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# The association between earnings quality and the cost of equity capital: Evidence from the UK

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**Abstract:** This study examines the association between earnings quality and the cost of equity in the United Kingdom (UK) over the time period 2005-2011. This setting and time period enables us to examine the effect of IFRS based earnings on the pricing of earnings quality and how this relation is influenced by a period of severe macro-economic turbulence as in the case of the recent global financial crisis. We find a significant negative association between each accounting-based earnings quality proxy considered separately and the cost of equity. Our results also indicate that during the financial crisis the relationship between earnings quality and cost of equity becomes more prominent than in the pre-crisis period. This strengthening of the relationship during a period of macro-economic turbulence shows the importance investors place on earnings quality as a measure of risk. Our results also document that investors place more importance on the innate component of accruals quality than on the discretionary component. These results should be reassuring to US standard setters who are considering adopting or converging to IFRS.

**Keywords:** earnings quality, accruals quality, the cost of equity, financial crisis.

## 1 Introduction

The question of whether, how and to what extent earnings quality affects capital market resource allocation decisions is fundamental to understanding why and how accounting information matters to investors (Francis et al., 2006). Theoretical work posits that information risk is a priced risk factor (Easley and O'hara, 2004; Lambert et al., 2012) and there is empirical evidence to support this (e.g., Francis et al., 2004; 2005; Verdi, 2006; Ogneva, 2012; Gray et al., 2009; McInnis, 2010; Kim and Qi, 2010; Bhattacharya et al., 2011; García Lara et al., 2011; Barth et al., 2013; Mouselli et al., 2013).

However, the empirical studies are mainly conducted using US data, which limits the generality of their findings vis-à-vis contexts beyond the US. Yet, researchers have reminded us of the importance of examining jurisdiction-specific factors in investigating the pricing of earnings quality (Francis et al., 2005; Gray et al., 2009). This study examines the association between earnings quality and the cost of equity in the United Kingdom (UK) over the time period 2005-2011.

Our choices of the UK setting and the time period examined are motivated by two factors. To the best of the authors' knowledge, this is the first country-specific study that examines the effect of IFRS on the pricing of earnings quality. In addition to examining the relationship between earnings attributes and the cost of equity, our study examines whether investors are indifferent to the source of information risk in an IFRS setting, which has not to our knowledge been examined in prior work. Second, to the best of the authors' knowledge, this is the first study to examine the relationship between earnings quality and the cost of capital during a period of severe macro-economic turbulence. In the discussion below we expand on how these two factors contribute to the literature.

It is widely accepted that reporting practices are shaped by many external factors, including a country's legal institutions (e.g., the rule of law), the strength of the enforcement regime (e.g., auditing), capital market forces (e.g., the need to raise outside capital), ownership and governance structure (see Ball et al., 2000; Leuz et al., 2003; Soderstrom and Sun, 2007). Nobes (2006) and Ball (2006) argue that despite the adoption of IFRS, these external factors will continue to influence reporting choices and Kvaal and Nobes (2010) provide evidence to support this. In this respect, the US and the UK share a number of common features, e.g., both have a common law system, dispersed ownership, strong investor rights, strong legal enforcement and large equity markets (Leuz et al., 2003; Nobes et al., 2008). The two countries have also been classified together based on their similarities in prior accounting studies (Leuz et al., 2003; Bhattacharya et al., 2003; Nobes et al., 2008). However, in spite of the similarities between the two countries, there remains one key differentiating factor - the use of IFRS in the UK and US GAAP in the US, among publicly traded companies.

While both US GAAP and IFRS are considered as high quality accounting standards and share much in common, there are underlying differences between them (Sun et al., 2011). A fundamental difference is that IFRS are principles-based while US GAAP are rules-based and more specific than IFRS often requiring the following of more specified prescriptions (Hail et al., 2010). Furthermore, there are a number of particular differences between IFRS and US GAAP. Most notable is the heavier reliance on fair value accounting and upward asset valuations within IFRS, reflecting a stronger equity market focus (Ashbaugh and Pincus, 2001; Cuijpers and Buijink, 2005; Wang et al., 2008; Byard et al., 2011; Tan et al., 2011; Jiao et al., 2012; Horton et al., 2013; Choi et al., 2013; Plumlee and Plumlee, 2008; Hail et al., 2010). Using the UK as our setting enables us to focus on the effect of IFRS on earnings quality and the cost of capital.

Furthermore, a particular contribution of our study is that we examine how intrinsic and discretionary attributes of earnings quality separately influence the cost of capital in an IFRS-based setting. US-based research shows that both intrinsic and discretionary attributes are priced by the market (Francis et al., 2004; 2005). The broader and less specific principles-based IFRS can provide management with opportunities for aggressive reporting. However, it also provides management with the opportunity to better reflect the economic situation of the company and there is a growing body of evidence which indicates that principles-based standards lead preparers to issue high quality financial reports (Segovia et al., 2009; Jamal and Tan, 2010; Agoglia et al., 2011; Cohen et al., 2013). The results of our study should be of interest to policy makers in the United States considering adoption or convergence towards IFRS (see SEC, 2008). It provides evidence on whether investors value IFRS earnings in a similar fashion to US GAAP earnings. Of particular importance is whether investors differentiate between the intrinsic and discretionary component of earnings quality in a principles-based accounting system.

Finally, to the best of the authors' knowledge, this study is the first to test the association between earnings quality and the cost of equity during a period of financial crisis in a country with relatively strong fiscal sustainability. While there is a growing body of evidence that examines the relationship between earnings quality and the cost of equity, prior research has not examined how this relationship is affected by a financial crisis. Indeed, the effect of macro-economic conditions on earnings quality, in general, is an area where there is limited work in spite of the large body of evidence in the wider field of earnings management. Filip and Raffournier (2014, p.476) note "generally speaking, the consequences of macro-economic changes in the quality of accounting information are largely unexplored". In general terms, a financial crisis can be defined as an interruption of the normal functioning of financial markets. At the beginning of 2008, capital markets around the world suffered from a global financial crisis, following the collapse of the US sub-prime mortgage market. The crisis formulates for European firms an economic environment characterised by declining GDP, lower output, reduced public spending and a lack of liquidity for firms and individuals. The crisis had its consequences also in the UK where troubled mortgage providers or banks were rescued (Barth and Landsman, 2010; Iqbal and Kume, 2013; Iatridis and Dimitras, 2013; Kousenidis et al., 2013; Bowen and Khan, 2014; Trombetta and Imperatore, 2014).

Using firms listed on the London Stock Exchange during the period 2005-2011, we examine the association between earnings quality and the cost of equity. Drawing on Francis et al. (2004), we use accruals quality, earnings persistence, earnings predictability and earnings smoothness as our measures of earnings quality. We find a significant negative association between each accounting-based earnings quality proxy considered separately and the cost of equity, measured by the earnings-price ratios in relation to their industry peers (*IndEP*), but the exceptions or least consistent associations are found for smoothness. Also, the results show that the predictability proxy explains more of the variation in estimates of the cost of equity, followed by accruals quality, then persistence, and finally smoothness. Economically, the largest impact (earnings predictability) increases the cost of equity by 315 basis points (bp) when we move from firms with the best predictability decile to those in the worst decile.

The results, also, show that the effect on the cost of equity of a unit of innate earnings quality is larger in both magnitude and statistical significance than the effect of a unit of discretionary earnings quality. In economic terms, the largest effect of the innate accruals quality increases the cost of equity by 576 bp between the highest and lowest decile ranks of innate accruals, while the similar figure for discretionary accruals quality is only 198 basis points. This finding indicates that investors assign far more importance to the innate component of earnings than the discretionary component. While these results are in line with Francis et al.'s (2004) US study, the effect is more pronounced in our study.

Our results also indicate that during the financial crisis the relationship between earnings quality and cost of equity becomes more prominent than in the pre-crisis period. This strengthening of the relationship during a period of macro-economic turbulence shows the importance investors place on earnings quality as a measure of risk. We also find that while there is a stronger significant association between the innate component and the cost of equity in the crisis period than in the pre-crisis period, there is no association between the discretionary component and the cost of equity in both periods. This indicates that investors are less concerned about discretionary managerial choices than they are about business models and the external environment that a company is operating in. This provides evidence that investors are less concerned about risk from managerial reporting choices than they are about information that reflects the fundamentals of a business. These results should be reassuring to US standard setters who are considering adopting or converging to IFRS.

The rest of this paper proceeds as follows: section (2) discusses the development of the hypotheses in the context of a review of prior studies; section (3) outlines sample selection and variables measurement; section (4) introduces the main tests and empirical results; section (5) concludes the paper.

## 2 Literature review and hypotheses development

The association between earnings quality and the cost of capital is based on the theory that information risk is priced due to either information asymmetry between informed and uninformed investors (Easley and O'hara, 2004) or due to the differences in the precision of information released by companies (Lambert et al., 2012). Irrespective of the source, there is a general consensus that information risk is non-diversifiable and therefore influences the pricing of capital.

This relationship is supported by a number of empirical papers (e.g., Francis et al., 2004; 2005; Verdi, 2006; Core et al., 2008; Ogneva, 2012; Gray et al., 2009; McInnis, 2010; Kim and Qi, 2010; Bhattacharya et al., 2011; García Lara et al., 2011; Barth et al., 2013; Mouselli et al., 2013). The majority of these studies use one proxy to measure earnings quality- the most common being accruals quality as a unique proxy for earnings quality (e.g., Francis et al., 2005; Core et al., 2008; Ogneva, 2012; Gray et al., 2009; Kim and Qi, 2010).

Francis et al.'s (2004) seminal work is among the few that uses multiple proxies to investigate this relationship. They use seven proxies of earnings quality: accruals quality, earnings persistence, earnings predictability, earnings smoothness, value relevance, timeliness and conservatism for US firms. Their findings show a statistically significant association between each earnings quality proxy considered separately and the cost of equity; the exceptions (or least consistent association) were for predictability and conservatism. They also find that the accounting-based earnings quality proxies and particularly accruals quality explain more of the variation in the cost of equity estimates compared to the market-based proxies.

While the main body of work focuses on US data, Gray et al. (2009) is among select research that examines a different setting. Using the unique regulatory and institutional environment of Australia, they re-examine the association between accruals quality and the cost of equity. Their study also lends support to the negative association between accruals quality and the cost of equity, though they find that the discretionary portion of accruals does not affect the pricing of capital.

While most of the studies focus on US data, researchers have reminded us of the importance of examining jurisdiction-specific factor in investigating the pricing of earnings quality (Francis et al., 2005; Gray et al., 2009). Our study examines the effect of earnings quality and the cost of capital using IFRS-based earnings. As discussed in the introduction, while the US and the UK share a number of common institutional features they differ in the use of IFRS and US GAAP standards for public listed firms. This provides us with a unique setting to test the relationship between IFRS earnings quality and the cost of equity. Prior work in the US such as Francis et al. (2004) points toward a negative relationship between earnings quality and the cost of capital. While there are a number of similarities, there are also a number of fundamental differences between IFRS and US GAAP, which motivates the re-examination of this relationship in our study. Given that this is the first study to test this relationship in an IFRS setting, we use the results from previous work to specify our hypothesis. To the extent that IFRS-based earnings quality capture information risk and is priced by the market, we expect to find a relationship that is consistent with prior work.

*$H_1$: firms with high earnings quality have a lower cost of equity compared to firms with poor earnings quality.*

Francis et al. (2005) also examine whether the innate and discretionary components of accruals quality have different effects on the cost of equity using their sample of US companies. Building on the earnings management literature, they posit that earnings quality – particularly accruals quality – is influenced by two factors. The first factor, the innate component, reflects the business models and operating environments in which a firm operates. The second, the discretionary component, reflects managerial choices including intentional reporting choices, forecasting errors and implementation errors (Francis et al., 2005). Their findings show that both the innate component and the discretionary component impact the cost of capital. In relation to our sample of UK companies using IFRS accounting standards, it is not clear whether the innate and discretionary factors will have similar effects on the cost of capital as in previous US studies.

Gray et al. (2009) re-examine the same association in the Australian market and find that the association between total accruals quality and cost of equity is driven by the innate component, with no evidence that the discretionary component affects the cost of equity.

The proponents of IFRS contend that the adoption of IFRS enhances the quality of financial reporting compared to using domestic accounting standards (Gassen and Sellhorn, 2006; Ding et al., 2007; Chen et al., 2010; Iatridis, 2010; Ewert and Wagenhofer, 2012; Horton et al., 2013). However, this is based on comparisons with domestic standards that are not comprehensive compared to US GAAP. In this respect, both IFRS and US GAAP are considered high quality accounting standards (Sun et al 2011). Yet they differ fundamentally in that IFRS is a principles-based standard while US GAAP is rules-based. While, the broader and less specific principles-based IFRS standards can be seen to provide management with opportunities for aggressive reporting, there is a growing body of evidence which suggests that principles-based standards lead preparers to issue high quality financial reports (Segovia et al., 2009; Jamal and Tan, 2010; Agoglia et al., 2011; Cohen et al., 2013). This is attributed to greater process accountability under a principles-based system than a rules-based system. Agoglia et al. (2011) find that CEO's are less likely to report aggressive numbers in a principles-based regime than in a rules-based regime, as they expect their intentions to be second guessed by external parties. Cohen et al. (2013) and Peytcheva et al. (2014) find that auditors judgments under principles-based standards lead to more conservative reporting when compared to a rules-based standard. Both Cohen et al. (2013) and Peytcheva et al. (2014) studies propose and support a theoretical model in which principles-based accounting standards increase auditors' process accountability— the expectation of having to justify to others the decision process used, regardless of the outcome of the decision. This implies a greater monitoring role played by auditors when working with IFRS standards, which in turn would mitigate managerial opportunism in financial reporting. Further, using a matched sample of cross-listed and US firms, Sun et al. (2011) find that adoption of IFRS led to an improvement of earnings quality for a select number of earnings quality measures.

If investors expect IFRS accounting standards to constrain managerial opportunism they will place greater weight on the innate component of earnings quality than on the discretionary component. Our second hypothesis therefore is:

*$H_2$. The innate component of earnings quality has a stronger impact on the cost of equity compared to the discretionary component.*

While there is a growing body of evidence that examines the relationship between earnings quality and the cost of equity, prior research has not examined how this relationship is affected by a dramatic change in the macro-economic climate. Focusing on earnings management, Filip and Raffournier (2014) provide an excellent discussion on why a financial crisis may lead to earnings manipulations but at the same time they also discuss managers may not be incentivised to engage in any form of earnings manipulations during a crisis. Reasons for upward earnings management include the need to make up for poor operating performance during a crisis and to ensure debt covenants are met. Managers may also be motivated to manage earnings downward in a crisis to obtain concessions from debt holders, to make them eligible for government subsidies and to mitigate against employee demands. On the other, a poor performance is expected during a crisis and companies usually come under a higher level of scrutiny from regulators and auditors which means that a crisis period may be less favourable to earnings management.

Existing work in general, points toward an improvement in earnings quality during a crisis but the results are not conclusive. Choi et al. (2011) examine effects of the Asian financial crisis on earnings quality of nine Asian countries and document an increase in opportunistic earnings management. Iatridis and Dimitras (2013) examine the impact of the recent financial crisis in 2008-2009 on earnings manipulation and value relevance of firms in five different countries, Portugal, Ireland, Italy, Spain, and Greece. In general, they find that countries in their sample tend to exhibit higher levels of earnings management in their effort to increase their lower profitability and liquidity, and accommodate their higher debt and growth. Kousenidis et al. (2013) use the same set of countries as the previous study of Iatridis and Dimitras (2013) but a larger number of earnings quality proxies. However, their results indicate that earnings quality proxies improved during the crisis. These results are also supported by Filip and Raffournier (2014) who investigate the impact of the recent financial crisis on earnings management using a sample of 16 EU countries. They conclude that earnings management has decreased significantly in the crisis years compared with the previous years, though this trend does not apply equally across all countries in the sample. Francis et al. (2013) focus on a different angle and examine the association between conservatism and shareholder value during the recent financial crisis using a sample of US companies. They find that there is a significant positive association between conservatism and shareholder value indicating the importance that investors place on risk averse accounting choices during a downturn in economic conditions.

Prior research, however, has not investigated the association between earnings quality and the cost of equity during a dramatic change in the economic climate as was the case in the recent financial crisis of 2008-2009. Our study examines whether the financial crisis affects the association between earnings quality and the cost of equity. Based on prior evidence that examines earnings management, we expect the financial crisis to have an impact on the association between earnings quality and the cost of equity; however; we do not specify a particular direction to this relationship. Therefore given the mixed evidence, we examine the following hypothesis:

*$H_3$: the financial crisis has a significant effect on the association between earnings quality and the cost of equity.*

## 3 Methodology and sample selection

### *3.1 Earnings Quality proxies*

We focus on four accounting-based earnings quality proxies; accruals quality, earnings persistence, earnings predictability and earnings smoothness (see Francis et al., 2004). These proxies demonstrate different angles of earnings quality (Francis et al., 2004; Dechow et al., 2010; Walker, 2013). The accruals quality proxy reflects the extent to which working capital accruals map into last-period, current, and next-period cash flow from operations (Dechow and Dichev, 2002). A stronger association between accruals and cash flow from operations is considered indicative of high earnings quality. Earnings persistence reflects the extent to which earnings are stable and, sustainable as less volatile earnings are valued by investors (Francis et al., 2004; Perotti and Wagenhofer, 2014). The more sustainable the earnings, the higher the quality of earnings. Similar to earnings persistence, earnings predictability reflects the extent to which current earnings are useful in predicting future earnings. This is based on the notion that an earnings number that is likely to repeat itself is of high quality. So, both earnings persistence and predictability are viewed as desired proxies of earnings quality because it helps increasing the precision of earnings forecasts (Francis et al., 2006).

It is not clear whether the final proxy - earnings smoothness represents high or low earnings quality (Dechow et al., 2010; Dichev et al., 2013). The common view is that earnings smoothness reflects managers using their private information about future income to smooth out transitory fluctuations, and thus achieve a more representative (normalized) reported earnings number. Therefore, current earnings that are more representative of future earnings, are of higher quality; thus, smoother earnings reflects higher quality earnings (Francis et al., 2006; Rountree et al., 2008). However, some argue that smoothness misleads users, as the true economic performance is veiled (e.g., Leuz et al., 2003). They argue that earnings smoothness reflects the extent to which financial accounting standards permit managers to artificially reduce earnings variability, to obtain certain benefits from the capital market, which are that related to a smooth stream of earnings (Leuz et al., 2003). According to this view, high earnings smoothness would indicate poorer earnings quality. The next subsections discuss in detail the measurements of each of the accounting-based earnings quality proxies.

### 3.1.1 Accruals quality

Accruals quality is measured as the extent to which accruals map into cash flow realizations. This is operationalized as the standard deviation of the residuals from firm-specific regressions of working capital accruals on previous-year, current, and one-year-ahead cash flow from operations (Dechow and Dichev, 2002, p.53). Our measure is based on Francis et al. (2005) who use McNichols (2002) modification of Dechow and Dichev (2002) approach to estimate accruals quality. Two additional variables from the modified Jones model, i.e., change in revenues and current property, plant and equipment (PPE) are included in the McNichols (2002) modification. Our model is therefore different from that used in the study of Francis et al. (2004), who do not make any modifications to the Dechow and Dichev (2002) model. Accruals quality is calculated as follows:

$$\frac{TCA_{c.t}}{Assets_{c,t}} = \alpha_{0,c} + \beta_{1,c}\frac{CFO_{c,t-1}}{Assets_{c,t}} + \beta_{2,c}\frac{CFO_{c,t}}{Assets_{c,t}} + \beta_{3,c}\frac{CFO_{c,t+1}}{Assets_{c,t}} + \beta_{4,c}\frac{\Delta Rev_{c,t}}{Assets_{c,t}} + \beta_{5,c}\frac{PPE_{c,t}}{Assets_{c,t}} + v_{c,t} \qquad \text{Eq ( 1 )}$$

*Where:*

$TCA_{c.t} = \Delta CA_{c,t} - \Delta CL_{c,t} - \Delta Cash_{c,t} + \Delta STDEBT_{c,t}$= total current accruals in year *t*.

$Assets_{c,t}$= average total assets of firm *c* in year *t* and *t*-1.

$CFO_{c.t}$ = operating cash flow of firm *c* in year *t*.

$\Delta CA_{c,t}$= change in current assets of firm *c* between year *t*-1 and year *t*.

$\Delta CL_{c,t}$= change in current liabilities of firm *c* between year t-1 and year *t*.

$\Delta Cash_{c,t}$= change in cash of firm *c* between year *t*-1 and year *t*.

$\Delta STDEBTA_{c,t}$= change in debt in current liabilities of firm *c* between year *t*-1 and year *t*.

$\Delta Rev_{c,t}$= change in revenues of firm *c* between year *t*-1 and year *t*.

$PPE_{c,t}$= gross PPE of firm *c* in year *t*.

Equation (1) is estimated for each 14 industry sectors with at least 12 firms in year *t*. Firm and year-specific residuals for the accruals quality proxy are estimated on an annual cross-sectional basis: $AQ_c = \sigma\ (v_{c,t})$ is the standard deviation of the residuals of firm *c*, computed over year $t$-4 to $t$. Large standard deviations of residuals indicate poor accruals quality. In this regard, if a firm has steadily high residuals for a period of time, the standard deviation of these residuals will be small; therefore, the firm will enjoy comparatively high accruals quality as a result of lower uncertainty about its accruals (Francis et al., 2005).

### *3.1.2 Earnings persistence*

Earnings persistence refers to the sustainability of earnings, Miller and Rock (1985) define persistence as the present value of the change in expected future earnings because of current unexpected earnings. Earnings persistence is measured as the slope coefficient from regressing current earnings on previous earnings (Francis et al., 2004; Richardson et al., 2005) and calculated as follows:

$$Earn_{c,t} = \emptyset_{0,c} + \emptyset_{1,c} * Earn_{c,t-1} + v_{c,t} \qquad \text{Eq ( 2 )}$$

Where:

$Earn_{c,t}$ = net income before extraordinary items of firm $c$ in year $t$.
$Earn_{c,t-1}$ = net income before extraordinary items of firm $c$ in year $t$-1.

Equation (2) is estimated for each firm-year by using maximum likelihood estimations and rolling ten-year windows. This measure is based on the slope coefficient estimate ($\emptyset_1$) from equation (2). A firm with a higher value of $\emptyset_1$ is associated with higher earnings persistence and hence a higher earnings quality, while a lower value of $\emptyset_1$ is associated with higher transitory earnings and poorer earnings quality (Francis et al., 2004).

### *3.1.3 Earnings predictability*

According to the IASB Framework, Information has "predictive value" if it helps users to predict future outcomes e.g. future financial performance. (Melville, 2008). Lipe (1990) defines predictability as the ability of preceding earnings to predict future earnings, and measures earnings predictability as the variability of earnings shocks (as variance increases, the predictability decreases). Our study measures earnings predictability as the square root of the estimated error variance using values calculated from earnings persistence in Equation (2) (Francis et al. (2004).

$$Pred_{c,t} = \sqrt{\sigma^2(\hat{v}_{c,t})} \qquad \text{Eq ( 3 )}$$

Where:

$Pred_{c,t}$= earnings predictability of firm $c$ in year $t$, calculated as the square root of the error variance from earnings persistence equation (Equation (2)); $\sigma^2(\hat{v}_{c,t})$= the error variance of firm $c$ in year $t$ calculated from earnings persistence equation. Thus, a higher (lower) square root of the estimated error variance, indicates a lower (higher) of predictability and a lower (higher) of earnings quality. To sum up, earnings predictability is considered as a function of the average absolute magnitude of annual earnings shocks, while earnings persistence reflects the autocorrelation in earnings (Lipe, 1990).

### *3.1.4 Earnings smoothness*

Our study measures earnings smoothness as the ratio of standard deviation of earnings of a firm to its standard deviation of cash flow operations, both deflated by beginning total assets (Pincus and Rajgopal, 2002; Leuz et al., 2003; Francis et al., 2004) as captured in Equation (4).

$$Smooth_{c,t} = \sigma(Earn_{c,t}/Total\ Assets_{c,t-1})/\sigma(CFO_{c,t}/Total\ Assets_{c,t-1}) \quad \text{Eq ( 4 )}$$

Where:
$Smooth_{c,t}$ is earnings smoothness of firm *c* in year *t*.
$\sigma$ is the standard deviation of firm *c* calculated over rolling ten-year windows.
$Earn_{c,t}$ is the net income before extraordinary items of firm *c* in year *t*.
$CFO_{c,t}$ is the operating cash flows of firm *c* in year *t*.
Hence, firms with higher ratios have a lower earnings smoothness indicative of poor earnings quality.

To compare coefficient estimates across earnings quality proxies, we rank each proxy by year and form deciles. Firms in the bottom decile (decile 10) have the largest values of the proxy while firms in the top decile (decile 1) have the lowest values of the proxy. Given the definitions of our proxy measures, this ordering places firms with the worst (best) outcome for the proxy in the bottom (top) deciles. Earnings persistence is resigned to be in the same direction as the other three earnings quality proxies. Using the decile rank of each proxy instead of its raw value alleviates the effects of extreme observations (Francis et al., 2004; 2005).

### 3.2 *The cost of equity capital*

We use the earnings-price ratio as our main proxy for the cost of capital and five implied (ex-ante) measures of the cost of equity derived from dividend valuation model as part of our robustness tests.

#### *3.2.1 Earnings-price ratios*

The earnings-price ratio is a widely used measure in the investment community and has support in the academic literature. We follow Penman (2007) who uses the price-earnings ratio as an inverse measure of the cost of equity to examine whether higher earnings quality leads to a higher price-earnings ratio. Kothari (2001) provides evidence that earnings capitalisation models explain cross-sectional variation in prices as much as more rigorous residual income valuation models. Following this line of research, the earnings-price ratio is commonly used in academic work as a proxy for the cost of equity capital (Francis et al., 2005; Gray et al., 2009; Liu and Wysocki, 2008). Furthermore in relation to our sample, an advantage of using the earnings-price ratio in the UK, is that it allows us to work with a larger sample size. The use of the implied/ex-ante cost of equity estimates require the use of analyst forecasts but since analysts generally follow larger firms, this significantly restricts the available sample size. Nevertheless, implied/ex-ante cost of equity estimates are also used as part of our robustness tests.

We follow Alford (1992) and calculate industry-adjusted earnings-price ratios in order to match firms to industry growth and risk factors (Francis et al. 2005). The association between each earnings quality proxy and industry-adjusted earnings–price ratios (*IndEP*) is examined.

To calculate *IndEP*, we first calculate the median of earnings-price ratio for all firms which have positive earnings in the year examined for each of the 14 industry sectors. Thereafter, the $IndEP$ of each firm is calculated as the difference between the earnings-price ratio of the firm and the median earnings price ratio of the industry sector the firm belongs to in that year. If investors attribute lower multiples due to of lower earnings quality, larger *IndEP* values are expected.

#### *3.2.2 The implied cost of equity capital proxies*

Since the cost of equity is a forward-looking concept based on expected cash flows, it is not directly observable (Singleton-Green, 2014). Therefore, this research extends the literature by computing the expected cost of equity through the application of recent methods of accounting and finance literature in the robustness check section.

Prior research on this topic relies primarily on *IndEP* as one proxy to calculate the cost of capital. In order to improve the robustness of our results, we estimate five other measures of the cost of capital, derived as an implied rate of return from the classic dividend valuation model. The five ex-ante measures are price earnings growth ratio model (*PEG*) (Easton, 2004); the *modified PEG* model (Easton, 2004); the *economy-wide growth* model (Ohlson and Juettner-Nauroth, 2005); and the *modified economy-wide growth* model (Gode and Mohanram, 2003). In order to reduce bias and measurement errors in the regression analysis (Hail and Leuz, 2006), we use the average of the four measures as a proxy for the cost of equity. Figure (1) shows the formulae for these proxies.

**[Insert Figure 1 here]**

### *3.3 Control variables*

The hypothesised association between earnings quality and the cost of equity is based on the assumption that other variables are held constant. Based on prior studies, we include four control variables in our regression model (Francis et al., 2005; Core et al., 2008; Gray et al., 2009). These are firm size, beta (CAPM), leverage and growth. We measure firm size as a log of total assets in year *t*. Beta (CAPM) is based on a 5-year rolling data acquired from firm-specific CAPM estimations using monthly data; it requires a firm to have at least 20 monthly observations. Leverage is measured as total interest bearing debt divided by total assets in year *t*. Finally, growth is measured as the log of 1 plus the percentage change in the book value of equity over the preceding 5 years (Francis et al., 2005; Core et al., 2008; Gray et al., 2009). We expect a positive associations between the cost of equity and both beta and leverage (Francis et al., 2005; Gray et al., 2009), and negative associations between the cost of equity and both firm size and growth (Francis et al., 2005; Gray et al., 2009).

### *3.4 Data*

Our sample covers all non-financial firms in the London Stock Exchange during the period 2005-2011. In order to avoid any survivorship bias, we include both active and dead equities in our sample. We use *Thomson Reuters DataStream* database for earnings quality proxies and industry-adjusted earnings–price ratios (*IndEP*). Also, we use the *I/B/E/S* Database for the implied cost of equity proxies which we use for our robustness tests. Our sample is restricted by two factors: (1) each firm requires at least 7 consecutive years of data because accruals quality is calculated as the standard deviation of 5 consecutive annual residuals, both lead and lag cash flows are also required in the accruals quality regression (see Equation (1)). (2) Data on all four proxies of earnings quality are required to be available for each firm-year. In total, there are 4,214 firm-year observations. The number of firm's each year ranges between 565 per year to 630 per year. The number of industries is 14 industries, Table (1) Panel (A) reports the number of firms per industry for each year. Along with the prior studies, the outliers of all variables are winsorised to the $1^{st}$ and $99^{th}$ percentiles (Francis et al., 2005).

# 4 Empirical tests and results

## *4.1 Descriptive results*

Panel B of table (1) reports descriptive statistics regarding the earnings quality proxies, *IndEP* and firm characteristics for the pooled sample. The mean of accruals quality (AQ) is 0.08 and median is 0.06; as a benchmark, Francis et al. (2004) provide mean and median values of 0.028 and 0.020. For persistence, the mean and median are 0.32 and 0.29 respectively and Francis et al. (2004) provide mean and median values of 0.482 and 0.520 respectively. For predictability, the figures are 0.74 and 0.074 respectively. In comparison, Francis et al. (2004) provide mean and median values of earnings predictability as 0.876 and 0.536 respectively. Finally, the mean and median of earnings smoothness are 1.12 and 1.03 respectively, while, Francis et al. (2004) provide mean and median values of earnings smoothness as 0.640 and 0.578.

Panel B also reports summary information of relevant financial variables. The mean of total assets is £1,633 million and the median of total assets is £127 million; mean sales is £1,260 million and median sales is £141 million. The mean and median of market value of equity are £1,273 million and £107 million respectively.

Panel C of table (1) reports the correlations among *IndEP*, earnings quality proxies, and the control variables. While there is a significant and positive correlation among the four earnings quality proxies, the correlations do not exceed 0.3 indicating that the earnings quality proxies are distinct with each measure reflecting a different dimension of earnings quality. This finding is consistent with prior studies that document low empirical correlations among these proxies of earnings quality (Francis et al., 2004; Bowen et al., 2008; Dechow et al., 2010).

The results show significant positive correlations between *IndEP* and all the four earnings quality proxies as well as the control variables, beta and leverage. Also, there is a significant negative correlation between *IndEP* and firm size which is consistent with prior literature. However, there is no significant correlation between *IndEP* and firm growth. The correlations among earnings quality proxies and the control variables range between 0.04 and 0.46 which indicates a lack of multicollinearity among the independent variables. We also calculate Variance Inflation Factors (VIFs). VIFs above ten are thought to indicate severe multicollinearity problems (Field, 2005). The results show none of the VIFs are above two, which suggests that multicollinearity does not pose a problem to our subsequent regression analyses.

**[Insert Table 1 here]**

### 4.2 Empirical tests

Panel D Table (1) provides results of our univariate analysis of the *IndEP* across quintiles sorted on each EQ proxy from the lowest to the highest. It presents information on the difference between the mean of the cost of equity and both the poor and the high earnings quality quintiles. It reports that firms with poor earnings quality quintile (Q10) have a significant larger mean $IndEP$ compared to firms with high earnings quality quintile (Q1), except for earnings smoothness which shows no significant difference between the two said quintiles. In terms of accruals quality, the difference between mean $IndEP$ values of the two quintiles (Q10 and Q1) is 0.039 and significantly different from zero (t-statistic 5.66). For persistence, the difference between mean $IndEP$ values of the two said quintiles is 0.015 and is significantly different from zero (t-statistic 2.94). For predictability, the difference between mean $IndEP$ values of the two said quintiles is 0.050 and is significantly different from zero (t-statistic 6.21). Finally, for smoothness, the difference between mean $IndEP$ values of the two said quintiles is -0.0064 but not significantly different from zero (t-statistic 1.20).

#### 4.2.1 The association between earnings quality and the cost of equity capital

In this section, we present the results of the main tests. We examine the associations between the cost of equity and each earnings quality proxies for each year *t* using equation (5).

$$IndEP_{c,t} = \partial_0 + \partial_1 Beta_{c,t} + \partial_2 Size_{c,t} + \partial_3 Growth_{c,t} + \partial_4 Leverage_{c,t} + \partial_5 EQProxy_{c,t}^{k} + \delta_{c,t} \quad \text{Eq (5)}$$

Where:

$Beta$ is the five years rolling pre-estimated beta acquired from CAPM estimates using monthly data; it involves no less than 20 monthly returns for each firm to do this estimation;
$Size$ is log of firm $c$'s total assets in year $t$,
$Growth$ is the log of one plus the firm's growth in book value of equity over the preceding 5 years;
$Leverage$ is a firm $c$'s interest-bearing debt deflated by total assets in year $t$;
$EQProxy_{c,t}^{k}$ is the decile rank of firm $c$'s value of the $k$th earnings quality proxy in year $t$,
$K \in \{AccrualsQuality, Persistence, Predictability, Smoothness\}$.

Based on prior work, we expect a positive coefficient on the earnings quality decile rank, indicating that investors attach higher risk assessments to stocks with less favourable (i.e., larger) values of each earnings quality proxy and therefore a higher cost of equity for the firm. For the control variables, we expect positive coefficients for CAPM beta and leverage, as high-risk companies financed with larger proportions of debt are expected to have a higher cost of equity. By contrast, the literature suggests that the coefficients for company size and growth should be positive since large companies or high growth companies can typically raise equity funds more cheaply. Moreover, to alleviate concerns about cross-sectional dependencies in the sample, we estimate Equation (5) for each of the 7 years in the sample by using the time-series standard errors regressions introduced by Fama and MacBeth (1973). Also, Newey and West (1987) standard errors pooled regression is used, which controls heteroscedasticity and autocorrelation effects, to assess the sensitivity of the previous results.

Table (2) provides the time-series standard errors regressions results (Column 1) and pooled regression results (Column 2) for Equation (5) for each earnings quality proxy. Predictability has the largest effect on the cost of equity, with a mean coefficient estimate of 0.0035 (t-statistic =6.46). This finding shows that firms with a lower earnings predictability have a higher cost of equity compared to firms with higher earnings predictability. The second largest cost of equity effect is observed for accruals quality, the results show a mean coefficient estimate of 0.0024 (t-statistic = 5.45). This finding shows that firms with a lower accruals quality have a higher cost of equity relative to firms with higher accruals quality. The third largest effect is observed for persistence, with a mean estimate of coefficient 0.0014 (t-statistic=3.19). Finally, the results show a significant association between earnings smoothness and the cost of equity, with a mean estimate of coefficient 0.0008 (t-statistic = 2.95).

Economically, the results show that firms with high earnings predictability enjoy a 315 (coefficient 0.0035 times 9 decile differences) basis point lower cost of equity compared to firms with poor earnings predictability. For accruals quality, the results show a 216 difference basis point between firms with high and poor accruals quality. For persistence, the results show a 126 difference basis point between firms with high and poor earnings persistence. Finally for smoothness, the results show a 72 difference basis point between firms with high and poor earnings smoothness. While there are differences in the ranking of the proxies, our results are generally consistent with prior findings reported by Francis et al. (2004); (2005) and Grey et al (2009). As the quality of earnings declines, the amount that investors are ready to pay for a pound of earnings declines as well, implying a higher cost of equity for such firms. This supports the conjecture of hypothesis (1).

In terms of control variables, results show that *IndEP* is negatively associated with both *Growth*[1] and *Size*, consistent with prior literature, firms with high growth rates have lower earnings–price ratios and larger firms have a lower cost of equity. Finally, the results show a positive association between *IndEP* and both *Beta*[2] and *Leverage* consistent with the prior work (Francis et al., 2005; Gray et al., 2009).

Further, Newey and West (1987) standard errors pooled regression is used. Table (2) (Column 2) reports the coefficient estimate and statistical significance of each earnings quality pooled regression for the same sample. The pooled results are similar to the results of the Fama and MacBeth (1973) mean annual regressions, except for the following (1) the association between *IndEP* and smoothness becomes insignificant. (2) The associations between *IndEP* and both *Beta* and Growth becomes significant. (3) The effect of persistence on the cost of equity has a significantly larger effect than accruals quality.

**[Insert Table 2 here]**

### *4.2.2 The innate and discretionary earnings quality effects on the cost of equity capital*

Following Francis et al. (2005), we disentangle between the innate and the discretionary components of total earnings quality. We use five summary indicators to compute the effects of the operating environment and business model that represent the innate component: firm size, the standard deviation of cash flows for preceding 10 years, the standard deviation of

[1] The negative relationship between *Growth* and *IndEP* is insignificant at 10% significant level except in AQ regression, which the relation is significant at 5% significant level.
[2] The positive relationship between *Beta* and *IndEP* is insignificant at 10% significant level.

sales for preceding 10 years, the length of operating cycle, and the frequency of negative realised earnings for preceding 10 years. This method uses the predicted values estimated from regressing earnings quality proxy on these summary indicators to compute the innate portion of earnings quality proxy, and the residual from this regression represents the discretionary portion (see Equation 6).

$$EQProxy_{c,t}^{k} = \lambda_{0,c} + \lambda_{1,c}Size_{c,t} + \lambda_{2,c}\sigma(CFO)_{c,t} + \lambda_{3,c}\sigma(Sales)_{c,t} + \lambda_{4,c}OperCycle_{c,t} + \lambda_{5,c}NegEarn_{c,t} + v_{c,t} \quad \text{Eq ( 6 )}$$

Where:

$\sigma(CFO)_{c,t}$ is the standard deviation of firm $c$'s cash flow operations computed through the preceding 10 years, $\sigma(Sales)_{c,t}$ is the standard deviation of firm $c$'s net revenue computed through the preceding 10 years, $OperCycle_{c,t}$ the log of firm $c$'s operating cycle in year *t*, $NegEarn_{c,t}$ the number of years where firm $c$ reported net income before extraordinary items (*NIBE)* < 0 out of the preceding 10 years. The predicted value of $EQProxy_{c,t}^{K}$ represents the innate earnings quality, and the residual ($v_{c,t}$) represents the discretionary earnings quality. Using the coefficient estimates acquired from the annual regressions of equation (6), we calculate the innate earnings quality and the discretionary earnings quality, then we replace total earnings quality in the main model (Equation 5) with those two components.

Table (3) reports that the innate component coefficient is larger than the discretionary component coefficient by a factor of two for all earnings quality proxies and also exhibits stronger statistical significance than the discretionary coefficient. Moreover, the results also show a significant association between *IndEP* and the innate portion of smoothness and insignificant association between *IndEP* and the discretionary portion of smoothness.

In economic terms, the largest effect of the innate accruals quality increases the cost of equity by 576 basis points between highest and lowest decile rank of the innate accruals quality firms, while the effect of the discretionary accruals quality is 198 basis points. This result suggests that investors give greater weight to the innate component which is driven by economic fundamentals, compared to the discretionary component that is driven by management choices in the UK when determining the cost of equity of a firm. While Francis et al. (2004) also find that investors place higher importance on innate factors, our findings are more pronounced. This supports the conjecture in our second hypothesis that applying IFRS in the UK increases the quality and precision of accounting information and reduces information asymmetry for both future cash flow and future earnings, thus the information risk that associated with the discretionary earnings quality is reduced.

