The effect of CFO experience and gender on management forecast quality: evidence from the S&P 1500 firms

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Abstract

The objective of this research is to examine whether the experience and gender of the CFO have an effect on the quality of management forecasts. Experience, measured by using two dimensions: tenure and age, has a negative insignificant effect on management forecast quality. The other characteristic being examined, gender, is positive and insignificantly related with management forecast quality. The main findings indicate that both CFO characteristics are not associated with management forecast quality. The results imply that the main stakeholders, investors and analysts, do not have to take these CFO characteristics into account when determining the credibility of management forecasts. Furthermore, this study has implications for companies. The findings suggest that gender does not make a difference regarding the quality of management forecasts. In combination with other studies that focus on other CFO tasks (e.g., Krishnan and Parsons, 2008; Francis et al., 2016), the findings of this study can be the beginning of breaking the glass ceiling.

Keywords: chief financial officer, experience, gender, management forecast quality.

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1. Introduction

The objective of this study is to gain insights into the effect of two observable background characteristics of the CFO on management forecast quality. The characteristics that will be examined are experience and gender. The following research question is defined:

Research question: *Does the experience and gender of the CFO have an impact on the quality of management forecasts?*

The U.S. Securities and Exchange Commission (SEC) enacted section 302 of the SOX act[1]. This act requires that the chief executive officer (CEO) needs to sign off on the annual reports, while the chief financial officer (CFO) needs to sign off on both the annual and the quarterly reports. One could conclude that the CFO has a greater responsibility regarding the disclosure quality compared to the CEO based on this act. This is consistent with previous studies that mention that the CFO is mainly responsible for the financials within the organization (Aier et al., 2005; Geiger and North, 2006; Ge et al., 2011; Ham et al., 2017).

Despite the fact that there is a public law and the literature which states that the CFO is mainly responsible for disclosure quality, most of the studies focus on the influence of the CEO or the entire management team on various accounting related decisions and outcomes (e.g., Bamber et al., 2010; Baik et al., 2011; Ahmed and Duellman, 2013; Ali and Zhang, 2015). There is limited empirical evidence on the effects of the CFO on accounting related decisions and outcomes. This shortage in literature is peculiar, since the CFO is primarily responsible for the quality of financial disclosures.

A key component of disclosures provided by the company are management forecasts (Feng et al., 2009). Prior literature shows that the quality of these forecasts have important capital market implications such as a reduction of information asymmetry (Coller and Yohn, 1997) and an influence on the stock price (Patell, 1976). An answer to the research question is mainly of interest to investors and analysts, since these stakeholders make important decisions and predictions based on management forecasts (Rogers and Stocken, 2005; Cotter et al., 2006).

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[1] The Sarbanes-Oxley Act of 2002 (Public Law 107-204, 116 Stat. 745) that is approved on the 30th of July 2002.

Several studies found evidence that individual top managers have an influence on different aspect of voluntary disclosures (Bamber et al., 2010; Yang, 2012). However, to the best of my knowledge, there is no research which specifically focuses on the influence of CFO characteristics on management forecast quality, although, the CFO is mainly responsible for the financials within an organization. This includes preparing and providing management forecasts (Brochet et al., 2011). This study will contribute to this gap in the literature by testing the relation between CFO experience and gender on management forecast quality.

This relation will be tested by using an ordinary least squares (OLS) model which includes several control variables and fixed effects to mitigate the effect of omitted correlated variables which could bias the results. Following prior research, accuracy will be used as a proxy for management forecast quality (Ajinkya et al., 2005; Feng et al., 2009; Bamber et al., 2010; Baik et al., 2011; Goodman et al., 2014). The independent variable, experience, is measured by using two dimensions: tenure and age. Furthermore, the other characteristic, gender is an indicator variable which equals 1 if the CFO is a woman, and 0 otherwise. In order to conduct this analysis, data is obtained from the following databases: ExecuComp, IBES guidance, IBES history, and Compustat. The sample holds data from 2000-2019 and consists of the Standard and Poor's (S&P) 1500 companies. In this sample only annual forecasts of EPS will be included as these forecasts are the focus of this research.

The findings of this research indicate that the experience and gender of the CFO does not have an impact on the quality of management forecasts. Both proxies for experience, tenure and age, have a negative insignificant effect on management forecast quality. Gender has a positive effect on management forecast quality, however, this effect is not statistically significant. The executed robustness tests: another measurement of forecast errors (i.e., the inverse of forecast accuracy), exclusion of range forecasts, and using the upper-bound of a range forecast instead of the mean value, confirm these findings.

This study contributes to the emerging body of literature that examines the influence of the CFO on various accounting related decisions and outcomes (e.g., Aier et al., 2005; Geiger and North, 2006; Li et al., 2010; Ge et al., 2011; Beck and Mauldin, 2014; Ham et al., 2017). To the best of my knowledge, this study is the first one that studies the effect of the CFO on the quality of management forecasts. Therefore, this research is more specified than earlier studies that tests the effect of the entire management team on management forecasts (e.g., Bamber et al., 2010). Specifically, the findings of

this research contribute to the academic research by showing that the experience and gender of the CFO does not have an influence on the quality of management forecasts.

The new insight which has arisen is that investors and analysts do not need to take the experience and gender of the CFO into account when assessing the credibility of management forecasts on which these stakeholders make important decisions and predictions (Rogers and Stocken, 2005; Cotter et al., 2006). Furthermore, in combination with the findings of other studies (e.g., Krishnan and Parsons, 2008; Francis et al., 2015), the results can be the beginning of breaking the glass ceiling when companies become aware that gender does not make a difference or that it is even better to have a woman as CFO.

The remaining part of this paper is divided in the following sections. Section 2 addresses the theoretical background. After that, section 3 explains the hypothesis development. Section 4 elaborates on the research design. In section 5 and 6, respectively, the results of the empirical analyses and conclusion will be discussed.

2.   Theoretical background

This paper relates to two streams of literature. The first stream focuses on the specific effects of managers in the accounting literature. The other stream is related to the voluntary disclosure literature as part of the broader stream of disclosure quality.

2.1.   Manager-specific effects

Under the neoclassical economic theory, the individual preferences of managers should not affect the decisions and outcomes of organizations (Bertrand and Schoar, 2003; Yang, 2012). This theory assumes that top executives are homogeneous and therefore each executive can serve as a perfect substitute. This suggests that two firms which are similar in terms of, for instance, available resources will make similar decisions regardless of the management team. This would imply that individual characteristics of top managers do not influence corporate outcomes. This is consistent with the agency theory. This theory states that managers' have an incentive to use discretion to alter decisions for their own benefit, i.e., to achieve compensation-based objectives. However, agency theory does not imply that the individual characteristics of managers affect corporate decisions and outcomes but rather that the differences in corporate decisions and outcomes are attributable to the differences in the strength of governance mechanisms that are in place and which are used to align managers' individual incentives with the incentives of the organization (Bertrand and Schoar, 2003).

In contrast to the neoclassical economic and agency theories, the upper echelons theory predicts that top managers' background characteristics have an influence on the outcomes of an organization (Hambrick and Mason, 1984; Hambrick, 2007). This applies especially to top managers which deal with great ambiguity and complexity when executing their tasks. This theory is extensively supported by numerous studies (e.g., Bertrand and Schoar, 2003; Dyreng et al., 2010). Bertrand and Schoar (2003) found evidence of significant differences across managers. These managerial differences have an influence on different practices within the organization such as investing and financing. The researchers showed that there is a correlation between the differences in practices due to managerial heterogeneity and the performance of the organization. Additional research by Dyreng et al. (2010) focused on a specific organizational practice, namely tax avoidance. The researchers showed that individual executives, including CEOs and CFOs, have an affect on the avoidance of tax. This is done by setting the "tone at the top".

There are also studies that focus specific on accounting related choices and outcomes. Prior literature found that fixed effects of managers have a significant effect on a variety of decisions and outcomes related to accounting (e.g., Bamber et al., 2010; Ge et al., 2011). The research conducted by Bamber et al. (2010) concludes that the specific fixed effects of managers have an influence on five characteristics of management forecasts: frequency, precisions, earnings news, bias, and accuracy. The managerial-fixed effects which have an influence on managers' unique disclosure styles are associated with observable demographic characteristics of managers. The study of Ge et al. (2011) focused specifically on CFOs rather than the entire management team. The researchers found that the style of a CFO has a significant effect on accounting choices, thus, individual factors influence accounting choices. However, there is limited evidence when testing the effect of observable CFO characteristics such as age on accounting choices.

