Earnings quality and the value premium

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Abstract

In this paper we examine whether earnings quality contributes to risk, mispricing or both as drivers for the value premium. We find that looking at proxies for risk or mispricing used in prior research supports both arguments. Combining earnings quality measures with the value and growth stock returns helps reconcile the conflicting evidence on the rationale for the value premium. Earnings quality seems to be underlying both mispricing and risk based explanations for the value premium; deteriorating earnings quality contributes to the riskiness of value stocks and to mispricing of both growth and value stocks. Our results suggest that earnings quality is the missing link in explaining why both risk and mispricing factors drive the value premium.

Earnings quality and the value premium

1. Introduction

In this paper, we examine whether earnings quality is associated with the value premium. More specifically, we examine whether deteriorating financial reporting quality, proxied by a generic property of reported earnings, namely earnings volatility, contributes to a risk, mispricing or both as an explanation for the value premium.

While prior research finds uniform support for the value premium, i.e. that value stocks yield higher average returns than growth stocks, using various value-growth proxies and across different jurisdictions and time periods (Basu 1977, Chan, Hamao and Lakonishok 1991, Fama and French 1992, 1993, 1996, Lakonishok, Shleifer and Vishny 1994, Chan and Lakonishok 2004, Athanasakos 2009), there is disagreement with regards to its drivers. Two explanations have emerged to explain the superior performance of value stocks – a risk-based and a mispricing/behavioral-based explanation. Proponents of the efficient market hypothesis, Fama and French (1992, 1993, 1996 and 1998), argue that value investing produces superior performance because value portfolios are fundamentally riskier than growth portfolios and once risk is taken into account superior performance of value stock is explained away. Alternative explanations of the value premium are based on mispricing/behavioral biases. Lakonishok, Shleifer and Vishny (1994), La Porta, Lakonishok, Shleifer and Vishny (1997), Chan and Lakonishok (2004) and Hwang and Rubesam (2013) argue that investors, for behavioral or institutional reasons, commit systematic errors when they value securities that induce them to pay too much for winners (low E/P or B/P stocks) and too little for losers (boring, poorly performing, unknown and out-of-favor (high E/P or B/P) companies). Arbitrage may not fully work to eliminate the value premium due to the persistence and power of the institutional/behavioral influences and/or various impediments to arbitrage (Brav, Heaton and Li 2010; Barberis and Shleifer 2003). These biases shape investment returns and the value premium.

Empirical evidence with regards to the drivers of the value premium is mixed. Vassalou and Xing (2004) and Kapadia (2011) provide evidence that there is a relation between distress risk and the value premium. Doukas, Kim and Pantzalis (2004) find support for the risk-based explanation of the value premium, using the standard deviation of analysts' EPS forecasts as a proxy for risk, which they believe to be a better measure of risk borne by investors. Li, Brooks and Miffre (2009), Fan Opsal and Yu (2015), and Guo, Savickas, Wang and Yang (2009) find evidence that the value premium is driven by (idiosyncratic) risk. On the other hand, Lakonishok, et al. (1994) find that "value strategies yield higher returns because these strategies exploit suboptimal behavior of the typical investor and not because these strategies are fundamentally riskier". Phalippou (2008) finds that the value premium is concentrated in stocks mostly held by individual investors and that, consistent with behavioral explanations, the value premium declines from the lowest to the largest institutional ownership decile. Finally, Piotroski and So (2012), Chaves et al. (2013), Chen at al. (2015), Fisher et al. (2016) and Walkshausl (2016), in more recent papers, also find support that the value premium is driven by mispricing.[1]

[1]Two recent working papers that find convincing evidence of mispricing are those of Jiang, (2015) and Hong and Yu (2015). Hong and Yu (2015), however, indicate that they cannot distinguish whether the expectation error is about something idiosyncratic or systematic. However, it is clear to practitioners that value investors tend to have idiosyncratic portfolios (Third Avenue Funds 2015, p.24).

It is not surprising that some papers find evidence supporting risk and others evidence supporting mispricing. This is because papers tend to examine only one market and only certain variables to proxy for risk or mispricing (Doukas et al. 2004; Phalippou 2008); depending on what variables and markets one decides to examine, some can find support for risk, while others can find support for mispricing (Athanassakos 2011a).

There is reason to believe that it could be both risk and behavioral factors that drive the value premium as what value investors do may actually involve both risk and mispricing (Asness Frazzini and Moskowitz 2015; Athanassakos 2011a). In their search process, value investors look for undesirability (Greenwald, Kahn, Sonkin and Biema 2001). This includes companies in bankruptcy or suffering from severe financial distress, as well as companies in industries that suffer from overcapacity, a sudden increase in imports, general decline or threat of legislative or regulatory punishment (Greenwald et al. 2001). Lawsuits may also make companies undesirable. Undesirability due to financial distress implies higher risk, but at the same time it also implies less desire to own by large institutional investors and hence mispricing. Therefore both risk and behavioral factors may be behind the value premium. Athanassakos (2011a), using a number of different metrics that capture risk and mispricing, finds evidence that both factors associated with mispricing (e.g. analyst following) and risk (e.g. stock return volatility) are associated with the superior performance of the value stocks.

In this paper, we posit that earnings quality is the missing link in explaining why both risk and mispricing factors may drive the value premium. The quality of reported earnings reflects firm fundamentals as it is driven by both volatility in the firm's operating environment and accounting choices of top management (Dechow and Dichev 2002). An interesting property of deteriorating earnings quality, or more generally noise in reported earnings, is that it increases information risk while at the same time raising the scope for mispricing and behavioral biases. Evidence indeed suggests that poor earnings quality is associated with higher information risk and a higher potential for mispricing. In fact, deteriorating earnings quality has been shown to be associated with both systematic and idiosyncratic risk (Francis, Lafond, Olsson and Schipper 2004, 2005; Rajgopal and Venkatachalam 2011; Zhang 2010, Chen, Huang and Jha 2012). However, to date, the risk inducing effect of poor earnings quality has been examined independently of the value - growth phenomenon. Evidence suggests that growth stocks are associated with high accruals, i.e. poor earnings quality (Dechow, Kothari and Watts 1998; Skinner and Sloan 2002), but what about value firms? Among value stocks there are several firms facing bankruptcy or suffering from financial distress, overcapacity, decline in profitability or threat of legislative or regulatory punishment (Greenwald et al. 2001). All these circumstances provide incentives to manage earnings (Fields, Lys and Vincent. 2001). This leads to a decline in earnings quality. The resulting fall in earnings quality may contribute to higher risk for value stocks. To the extent that deteriorating earnings quality induces higher risk for value than for growth stocks it could contribute to a risk based explanation for the value premium.

At the same time, earnings quality has been associated with mispricing through the accruals anomaly literature (Sloan 1996; Xie 2001). Such research focuses on the fact that highly positive (negative) accruals tend to be overpriced by the market leading to lower (higher) abnormal returns in the subsequent period, when the market corrects. Desai, Rajgopal and Vehkatachalam (2004) argue that the accruals anomaly and the mispricing of growth stocks may be related phenomena as firms with high sales growth (growth stocks) are likely to have larger positive accruals than firms with low sales growth (value firms). Therefore, the mispricing of growth stocks may be due to the mispricing of growth stocks' poor earnings quality (positive accruals) and may explain the underperformance of growth stocks in subsequent periods, when the market corrects. This provides support to the argument that the value premium may be driven by the mispricing of the poorer earnings quality of growth stocks. A similar argument can be made for the mispricing of value stocks. More generally, earnings quality issues may exacerbate behavioral biases for both growth and value stocks by affecting investors' tendency to extrapolate over (under) performance of growth (value) stocks.

Based on the above arguments, we hypothesize that earnings quality may underlie both a risk and a mispricing explanation for the value premium. To test our hypotheses, we examine whether a value premium exists over our sample period, whether factors associated with risk and/or mispricing explain the value premium, and more importantly whether earnings quality contributes to a risk, mispricing or both as an explanation for the value premium. We use a generic measure of earnings quality which is linked to equity valuation, namely earnings variability.

We find that looking at proxies for risk or mispricing used in prior research, it is difficult to conclude on the drivers of the value premium as the evidence supports sometimes the risk and other times the mispricing argument. When conditioning on earnings quality, we find that while a value premium is evident in the total sample, it is primarily driven by stocks with poor earnings quality. This evidence supports the argument that earnings quality issues may contribute to the value premium. We also find that one-year-ahead buy-and-hold returns decline (increase) the most for growth (value) stocks with poorest earnings quality, consistent with the argument that deteriorating earnings quality contributes to the mispricing (overvaluation) of growth stocks and the riskiness or mispricing (undervaluation) of value stocks. This preliminary evidence suggests that earnings quality contributes to both a mispricing and a risk based explanation of the value premium.