**[Insert Table 3 here]**

### *4.2.3 The financial crisis*

We classify the sample period (2005-2011) into three sub-periods: 'pre-crisis period' for years 2005, 2006 and 2007, 'crisis period' for years 2008 and 2009, and 'recovery period' for years 2010 and 2011. Figure (2) presents the mean of *IndEP* each year from 2005 to 2011. It shows that the mean of *IndEP* increased steadily from the pre-crisis years (2005, 2006 and 2007) to the crisis years (2008 and 2009) and then decreased in the post-crisis years (2010 and 2011). We test the interaction effect between earnings quality and the financial crisis on the cost of equity using equation (7).

$$\begin{aligned} IndEP_{c,t} = {} & \partial_0 + \partial_1 Beta_{c,t} + \partial_2 Size_{c,t} + \partial_3 Growth_{c,t} + \partial_4 Leverage_{c,t} \\ & + \partial_5 EQProxy^k_{c,t} + \partial_6 Crisis_{c,t} + \partial_7 Recovery_{c,t} \\ & + \partial_8 EQProxy^k_{c,t} * Crisis_{c,t} + \partial_9 EQProxy^k_{c,t} * Recovery_{c,t} + \delta_{c,t} \end{aligned} \qquad \text{Eq (7)}$$

Where:

$Crisis_{c,t}$ is a dummy variable equals 1 if years are 2008 and 2009 and equals zero otherwise; $recovery_{c,t}$ is a dummy variable equals 1 if years are 2010 and 2011 and equals zero otherwise.

**[Insert Figure 2 here]**

**[Insert Table 4 here]**

The results are reported in Table (4). The results indicate that, during the crisis, the relationship between the cost of equity and earnings quality becomes stronger. The slope coefficient of accruals quality in the pre-crisis period is 0.0026, however during the crisis, the value of this slope coefficient had risen to 0.0136 (0.0026+0.011), reflecting the higher sensitivity of the cost of equity to accruals quality during the crisis. This supports the conjecture of our third hypothesis. However, the strength of this association decreases after the crisis period. The results, also, show that during the crisis, investors place more attention on earnings sustainability and the change in expected future earnings than on the relationship between earnings and cash flow of firms.

We also test the interaction effects between both the innate and discretionary earnings quality components and the financial crisis on the cost of equity capital. The results indicate that in both periods, the pre-crisis and the crisis period, there is strong evidence that the innate accruals quality is priced, whereas the discretionary component has insignificant pricing effects. Table (5) reports the results.

**[Insert Table 5 here]**

### *4.3 Robustness check*

We perform a number of sensitivity tests on our results. In addition to *IndEP*, we use five other *ex-ante* measures for the cost of equity, derived from the following dividend valuation models; the price-earnings growth ratio model (PEG) (Easton, 2004), the modified price-earnings growth ratio (Easton, 2004), the economy-wide growth model (Ohlson and Juettner-Nauroth, 2005), the modified economy-wide growth model (Gode and Mohanram, 2003), and the mean of the four proxies ($r_{PEG}, r_{MPEG}, r_{ojn}, r_{GM}$) to reduce biases and measurement errors in the regression analysis (Hail and Leuz, 2006). All of these proxies are used as alternatives to the *IndEP*. Equation (5) is re-tested by replacing *IndEP* with the five ex-ante measures of the cost of equity (results reported in table (6) panel A-B). We find similar results to the main tests with higher $R^2$ compared to using *IndEP*. We also use the ratio of firms E/P to median Industry E/P as a measure of the cost of equity and re-test Equation (5) (results not reported). We find a significant negative association between each earnings quality proxy and the cost of equity in line with our main results.

As part of our further robustness tests, we use panel regressions with fixed and random effects for *IndEP*. In addition, we use the Hausman test to differentiate between the fixed effects and the random effects model. We test the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the coefficients estimated by the consistent fixed effects estimator. The results indicate a rejection of the null hypothesis; this suggests that fixed effects estimations are more appropriate than random effects estimations. Table (7) reports the results. We find a significant negative association between each earnings quality proxy and *IndEP*. The largest effect on the cost of equity is observed for predictability then accruals quality then persistence and smoothness, consistent with the main results.

Third, following Francis et al. (2005), we partition the total earnings quality into the innate and discretionary component using an alternative method. This involves adding the summary indicator variables that represent the innate portion to the cost of equity regression model as control variables. The variables are firm Size, $\sigma(CFO)$, $\sigma(Sales)$, $Operating\ Cycle$, and $NegEarn$. Therefore, the coefficient estimate of earnings quality represents the effect of the discretionary portion of earnings quality on the cost of equity (Francis et al., 2005). Table (8) reports the results. We find that the discretionary component has a negligible effect on the cost of equity.

**[Insert Table 6 here]**
**[Insert Table 7 here]**
**[Insert Table 8 here]**

## 5 Discussion and conclusion

Empirical evidence that examines the association between earnings quality and the cost of equity supports theoretical work that information risk is a non-diversifiable risk factor. However, the main body of evidence, centred on Francis et al.'s (2004) seminal work, focuses on earnings quality measures that are based on US GAAP. This study extends the analysis of Francis et al. (2004) for a sample of UK listed firms during the period 2005 to 2011. The UK is selected because it has a similar institutional setting to the United States but differs in the use of IFRS. Our study also investigates the interplay between earnings quality and the cost of capital during a period of severe macro-economic turbulence.

Using a sample of firms listed on the London Stock Exchange during the period 2005-2011, we calibrate our four accounting-based earnings quality proxies (accruals quality, persistence, predictability and smoothness) against the cost of equity. We examine whether each proxy matters to investors, and which proxy is viewed by investors as conferring the greatest capital market advantage, as measured by a decreased cost of equity.

Our empirical results are consistent across estimation methods (annual regressions and pooled regressions) and proxies of the cost of equity ($IndEP$ and the implied measures). We generally find a statistically significant negative association between each earnings proxy considered separately and the cost of equity consistent with our first hypothesis.

However, unlike Francis et al. (2004), our results show that the predictability proxy explains more of the variation in estimates of the cost of equity, followed by accruals quality, then persistence, and finally smoothness. Moreover, while Francis et al. (2004) find that investors reward smoother earnings streams, with a reduced cost of equity, we do not find any association or least consistent association between the cost of equity and earnings smoothness. Consistent with our second hypothesis, our results also show that the innate component of each earnings quality proxy has a larger impact on the cost of equity than the discretionary component. While this is consistent with Francis et al. (2004), the effect of the innate component on the cost of equity is more pronounced in our study.

The interaction effect between earnings quality and the financial crisis on the cost of equity is also examined. The results indicate that the association between earnings quality and the cost of equity is stronger in the crisis than in the pre-crisis period. Also, we investigate the interaction effect between the two components of earnings quality – the innate and the discretionary components – and the financial crisis on the cost of equity. We find that the the innate component has a stronger impact on the cost of equity in the crisis period than the pre-crisis; however, we find no significant association between the discretionary component and the cost of equity in both period.

Explaining this finding may need to recognize that when the economy is stable because investment opportunities are numerous, investors perhaps pay less attention to the quality of accounting information (Mitton, 2002). Conversely, a crisis could force investors to identify the weakness in the quality of accounting information that existed all along. This identification may lead to a ‘‘flight-to-quality’’ syndrome (e.g., Goh et al., 2009; Francis et al., 2012). This leads investors to either withdraw from the stock market completely or move their investments to what they consider as firms with high quality accounting information (Francis et al., 2012; Francis et al., 2013).

There are a number of implications that derive from the results of our study. First, more generally, our study consistent with prior work in the field shows that quality matters and customers (investors) are willing to pay for it. More specifically to the best of our knowledge, our empirical findings are the first to document that information risk as measured by earnings quality is priced in a setting that uses IFRS for reporting practices. Our study is also the first to document that this relationship becomes even stronger during a period of macro-economic turbulence.

While our main results are similar to Francis et al. (2004), our findings differ in the rankings accorded to the different earnings quality proxies. We find that predictability is ranked as the most significant earnings quality proxy while Francis et al. (2004) do not find a significant relationship between predictability and the cost of equity. Given the inclination of IFRS towards fair value reporting and principles-based standards, the results give insights into the importance investors place on predicting future performance using current earnings in this setting.