Most research on managerial characteristics within the accounting literature focus on the entire management team (e.g., Bamber et al., 2010) or solely on CEOs. These executive studies showed for instance the effect of CEO ability (Baik et al., 2011), CEO overconfidence (Ahmed and Duellman, 2013), and CEO tenure (Ali and Zhang, 2015) on the quality of financial disclosure. Although, prior research focused extensively on the entire management or solely on the CEO[2], there is limited empirical evidence regarding the influence of different CFO characteristics on financial disclosure quality. This shortage in literature is peculiar as CFOs are the ones who are mainly responsible for the financials and therefore have the most impact on the financial disclosure quality of the organization (Aier et al., 2005; Geiger and North, 2006; Ge et al., 2011). Therefore, one could argue that CFO characteristics are of greater importance regarding the quality of financial disclosure than the characteristics of the entire management team or the CEO. This is consistent with the research of Ham et al. (2017) which mentions explicitly that the characteristics of the CFO are important for decisions related to financial reporting. In addition to, the research conducted by Jiang et al. (2010) found evidence that there is a greater chance that CFOs will engage in earnings management relative to CEOs based on their equity incentives. Therefore, when focusing specifically on CFOs I expect a more direct link between their characteristics and the quality of management forecast which they have an influence on.

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[2] Finkelstein and Hambrick (1996) suggest that more research on the influence of top management characteristics is necessary. These studies should focus on other top management functions than the CEO, because the influence of the CEO is relatively well-understood.

There is some research which focuses explicitly on the influence of CFO's characteristics on a variety of financial reporting decisions and outcomes. For example, the appointment of a new CFO (Geiger and North, 2006), the influence of the style of the CFO (Ge et al., 2011), and CFO narcissism (Ham et al., 2017). The studies looked at several financial reporting decisions and outcomes such as discretionary accruals, the quality of internal controls, restatement, and the timeliness of the recognition of losses. However, to the best of my knowledge, the CFO's individual effect on management forecast quality has not been studied before. Forecasts are an important attribute for the organization to communicate firm performance to investors and therefore an important determinant of the firms overall reporting quality (Healy and Palepu, 2001). The study conducted by Bamber et al. (2010) found that top managers significantly influence voluntary disclosures. Therefore, it is interesting to test the effect of several CFO's characteristics on the quality of management forecasts. Especially, because one of the main financial tasks of the CFO is to prepare and provide management forecasts (Brochet et al., 2011).

2.2. Management forecast quality

Both required and voluntary disclosures are important channels to inform different external stakeholders about the governance and performance of the organization. This is important because of information asymmetry and agency problems between management and shareholders or other stakeholders. Therefore, as mentioned by Healy and Palepu (2001), corporate disclosures are critical for the efficient functioning of capital markets because they could potentially be used to reduce the misallocation of resources. Prior literature discusses the different motives managers may have to provide voluntary disclosure additional to the required disclosures such as transactions in the capital markets (e.g., Healy and Palepu, 2001). In this situation voluntary disclosures could lead to a lower information risk. Studies found that increased voluntary disclosure can lead to three potential capital market scenarios: reduced cost of capital (Botosan, 1997), improved stock liquidity (Healy et al., 1999), and increased information intermediation (Healy et al., 1999).

The potential of voluntary disclosure to reduce misallocation of resources in capital markets depends on the credibility of the information provided which is not provided to the market through other sources (Healy and Palepu, 2001). However, the credibility of voluntary disclosure is questionable because managers may have self-serving motives to disclose such information. For example, research by Rogers and Stocken (2005) discussed four incentives to misrepresent management forecasts with the intention to mislead investors: litigation environment, competitive environment, financial distress, and insider transactions. A way for investors and other stakeholders to determine the credibility of current management forecasts is through validation (Healy and Palepu, 2001; Rogers and Stocken, 2005). This

means that forecasts in prior periods can be verified through the actual results. These results are disclosed in the required financial reports which are audited. Therefore, the quality of management forecasts, i.e., the accuracy of expected versus realized, is important to reduce misallocation of resources.

The focus of this research is on management forecasts as these forecasts are a key component of a firm's voluntary disclosure (Feng et al., 2009). Prior studies have shown the importance and informativeness of providing accurate management forecasts. A response to management forecasts, by both investors and analysts, depends on the accuracy of forecasts in prior periods (Hutton and Stocken, 2009) and hence leads to a reputation of credible disclosure (Graham et al., 2005). Another study by Coller and Yohn (1997) found evidence that the disclosure of accurate management forecasts leads to a reduction in the information asymmetry between management and investors calculated as the difference in bid-ask spreads. Further studies have reported benefits such as a reduction in litigation risk (Rogers and Stocken, 2005) and influences on the stock prices (Patell, 1976).

Previous research found evidence that individual top managers have significant influence on different aspects of voluntary communications such as control over the frequency and timeliness (Bamber et al., 2010; Yang, 2012). Specifically, Yang (2012) illustrated that within their study the market had a stronger reaction to the news component in management forecasts when the manager has a reputation of providing accurate forecasts. Thus, once again, the importance of accurate forecasts is highlighted and also the credibility of the individual manager matters. However, according to my knowledge, there are no studies that focuses specifically on the influence of the CFO on management forecast quality. This is peculiar, given the importance of management forecast quality, it is reasonable to assume that the CFO has a great influence on this quality as he or she is mainly responsible for the financial duties within the organization (Aier et al., 2005; Geiger and North, 2006; Ge et al., 2011; Ham et al., 2017). This is in accordance with the study of Hui and Matsunaga (2015) which found a relation between the quality of disclosure and the changes in the bonuses of the CFO. Specifically, the researchers used management forecast accuracy as a measurement for disclosure quality. The findings suggest that the board of directors hold the CFO responsible for the management forecast quality by rewarding them in terms of an increase in annual bonuses.

2.3. CFO characteristics and management forecast quality

This study tests the effect of two observable background characteristics of the CFO on management forecast quality, namely experience and gender. This is in accordance with the recommendation of the upper echelons theory to focus on observable characteristics of management such as gender, religion, and education (Hambrick and Mason, 1984; Hambrick, 2007) because these characteristics can be measured in a reliable fashion. Some studies test the effect of different CFO characteristics on accounting decisions and outcomes (e.g., Geiger and North, 2006; Ge et al., 2011; Ham et al., 2017). However, this effect is relatively well-understood and to the best of my knowledge, its influence on management forecast quality has not been studied before what is peculiar given the importance.

The upper echelons theory assumes that choices are indirectly influenced by, among others, the experiences of the managers (Hambrick and Mason, 1984; Hambrick, 2007). Therefore, various organizational outcomes could also be affected by managerial experience. This assumption was tested in various contexts (e.g., Finkelstein and Hambrick, 1990). Additional studies have also focused specifically on the experience of the CFO in a variety of accounting related decisions and outcomes. These include fewer accounting restatements (Aier et al., 2005), improvements of the SOX 404 opinions (Li et al., 2010), and a more powerful CFO (measured by their experience) and his or her impact on audit fees (Beck and Mauldin, 2014).

Previous studies tested the effect of gender in various contexts (e.g., Adams and Ferreira, 2009). Evidence suggest that gender differences affect organizational outcomes such as performance (Milliken and Martins, 1996). However, there is little empirical evidence on the effect of gender in top management positions as most of the existing research focused on the entire population, students, or workers (Adams and Funk, 2012). Furthermore, little is known about the influence on accounting related decisions and outcomes (Francis et al., 2015).

3. Hypothesis development

3.1. CFO experience and management forecast quality

The first hypothesis relates to the experience of the CFO and the quality of management forecasts. Prior studies documented a positive relation between work experience and job performance (e.g., Quińones et al., 1995). This implies that an individual can better perform his or her job (e.g., making less mistakes and achieving goals) when that individual has more experience (e.g., fulfill longer his/her job within the organization).

Some studies specifically focus on the experience of the CFO. The study of Aier et al. (2005) provides empirical evidence that the experience of the CFO is inversely related with accounting restatements as a proxy for the quality of financial reporting. Another study conducted by Li et al. (2010) focused on another important responsibility of the CFO, namely the quality of the underlying processes of financial reporting. The researchers showed a positive correlation between the qualifications of the CFO and improvements in the opinions of SOX 404 (i.e., internal control of the organization). In the study of Aier et al. (2005) the qualifications of the CFO were split into two components: experience and accounting knowledge. Feng et al. (2009) documented that the quality of management forecasts (i.e., less errors) increases after an improvement in the SOX 404 opinion. This suggests that there is an indirect relation between CFO expertise, consisting of experience and accounting knowledge, and an improvement in the quality of management forecasts. In research by Beck and Mauldin (2014) the authors report that a CFO has more power when that CFO has more experience (measured as tenure). This power leads to a greater influence on the audit fee negotiations compared to the influence of the audit committee. Therefore, a more experienced CFO has a positive influence on certain organizational outcomes, in this case, audit fee reductions. The results from these different studies highlight the benefits of a more experienced CFO regarding a variety of accounting related outcomes.