Subsequent asset pricing tests affirm the preliminary findings. Using the Fama and French (2015) five-factor model, we find that the value factor becomes redundant for describing average returns in the sample when we add an earnings quality factor, while the earnings quality factor is incrementally significant. Also, when carrying out asset pricing tests separately for value and growth stocks, the signs and significance of intercepts provide evidence of overvaluation (undervaluation) of growth (value) stocks, consistent with Lakonishok, Shleifer and Vishny (1994). This evidence is more pronounced for firms with the poorest earnings quality and highlights once more the fact that earnings quality underlies both risk and mispricing as explanations for the value premium. Earnings quality is the channel through which both risk and mispricing arise.

Our study unravels the role of earnings quality in explaining the value premium. We find that combining earnings quality measures with the value and growth stock returns helps reconcile the conflicting evidence on the rationale for the value premium. As such, our analysis offer an explanation not only for the *drivers* of the value anomaly, but also for the *sources* of the drivers of this anomaly.

The rest of the paper is structured as follows: Section 2 develops the research questions and forms expectations. Section 3 discusses the methods, measures and data, section 4 presents the results of univariate and bivariate analysis, as well as asset pricing tests, section 5 reports additional analysis and robustness tests and section 6 concludes the paper.

2. Research Questions and Formation of Expectations

Value investors start their analysis with a search process for possibly undervalued stocks. This process involves looking for stocks which are neglected and/or undesirable due to bad performance. With regards to the first criterion, this translates into stocks which are generally avoided by large institutional investors due to small size or lack of analyst coverage, that is, stocks which are not viewed as the glamour stocks everyone wants to own. With regards to the second criterion, this translates into stocks with high E/P or B/P ratio, which in turn generally means stocks with high analyst pessimism about future prospects, financial distress or stocks that are experiencing problems, such as a lawsuit or poor subsidiary performance.

Given the search process that value investors follow, two schools of thought have emerged to explain the value premium. One school of thought argues that the value premium is driven by the higher risk of value portfolios. Most of the work relating risk and the value premium has focused on systematic risk, namely, beta. But beta risk does not seem likely to explain the value premium. Evidence shows that the CAPM beta of value stocks is well below the CAPM beta of growth stocks (Athanassakos 2009, Fama and French 2006; Ang and Chen 2003). Ang and Chen (2003) and Adrian and Franzoni (2005) develop a conditional CAPM by allowing betas and expected returns to vary over time and find that the conditional CAPM performs better than the unconditional; nonetheless, Lewellen and Nagel (2006) show that variations of betas are not large enough to explain the value premium, and Petkova and Zhang (2005) echo this. While papers providing evidence against the risk-based explanation seem to test the effect of systematic risk on the value premium, others that focus on standard deviation of returns or of analysts' forecasts seem to find better support for a risk based explanation (Doukas et al. 2004; Athanassakos 2011a). This raises the possibility that the value premium is affected by unsystematic risk. In fact, Li, Brooks and Miffre (2009) find that idiosyncratic risk captures the value premium and that the value premium is compensation for exposure to time varying risk. Fan Opsal and Yu (2015) and Guo, Savickas, Wang and Yang (2009) also find evidence that the value premium can be explained by idiosyncratic risk. Despite this, no paper, to our knowledge, has investigated the sources of the idiosyncratic risk as they relate to the value premium.[2]

The other school of thought argues that mispricing is the driver of the value premium. In a seminal paper, Lakonishok, et al. (1994) examine the errors in expectations model and the performance of value and growth investment strategies in adverse states of the world, as well as betas and standard deviations of those strategies. They find support for the errors in expectations model, in that investors tend to be too optimistic for growth relative to value stocks. They also find no difference in betas and standard deviations or the performance of value and growth stocks in adverse states of the world. They conclude that "value strategies yield higher returns because these strategies exploit suboptimal behavior of the typical investor and not because these strategies are fundamentally riskier". Subsequent studies of this school of thought examine the relationship between the value premium and analyst following or firm size, which have been used as proxies for visibility and possible mispricing in the finance literature (Merton 1987; Bhushan 1989). For example, Phalippou (2008) shows that the value premium, consistent with behavioral explanations, declines from the lowest to the largest institutional ownership decile. Similarly, Athanassakos (2011a) finds that the value premium is negatively related to the number of institutions holding a stock, the percentage of institutional

[2]Hou and Loh (2016) examine a large number of potential explanations for the idiosyncratic risk puzzle and find extant explanations explain less than 10% of the puzzle. When they put them all together, all explanations account for 29%-54% of the puzzle.

ownership of a stock and analysts' forecast optimism. His findings support the notion that behavioral factors drive the value premium. Other more recent papers as well, such as Piotroski and So (2012), Chaves et al. (2013), Chen at al. (2015), Fisher et al. (2016) and Walkshausl (2016) also find support that the value premium is driven by mispricing.

In this paper, we take a different path in testing the proclamations of these two schools of thought. Previous studies seem to imply that both risk and mispricing could be driving the value premium, but they do not offer a rationale for this. We conjecture that earnings quality may be behind this result as earnings quality, reflecting firm fundamentals, may contribute to both a risk based explanation of the value premium, through its effect on value stocks and to a behavioral/mispricing explanation of the value premium, through its effect on both growth and value stocks.

On one hand, prior research suggests that a fundamental source of risk is information uncertainty (Francis, LaFond, Olsson and Schipper 2005), usually proxied by deteriorating earnings quality as poor earnings quality induces an informational disadvantage to uninformed investors and imprecision to the public and private information (Easley, Hvidkjaer and O'Hara 2002; Easley and O' Hara 2004; O'Hara 2003). Recent research has associated poor earnings quality with idiosyncratic risk, by showing that much of the variation in stock return volatilities is driven by earnings volatility (Rajgopal and Venkatachalam 2011, Zhang 2010), especially insofar as they are associated with managerial discretion (Chen et al. 2012). Earnings quality issues may act as a source of information risk particularly for those value stocks facing financial distress and poor operating performance both of which introduce noise to reported earnings (Bandyopadhyay, Huang, Sun and Wirjanto 2015; Ashbaugh et al. 2006; Bharath et al. 2008, Graham, Li and Qiu 2008; Beneish 1997). As such, earnings quality issues of value stocks, proxying for information risk, may contribute to a risk based explanation of the value premium.[3] In this case, we would expect the value premium to increase with deteriorating earnings quality.

On the other hand, earnings quality issues may also contribute to a mispricing based explanation of the value premium. Poor earnings quality, driven by accruals based earnings management, may explain the market's inability to fully assess the implications of discretionary accruals. Relevant guidance is provided in the accruals anomaly literature (Sloan 1996; Xie 2001). This strand of research focuses on the pricing implications of highly positive (negative) accruals, which appear to be overpriced by the market leading to lower (higher) abnormal returns in the subsequent period, when the market corrects (Sloan 1996). The accruals anomaly literature has examined the potential overlap of the value versus growth anomaly and the accruals anomaly, as both anomalies are associated with the reversal of prior period stock returns (Desai et al. 2004). The basic reason for the overlap is that growth stocks experience high growth in sales that may give rise to high positive accruals. As a result, investors' mispricing of growth stocks may be due to the mispricing of their poor earnings quality (positive accruals) and may be the reason that growth stocks underperform values stocks in subsequent periods, when the market corrects.[4] In a similar vein, value stocks may experience poor performance (negative accruals), which investors tend to overprice leading to positive abnormal returns in subsequent periods when the market corrects. This line of argument

[3] Bandyopadhyay, Huang, Sun and Wirjanto (2015) link information risk/uncertainty to idiosyncratic risk. They argue that "accruals quality measures firms' financial reporting quality stemming from managerial discretion of earnings and therefore reflects firms' information quality". They show that accruals quality is related to risk in a way that is distinct from other dimensions of information uncertainty and that their finding of the relation between accruals quality and returns expands the information uncertainty phenomenon.

[4] Growth stocks' susceptibility to mispricing is supported by its residual variability posing limits to arbitrage (Brav, Heaton and Li 2010).

provides a potential explanation for the value premium based on the overvaluation (undervaluation) of growth (value) stocks due to the overpricing of accruals. In this case, deteriorating earnings quality, either in the form excessively high or excessively low accruals, increases the value premium through the mispricing of both growth and of value stocks.

Put differently, poor earnings quality may exacerbate behavioral biases in so far as they compound investors' tendency to extrapolate past performance into the future. For example, high earnings volatility may cause investors to overreact to good or bad news in such a way that growth stocks become overpriced, while value stocks become underpriced. In this case too, we would expect deteriorating earnings quality, triggering behavioral biases, to be related positively to the value premium through the mispricing of growth and value stocks.