Our results also show that in an IFRS-based setting; investors are less concerned about the discretionary portion of earnings than they are about earnings quality that reflects the fundamentals of a business. This relationship becomes even more important during a period of macro-economic turbulence. Furthermore, unlike Francis et al. (2004), our results show that investors are indifferent to earnings smoothing driven by discretionary factors but price earnings smoothing factors driven by innate factors . Taken together these results should be comforting to US standard setters who are considering adopting IFRS as it provides evidence that investors are less concerned about managerial opportunism when principles-based accounting standards are used to calculate earnings.

A limitation of our study is that we do not address reverse causality concerns, as firms with a lower cost of equity may have more resources to improve earnings quality[3]. This is an area that future research can address. Moreover, future work can also examine how earnings quality affects the cost of debt in an IFRS setting. Finally, reiterating the analysis to other geographical locations with varying institutional structures will provide us with better global insights into the relation between earnings quality and the cost of capital.

[3] We are grateful to the anonymous reviewer for highlighting this issue.

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**Figure 1**

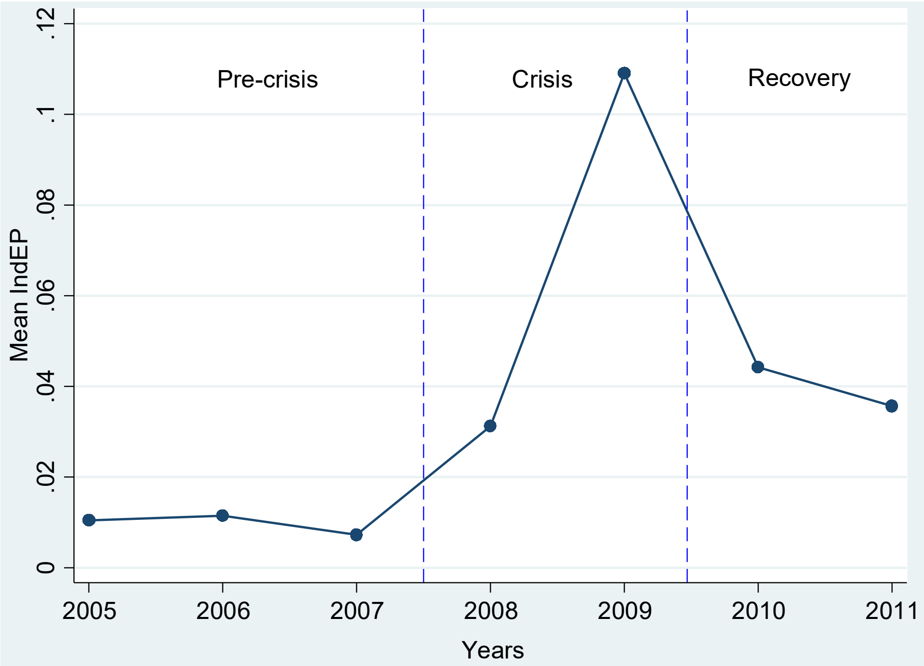
## Formulae for the implied cost of equity capital models

| The cost of equity proxy | The proxy symbol | Formula |
|---|---|---|
| Price earnings growth ratio model (PEG) (Easton, 2004) | $r_{PEG}$ | $r_{PEG} = \sqrt{\frac{E(eps_{t+2}) - E(eps_{t+1})}{P_t}}$<br>$eps_t$= earnings per share at the period *t*<br>$P_t$ = price of the share at period *t*. |
| The modified price-earnings-growth ratio model (Easton, 2004) | $r_{MPEG}$ | $r_{MPEG} = A + \sqrt{A^2 + (E(eps_{t+2}) - (E(eps_{t+1}))/P_0}$<br>$A = E(dps_{t+1})/2P_t$<br>$A = \frac{1}{2}\left(\gamma - 1 + \frac{dps_{t+1}}{P_0}\right)$ and<br>$dps_t$ = dividends per share at the period *t*.<br>$\gamma$ = the rate of growth in abnormal earnings post forecast horizon. In implementing the model, $\gamma$ is equal to the risk-free rate less 3%, where the 3 % represents economy-wide growth. |
| The Economy-wide growth model (Ohlson and Juettner-Nauroth, 2005) | $r_{OJN}$ | $r_{OJN} = A + \sqrt{A^2 + \left(\frac{eps_{t+1}}{P_t}\right) \times \left\{\frac{\frac{eps_{t+3} - eps_{t+2}}{eps_{t+2}} + \frac{eps_{t+5} - eps_{t+4}}{eps_{t+4}}}{2} - (\gamma - 1)\right\}}$ |
| The modified economy-wide growth model (Gode and Mohanram, 2003) | $r_{GM}$ | $r_{OJN} = A + \sqrt{A^2 + \left(\frac{eps_{t+1}}{P_t}\right) \times (\frac{eps_{t+2} - eps_{t+1}}{eps_{t+1}} - (\gamma - 1))}$ |
| Mean implied cost of equity capital | $r_{mean}$ | The average of $r_{PEG}$, $r_{MPEG}$, $r_{OJN}$ and $r_{GM}$. |

This figure shows the implied cost of equity proxies that are used as robustness to the *IndEP* measure. It includes the proxy name, symbol and the formula that used to measure it.

**Figure 2**

**The mean of *IndEP* over years 2005-2011**




The figure shows the average cost of equity, measured by industry adjusted earnings price ratio, per year from the period of 2005 to 2011. This period is classified into three sub-periods; the pre-crisis period (2005, 2006, 2007), the crisis period (2008-2009) and the recovery period (2010-2011).

**Table 1**
***Panel A: Number of firms per industry for each year***

| Industry | Year | | | | | | | Total | Percent |
|---|---|---|---|---|---|---|---|---|---|
| | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | | |
| Automobiles and Parts | 3 | 3 | 2 | 2 | 1 | 0 | 1 | **12** | **0.28** |
| Basic Resources | 14 | 16 | 21 | 23 | 28 | 24 | 36 | **162** | **3.84** |
| Chemicals | 14 | 13 | 14 | 16 | 12 | 9 | 11 | **89** | **2.11** |
| Construction and Materials | 30 | 28 | 29 | 30 | 25 | 19 | 22 | **183** | **4.34** |
| Food and Beverage | 26 | 24 | 25 | 25 | 26 | 23 | 24 | **173** | **4.11** |
| Health Care | 26 | 24 | 30 | 32 | 34 | 33 | 32 | **211** | **5.01** |
| Industrial Goods and Services | 184 | 192 | 199 | 196 | 202 | 194 | 189 | **1,356** | **32.18** |
| Media | 40 | 44 | 41 | 45 | 38 | 46 | 47 | **301** | **7.14** |
| Oil & Gas | 22 | 23 | 25 | 30 | 28 | 22 | 26 | **176** | **4.18** |
| Personal and Household Goods | 50 | 45 | 46 | 46 | 38 | 34 | 39 | **298** | **7.07** |
| Retail | 57 | 52 | 38 | 39 | 37 | 34 | 36 | **293** | **6.95** |
| Technology | 78 | 78 | 84 | 81 | 76 | 72 | 71 | **540** | **12.81** |
| Telecommunications | 7 | 8 | 8 | 12 | 12 | 8 | 9 | **64** | **1.52** |
| Travel and Leisure | 54 | 51 | 55 | 53 | 50 | 47 | 46 | **356** | **8.45** |
| **Total** | **605** | **601** | **617** | **630** | **607** | **565** | **589** | **4,214** | **100** |