There are multiple ways to define experience. Consistent with prior research I will define experience as tenure. This time-based proxy for experience is used extensively (i.e., almost 80 per cent) in earlier studies (Quińones et al., 1995). Finkelstein and Hambrick (1990) mention that tenure of top management has a positive effect on certain organizational outcomes. This is due to an increase in specific knowledge of the organization such as risks, operations, and resources. Although, the researchers specifically focused on audit-firm tenure, the results are supported by Johnson et al. (2002). In their study the researchers found that a short audit-firm tenure (i.e., two to three years) leads to a lower quality of the financial reports. The reason therefore is a lack of specific knowledge about the

client. CFOs who are able to provide high-quality management forecasts have to deal with an uncertain business environment (Lee et al., 2012). I expect that specific knowledge about the organization is necessary to deal with this complexity and consequently being able to make good forecasts.

However, as mentioned before, there is not a uniform definition of experience in previous literature. Different definitions of experience could capture other aspects of experience (Quińones et al., 1995). Therefore, besides tenure, I will also use age to capture experience. This is consistent with the recommendation of the upper echelons theory to use background characteristics of managers which are observable (Hambrick and Mason, 1984; Hambrick, 2007). There is scant literature which test the effect of age on the quality of financial reporting. A study conducted by Huang et al. (2012) tests the effect of the age of the CEO on restatements and meeting or beating the forecasts of analysts. The results showed a positive association between age and their proxies for financial reporting quality.

Based on the findings in prior literature, I expect that a more experienced CFO is better able to perform his or her job. As providing management forecasts is part of this job, I expect less mistakes, thus, a higher-quality of management forecasts. Having said this, the following hypothesis was constructed:

Hypothesis 1: *The experience of the CFO is positively related to the quality of management forecasts.*

3.2. CFO gender and management forecast quality

The second hypothesis relates to the gender of the CFO and the quality of management forecasts. Women are still underrepresented in top management positions. However, there is a slow but steady increasing trend in women who are in top management functions (Adams and Funk, 2012; Francis et al., 2015). Previous studies document that there are fundamental gender differences in top management positions which have a possible effect on decisions and consequently on outcomes of organizations (e.g., Adams and Funk, 2012). There are also studies that confirm this in the area of accounting related decisions and outcomes. For example, Francis et al. (2015) reports that women are more conservative in financial reporting compared to men. In addition to, the study of Krishnan and Parsons (2008) showed that an increase in diversity based on gender leads to a higher quality of earnings. The research emphasizes the benefits of women in top positions by showing the positive effect on an important component of the financial reporting of the organization. However, there are also studies that did not find evidence for these accounting related differences such as Ge et al. (2011). The researchers did not find significant results when testing the effect of CFO gender on various accounting decisions and

outcomes (e.g., discretionary accruals and accounting misstatements). The researchers state that a possible explanation for this is a low representation of women in their sample.

There are studies that argue that the underrepresentation of women is caused by, among other things, a lower ability of women compared to men (Niederle and Vesterlund, 2007). A study conducted by Gneezy et al. (2003) specifically showed that women perform worse than men in competitive environments, such as the CFO position, within an organization. Based on this literature, I should expect a negative relation of women on management forecast quality.

However, another common explanation for the underrepresentation of women in top management functions is due to discrimination (Niederle and Vesterlund, 2007; Kumar, 2010; Adams and Funk, 2012). This implies that the treatment of women is different regardless of their abilities. Therefore, it is possible that only women with abilities that are above the average top management functions decide to compete for these functions. This suggests that women perform better than men in these positions. This is consistent with the research of Kumar (2010) who found that female analysts provide more accurate forecasts in comparison to male analysts. Following these explanations, the management forecast quality could be higher when it is provided by a female CFO.

Given the contradicting findings in previous literature, the second hypothesis can be stated without any specific direction. This leads to the following hypothesis:

Hypothesis 2: The gender of the CFO is not related to the quality of management forecasts.

4. Research design

4.1. Measurement of theoretical constructs

Dependent variable

I present the predictive validity frameworks (i.e., "Libby boxes") in appendix A. There are two ways to measure the CFO's influence on the financial reporting of the company: decisions (e.g., level of accounting conservatism) and outcomes (Ge et al., 2011). This study focuses on an outcome-based measure of financial reporting: the quality of management forecasts. Following prior studies, the quality of earnings guidance is used as a proxy (Ajinkya et al., 2005; Goodman et al., 2014). I will use accuracy to measure this quality, consistent with earlier studies (Ajinkya et al., 2005; Feng et al., 2009; Bamber et al., 2010; Baik et al., 2011; Goodman et al., 2014). Management forecast accuracy is the inverse (i.e., negative value) of forecasts errors (Ajinkya et al., 2005; Kumar, 2010). In other words, a small value of management forecasts errors implies a high accuracy (i.e., high-quality) of management forecasts. Following Feng et al. (2009) these errors are calculated as the difference between the forecast of the earnings per share (EPS) and the actual EPS scaled by the value of total assets per share (i.e., total assets divided by common shares outstanding) at the beginning of the forecasting year. The magnitude of errors in determining accuracy is more important than the direction which is often used a proxy for bias (Feng et al., 2009; Lee et al., 2012). Therefore, the absolute value of management forecast errors will be used[3]. Given the information above, management forecast errors are calculated using the following formula:

$$Error \; = \left(absolute \; value \left(\frac{(Management \; forecast \; of \; EPS - Actual \; EPS)}{Total \; assets \; per \; share} \right) \right) \qquad (1)$$

The data needed to construct the management forecast error variable is obtained from both the IBES guidance database which provides the management forecasts of the EPS and the IBES history database which provides, among other variables, the actual (i.e., reported) EPS. Although, the actual EPS can also be obtained from Compustat, I explicitly chose to obtain this variable from IBES history to ensure comparability. However, as this study follows the definition of Feng et al. (2009), the Compustat database is still necessary to obtain the data to scale the calculated errors, as this data is not available in IBES history.

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[3] Note: This has the consequence that the distribution of this variable is (highly) skewed to the right. Therefore, the natural logarithm is taken.

Independent variables

The first hypothesis investigates the relation between CFO experience and management forecast quality. As there is not a uniform definition of experience in previous literature, this study measures experience by using two dimensions: tenure and age (Quińones et al., 1995). Tenure is defined as the natural logarithm of the number of years the CFO is fulfilling his or her current position as CFO within the company. The other proxy for experience is the age of the CFO during the year in which the forecast was disclosed. The second CFO characteristic being studied is gender. Gender is an indicator variable that equals one if the CFO is a woman and zero if it is a man.

4.2. Statistical tests

The first hypothesis tests the effect of CFO experience on management forecast quality. In order to test this relation, the following ordinary least squares model will be used:

$$Accuracy_{it} = \alpha_1 + \beta_1 Experience + \Sigma \beta_2 Control\ Variables_{it} + \Sigma \beta i\ Industry\ fixed\ effects \qquad (2)$$
$$+ \Sigma \beta j\ Year\ fixed\ effects + \varepsilon_{it}$$

The variable of interest within this regression is β_1. This coefficient represents the hypothesized effect of CFO experience on management forecast quality. The hypothesis can be presented in the following way:

$$H1: \beta_1 > 0$$

Bertrand and Schoar (2003) emphasize the importance of separating managerial fixed effects from other fixed effects including time variances. Therefore, industry and year fixed effects were also included. For instance, if a company operates in a more volatile (e.g., rapidly changing) industry, the management forecasts are more likely to be less accurate (Ajinkya et al., 2005; Feng et al., 2009). Additionally, the year fixed effects control for macroeconomic effects (e.g., financial crisis). The fixed effects allow me to control for (unobservable) within-industry variation and time-varying effects which could bias the results. Additionally, variables which (potentially) correlate with management forecast accuracy are included. The control variables are described in the next section. Moreover, standard errors are clustered by firm to mitigate the bias introduced by repeated control firms in the sample (Gow et al., 2010).

The second hypothesis examines the effect of CFO gender on management forecast quality. The regression equation being used to test this effect is similar to equation (2). This leads to the following OLS model:

$$Accuracy_{it} = \alpha_1 + \beta_1 Gender + \Sigma\, \beta_2 Control\ Variables_{it} + \Sigma\, \beta_i\ Industry\ fixed\ effects \qquad (3)$$
$$+ \Sigma\, \beta_j\ Year\ fixed\ effects + \varepsilon_{it}$$

Within this regression the variable of interest is β_2. The coefficient captures the hypothesized effect of CFO gender on management forecast quality. This effect can be presented as follows:

$$H2: \beta_1 = 0$$

4.3. Control variables

Horizon. When issuing management forecasts in a more timely fashion, there is greater uncertainty about the actual earnings. Prior studies found that this leads to forecasts which are more likely to be less accurate (Baginski and Hassel, 1997). Following Ajinkya et al. (2005) forecast horizon is calculated as the number of calendar days between the announcement date of management forecasts and the fiscal period-end date.

Earnings volatility. Earlier studies used earnings volatility to capture business uncertainty (e.g., Ajinkya et al., 2005). Managers may have more difficulty in predicting earnings in a more volatile and uncertain business environment (Feng et al., 2009). Ajinkya et al. (2005) found a positive relation between earnings volatility and management forecast errors. Therefore, it can be expected that greater earnings volatility leads to more inaccurate forecasts. Consistent with Yang (2012), earnings volatility is measured as the natural logarithm of the standard deviation of EPS for the prior four periods.

Analysts' dispersion. Analysts' dispersion is defined as the standard deviation of forecasts provided by analysts. These standard deviations are divided by the median estimate (Ajinkya et al., 2005). This variable serves as an alternative proxy for uncertainty following Chen et al. (2011). An alternative measure of uncertainty is important as different variables are able to capture other dimensions of uncertainty (Ajinkya et al., 2005). However, there is the possibility that these variables are overlapping, which could lead to either one of the variables not being statistically significant. The study conducted by, among others, Ajinkya et al. (2005) and Feng et al. (2009) found a negative association between analysts' dispersion and management forecast accuracy. Therefore, the expectation is that analysts' dispersion is negatively correlated with management forecast accuracy.

Firm size. Prior literature found a positive association between firm size and the quality of corporate disclosure including management forecasts (Lang and Lundholm, 1993; Ajinkya et al., 2005). Following Feng et al. (2009), firm size will be calculated as the natural logarithm of total assets at the beginning of the forecasting year.

Cash return. Following the research of Erkens et al. (2018), this study includes cash return as a control variable. Their study shows a positive significant relation between cash return and a greater likelihood of accounting restatements which is used as a proxy for financial reporting quality. Their study does not specifically focus on management forecast quality, however, as the quality of management forecasts is an important component of financial reporting quality (Feng et al., 2009), these topics are interrelated. Based on their research, I predict that cash return is negatively related with the quality of management forecasts. The variable is defined as the ratio between earnings before interest, taxes, depreciation, and amortization (EBITDA) and total assets at the beginning of the forecasting year.

Return on assets (ROA). ROA will be controlled for as earlier studies report a positive association between ROA and management forecast accuracy (Baik et al., 2011). ROA is defined as the income before extraordinary items relative to total assets at the beginning of the forecasting year consistent with Feng et al. (2009).

Loss. Loss is an indicator variable that equals one if the company reports a loss (i.e., negative value of income before extraordinary items), and zero otherwise. Prior literature documents a positive association between companies that report losses and management forecasts errors (Ajinkya et al., 2005; Feng et al., 2009). This suggests that predicting earnings is more difficult for firms that report a loss than for firms that do not report a loss. Therefore, I expect that loss is negatively associated with management forecast accuracy.

Leverage. Following the definition of Feng et al. (2009) and Ali and Zhang (2015), leverage equals the sum of total debt scaled by total assets at the beginning of the forecasting year. Earlier studies provide evidence that leverage is positively correlated with several proxies that are commonly used to determine a low-quality financial reporting (e.g., Li et al., 2010; Erkens et al., 2018). The study of Feng et al. (2009) specifically shows that the financial conditions[4] of a company are associated with management

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[4] In their research the financial conditions of a company consist of multiple factors such as ROA and special items. ROA should lead to less financial challenges, however, other components, for example, loss and special items lead to more financial challenges.

forecast errors. This implies that when a company has more financial challenges, including a higher leveraged company, the quality of management forecasts is lower.

Special items. Special items could serve as another proxy to capture the financial challenges of a company (Feng et al., 2009). However, as mentioned before, by using different variables to capture the same construct (e.g., financial challenges), these variables could be overlapping. Consequently, the possibility arises, that not all variables used to capture the same construct are statistically significant. Consistent with Feng et al. (2009), special items are defined as special items divided by total assets at the beginning of the forecasting year. The absolute value of this variable is taken.

Growth. Earlier studies tested the effect of growth on different aspect of financial reporting quality. For example, the study of Menon and Williams (2004) showed a positive relation between growth and absolute discretionary accruals as their proxy for earnings management. However, other studies did not find significant results. For instance, Erkens et al. (2018) did not find significant results by including growth as a control variable. Given the mixed results in prior literature, this study does not specify a direction for this control variable. Two different proxies will be used to measure growth. The first one is sales growth which is calculated as the growth in sales between the year prior to the forecasting year and the forecasting year, consistent with Feng et al. (2009) and Erkens et al. (2018). The second proxy is asset growth. Following Feng et al. (2009), this variable is measured the same way as sales growth, thus, the asset growth between the year prior to the forecasting year and the forecasting year.

Soft assets. Consistent with Erkens et al. (2018), this study includes soft assets as a control variable that is used to capture complexity. Several studies found a positive relation between factors related to the difficulty of forecasting and forecasting errors (e.g., Duru and Reeb, 2002; Ajinkya et al., 2005; Feng et al., 2009). One could argue, that when a task is more complex, it is also more difficult. Given the findings in prior research, I expect that soft assets as a proxy for difficulty is negatively related to management forecast accuracy. As difficulty is not easy to measure, several proxies are used in this study (e.g., loss and change in ROA)[5]. In line with the research of Erkens et al. (2018), soft assets is defined as soft assets (calculated as total assets – property, plant, and equipment – cash and short-term investments) relative to the total assets at the beginning of the forecasting year.

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[5] Note: as mentioned before, the possibility exists that these variables are overlapping which could lead to either one of the variables not being statistically significant

Change in ROA. This control variable equals the change in ROA[6] from the year prior to the forecasting year and the forecasting year. The absolute value of this variable is taken. This definition is in accordance with the research of Feng et al. (2009). This variable serves as an alternative proxy for difficulty. Feng et al. (2009) claim that shock to earnings (i.e., change in ROA) come with a higher level of difficulty in terms of predicting earnings. The results of their study confirm their claim by showing a positive and significant association between the change in ROA and forecast errors. Therefore, the expected prediction of the change in ROA on management forecast accuracy is negative.

Table 1 presents an overview of the control variables which are included in equation (2) and (3) with the corresponding expected relation (i.e., positive or negative) on the outcome variable: management forecast accuracy. An overview of all variable definitions used in this study can be found in appendix B.

Table 1
Expected signs of control variables

Variable	Expected sign
Horizon	-
Earnings volatility	-
Analysts' dispersion	-
Firm size	+
Cash return	-
ROA	+
Loss	-
Leverage	-
Special items	-
Sales growth	-/+
Asset growth	-/+
Soft assets	-
Change in ROA	-

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[6] Note: as defined earlier in this study, ROA equals the ratio between income before extraordinary items and the total assets at the beginning of the forecasting year.

4.4. Sample selection and data collection

The initial sample of this study consists of the S&P 1500 companies with available CFO data. The same approach as Jiang et al. (2010) and Ge et al. (2011) is used to identify CFOs. An executive is identified as a CFO when the variable "cfoann" in ExecuComp is CFO or when an executive holds a certain title that is often used to describe the position of a CFO which can be found in the "titleann" variable [7]. This method of identifying CFOs has an advantage in that it is more complete than only using the "cfoann" variable. The sample period covers the years from 2000-2019. This time span of 20 years is necessary as I am interested in structural long-term effects. This sample period allows exclusion of "accidental" high-quality management forecasts. Additionally, such a sample period is necessary because a CFO is generally not replaced every year. Since tenure is one of the main variables, a longer timespan is crucial. Furthermore, this study focuses on annual forecasts. Within the sample period, the maximum number of forecasts a company can have is 19. This also justifies the sample period of 20 years.

In order to conduct this study, data is obtained from four different databases: ExecuComp, Compustat (both annual and quarterly), IBES guidance, and IBES history. Appendix B contains an overview of the databases that are used for the variables in this study. The different datasets are combined based on a unique identifier, either GVKEY, IBES ticker or the CUSIP code [8], and the corresponding fiscal year of the (financial) information or the fiscal year to which the forecast implies.

Consistent with previous studies, this study focuses on annual management forecasts of EPS with a maximum horizon of one year (Ajinkya et al., 2005; Kumar, 2010; Baik et al., 2011). The use of annual forecasts is particularly suitable for this study, because the data of the CFOs is only available annually. The forecasts included in this study have a horizon between 1 and 365 calendar days. A horizon of at least 1 is essential as this study is interested in forecasts rather than pre-announcements of EPS. Following prior research (Rogers and Stocken, 2005; Lee et al., 2012), this study only takes the first forecast of the year into account when there are several forecasts for the same fiscal year. Following Rogers and Stocken (2005) and Baik et al. (2011), there are two types of quantitative forecasts included in this study: a point forecast or the mean of a range forecast (i.e., mid-point). Including only these two types of forecasts provides the opportunity of unambiguously measuring the difference between the

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[7] The titles used to identify an executive as a CFO are as follows: CFO, Chief Financial Officer, Finance, Controller, Vice President-Finance, and Treasurer.

[8] The GVKEY is used as a unique company code to combine ExecuComp with Compustat, the IBES ticker is used to link IBES history to IBES guidance, and finally the CUSIP code is used as the unique number to merge ExecuComp and Compustat with IBES guidance and IBES history.

forecast and the actual EPS. This measurement is used to determine management forecast error and, consequently, as a proxy for management forecast quality. Therefore, other types of forecasts, such as open-ended or qualitative, are not included. An overview of the sample selection process of IBES guidance and subsequent merging with the IBES history can be found in appendix C.

Table 2 provides an overview of the sample selection procedure. After the merging of the different datasets, observations are deleted with missing data on the necessary (control) variables to execute the regression equations (2) and (3). The number of firm-year observations in the final sample is 7,293 of which 2,166 are unique CFO/company combinations ("co_per_rol" variable).

Table 2
Sample selection

	Observations
Firm-year observations with ExecuComp CFO data	26,400
Less: Observations with missing link to Compustat	-188
Less: Observations with missing link to IBES[9]	-17,641
Firm-year observations after combining different datasets	**8,571**
Less: Observations with missing CFO data of the dependent variables	-400
Less: Observations with missing data to construct management forecast error variable[10]	-132
Less: Observations with missing data for control variable from IBES history	-117
Less: Observations with missing financial data from Compustat	-629
Number of firm-year observations in the final sample	**7,293**

The continuous variables are winsorized at the top and bottom 1%. This method, to mitigate the effect of outliers, is in line with previous studies (e.g., Ajinkya et al., 2005; Feng et al., 2009).

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[9] This dataset "IBES" is already the merged dataset from IBES guidance and IBES history. The sample selection procedure can be found in appendix C.

[10] This component contains 16 observations that have a value of management forecast errors of 0. These observations are deleted from the sample as the natural logarithm is taken from management forecast errors in order to transform this variable to a normal distribution. The marginal effect is small to drop these observations as the data contains enough small values.

5. Results

5.1. Descriptive statistics

Table 3 presents the descriptive statistics. The mean value of the dependent variable, forecast error, is -5.584. The variables of interest: tenure, age, and gender, respectively, have a mean of 1.082[11], 51.522 and 0.094. The 0.094 (specifically 9.38 per cent) describes the representation of women within this sample. The 9.38 per cent equals a total number of 684 observations with a female CFO.

Table 3
Descriptive statistics

	Mean	Median	Std. Dev.	Min	Max
Forecast error	-5.584	-5.301	2.252	-20.115	-2.220
Tenure	1.082	1.097	0.755	0 .000	2.565
Age	51.522	52.000	6.278	29.000	72.000
Gender	0.094	0.000	0.292	0.000	1.000
Horizon	308.550	324.000	56.863	58.000	358.000
Earnings volatility	-1.686	-1.719	1.135	-5.298	2.631
Analysts' dispersion	0.039	0.022	0.055	-0.057	0.389
Firm size	7.951	7.903	1.613	2.983	13.586
Cash return	0.159	0.145	0.084	-0.036	0.454
ROA	0.065	0.061	0.070	-0.194	0.280
Loss	0.094	0.000	0.292	0.000	1.000
Leverage	0.271	0.110	0.215	0.000	1.076
Special items	0.016	0.005	0.030	0.000	0.194
Sales growth	0.074	0.060	0.145	-0.291	0.648
Asset growth	0.093	0.052	0.209	-0.271	1.278
Soft assets	0.689	0.702	0.277	0.118	1.755
Change in ROA	0.036	0.017	0.045	0.000	0.336
Number of observations	7,293				

This table provides descriptive statistics of all the variables that are employed within this study. Appendix B provides a description of these variables. The top and bottom 1% of the continuous variables are winsorized. The final sample consists of 7,293 observations.

5.2. Multicollinearity

Table 4 and 5 provides the results from the Pearson correlation and the variance inflation factors (VIF) test. These tests are executed to check for multicollinearity issues that could create problems when analysing and interpreting the results of the regression analyses. The results of the Pearson correlation indicate that there are no multicollinearity issues as the coefficients are below the 0.9 level (Dohoo et al., 1997). The results of the VIF test confirm this finding as the value of the VIF is below 10 and the tolerance level is below 1 (Lin et al., 2008).

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[11] Note: within the sample the mean tenure is 3.859 years (before the natural logarithm is taken and before winsorization). This mean is specifically emphasized because it is an important statistic to answer the research question. It means that on average you can study 3 CFO firm-years.

Table 4
Pearson correlation matrix

	Forecast error	Tenure	Age	Gender	Horizon	Earnings volatility	Analysts' dispersion	Firm size	Cash return	ROA	Loss	Leverage	Special items	Sales growth	Asset growth	Soft assets	Change in ROA
Forecast error	1.000																
Tenure	0.002	1.000															
Age	-0.048***	0.044***	1.000														
Gender	-0.011	0.005	-0.045***	1.000													
Horizon	0.064***	0.018	0.027**	-0.005	1.000												
Earnings volatility	-0.022*	-0.041***	0.045***	-0.019	-0.002	1.000											
Analysts' dispersion	0.119***	-0.027**	-0.062**	-0.019	-0.180***	0.066***	1.000										
Firm size	-0.236***	-0.004	0.161***	-0.026**	0.146***	0.305***	-0.169***	1.000									
Cash return	0.102***	0.041***	-0.012	0.040***	0.064***	-0.124***	-0.159***	-0.170***	1.000								
ROA	0.051***	0.055***	0.003	0.035***	0.061***	-0.131***	-0.177***	-0.089***	0.793***	1.000							
Loss	0.105***	-0.055***	-0.054***	-0.005	-0.060***	0.078***	0.171***	-0.107***	-0.339***	-0.607***	1.000						
Leverage	-0.115***	-0.053***	0.028**	-0.047***	0.052***	0.153***	-0.060***	0.302***	0.039***	-0.094***	0.005	1.000					
Special items	0.093***	-0.062***	-0.035***	-0.029**	-0.015	0.067***	0.107***	-0.038***	-0.096***	-0.428***	0.542***	0.100***	1.000				
Sales growth	0.037***	0.000	-0.073***	-0.001	-0.039***	-0.175***	-0.024**	-0.206***	0.265***	0.233***	-0.126***	0.066***	-0.055***	1.000			

Table 4

(Continued)

	Forecast error	Tenure	Age	Gender	Horizon	Earnings volatility	Analysts' dispersion	Firm size	Cash return	ROA	Loss	Leverage	Special items	Sales growth	Asset growth	Soft assets	Change in ROA
Asset growth	0.037***	0.005	-0.043***	-0.009	-0.023*	-0.154***	-0.008	-0.182***	0.279***	0.240***	-0.120***	0.319***	-0.005	0.528***	1.000		
Soft assets	0.031***	-0.011	0.018	-0.025**	0.013	-0.115***	-0.070***	-0.082***	0.080***	0.083***	-0.033***	0.216***	0.081***	0.329***	0.545***	1.000	
Change in ROA	0.198***	-0.051***	-0.087***	-0.020*	-0.083***	0.168***	0.231***	-0.227***	-0.046***	-0.195***	0.385***	-0.041***	0.490***	0.036***	0.039***	0.004	1.000

This table shows the Pearson correlation coefficients. An overview of the variable definitions can be found in appendix B. The top and bottom 1% of all continuous variables are winsorized. ***, **, * corresponds to the level of significance, respectively, 1%, 5%, and 10%.

Table 5

Collinearity statistics

	VIF	Tolerance
Tenure	1.12	0.893
Age	1.21	0.826
Gender	1.19	0.840
Horizon	1.17	0.855
Earnings volatility	1.61	0.621
Analysts' dispersion	1.26	0.794
Firm size	2.22	0.450
Cash return	5.30	0.189
ROA	6.37	0.157
Loss	2.18	0.459
Leverage	2.17	0.461
Special items	2.24	0.446
Sales growth	1.67	0.599
Asset growth	2.73	0.366
Soft assets	3.57	0.280
Change in ROA	1.75	0.571

This table provides the collinearity statistics. Specifically, the VIF test and the tolerance test (calculated as 1/VIF) is provided. An overview of the variable definitions can be found in appendix B. The top and bottom 1% of all continuous variables are winsorized.

5.3. Regression analysis

CFO experience

The first hypothesis predicts a positive effect of CFO experience on management forecast accuracy (i.e., lower management forecast errors). Table 6 presents the results of equation (2) that is employed to test this effect. The two proxies for experience, tenure and age, are both not significant and have an opposite sign than expected. This implies that no relation can be identified.

Insignificant results of these factors are in line with the studies of Lawrence (1997) and Carpenter et al. (2004). These studies criticize the effect of using demographic characteristics as these factors only explain a limited effect and are often unable to capture or only a small fraction of the underlying theoretical construct . Therefore, it is suggested to look at characteristics beyond demographic factors. In most cases, this requires a more dynamic model. This is consistent with Ge et al. (2011). In their study the researchers did not find significant results when testing the effect of different observable CFO characteristics, such as educational background and gender, on accounting choices. However, when testing the impact of the CFO's style (a less straightforward effect) on accounting choices, the researchers found significant results. Thus, once again, the importance of moving away from demographic characteristics is highlighted.

However, as mentioned before in section 2, this study specifically focuses on demographic characteristics based on the recommendations of the upper echelons theory (Hambrick and Mason, 1984; Hambrick, 2007). The main advantage of using these characteristics is the provision of reliable proxies that are used to capture an unobservable theoretical construct. Based on the findings of this study, these two observable demographic characteristics are not sufficient to explain what drives the quality of management forecasts. Therefore, a possibility for future research is to consider effects beyond the demographic factors to test the CFO's influence on different accounting related decisions and outcomes.

Besides the main variables of interest and fixed effects, the OLS regression (see equation (2)) includes 13 other variables that could correlate with management forecast accuracy. The coefficients of the variables: horizon, analysts' dispersion, ROA, loss, asset growth, and change in ROA are statistically significant and have a negative effect on management forecast accuracy. The sign of these variables, except ROA, are in line with expectations. Contrary to expectations, ROA has a negative effect on management forecast accuracy, while a positive effect was predicted. Furthermore, firm size and soft

assets have a positive significant effect on management forecast accuracy. However, the sign of soft assets contradicts with the expectation that is based on earlier studies. Moreover, the variables: earnings volatility, cash return, and special items have a negative effect on management forecast accuracy. The coefficients of these variables are not statistically significant. The negative effect of these variables is in line with expectations. In addition, the variables, leverage and sales growth, have a positive insignificant effect on management forecast accuracy. This positive effect is in line with the expectation for sales growth. However, the sign of leverage does not correspond to the expectation. An overview of the results can be found in table 6.

CFO gender

The second hypothesis predicts no relation between CFO gender and management forecast quality. Table 7 presents the results of equation (3) that is used to examine this prediction. Gender has a positive effect on management forecast quality (i.e., negative effect on management forecast errors). However, the coefficient of -0.073 is not statistically significant. Therefore, no empirical evidence can be provided. The insignificant results are consistent with the prediction of the second hypothesis.

Given that this finding is based on a small representation of women in the sample, the result should therefore be treated with caution. Ge et al. (2011) mention that the insignificant association between CFO gender and several accounting decisions may be caused by a low number of female observations within their sample. In this study 9.38 per cent of the CFOs are women. This percentage is only slightly higher compared to the study of Ge et al. (2011). Within their study, 8.97 per cent of the observations are women. Additionally, another possible explanation of the insignificant results, as mentioned earlier, is that some researchers (e.g., Lawrence, 1997; Carpenter et al., 2004) criticize the use of demographic characteristics. The researchers state that these characteristics have little effect on various decisions and outcomes.

Table 6

CFO experience and management forecast quality

Forecast error	Coef.	Coef.
Tenure	**0.050**	
	(1.44)	
Age		**0.002**
		(0.37)
Horizon	0.004***	0.004***
	(7.54)	(7.53)
Earnings volatility	0.038	0.038
	(1.23)	(1.23)
Analysts' dispersion	2.434***	2.421***
	(4.21)	(4.16)
Firm size	-0.219***	-0.219***
	(-8.66)	(-8.62)
Cash return	1.260	1.261
	(1.59)	(1.58)
ROA	1.791*	1.804*
	(1.67)	(1.68)
Loss	0.534***	0.533***
	(3.90)	(3.89)
Leverage	-0.193	-0.202
	(-1.02)	(-1.07)
Special items	1.465	1.451
	(1.10)	(1.09)
Sales growth	-0.377	-0.373
	(-1.60)	(1.59)
Asset growth	0.452**	0.453**
	(2.16)	(2.17)
Soft assets	-0.523***	-0.520***
	(-2.79)	(-2.77)
Change in ROA	3.764***	3.763***
	(4.79)	(4.79)
Industry & year fixed effects	yes	yes
Observations	7,293	7.293
R-squared	17.46%	17.44%

This table presents the results when testing the effect of CFO experience on management forecast quality (i.e., the inverse of forecast error). Both tenure and age are used to determine CFO experience. An OLS model is executed to test this effect. I refer to appendix B for a description of the variables used in this study and to table 3 for the descriptive statistics of these variables. The top and bottom 1% of all continuous variables are winsorized and standard errors are clustered at the firm-level. ***, **, * corresponds to the level of significance, respectively, 1%, 5%, and 10%. The T-values are shown between the parentheses.

Table 7

CFO gender and management forecast quality

Forecast error	Coef.
Gender	**-0.073**
	(-0.64)
Horizon	0.004***
	(7.53)
Earnings volatility	0.038
	(1.22)
Analysts' dispersion	2.417***
	(4.16)
Firm size	-0.219***
	(-8.66)
Cash return	1.281
	(1.61)
ROA	1.790*
	(1.67)
Loss	0.533***
	(3.89)
Leverage	-0.208
	(-1.10)
Special items	1.433
	(1.08)
Sales growth	-0.377
	(-1.60)
Asset growth	0.457**
	(2.18)
Soft assets	-0.521***
	(-2.78)
Change in ROA	3.753***
	(4.77)
Industry & year fixed effects	yes
Observations	7,293
R-squared	17.44%

This table documents the results when testing the effect of CFO gender on management forecast quality (i.e., the inverse of forecast error). An OLS model is executed to test this effect. I refer to appendix B for a description of the variables used in this study and to table 3 for the descriptive statistics of these variables. The top and bottom 1% of all continuous variables are winsorized and standard errors are clustered at the firm-level. ***, **, * corresponds to the level of significance, respectively, 1%, 5%, and 10%. The T-values are shown between the parentheses.

5.4. Robustness tests

Measurement of forecast error

This study uses management forecast errors to determine the quality of management forecasts. Following the study of Feng et al. (2009), these errors are divided by total assets per share at the beginning of the forecasting year. However, another common method in earlier studies is to divide these errors by the stock price at the beginning of the forecasting year (e.g., Ajinkya et al., 2005; Bamber et al., 2010; Baik et al., 2011; Goodman et al., 2014). Therefore, I will perform a robustness check to test whether the results still hold when computing these errors in a different way. The number of observations within this sample is slightly smaller due to missing stock price data. The results of the robustness tests are given in appendix D in which table 8 shows the results of CFO experience and table 9 the results of CFO gender. Based on these findings, it can be concluded that the results remain qualitatively the same.

Use of range forecasts

There are two types of forecasts included in this study: a point forecast or a range forecast. Consistent with previous studies (e.g., Rogers and Stocken, 2005; Baik et al., 2011), the mean value is used when a range forecast is provided. This decision assumes that the mean value is the best estimate for management expectations regarding the EPS. However, the possibility arises that this assumption creates some noise or even bias in the measurement of management forecast errors when the mean value is not the best estimate of management expectations. Therefore, a robustness check is executed which includes only point forecasts. This leads to a much smaller sample of only 762 observations compared to a total number of 7,293 observations in the main analyses. The results of the robustness check are presented in appendix D. Table 10 column (1) provides the results of experience and table 11 column (1) of gender. The findings are qualitatively similar, however, only a small number of control variables are still significant. This is probably caused by the low number of observations within the sample. Moreover, the sign of tenure, a negative effect on management forecast errors and thus a positive effect on management forecast quality, is in line with the prediction of the hypothesis. This was not the case in the main analysis. However, as the results are still not significant, no relation can be identified.

In addition, based on the study of Ciconte et al. (2014), I will check whether the results are qualitatively the same when using the upper bound instead of the mean value of range forecasts. Within their study the researchers argued that the mean value of range forecasts does not represent the true expectations of managers and instead of using the mean value, the upper bound is a better representation of their

expectations. This is caused by managers' incentive to meet or beat analysts' expectations. Therefore, managers try to influence these expectations downwards. The researchers found significant evidence for this prediction. The results of the robustness tests can be found in table 10 (experience) and 11 (gender) column (2) that is provided in appendix D. The findings remain unchanged when using the upper bound.

6. Conclusion

This study examines the effect of CFO experience and gender on management forecast quality. The research question being studied, is defined as follows:

Research question: *Does the experience and gender of the CFO have an impact on the quality of management forecasts?*

The main finding of this study is that experience and gender of the CFO does not have a significant effect on management forecast quality. Contrary to the first hypothesis, both proxies for experience (tenure and age) have a negative impact on the quality of management forecasts in the main analysis. Gender has a positive influence on management forecast quality, however, as the results are not significant, no relation can be identified. This finding is consistent with the second hypothesis.

This study contributes to the existing body of literature by showing that CFO experience and gender do not have a significant effect on the quality of management forecast. To the best of my knowledge, this study is the first one that specifically focuses on the influence of CFO characteristics on management forecast quality. Therefore, as voluntary disclosures are part of the broader stream of disclosure quality, this study contributes to the limited empirical evidence that tests the effect of CFO characteristics on accounting related decisions and outcomes. The new insight which has arisen is that gender and experience does not need to be taken into account by investors and analysts when assessing the credibility of management forecasts.

Prior research criticizes the use of observable demographics characteristics to capture a theoretical construct (Lawrence, 1997; Carpenter et al., 2004). Therefore, the possibility exists that the two proxies for experience, tenure and age, only measure a (small) part of the construct resulting in insignificant results. Moreover, the small representation of women within the sample (9.38%) could cause the insignificant findings when testing the effect of gender on management forecast quality.

This study is subject to several limitations. First, I attempt to reduce the unobserved variable effect in several ways (e.g., industry and fixed effects, clustering of standard errors, and a variety of control variables), however, this does not necessarily mean that this effect is eliminated. Therefore, the results of this study should be interpreted with caution.

Second, based on the recommendation of the upper echelons theory (Hambrick and Mason, 1984; Hambrick, 2007), this study uses two concrete and observable demographic characteristics to measure experience: tenure and age. However, as mentioned before, some studies found that the use of demographic characteristics are insufficient to explain a theoretical construct (Lawrence, 1997; Carpenter et al., 2004). Therefore, the possibility arises, that the two proxies for experience do not fully capture experience. Future research could consider other proxies to capture experience. Lawrence (1997) and Carpenter et al. (2004) suggests a more dynamic model that takes characteristics beyond the demographics characteristics into consideration to enhance the construct validity.
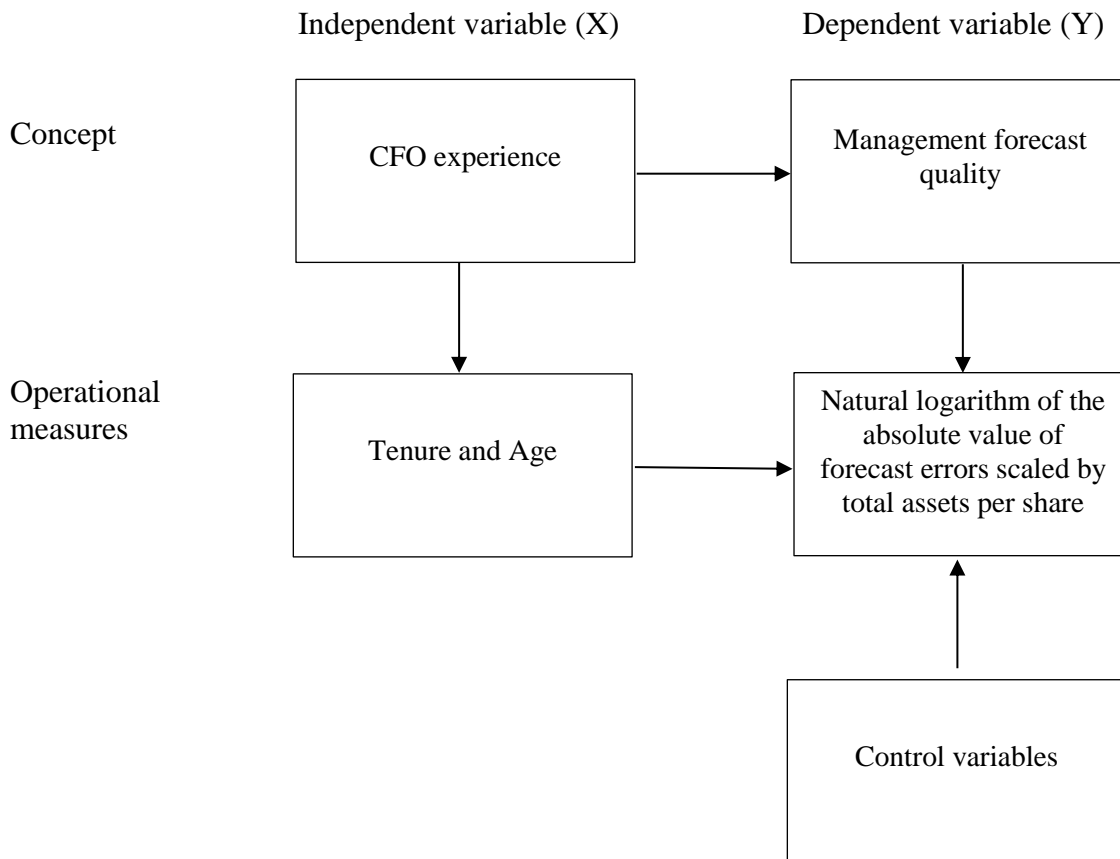
Third, this study uses the ExecuComp database as the initial position for data collection. CFO data is only available on an annual basis. Therefore, the possibility exists that this introduces some noise or even bias in the measurement of the independent variables.

As highlighted during this study, there is a shortage in literature on CFO characteristics and financial disclosure quality. A possibility of future research is to consider other CFO characteristics that drives the quality of management forecasts and other components of disclosure quality. Specifically, characteristics beyond demographic characteristics could be considered. Furthermore, other studies could test whether the results still hold when using a different setting, since this study only considers the S&P 1500 firms. Moreover, this study documents that gender is not of importance regarding the quality of management forecasts. Prior research has already shown that having a woman as a CFO has a positive influence on the quality of financial disclosure by looking at conservative accounting and the quality of earnings (Krishnan and Parsons, 2008; Francis et al., 2015). Future research can examine other tasks of a CFO or use other proxies for this quality and test whether gender has an influence. The glass ceiling can be broken when the results also show that gender does not make a difference or that it is even better to have the CFO position occupied by a woman.

Appendix

Libby boxes

Hypothesis 1

	Independent variable (X)	Dependent variable (Y)

Concept

CFO experience → Management forecast quality

Operational measures

Tenure and Age → Natural logarithm of the absolute value of forecast errors scaled by total assets per share

Control variables

Hypothesis 2

Independent variable (X)   Dependent variable (Y)

Concept

CFO gender

Management forecast quality

Operational measures

1 if the CFO is a woman, and 0 otherwise

Natural logarithm of the absolute value of forecast errors scaled by total assets per share

Control variables

APPENDIX B
Variable Definitions

Variable	Definition	Data Source
Forecast error	Natural logarithm of the absolute value of forecast errors scaled by total assets per share at the beginning of the forecasting year	IBES guidance IBES history Compustat
Tenure	Natural logarithm of the number of years the CFO is fulfilling his/her current position as CFO within the company	ExecuComp
Age	The age of the CFO	ExecuComp
Gender	1 if the CFO is a woman, and 0 otherwise	ExecuComp
Horizon	Number of calendar days between the announcement date of management forecasts and the fiscal period-end date	IBES guidance Compustat
Earnings volatility	Natural logarithm of the standard deviation of EPS for the prior four periods	IBES history
Analysts' dispersion	Standard deviation of analysts' forecasts scaled by the median estimate	IBES history
Firm size	Natural logarithm of total assets at the beginning of the forecasting year	Compustat
Cash return	Ratio between EBITDA and total assets at the beginning of the forecasting year	Compustat
ROA	Income before extraordinary items scaled by total assets at the beginning of the forecasting year	Compustat
Loss	1 if the company reports negative earnings, and 0 otherwise	Compustat
Leverage	Total debt scaled by total assets at the beginning of the forecasting year	Compustat
Special items	The absolute value of special items divided by total assets at the beginning of the forecasting year	Compustat
Sales growth	Sales growth between the year prior to the forecasting year and the forecasting year	Compustat
Asset growth	Asset growth between the year prior to the forecasting year and the forecasting year	Compustat
Soft assets	Soft assets scaled by total assets at the beginning of the forecasting year	Compustat
Change in ROA	The absolute value of the change in ROA from the year prior to the forecasting year and the forecasting year	Compustat

APPENDIX C
Sample selection process of IBES

	Observations
Initial sample of annual EPS management forecasts	166,633
Less: Observations without a horizon between 1 and 365 days	-19,016
Less: Observations which is not the first annual EPS management forecast	-94,991
Firm-year observations with management forecasts data in IBES guidance	**52,626**
Less: Observations with missing link to IBES history	-30,617
Number of firm-years observations in the IBES merged dataset	**22,009**

Robustness tests

Table 8

CFO experience and management forecast quality

Forecast error	Coef.	Coef.
Tenure	**0.055**	
	(1.58)	
Age		**0.004**
		(0.08)
Horizon	0.004***	0.004***
	(6.92)	(6.92)
Earnings volatility	0.122***	0.122***
	(3.87)	(3.86)
Analysts' dispersion	3.079***	3.060***
	(5.26)	(5.19)
Firm size	-0.189***	-0.189***
	(-7.26)	(-7.21)
Cash return	-2.039**	-2.028**
	(-2.56)	(-2.54)
ROA	0.003	0.009
	(0.00)	(0.01)
Loss	0.411***	0.410***
	(2.97)	(2.95)
Leverage	0.242	0.230
	(1.27)	(1.21)
Special items	1.869	1.846
	(1.44)	(1.42)
Sales growth	-0.492**	-0.491**
	(-2.03)	(-2.03)
Asset growth	-0.061	-0.058
	(-0.29)	(-0.28)
Soft assets	-0.129	-0.125
	(-0.66)	(-0.64)
Change in ROA	3.013***	3.007***
	(3.90)	(3.89)
Industry & year fixed effects	yes	yes
Observations	7,283	7.283
R-squared	15.54%	15.51%

This table presents the results when testing the effect of CFO experience on management forecast quality (i.e., the inverse of forecast error). Both tenure and age are used to determine CFO experience. An OLS model is executed to test this effect. I refer to appendix B for a description of the variables used in this study and to table 3 for the descriptive statistics of these variables. The top and bottom 1% of all continuous variables are winsorized and standard errors are clustered at the firm-level. ***, **, * corresponds to the level of significance, respectively, 1%, 5%, and 10%. The T-values are shown between the parentheses.

Table 9

CFO gender and management forecast quality

Forecast error	Coef.
Gender	**-0.077**
	(-0.64)
Horizon	0.004***
	(6.92)
Earnings volatility	0.122***
	(3.85)
Analysts' dispersion	3.060***
	(5.21)
Firm size	-0.189***
	(-7.25)
Cash return	-2.017**
	(-2.53)
ROA	0.003
	(0.00)
Loss	0.411***
	(2.96)
Leverage	0.224
	(1.10)
Special items	1.833
	(1.41)
Sales growth	-0.492**
	(-2.03)
Asset growth	-0.055
	(-0.26)
Soft assets	-0.127
	(-0.65)
Change in ROA	3.001***
	(3.87)
Industry & year fixed effects	yes
Observations	7,283
R-squared	15.51%

This table documents the results when testing the effect of CFO gender on management forecast quality (i.e., the inverse of forecast error). An OLS model is executed to test this effect. I refer to appendix B for a description of the variables used in this study and to table 3 for the descriptive statistics of these variables. The top and bottom 1% of all continuous variables are winsorized and standard errors are clustered at the firm-level. ***, **, * corresponds to the level of significance, respectively, 1%, 5%, and 10%. The T-values are shown between the parentheses.

Table 10

CFO experience and management forecast quality

Forecast error	(1) Only point estimates		(2) Point estimates and upper bound of range	
Tenure	**-0.029**		**0.002**	
	(-0.40)		**(0.05)**	
Age		**0.006**		**0.005**
		(0.57)		**(0.92)**
Horizon	0.003***	0.003***	0.005***	0.005***
	(3.91)	(3.97)	(7.57)	(7.58)
Earnings volatility	0.015	0.014	0.028	0.028
	(0.27)	(0.26)	(0.82)	(0.83)
Analysts' dispersion	1.743*	1.763*	2.612***	2.623***
	(1.68)	(1.70)	(5.69)	(5.72)
Firm size	-0.179***	-0.178***	-0.194***	-0.196***
	(-3.15)	(-3.12)	(-6.83)	(-6.86)
Cash return	0.648	0.674	0.852	0.815
	(0.45)	(0.47)	(1.13)	(1.08)
ROA	0.756	0.723	1.511	1.543
	(0.44)	(0.42)	(1.58)	(1.61)
Loss	0.176	0.192	0.722***	0.724***
	(0.73)	(0.80)	(5.31)	(5.34)
Leverage	0.189	0.198	-0.185	-0.178
	(0.43)	(0.44)	(-0.85)	(-0.82)
Special items	1.204	1.103	0.405	0.434
	(0.56)	(0.52)	(0.32)	(0.35)
Sales growth	-0.193	-0.172	-0.682***	-0.669***
	(-0.47)	(-0.41)	(-2.79)	(-2.75)
Asset growth	0.121	0.118	0.400	0.399
	(0.33)	(0.32)	(1.60)	(1.59)
Soft assets	-0.870**	-0.893**	-0.312	-0.315
	(-2.42)	(-2.47)	(-1.54)	(-1.56)
Change in ROA	4.209***	4.242***	4.395***	4.408***
	(3.44)	(3.48)	(5.51)	(5.53)
Industry & year fixed effects	yes	yes	yes	yes
Observations	762	762	7,269	7,269[12]
R-squared	41.91%	41.94%	14.01%	14.03%

This table presents the results when testing the effect of CFO experience on management forecast quality (i.e., the inverse of forecast error). Both tenure and age are used to determine CFO experience. An OLS model is executed to test this effect. (1) Only includes point estimates and (2) includes both point estimates and the upper bound of a range forecast. I refer to appendix B for a description of the variables used in this study. The top and bottom 1% of all continuous variables are winsorized and standard errors are clustered at the firm-level. ***, **, * corresponds to the level of significance, respectively, 1%, 5%, and 10%. The T-values are shown between the parentheses.

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[12] Note: the number of observations is slightly less compared to the main analyses (7,293). The loss of 24 observations is caused by missing values due to the condition that the natural logarithm only takes values when X (i.e., management forecast errors before the natural logarithm is taken) is greater than 0. The large number of observations justifies the decision to drop these observations.

Table 11
CFO gender and management forecast quality

Forecast error	(1) Only point estimates	(2) Point estimates and upper bound of range
Gender	**-0.004**	**-0.049**
	(-0.02)	**(-0.40)**
Horizon	0.003	0.005***
	(3.93)	(7.57)
Earnings volatility	0.015	0.028
	(0.27)	(0.82)
Analysts' dispersion	1.751*	2.611***
	(1.68)	(5.68)
Firm size	-0.179***	-0.194***
	(-3.14)	(-6.81)
Cash return	0.662	0.848
	(0.46)	(1.13)
ROA	0.750	1.513
	(0.43)	(1.58)
Loss	0.178	0.721***
	(0.74)	(5.31)
Leverage	0.191	-0.182
	(0.43)	(-0.84)
Special items	1.212	0.409
	(0.56)	(0.33)
Sales growth	-0.192	-0.682***
	(-0.47)	(-2.79)
Asset growth	0.111	0.399
	(0.30)	(1.59)
Soft assets	-0.873**	-0.310
	(-2.42)	(-1.54)
Change in ROA	4.219***	4.398***
	(3.45)	(5.51)
Industry & year fixed effects	yes	yes
Observations	762	7,269[13]
R-squared	41.89%	14.02%

This table documents the results when testing the effect of CFO gender on management forecast quality (i.e., the inverse of forecast error). An OLS model is executed to test this effect. (1) Only includes point estimates and (2) includes both point estimates and the upper bound of a range forecast. I refer to appendix B for a description of the variables used in this study. The top and bottom 1% of all continuous variables are winsorized and standard errors are clustered at the firm-level. ***, **, * corresponds to the level of significance, respectively, 1%, 5%, and 10%. The T-values are shown between the parentheses.

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[13] Note: the number of observations is slightly less compared to the main analyses (7,293). The loss of 24 observations is caused by missing values due to the condition that the natural logarithm only takes values when X (i.e., management forecast errors before the natural logarithm is taken) is greater than 0. The large number of observations justifies the decision to drop these observations.

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