To summarize, earnings quality may contribute to a risk and/or behavioral/mispricing explanation of the value premium. Either way, we expect the value premium to be increasing with deteriorating earnings quality.

3. Methods, measures and data

3.1 Value-growth proxies

We use book-to-market ration (B/M) as our main proxy to capture the value-growth effect. We provide detailed definitions for all key variables in Appendix A. Comparing to alternative proxies, such as operating cash flows to price (OCF/P) and earnings to price (E/P), B/M is the least affected by earnings properties that are embedded in earnings quality, the key focus of our investigation. We compute the book-to-market ratio (B/M) as the ratio of the fiscal year-end book value of equity to the market value of equity. We measure the market value of equity at the end of the fourth month following the end of the calendar year and book values of equity from all year-ends falling within this calendar year to ensure all the accounting variables for the previous year-end are available at the portfolio formation date.

At the end of April every year firms are ranked based on B/M ratios from low to high and the ranked firms are divided into four groups of equal size. Quartile-1 (Q1) is the low B/M ratio quartile or the growth stocks, while Quartile-4 (Q4) is the high B/M ratio quartile or the value stocks.

3.2 Returns

We calculate annual buy-and-hold total returns for each firm for the year after the portfolio is formed, i.e. the twelve months starting on the fifth month after the calendar year-end (*Ret1*) (see Fama and French 1992; Lakonishok, Shleifer and Vishny 1994; and La Porta, Lakonishok, Shleifer and Vishny 1997). The starting period of the return accumulation period ensures complete dissemination of accounting information in the financial statements of the previous year.

3.3 Earnings quality measure

Prior literature uses various metrics for earnings quality, some based on earnings attributes and others on accruals properties. As there is no agreed-upon measure of earnings quality, we use earnings variability (*EarnVar*) because it has been shown to work as an instrument for various earnings quality measures, such as earnings smoothness, earnings predictability, accruals quality, poor matching of revenue and expenses, etc. (e.g., Francis, LaFond, Olsson and Schipper 2004; Dichev and Tang 2008 2009). We calculate *EarnVar* as the standard deviation of the firm's net income before extraordinary items scaled by total assets over the last 5 fiscal years (year $t-5$ to year t). We obtain similar results when using the Dechow and Dichev (2002) measure of accruals quality (*AQ*) or absolute abnormal accruals (*AbsAA*) based on the Jones' (1991) model as alternative measures of earnings quality (see additional analysis).

3.4 Risk and behavioral/mispricing measures

To assess the extent to which earnings quality contributes to a risk and mispricing explanation for the value premium, we first test its association with factors that prior literature has used to proxy for risk or mispricing.

With respect to risk measures, we use *Beta* and *IVol* consistent with prior research (i.e., Fan Opsal and Yu 2015, Guo, Savickas, Wang and Yang 2009, Lewellen and Nagel 2006). *Beta* is the coefficient from firm-specific CAPM regressions using the daily total stock returns, adjusted for the risk free rate, on the market premium. *IVol* is idiosyncratic stock return volatility calculated as the standard deviation of daily abnormal stock returns during the fiscal year. We obtain abnormal returns as the residuals from regressing the company's daily stock returns adjusted for the risk free rate on the market premium.

We also use two additional measures associated with analyst uncertainty. The first is analyst forecast dispersion, *ADispersion*, calculated as the standard deviation of individual analyst earnings forecasts issued during the fiscal year, divided by end of previous year stock prices.[5] The dispersion of analysts' forecasts represents an indication of the heterogeneity of

[5] The standardization renders our dispersion measure scale free across firms for the cross sectional analysis conducted in each month. We opt for dividing by price rather than earnings per share as the latter may produce many outliers. We obtain similar results when considering the standard deviation of one-year-ahead analyst forecasts as in Doukas, et al. (2004), or the standard deviation of analyst forecasts outstanding at the beginning of the fiscal year.

beliefs among analysts.[6] The second measure is the absolute value of the forecast error, |*Forecast error*|, calculated as the absolute value of the difference between actual EPS and the first analyst consensus forecast for the period divided by end of previous year stock price. |*Forecast error*| also proxies for the level of uncertainty associated with the information and environment in which a company operates. Analyst uncertainty, reflected either in higher dispersion in analyst forecasts or higher forecast errors, is likely to increase the perception of the associated risk of an investment investors are exposed to and consequently makes them demand higher rates of return.[7] In so far as earnings quality underlies the higher risk of value stocks vis-a-vis growth stocks, value stocks should exhibit higher values in the above risk measures.

In terms of behavioral biases, value investors believe that hidden value can be found in securities that are obscure. These tend to be the stock of companies that lack coverage by security analysts. Institutional investors would tend to avoid stocks that are obscure and not followed by analysts. It does not look good in their annual reports to have in their portfolios stocks that are not in the public eye and which are not considered glamour stocks. Moreover, institutional managers can always blame analysts' coverage if something goes wrong. In other words, there are many risks to which institutional managers are exposed to by investing in obscure stocks or stocks that no (or only few) analysts cover. Institutional disinvestment from

[6] The standard deviation of analysts' forecasts may be a better measure of risk than the standard deviation of stock returns, as it is forward looking whereas the standard deviation of stock returns is based on historical data. Other researchers, such as Doukas et al. (2004), Malkiel (1982), Williams (1977), have also shown that the dispersion in analysts' earnings forecasts represents a better measure of risk.

[7] We note that analyst forecast dispersion, as a proxy for the heterogeneous beliefs among analysts, has also been associated with mispricing (Malloy and Scherbina 2002; Ang, Hodrick, Xing and Zhang 2006, Miller 1977). Under this lens, disagreement of opinion about a stock's value and short sale constraints induce an asymmetry in the distribution of stock returns such that price setting reflects mainly optimistic investors. As a result, we are cautious when interpreting results on the association between analyst forecast dispersion and the value premium. In fact, Ackert and Athanassakos (1997) show that analyst forecast dispersion and forecast error are indeed associate with analyst optimism, and hence can be also used as a proxy for behavioral biases,

and avoidance of such stocks affects their prices. As a result, stocks which are ignored and obscure (i.e., stocks that value investors tend to invest in) may be undervalued and have higher forward returns. Accordingly, we investigate behavioral/mispricing based explanations of the value premium starting with *Analyst Coverage*, i.e. the number of analysts following the firm each year.

Kothari, Shanken and Sloan (1995) and Loughran (1997) show that the value premium is stronger for small cap stocks. Many institutional investors, constrained either by their mandate or by the fact that they have too much money to manage and small cap stocks cannot absorb enough flow, tend to avoid such stocks (Greenwald et al. 2001). As smaller companies evolve to bigger companies through growth, they may become eligible for purchase by more mutual/pension fund companies and their shares are bid up. Moreover, smaller cap companies tend to be followed by fewer analysts (Ackert and Athanassakos 2003). Hence, smaller cap companies, followed by fewer analysts and owned by a smaller number of institutions, tend to be more obscure and less in the public eye than larger companies. This leads to their possible underpricing vis-à-vis larger stocks. We use firm market capitalization, *Log(MarketCap)*, as a proxy for visibility and for firms which are neglected or ignored by institutional investors and, hence, as a proxy for possible mispricing. We use the natural log of the firm's market capitalization at the portfolio formation date, i.e. four months following the calendar year-end. If earnings quality underlies a mispricing explanation of the value premium, then value stocks should exhibit lower visibility (firm size or analyst coverage) than growth stocks.

3.5 Data and sample selection

We use stock return data from CRSP (monthly and daily stock prices, returns, and shares outstanding for AMEX, NASDAQ, and NYSE stocks). We calculate market capitalization from this database by multiplying shares outstanding by price per share at the end of the fourth month following the firm's fiscal year-end. We use accounting data from COMPUSTAT and analyst data from Institutional Brokers Estimate System (I/B/E/S).

The firms included in the final sample passed through several filters. First, the share price exceeds $1. Second, the B/M ratio is positive. Third companies have matching stock return data on CRSP available for the current and subsequent accounting period (i.e., the year following the determination of value-growth classification), and fourth, matching data in I/B/ES.[8] The first criterion ensures that the sample is not dominated by penny stocks as severe liquidity problems exist in this group of stocks, and extremely high stock returns are not unusual for such stocks biasing value and growth stock returns. Moreover, the stock price is used as a scalar and excluding penny stocks prevents these ratios from reaching extreme values. The second criterion prevents problems resulting from the inclusion of companies with negative B/M ratios which will distort our value and growth proxies (Desai et al. 2004; Lakonishok et al. 1994), and deals with potential data errors (La Porta et al. 1997; Cohen, Polk and Vuolteenaho 2003). The final sample consists of a total of 49,368 firm-year observations for 6,535 unique firms over the period 1982-2013.[9]

8 In follow-up asset pricing tests, we relax this sample criterion to enhance comparability of the asset pricing results with prior literature.

9 Our initial sample period covers 1982-2015. Because our analysis includes one year ahead stock returns our analysis covers the fiscal periods 1982-2013.

4. Empirical Evidence

4.1 Descriptive statistics

Table 1 reports mean returns and other key measures across quartiles of B/M. It also reports the statistics of a *t*-test for the difference in means between value stocks (fourth quartile of B/M) and growth stocks (first quartile of B/M). Table 1 shows that indeed there is a value premium in our sample with a mean of 0.043 (*t*-test 6.44).

Similar to prior research (Athanassakos 2009; Fama and French 2006; Ang and Chen 2003; Adrian and Frazoni 2005), we find that the market beta of value stocks is well below the beta of growth stocks (mean difference: -0.194, *t*-test 28.17). However, when it comes to idiosyncratic return volatility, *IVol*, the results are opposite in the sense that value stocks have higher *IVol* than growth stocks (mean difference: 0.002, *t*-test 16.17). We note however that while the decline in beta is monotonic across quartiles of B/M, when it comes to idiosyncratic volatility the increase across quartiles of B/M is less monotonic. These initial statistics suggest that value firms face less systematic, but more unsystematic risk than growth firms. Value stocks also have higher analyst forecast dispersion than growth stocks (mean difference: 0.012, *t*-test 29.90) and higher absolute forecast error (mean difference: 0.027, *t*-test 31.06), pointing further to a risk based explanation of the value premium. At the same time, however, value stocks are followed by fewer analysts (mean difference: -5.514, *t*-test -48.12) and have smaller market cap than growth stocks (mean difference: -1.745, *t*-test -78.91), which could be taken as evidence consistent with behavioral/mispricing explanations of the premium. The difference in earnings volatility (*EarnVar*), our key earnings quality measure, also shows that earnings volatility of value stocks is well below the earnings volatility of growth stocks (mean difference: -0.028, *t*-test -7.52).

In summary, results in Table 1 affirm evidence of a value premium. There is some support for a risk based explanation of the value premium, but the risk seems idiosyncratic. This seems to be reinforced by the higher idiosyncratic volatility, forecast dispersion and forecast error of the value than the growth stocks. However, there is also evidence pointing to mispricing as the driver of the value premium in terms of the lower visibility (analyst coverage and firm size) of value stocks than growth stocks. Finally, consistent with previous research, we also find growth stocks tend to have poorer earnings quality than value stocks (Lee, Li, and Yue 2006). We explore these findings further below.

4.2 Earnings quality and traditional measures of risk

Table 2, Panel A, reports the beta of value and growth stocks across different earnings quality quartiles. We observe, consistent with previous evidence, that the beta of value firms is lower than the beta of growth firms. We further observe that value stocks exhibit lower beta in all earnings quality quartiles. For example, the mean beta of the highest earnings quality value firms is 0.750 while the corresponding figure for growth firms is 0.905. The mean beta of the poorest earnings quality value firms is 0.991, while the corresponding figure for growth firms is 1.168. The differences in means are statistically significant at traditional levels of significance. This evidence reaffirms that systematic risk is lower for value than growth stocks. In this panel we also observe that the beta increases as we go from higher to lower earnings quality quartiles. However, the beta differential between value and growth stocks does not systematically vary across quartiles of earnings quality. So while earnings quality contributes to systematic risk, it is not useful in explaining the systematic risk differential across value and growth stocks.

Table 2, Panel B, reports idiosyncratic volatility, *IVol*, of value and growth stocks across different earnings quality quartiles. Value stocks have statistically higher mean *IVol* than growth stocks and the relationship exists across all earnings quality quartiles. For example, the mean *IVol* of the highest earnings quality value firms is 0.021, while the corresponding figure for growth firms is 0.018. Moreover, *IVol* increases as we go from higher to lower earnings quality quartiles. For example, the mean *IVol* of the poorest earnings quality value firms is 0.038, and the corresponding *IVol* for the growth firms is 0.037. The *IVol* differential across earnings quality quartiles is statistically significant. However, we note that the rise in *IVol* from higher to lower earnings quality is similar for growth as it is for value stocks (i.e. the *IVol* differential between value and growth stocks does not systematically vary across quartiles of earnings quality). This evidence affirms that idiosyncratic risk is higher for value than growth stocks. It further suggests that deteriorating earnings quality does not contribute to the higher relative idiosyncratic risk of value stocks.

4.3 Earnings quality and analyst forecast dispersion and forecast error

Table 2, Panel C, reports the standard deviation of analysts' forecasts (i.e., dispersion of analyst forecasts) for value and growth stocks across different earnings quality quartiles. We observe that the highest earnings quality value stocks have higher analyst forecast dispersion (mean: 0.011) than growth stocks (mean: 0.002) and this relationship is consistent and monotonic across all earnings quality quartiles. At the same time, the poorest earnings quality firms have higher dispersion of analyst forecasts for both value (mean: 0.039) and growth stocks (mean: 0.022), than the highest earnings quality firms. The differences in means are statistically significant at traditional levels of significance. We also note that earnings quality contributes to a higher rise in analyst forecast dispersion for value than growth stocks (i.e., the *ADispersion* differential between value and growth stocks is increasing from higher to lower earnings quality).

A similar picture emerges in Panel D, which reports the analyst absolute forecast error as a measure of risk for value and growth stocks across different earnings quality quartiles. We observe that the highest earnings quality value stocks have higher absolute forecast error (mean: 0.023) than the highest earnings quality growth stocks (mean: 0.010) and this relationship is consistent and monotonically increasing across all earnings quality quartiles. At the same time, the poorest earnings quality firms have higher analyst absolute forecast error for value (mean: 0.096) and growth (mean: 0.051) stocks than the highest earnings quality firms; the differential is higher for value than growth stocks. The differences in means are statistically significant at traditional levels of significance. The evidence in Panels C and D affirms that analyst uncertainty is higher for value than growth stocks and that deteriorating earnings quality contributes to the rising analyst uncertainty.

4.4 Earnings quality and measures of firm visibility

Table 3, Panel A, reports the analyst coverage for value and growth stocks across different earnings quality quartiles. We observe that the highest quality value stocks have a lower analyst coverage and so visibility (mean: 8.061) than growth stocks (mean: 16.306). This is consistent across all earnings quality portfolios. In this sense, value stocks, being less in the public eye and under the radar, may be more undervalued than growth stocks. In addition, the lower the earnings quality the lower the visibility across the value-growth quartiles. For example, the mean analyst following for the lowest earnings quality value stocks is 7.575, whereas for the growth stocks the corresponding number is 9.439. Also, the decline in visibility as we go towards lower earnings quality quartiles is more pronounced for growth than value stocks. It seems that poor earnings quality is undesirable by analysts especially for growth stocks.

Table 3, Panel B, reports the log market capitalization (*LogMktCap*) for value and growth stocks across different earnings quality quartiles. We observe that value stocks have a lower *LogMktCap* (and so visibility) (mean: 12.924) than growth stocks (mean: 14.935). In this sense, value stocks, being smaller (e.g., less desirable by large financial institutions), may be more undervalued than growth stocks. In addition, the lower the earnings quality the lower the market cap across the value-growth quartiles. For example, the mean *LogMktCap* for the poorest earnings quality value stocks is 11.581, whereas for the growth stocks is 13.043. Also, the decline in market capitalization as we go towards the lower earnings quality quartiles is more pronounced for growth than value stocks. The evidence from Table 3 seems to affirm that value stocks are less visible than growth stocks and that deteriorating earnings quality coincides with a sharper decline in visibility of growth stocks.

4.5 Earnings quality and risk and/or mispricing explanations for the value premium

The evidence thus far seems to affirm prior findings that, depending on the measures employed, evidence can support either risk (in the form of idiosyncratic risk and analyst uncertainty) or mispricing (lower visibility) as an explanation for the value premium. While this may make some sense as was discussed earlier, it does not provide much comfort in terms of shedding light on the rationale for the value premium. We believe that our research approach helps in this respect. Analysis across earnings quality quartiles so far shows that deteriorating earnings quality contributes to higher analyst uncertainty for value than growth stocks and to lower visibility of growth than value stocks.

Table 4 reports one year ahead buy-and-hold returns, *Ret1*, for value and growth stocks across different earnings quality quartiles. A number of interesting results emerge. First, we observe that while a value premium is evident in the total sample, the value premium appears to be driven by firms in poorer earnings quality quartiles. The mean value premium for the best earnings quality firms is 0.006 (but not statistically significant), whereas the corresponding value premium for the poorest earnings quality firms is 0.096 (t-test: 5.96). Second mean one year returns are decreasing while moving from higher to lower earnings quality for growth stocks and increasing while moving from higher to lower earnings quality for value stocks. More importantly, the value premium increases as we go to lower earnings quality firms, and this is primarily because of a *decline* in one year ahead mean returns of the growth stocks across the earnings quality quartiles and a corresponding *rise* in mean returns of the value stocks. The *Ret1* differential between highest and poorest earnings quality is -0.027 as mean returns of growth stocks decline from 0.128 for the best earnings quality firms to 0.101 for the poorest earnings quality firms, whereas for value stocks one year ahead mean returns actually rise from 0.134 for the best earnings quality firms to 0.197 for the poorest earnings quality firms.[10]

These results shed light on the drivers of the relationship between earnings quality and the value premium. In section 2, we hypothesized that the value premium is positively related to earnings quality and this was consistent both with the risk and mispricing argument. Had we only had access to the value premium across different earnings quality quartiles, it would

[10] We obtain similar results once we further sort on size, i.e. repeat the analysis for different firm size quartiles.

have been difficult to conclude whether the driver of this relationship is risk or mispricing. But in addition to the value premium, observing one year ahead returns for both value and growth stocks across the different earnings quartiles enables us to conclude in favor of the mispricing hypothesis for growth stocks and the risk or mispricing hypothesis for value stocks.

Two additional findings add clarity to this conclusion. First, while, on average, growth stocks tend to be bid up by investors, the less visible growth stocks are bid up more (Lakonishok, Shleifer and Vishny 1994; Phalippou 2008). As the poor quality growth stocks are less visible than the good quality growth stocks (and hence are bid up more), they end up having lower forward returns than the better quality growth stocks (see Table 3, Panel A and Table 4). This evidence favors the mispricing (overvaluation) for growth stocks. Second, deteriorating earnings quality of value stocks is associated not only with a rise in stock returns (see Table 4), but also with a sharp rise in analyst uncertainty about these stocks' expected earnings (see Table 2, Panels C and D). To the extent that analyst forecast dispersion and absolute forecast error proxy for risk (Doukas et al., 2004, Malkiel, 1982, Williams, 1977), this evidence favors a risk based explanation for value stocks. Analyst forecast dispersion and absolute forecast error, however, may also reflect larger investor uncertainty and therefore a higher potential for mispricing (Malloy and Scherbina 2002; Ang, Hodrick, Xing and Zhang 2006, Miller 1977). Taken together our results so far therefore suggest that deteriorating earnings quality contributes to the mispricing (overvaluation) of growth stocks and the riskiness or mispricing of the value stocks. As predicted this evidence is consistent with earnings quality underlying both the mispricing and risk based explanations for the value premium. To add more clarity into the relationship between earnings quality and the value premium, we now proceed with asset pricing regressions and tests.

4.6 Asset pricing tests

To further examine the results reported in Table 4, we next conduct firm-specific asset pricing regressions. We use the Fama and French (2015) five-factor model, which augments the three-factor model (market risk - RMRF, size - SMB, and book to market - HML) with profitability (RMW) and investment factors (CMA). *RMRF* is the excess return on the market portfolio, SMB is the excess return to size factor portfolio, *HML* is excess the return to book-to-market portfolio, *RMW* is the excess return on the profitability portfolio (two robust operating profitability portfolios minus two weak operating profitability portfolios), and *CMA* is the excess return to investment (average returns on two conservative investment portfolios minus the average return on the two-aggressive investment portfolios). We also employ and test an augmented five-factor model by adding an earnings quality factor (*EQfactor*) and/or the Pastor and Stambaugh (2003) liquidity factor (LIQ)[11]. We calculate an *EQfactor* as the excess return to the earnings quality (*EarnVar*) factor portfolio, i.e. the average returns on two high earnings variability portfolios minus the average return on two low earnings variability portfolios. To estimate the *EQfactor,* we condition on size the same way Fama and French (2015) use to condition the *RMW* and *CMA* factors.[12]To the extent that earnings quality contributes to a risk-based explanation for the value premium, we expect the earnings quality factor to be incrementally significant in explaining returns.

For the asset pricing tests, we use the unconstrained sample, i.e. the sample before deleting observations without analyst forecast data in order to improve comparability of the

[11] For a discussion of the LIQ factor, see Pastor and Stambaugh (2003). We use the Pastor-Stambaugh liquidity measure provided by the Wharton Research Database Service.

[12] See http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_5_factors_2x3.html.

results to prior literature. From this broader sample, we retain monthly stock returns for firms with at least 18 monthly returns in our 1982–2013 sample period, as per Fama and MacBeth (1973). This yields 1,540,130 monthly returns for 13,336 firms.

Table 5 presents the regression results. The table reports the Fama-MacBeth coefficients and corresponding t-statistics of the firm-specific asset pricing regressions using monthly returns. The first column reports the results on the entire sample considering only the five factors. In the second column, by adding *EQfactor* we can assess the degree to which earnings quality adds to the market risk, size, book-to-market, profitability and investment premium in explaining returns. Similar to Francis et al (2005), we document a marginally significant positive mean loading on the *EQfactor* (coef: 0.030, t = 1.90). This suggests that the earnings quality factor is incrementally useful in explaining returns. We obtain similar results when we add the Pastor and Stambaugh (2003) liquidity factor (*LIQ*) in the final column (*EQfactor* coef: 0.021, t = 1.68). Note that in both specifications, when we include EQfactor, the *HML* factor becomes insignificant. Also while the intercept is positive and significant when we exclude the *EQfactor* (coef: 0.010, t =5.50), it becomes insignificant when the *EQfactor* is added to the model (coef: 0.001, t =1.64). This evidence suggests that earnings quality is priced and contributes to a risk based explanation of the value premium.

To examine whether earnings quality contributes to the mispricing of growth and value stocks, we repeat the analysis separately for growth (first B/M based quartile) and value stocks (fourth B/M based quartile) using the augmented five-factor model that includes the EQfactor and LIQ factors. Table 6 reports the results. The intercept is negative and significant for growth stocks (coef: -0.004, t =-2.37) and positive and significant for value stocks (coef: 0.010, t =5.50). This result is consistent with prior evidence on the overvaluation (undervaluation) of growth (value) stocks (Lakonishok, Shleifer and Vishny 1994). To further assess whether earnings quality contributes to this mispricing, we repeat the analysis for growth and value stocks, but this time we separate the highest earnings quality stocks (first *EarnVar* based quartile) from poorest earnings quality stocks (fourth *EarnVar* based quartile). For growth stocks, the intercept is significantly negative only for firms with the poorest earnings quality (−0.011, t = −2.38). For value stocks, the intercept is positive and significant both for firms with poorest earnings quality (0.017, t = 2.66) and those with highest earrings quality (0.004, t=1.72). These results suggest that earnings quality contributes to the mispricing of both growth and value stocks.

Taken together the results in Tables 4-6 suggest that firm-level earnings quality contributes to both a risk and a mispricing based explanation for the value premium. With respect to mispricing, deteriorating earnings quality contributes to the value premium through the overvaluation (undervaluation) of growth (value) stocks. The asset pricing models allow us to delve more into the findings of section 4.5 and additionally determine that value stocks are not only exposed to higher risk but also to higher mispricing which seems to be driven by poor earnings quality.

5. Additional analysis

5.1 Time series analysis of the value premium for different EQ quartiles

To investigate the role of earnings quality further, Table 7 reports the results of a time series analysis of the value premium and how that varies across stocks with poor versus good earnings quality. For this purpose, we report one year ahead buy-and-hold returns after the portfolio formation date (RET1), and track annual returns for the preceding three years, *RET0*, *RET-1*, *RET-2*, and for the following three years, *RET2*, *RET3*, *RET4*, for value and growth stocks. In the first three columns, we observe evidence that growth stocks tend to be overvalued in the three years leading up to the portfolio formation date (average returns of 0.242, 0.279, and 0.343) and underperform for the following four years (average returns of 0.119, 0.117, 0.125, and 0.134). Value stocks, on the other hand, have low returns in the three years leading up to the portfolio formation date (0.068, 0.020 and -0.038) followed by higher returns over the next four years (0.162, 0.159, 0.150, 0.146). The result is more pronounced for the poorest earnings quality stocks (the lowest *EQ* quartile) compared to highest earnings quality stocks (the highest *EQ* quartile) reported in columns 4-6. The poorest earnings quality growth stocks have very strong returns in lag years (0.240, 0.282, 0.413) and weaker in the lead years (0.101, 0.112, 0.122, 0.157), whereas poor quality value stocks have weak returns in the lag years (0.023, -0.062, -0.138) and quite strong returns in the lead years (0.197, 0.159, 0.140, 0.137). These findings provide further evidence on the mispricing of both growth and value stocks and the contributing effect of earnings quality to this mispricing.

5.2 Pre- and post-financial crisis

In this section, to assess the sensitivity of our results to different periods within our sample, we repeat the analysis for a pre-financial crisis period, 1982-2006, and a post-financial crisis period, 2010-2013.[13] The financial crisis years of 2007 to 2009, are excluded as are characterized as a 1 in 100-year event (Globe and Mail, 2011). The financial crisis and several regulatory changes taking place in surrounding periods may have affected the value premium and the role of earnings quality. Table 8 reports the regression results for the entire sample per

[13] When interpreting the results for this part of the analysis we are mindful of the imbalance of the financial periods included in the two sub-periods especially in view of the firm-level regressions.

sub-period, as well as separately for growth and value stocks, for pre and post crisis. For the entire sample, the mean loading on *EQfactor* is insignificant pre crisis (0.004, t=0.22), but becomes quite significant post crisis (0.170, t=3.06). This finding suggests that earnings quality is a priced factor in the augmented five factor model, particularly in more recent years. The insignificance of the intercept in both sub-periods validates this conclusion.

When separating the sample by growth/value, we observe that the intercept is significantly negative for growth stocks in both sub-periods (-0.004, t=-2.15; -0012, t=-2.40, respectively), but it is positive and significant only for the pre-crisis period for value stocks (0.010, t=5.05). Therefore, while growth stocks seem to be overvalued in both sub-periods, value stocks are underpriced mainly in the earlier sub-period. Further analysis (not-tabulated) suggests that the underpricing of growth stocks post-crisis is mainly driven by poor earnings quality. Taken together this evidence further suggests that earnings quality contributes to both a risk and a mispricing based explanation for the value premium, but over more recent years earnings quality seems to act more as a source of risk and less as a source of mispricing.

6. Conclusion

The purpose of this paper is to examine whether a value premium exists over our sample period and whether earnings quality contributes to a risk, mispricing or both explanations for the value premium. Our results confirm the existence of a value premium. They also provide support for risk or mispricing as an explanation of the value premium, when using proxies employed in prior research, which is as puzzling to us at it was for other researchers. However, our study helps reconcile the conflicting evidence on the rationale for the value premium. It shows that combining earnings quality measures with the value and growth stocks returns clears the puzzle. Earnings quality underlies both a risk and a mispricing explanations of the value premium.

This makes intuitive sense. What value investors do may actually involve both risk and mispricing. For example, in their search process, value investors look for companies in bankruptcy proceedings or suffering from severe financial distress, companies in industries that suffer from overcapacity, general decline or threat of legislative or regulatory punishment, as well as companies exposed to lawsuits, both current and potential. Undesirability due to financial duress implies higher risk, but at the same time it also implies less desire to own by large institutional investors and, hence, mispricing. Noisier earnings in the financial statements help in this respect as they increase the scope for mispricing/behavioral biases, while at the same time increase the riskiness of a stock (i.e., information risk).

As a result, our study offers an explanation not only for the *drivers* of the value premium – it is not risk or mispricing that drives it but rather a combination of both – but also for the *sources* of the drivers of the value premium by highlighting the role that earnings quality plays within growth and value stocks. By unraveling the effect of reported earnings quality on the value premium, our study suggests that a further screening of value and growth stocks, based on earnings quality, could potentially improve investment strategies. Future research can build on the insights gained from this study to explore this possibility.

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Appendix A
Definition of variables in alphabetical order

Variable	Description
ADispersion	Standard deviation of individual analyst earnings forecasts issued during the fiscal year, divided by stock price at year *t-1*.
AbsAA	Absolute abnormal accruals based on the Jones (1991) model.
AQ	The standard deviation of the firm's residuals from years $t-4$ to year t from annual cross-sectional estimations of the modified Dechow and Dichev (2002) model, i.e. regressions of the firm's year t working capital accruals (TCA) on year t, $t-1$, and $t+1$ cash flows from operations (CFO), the year t change in revenues (ΔREV) and the year t property, plant, and equipment (*PP&E*) (all variables scaled by average total assets), where the regression is estimated using data from t = 1961–2010.Because of the lead term in cash flows from operations the measure is lagged one year to ensure there is no conditioning on future information.
Beta	*Beta* is the coefficient from firm-specific CAPM regression using daily returns each year.
BM	Book value of equity divided by the market value of equity at the end of the fourth month after the firm's fiscal year-end.
CMA	The excess return to investment (average returns on two conservative investment portfolios minus the average return on the two-aggressive investment portfolios).
CFO/P	Operating cash flows divided by the market value of equity at the end of the fourth month after the firm's fiscal year-end.
|Forecast error|	The absolute difference between actual EPS (I/B/E/S actual EPS) and the first analyst consensus forecast for year *t* issued at the beginning of the period scaled by stock price at year t-1.
Analyst coverage	Number of analysts following the firm
EarnVar	Standard deviation of the firm's net income before extraordinary items (NIBE) scaled by total assets over years $t-5$ *to* t.
EQfactor	The return to the earnings quality (*EarnVar*) factor mimicking portfolio calculated as the difference between the monthly excess returns of the top two quintiles of *EarnVar* quintiles (Q4 and Q5) and the bottom two quintiles of *EarnVar* (Q1 and Q2). In calculating the *EQfactor* we sort on size and book to market similar to the way Fama and French (1993) construct size and book-to-market mimicking portfolios SMB.
HML	The return to book-to-market mimicking portfolio (Fama and French 1993).
IVol	Idiosyncratic stock return volatility calculated as the standard deviation of daily abnormal stock returns. We obtain abnormal returns as the residuals from regressing the company's daily stock returns adjusted for the risk free rate on the market premium.
LIQ	The Pastor and Stambaugh (2003) liquidity factor.
RMRF	The excess return on the market portfolio.
RMW	The excess return on the profitability portfolio (two robust operating profitability portfolios minus two weak operating profitability portfolios).
Ret1	Annual buy-and-hold returns for each firm for the year after the portfolio is formed, i.e. the twelve months starting on the fifth month after the calendar year-end.
Size	Natural log of the firm's market capitalization four months following the fiscal year end.
SMB	The return to size factor-mimicking portfolio (Fama and French 1993).

Table 1 Descriptive statistics

The table presents statistics for key variables across value versus growth portfolios, based on B/M. Statistics correspond to a *t*-test for the difference in means between value stocks (fourth quartile of B/M) and growth stocks (first quartile of B/M). Appendix A describes all variables.

Q(BM)	**Growth 1**	**2**	**3**	**Value 4**	Value-Growth	*t*-test
Mean *Ret1*	0.119	0.126	0.140	0.162	0.043	*6.44*
Mean *Beta*	1.057	0.970	0.908	0.863	-0.194	*-28.17*
Mean *IVol*	0.027	0.025	0.026	0.029	0.002	*16.17*
Mean *ADispersion*	0.011	0.010	0.014	0.023	0.012	*29.90*
Mean |*Forecast error*|	0.028	0.026	0.034	0.055	0.027	*31.06*
Mean *Coverage*	13.230	11.809	10.018	7.716	-5.514	*-48.12*
Mean *Log(MktCap)*	14.052	13.634	13.138	12.307	-1.745	*-78.91*
Mean *EarnVar*	0.084	0.061	0.055	0.056	-0.028	*-7.52*
N	12,331	12,345	12,355	12,337		

Table 2 Risk, earnings quality and value versus growth

The table presents statistics for market beta, idiosyncratic return volatility, analyst forecast dispersion and absolute forecast error across earnings volatility (quality) and value versus growth quartiles (based on B/M). Statistics correspond to a *t*-test for the difference in means between value stocks (fourth quartile of B/M) and growth stocks (first quartile of B/M) and between poor earnings quality stocks (fourth quartile of *EarnVar*) and good earnings quality stocks (first quartile of *EarnVar*). Appendix A describes all variables.

Panel A: Market beta across earnings quality and value-growth quartiles

Mean *Beta*						
Q(BM)	**Growth**			**Value**	*Value-*	
Q(EarnVar)	**1**	**2**	**3**	**4**	*Growth*	*t*-test
1 (Good Quality)	0.905	0.817	0.733	0.750	-0.155	*-13.42*
N	2,648	3,200	3,548	2,935		
2	0.989	0.919	0.892	0.805	-0.184	*-14.72*
	2,779	3,254	3,107	3,205		
3	1.104	1.024	0.983	0.910	-0.194	*-13.58*
N	2,755	3,077	3,067	3,456		
4 (Poor Quality)	1.168	1.146	1.077	0.991	-0.176	*-11.69*
N	4,149	2,814	2,633	2,741		
Poor-Good Quality	0.263	0.330	0.344	0.241		
t-test	*21.56*	*23.83*	*24.68*	*16.59*		

Panel B: Idiosyncratic volatility (*IVol*) across earnings quality and value-growth quartiles

Mean *IVol*						
Q(BM)	**Growth**			**Value**	*Value-*	
Q(EarnVar)	**1**	**2**	**3**	**4**	*Growth*	*t*-test
1 (Good Quality)	0.018	0.019	0.018	0.021	0.003	*11.42*
N	2,648	3,200	3,548	2,935		
2	0.022	0.022	0.024	0.026	0.004	*14.11*
N	2,779	3,254	3,107	3,205		
3	0.027	0.027	0.028	0.030	0.004	*11.34*
N	2,755	3,077	3,067	3,456		
4 (Poor Quality)	0.037	0.036	0.035	0.038	0.001	*1.81*
N	4,149	2,814	2,633	2,741		
Poor-Good Quality	0.019	0.017	0.017	0.016		
t-test	*65.70*	*56.43*	*53.78*	*46.15*		

Panel C: Analyst forecast dispersion, earnings volatility and value-growth quartiles

Mean *ADispersion*

Q(BM) *Q(EarnVar)*	**Growth** **1**	**2**	**3**	**Value** **4**	*Value-* *Growth*	*t*-test
1 (Good Quality)	0.002	0.003	0.005	0.011	0.008	*23.25*
	2,648	3,200	3,548	2,935		
2	0.004	0.006	0.009	0.016	0.012	*23.87*
	2,779	3,254	3,107	3,205		
3	0.008	0.010	0.015	0.025	0.017	*24.35*
	2,755	3,077	3,067	3,456		
4 (Poor Quality)	0.022	0.023	0.028	0.039	0.017	*15.52*
	4,149	2,814	2,633	2,741		
t-test	*32.88*	*28.00*	*28.76*	*29.69*		

Panel D: Analyst absolute forecast error across earnings volatility and value-growth quartiles

Mean *Absolute forecast error*

Q(BM) *Q(EarnVar)*	**Growth** **1**	**2**	**3**	**Value** **4**	*Value-* *Growth*	*t*-test
1 (Good Quality)	0.010	0.011	0.014	0.023	0.013	*17.72*
N	2,648	3,200	3,548	2,935		
2	0.014	0.017	0.025	0.040	0.025	*22.94*
N	2,779	3,254	3,107	3,205		
3	0.022	0.028	0.039	0.063	0.041	*26.08*
N	2,755	3,077	3,067	3,456		
4 (Poor Quality)	0.051	0.053	0.065	0.096	0.045	*18.19*
N	4,149	2,81 4	2,633	2,741		
Poor-Good Quality	0.041	0.042	0.051	0.073		
t-test	*30.74*	*27.09*	*28.87*	*33.32*		

Table 3 Firm visibility, earnings quality and value versus growth

The table presents statistics for firm visibility, proxied by analyst following and firm size, across earnings volatility (quality) and value versus growth quartiles (based on B/M). Statistics correspond to a *t*-test for the difference in means between value stocks (fourth quartile of B/M) and growth stocks (first quartile of B/M) and between poor earnings quality stocks (fourth quartile of *EarnVar*) and good earnings quality stocks (first quartile of *EarnVar*). Appendix A describes all variables.

Panel A: Analyst following (coverage) across earnings volatility and value-growth quartiles

Mean *Coverage*

Q(BM) *Q(EarnVar)*	**Growth** **1**	**2**	**3**	**Value** **4**	*Value-Growth*	*t*-test
1 (Good Quality)	16.306	13.348	10.508	8.061	-8.245	*-36.20*
N	2,648	3,200	3,548	2,935		
2	15.313	12.482	10.302	7.612	-7.702	*-32.70*
N	2,779	3,254	3,107	3,205		
3	13.881	11.877	10.180	7.633	-6.248	*-25.63*
N	2,755	3,077	3,067	3,456		
4 (Poor Quality)	9.439	9.204	8.832	7.575	-1.864	*-9.05*
N	4,149	2,814	2,633	2,741		
Poor-Good Quality	-6.867	-4.145	-1.677	-0.486		
t-test	*-29.77*	*-18.03*	*-7.81*	*-2.40*		

Panel B: Market Cap across earnings volatility and value-growth quartiles

Mean *Size (Log(MarketCap)*

Q(BM) *Q(EarnVar)*	**Growth** **1**	**2**	**3**	**Value** **4**	*Value-Growth*	*t*-test
1 (Good Quality)	14.935	14.296	13.726	12.924	-2.011	*-45.97*
N	2,648	3,200	3,548	2,935		
2	14.628	13.936	13.340	12.535	-2.092	*-49.08*
N	2,779	3,254	3,107	3,205		
3	14.143	13.509	12.977	12.147	-1.995	*-47.61*
N	2,755	3,077	3,067	3,456		
4 (Poor Quality)	13.043	12.667	12.296	11.581	-1.462	*-38.70*
N	4,149	2,814	2,633	2,739		
Poor-Good Quality	-1.892	-1.628	-1.430	-1.343		
t-test	*-47.47*	*-40.12*	*-36.53*	*-32.09*		

Table 4 Earnings quality and the value premium

The table presents statistics for one year ahead buy-and-hold returns (accumulation starting on the fifth month after the fiscal year-end) across earnings quality and value versus growth quartiles. Statistics correspond to a *t*-test for the difference in means between value stocks (fourth quartile of B/M) and growth stocks (first quartile of B/M) and between poor earnings quality stocks (fourth quartile of *EarnVar*) and good earnings quality stocks (first quartile of *EarnVar*). Appendix A describes all variables.

Mean Ret1 *Q(BM)* *Q(EarnVar)*	**Growth** **1**	**2**	**3**	**Value** **4**	*Value-* *Growth*	*t*-test
1 (Good Quality)	0.128	0.130	0.132	0.134	0.006	*0.56*
N	2,648	3,200	3,548	2,935		
2	*0.130*	*0.127*	*0.138*	*0.161*	*0.031*	*2.60*
N	2,779	3,254	3,107	3,205		
3	0.127	0.124	0.147	0.160	0.032	*2.40*
N	2,755	3,077	3,067	3,456		
4 (Poor Quality)	**0.101**	0.122	0.144	**0.197**	0.096	*5.96*
N	4,149	2,814	2,633	2,741		
Poor-Good Quality	**-0.027**	-0.008	0.012	**0.063**		
t-test	*-2.39*	*-0.60*	*0.93*	*4.10*		

Table 5 Market pricing of earnings quality for value versus growth stocks

The table presents results of firm-specific asset pricing regressions using monthly one year ahead buy-and-hold returns (accumulation starting on the fifth month after the fiscal year-end) for 5,397 firms with at least 18 monthly stock returns over the period 1982-2013. This includes 2,783 growth stocks (first quartile of BM) and 3,147 value stocks (fourth quartile of BM). *RMRF* is the excess return on the market portfolio, SMB is the return to size factor-mimicking portfolio, *HML* is the return to book-to-market mimicking portfolio, *RMW* is the excess return on the profitability portfolio (two robust operating profitability portfolios minus two weak operating profitability portfolios), *CMA* is the excess return to investment (average returns on two conservative investment portfolios minus the average return on the two-aggressive investment portfolios), *EQfactor* is the excess return to the earnings quality (*EarnVar*) factor mimicking portfolio (average returns on two high earnings variability portfolios minus the average return on two low earnings variability portfolios), and *LIQ* is the Pastor and Stambaugh (2003) liquidity factor. The results reports the average Fama-MacBeth coefficients estimates and corresponding t-statistics of the firm-specific regressions. *, **, *** stand for significance at the 10%, 5% and 1% level, respectively.

	Ret1	*Ret1*	*Ret1*
	Entire Sample	*Entire Sample*	*Entire Sample*
Variables	*Coef./(t-stat)*	*Coef./(t-stat)*	*Coef./(t-stat)*
RMRF	0.956***	0.985***	0.984***
	(83.53)	(83.37)	(82.07)
SMB	0.835***	1.078***	1.068***
	(52.06)	(47.52)	(34.24)
HML	0.040*	0.031	0.032
	(1.92)	(1.47)	(1.57)
EQ		0.030*	0.021*
		(1.90)	(1.68)
RMW	-0.421***	-0.407***	-0.398***
	(-14.62)	(-13.21)	(-11.83)
CMA	-0.098***	-0.079	-0.062
	(-2.68)	(-1.59)	(-1.28)
LIQ			0.017
			(1.35)
Constant	0.002***	0.001	0.001
	(5.05)	(1.64)	(1.46)
Observations	1,540,130	1,540,130	1,540,130
R-squared	0.0914	0.0922	0.0924
No of firms	13,336	13,336	13,336

Table 6 Asset pricing tests value versus growth stocks conditional on earnings quality

The table presents results of firm-specific asset pricing regressions using monthly one year ahead buy-and-hold returns (accumulation starting on the fifth month after the fiscal year-end) for 971 growth stocks (first quartile of BM) with good earnings quality (first quartile of EarnVar), 1,382 growth stocks (first quartile of BM) with poor earnings quality (fourth quartile of EarnVar), 1,002 value stocks (fourth quartile of BM) with good earnings quality (first quartile of EarnVar) and 1,195 value stocks (fourth quartile of BM) with poor earnings quality (fourth quartile of EarnVar). *RMRF* is the excess return on the market portfolio, SMB is the return to size factor-mimicking portfolio, *HML* is the return to book-to-market mimicking portfolio, *RMW* is the excess return on the profitability portfolio (two robust operating profitability portfolios minus two weak operating profitability portfolios), *CMA* is the excess return to investment (average returns on two conservative investment portfolios minus the average return on the two-aggressive investment portfolios), *EQfactor* is the excess return to the earnings quality (*EarnVar*) factor mimicking portfolio (average returns on two high earnings variability portfolios minus the average return on two low earnings variability portfolios), and *LIQ* is the Pastor and Stambaugh (2003) liquidity factor. The results reports the average Fama-MacBeth coefficients estimates and corresponding t-statistics of the firm-specific regressions. *, **, *** stand for significance at the 10%, 5% and 1% level, respectively.

Variables	*Ret1 Growth* *Coef./(t-stat)*	*Ret1 Value* *Coef./(t-stat)*	*Ret1 Growth Good quality* *Coef./(t-stat)*	*Ret1 Growth Poor quality* *Coef./(t-stat)*	*Ret1 Value good quality* *Coef./(t-stat)*	*Ret1 Value poor quality* *Coef./(t-stat)*
RMRF	1.099***	0.911***	0.878***	1.285***	1.014***	0.948***
	(22.13)	(17.99)	(12.74)	(9.24)	(14.47)	(7.30)
SMB	1.201***	1.127***	0.683***	1.361***	0.645***	0.908***
	(14.03)	(13.43)	(4.32)	(6.74)	(6.93)	(2.76)
HML	-0.177***	0.283***	-0.234*	-0.113	0.425***	0.091
	(-2.70)	(3.08)	(-1.74)	(-0.77)	(3.80)	(0.43)
EQ	-0.016	-0.003	-0.205***	0.005	-0.077	-0.086
	(-0.32)	(-0.05)	(-2.65)	(0.04)	(-1.17)	(-0.62)
RMW	-0.376***	-0.549***	0.229	-0.147	-0.066	-1.482***
	(-3.16)	(-3.88)	(0.97)	(-0.55)	(-0.43)	(-2.89)
CMA	-0.115	-0.069	0.068	0.018	0.218	0.215
	(-0.91)	(-0.56)	(0.40)	(0.07)	(1.53)	(0.67)
LIQ	0.062	-0.057	0.192**	0.187	0.072	-0.047
	(1.37)	(-1.12)	(2.14)	(1.57)	(1.13)	(-0.32)
Constant	-0.004**	0.010***	-0.001	-0.011**	0.004*	0.017***
	(-2.37)	(5.50)	(-0.27)	(-2.38)	(1.72)	(2.66)
Observations	379,007	382,835	47,817	132,421	83,966	61,100
R-squared	0.0847	0.0782	0.1266	0.0786	0.1098	0.0766
No of firms	7,974	7,828	1,350	3,665	2,238	2,433

Table 7 Time series analysis of the value premium across earnings quality quartiles

The table presents statistics for the buy-and-hold returns for value stock (fourth quartile of B/M) versus growth stock (first quartile of B/M) for one year ahead after portfolio formation, RET1 (with accumulation starting on the fifth month after the fiscal year-end), the preceding three years, RET0, RET-1, RET-2, and the following three years, RET2, RET3, RET4, distinguishing between stock with poor earnings quality stocks (fourth quartile of *EarnVar*) and good earnings quality stocks (first quartile of *EarnVar*).

	Growth	*Value*	Value-Growth	*Growth (poor quality)*	*Value poor quality*	*Value-Growth (poor quality)*	*Growth (good quality)*	*Value (good quality)*	*Value-Growth (good quality)*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RET-2	0.242	0.068		0.240	0.023		0.220	0.101	
RET-1	0.279	0.020		0.282	-0.062		0.244	0.084	
RET0	0.343	-0.038		0.413	-0.138		0.257	0.039	
RET1	0.119	0.162	0.043	0.101	0.197	0.096	0.128	0.134	0.006
RET2	0.117	0.159	0.042	0.112	0.159	0.047	0.128	0.157	0.029
RET3	0.125	0.150	0.025	0.122	0.140	0.018	0.126	0.155	0.028
RET4	0.134	0.146	0.012	0.157	0.137	-0.021	0.118	0.155	0.037

Table 8 Market pricing of earnings quality for value versus growth stocks pre- and post the 2007-2009 financial crisis

The table presents results of firm-specific asset pricing regressions using monthly one year ahead buy-and-hold returns (accumulation starting on the fifth month after the fiscal year-end) for 2,247 growth stocks (first quartile of B/M) and 2,542 value stocks (fourth quartile of B/M) over the pre- 2007-2009 financial crisis period (1982-2006) and of 847 growth stocks and 903 value stocks over the post-2007-2009 financial crisis period (2010-2013). *RMRF* is the excess return on the market portfolio, SMB is the return to size factor-mimicking portfolio, *HML* is the return to book-to-market mimicking portfolio, *RMW* is the excess return on the profitability portfolio (two robust operating profitability portfolios minus two weak operating profitability portfolios), *CMA* is the excess return to investment (average returns on two conservative investment portfolios minus the average return on the two-aggressive investment portfolios), *EQfactor* is the excess return to the earnings quality (*EarnVar*) factor mimicking portfolio (average returns on two high earnings variability portfolios minus the average return on two low earnings variability portfolios), and *LIQ* is the Pastor and Stambaugh (2003) liquidity factor. The results reports the average Fama-MacBeth coefficients estimates and corresponding t-statistics of the firm-specific regressions. *, **, *** stand for significance at the 10%, 5% and 1% level, respectively.

Variables	*Ret1* *Entire Sample* *Coef./(t-stat)* *Pre-Crisis* *1982-2006*	*Ret1* *Entire Sample* *Coef./(t-stat)* *Post-Crisis* *(2010-2013)*	*Ret1* *Growth* *Coef./(t-stat)* *Pre-Crisis* *1982-2006*	*Ret1* *Growth* *Coef./(t-stat)* *Post-Crisis* *(2010-2013)*	*Ret1* *Value* *Coef./(t-stat)* *Pre-Crisis* *(2010-2013)*	*Ret1* *Value* *Coef./(t-stat)* *Post-Crisis* *(2010-2013)*
MKT	0.961***	0.986***	1.034***	1.461***	0.862***	0.813***
	(72.97)	(18.55)	(23.53)	(7.43)	(15.64)	(6.70)
SMB	1.194***	0.492***	1.319***	0.519**	1.297***	0.110
	(33.75)	(7.09)	(14.22)	(2.39)	(14.41)	(0.59)
HML	0.047*	0.211***	-0.182**	-0.723***	0.266***	0.341**
	(1.79)	(3.20)	(-2.51)	(-3.97)	(2.66)	(1.99)
EQ	0.004	0.170***	-0.042	0.378*	0.038	0.115
	(0.22)	(3.06)	(-1.00)	(1.85)	(0.62)	(0.98)
RMW	-0.325***	-0.574***	-0.310**	-0.698**	-0.436***	-1.117***
	(-8.31)	(-6.77)	(-2.51)	(-2.02)	(-2.88)	(-3.64)
CMA	-0.017	-0.532***	-0.054	-0.286	0.085	-0.646***
	(-0.32)	(-8.31)	(-0.42)	(-0.88)	(0.63)	(-3.50)
LIQ	-0.007	0.040	0.028	0.038	-0.066	-0.182
	(-0.53)	(1.13)	(0.59)	(0.35)	(-1.27)	(-1.36)
Constant	0.001	0.001	-0.004**	-0.012**	0.010***	0.001
	(1.44)	(0.57)	(-2.15)	(-2.40)	(5.05)	(0.36)
No of Obs	1,263,473	146,008	310,193	36,293	314,459	36,097
R-squared	0.0832	0.1010	0.0776	0.0941	0.0708	0.0805
No of firms	12,290	3,883	7,201	1,374	6,964	1,469