***Panel B: Descriptive Statistics on earnings quality proxies and Firm Characteristics, 2005-2011***

| | Mean | S.D | Min | 25% | Median | 75% | Max |
|---|---|---|---|---|---|---|---|
| Accruals quality (AQ) | 0.084 | 0.078 | 0.007 | 0.035 | 0.059 | 0.103 | 0.275 |
| Persistence | 0.316 | 0.464 | -0.948 | -0.003 | 0.287 | 0.610 | 1.650 |
| Predictability | 0.735 | 0.338 | 0.002 | 0.030 | 0.074 | 0.188 | 2.579 |
| Smoothness | 1.122 | 0.765 | 0.159 | 0.708 | 1.034 | 1.378 | 2.163 |
| Total Assets (£mils) | 1,633 | 5,100 | 2.665 | 34.97 | 127.44 | 622.80 | 33,195 |
| Size (log of total assets) | 11.3 | 2.379 | 6.328 | 9.575 | 11.030 | 12.804 | 17.32 |
| Market Value (£mils) | 748.6 | 4,001 | 1.37 | 22.44 | 107 | 551.6 | 24,855 |
| Sales (£mils) | 1,260 | 3,432 | 0 | 31.50 | 140.60 | 654 | 21,053 |
| Growth | 0.577 | 1.078 | -2.813 | -0.111 | 0.449 | 1.133 | 1. 50 |
| Leverage | 0.182 | 0.149 | 0.000 | 0.007 | 0.137 | 0.277 | 0.587 |
| Beta (CAPM) | 0.889 | 0.687 | -0.578 | 0.413 | 0.821 | 1.287 | 2.051 |
| *IndEP* | 0.036 | 0.091 | -0.056 | -0.011 | 0.009 | 0.046 | 0.512 |
| Earning-Price Ratio | 0.099 | 0.093 | 0.008 | 0.050 | 0.070 | 0.111 | 0.588 |
| σ(CFO) | 33.74 | 69.80 | 0.20 | 1.20 | 3.70 | 14.70 | 301 |
| $\sigma$(Sales) | 153.2 | 243.2 | 0 | 3.6 | 15.6 | 87.3 | 789.2 |
| OperCycle | 4.8 | 0.715 | 2.639 | 4.4 | 4.8 | 5.2 | 6.6 |
| NegEarn | 1.8 | 2.1 | 0 | 0 | 3 | 6 | 8 |

***Panel C: Correlation among earnings quality proxies***

| | *IndEP* | AQ | Persist | Predict | Smooth | Beta | Size | leverage |
|---|---|---|---|---|---|---|---|---|
| *IndEP* | 1 | | | | | | | |
| AQ | 0.09 | 1 | | | | | | |
| | *<.0001* | | | | | | | |
| Persistence | 0.0662 | 0.0818 | 1 | | | | | |
| | *<.0001* | *<.0001* | | | | | | |
| Predictability | 0.0973 | 0.034 | 0.1084 | 1 | | | | |
| | *<.0001* | *0.0021* | *<.0001* | | | | | |
| Smoothness | 0.0321 | 0.0612 | 0.193 | 0.2696 | 1 | | | |
| | *0.0206* | *<.0001* | *<.0001* | *<.0001* | | | | |
| Beta | 0.0486 | 0.0048 | -0.0051 | 0.1058 | 0.0597 | 1 | | |
| | *0.0005* | *0.6658* | *0.6462* | *<.0001* | *<.0001* | | | |
| Size | -0.0747 | -0.4656 | -0.1625 | 0.3085 | -0.1112 | 0.1585 | 1 | |
| | *<.0001* | *<.0001* | *<.0001* | *<.0001* | *<.0001* | *<.0001* | | |
| Leverage | 0.12 | -0.0394 | 0.015 | 0.1857 | 0.0374 | 0.0257 | 0.1645 | 1 |
| | *<.0001* | *0.0010* | *0.2122* | *<.0001* | *<.0001* | *0.0344* | *<.0001* | |
| Growth | 0.0206 | 0.0624 | -0.1027 | -0.1756 | -0.1561 | -0.0009 | 0.0784 | 0.1357 |
| | *0.1793* | *<.0001* | *<.0001* | *<.0001* | *<.0001* | *0.9410* | *<.0001* | *<.0001* |

***Panel D: Mean IndEP values by each earnings quality quintiles***

| | **High** Q1 | Q3 | Q5 | Q7 | **Low** Q10 | **Diff** Q10-Q1 | **t-stat** |
|---|---|---|---|---|---|---|---|
| AQ ***IndEP*** | 0.0239 | 0.0289 | 0.0341 | 0.0392 | 0.0631 | **0.0392** | **5.66*** ** |
| Persistence ***IndEP*** | 0.0215 | 0.0346 | 0.0365 | 0.0361 | 0.0367 | **0.0152** | **2.94*** ** |
| Predictability ***IndEP*** | 0.0243 | 0.0318 | 0.0273 | 0.0316 | 0.0741 | **0.0498** | **6.21*** ** |
| Smoothness ***IndEP*** | 0.0409 | 0.0252 | 0.0325 | 0.0384 | 0.0345 | **-0.0064** | **1.20** |

Sample description and variable definitions: The sample comprises firms with data on all four earnings proxies in a given year *t*, t= 4,214 firm-year observations over 2005-2011 (14 industries). Size = log of total assets in year *t*; Market value = market value of equity in year *t*. Leverage = total interest bearing debt divided by total assets in year *t*; Growth = log of 1 plus the percentage change in the book value of equity over the preceding 5 years; Beta (CAPM) = 5-year rolling data acquired from firm-specific CAPM estimations using monthly data; it requires a firm to have at least 20 monthly observations; *IndEP* = the earnings–price ratio of a firm less the median earnings–price ratio of its industry. σ(CFO) = the standard deviation of operating cash flow of a firm computed over the preceding 10 years, σ(Sales) = the standard deviation of net revenue of a firm computed over the preceding 10 years, OperCycle = the log of operating cycle of a firm in year *t*, NegEarn = the number of years that a firm reported net income < 0 out of the preceding 10 years.

Panel C shows the Pearson correlations, significance levels are shown in italics.

Panel D shows the mean industry-adjusted earnings–price ratio *(IndEP)* for each EQ proxy quintile. The column labelled Diff (Q10-Q1) show the difference in the mean values of *IndEP* between the poor (Q10) and high (Q1) earnings quality quintiles, plus t-statistics test of whether the difference is zero.

**Table 2**
**Regressions of *IndEP* on each earning quality proxy (decile rank) and control variables**

| | *1* | *2* | *1* | *2* | *1* | *2* | *1* | *2* |
|---|---|---|---|---|---|---|---|---|
| Beta | 0.019 | 0.011*** | 0.019 | 0.011*** | 0.018 | 0.0096*** | 0.019 | 0.011*** |
| | *(1.16)* | *(3.92)* | *(1.18)* | *(3.90)* | *(1.11)* | *(3.46)* | *(1.19)* | *(3.96)* |
| Size | -0.0055** | -0.0042*** | -0.0061** | -0.0045*** | -0.0078*** | -0.0065*** | -0.0065** | -0.0050*** |
| | *(-2.24)* | *(-6.26)* | *(-2.39)* | *(-6.78)* | *(-2.83)* | *(-9.60)* | *(-2.50)* | *(-7.56)* |
| Growth | -0.0021** | 0.0021 | -0.00073 | 0.0035*** | 0.00035 | 0.0046*** | -0.0010 | 0.0030*** |
| | *(-2.11)* | *(1.44)* | *(-0.84)* | *(2.31)* | *(0.37)* | *(3.13)* | *(-1.05)* | *(2.03)* |
| Leverage | 0.080*** | 0.077*** | 0.075*** | 0.072*** | 0.077*** | 0.076* | 0.078*** | 0.076*** |
| | *(2.76)* | *(7.12)* | *(2.66)* | *(6.63)* | *(2.72)* | *(7.04)* | *(2.74)* | *(7.03)* |
| **Earnings quality** | | | | | | | | |
| AQ | 0.0024*** | 0.0017*** | | | | | | |
| | *(5.45)* | *(2.93)* | | | | | | |
| Persistence | | | 0.0014*** | 0.0018*** | | | | |
| | | | *(3.19)* | *(3.82)* | | | | |
| Predictability | | | | | 0.0035*** | 0.0040*** | | |
| | | | | | *(6.46)* | *(7.12)* | | |
| Smoothness | | | | | | | 0.00080** | 0.00070 |
| | | | | | | | *(2.23)* | *(1.51)* |
| Intercept | 0.061** | 0.052*** | 0.073*** | 0.054** | 0.081*** | 0.065*** | 0.080*** | 0.065*** |
| | *(2.49)* | *(5.44)* | *(2.65)* | *(6.15)* | *(2.88)* | *(8.05)* | *(2.95)* | *(7.48)* |
| *N* | 4,214 | 4,214 | 4,214 | 4,214 | 4,214 | 4,214 | 4,214 | 4,214 |
| $R^2$ | 0.076 | 0.026 | 0.075 | 0.027 | 0.087 | 0.036 | 0.072 | 0.024 |

*** p-value <0.01, ** p-value <0.05, * p-value <0.1.

The sample consists of 4,214 firm-year observations covers the years 2005 to 2011. *IndEP* = the earnings–price ratio of a firm less the median earnings–price ratio of its industry; