms invest in R&D and 0 otherwise (Model 5) and M&A activity, a dummy variable coded 1 if a firm completes one or more acquisition in a given year and 0 otherwise (Model 6). In our all specifications, we use similar controls as in baseline specification of Table 3 of the main body of our paper. The CFO Index variable is constructed after combining six CFO attributes using principal component analysis as discussed in Section 2.2 of our paper. All independent variables are lagged by one year. Models 1, 2 and 4 are estimated using simple ordinary least square regressions with standard errors clustered at the firm level. Models 3, 5 and 6 are estimated using logit regressions. Analytical definitions for all variables are provided in the Appendix. Standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Leverage	Debt Maturity	Dividend Policy	Capital Expenditure	R&D Investment	M&A Activity
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
CFO Index	0.000	0.001	0.121***	0.000	0.067***	0.041**
	(0.001)	(0.002)	(0.019)	(0.001)	(0.017)	(0.019)
Firm Size	0.024***	0.079***	0.544***	0.001	0.180***	0.219***
	(0.001)	(0.002)	(0.021)	(0.001)	(0.016)	(0.016)
Net Working Capital	−0.209***	−0.005	0.358***	−0.025***	0.896***	−0.464***
	(0.018)	(0.022)	(0.131)	(0.004)	(0.100)	(0.108)
Capital Expenditure	−0.053	0.266***	0.079	-	−1.600***	−3.105***
	(0.062)	(0.093)	(0.496)	-	(0.448)	(0.511)
R&D	−0.002	0.003	0.070	−0.006**	-	−0.224***
	(0.009)	(0.017)	(0.074)	(0.003)	-	(0.063)
Dividend	−0.029***	−0.017	-	0.002	−0.041	0.371***
	(0.009)	(0.017)	-	(0.003)	(0.070)	(0.073)
Market to Book	0.001	−0.011***	0.005	0.003***	0.143***	−0.012
	(0.002)	(0.004)	(0.023)	(0.001)	(0.017)	(0.020)
Cash Flow	0.004	−0.004	2.144***	−0.003	−0.256***	0.534***
	(0.008)	(0.009)	(0.177)	(0.003)	(0.051)	(0.103)
Leverage	-	-	−1.081***	−0.007	−0.070	−0.538***
	-	-	(0.202)	(0.008)	(0.160)	(0.168)
Cash Flow Volatility	−0.003	−0.010	−3.120***	−0.010***	0.111*	0.255***
	(0.010)	(0.013)	(0.220)	(0.003)	(0.066)	(0.070)
Intercept	0.035	−0.492***	−4.444***	0.064***	−0.517	−2.475***
	(0.054)	(0.074)	(0.681)	(0.014)	(0.374)	(0.344)
Observations	8,509	8,509	8,509	8,509	8,509	8,509
R^2 or Pseudo R^2	0.222	0.238	0.414	0.091	0.223	0.086
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes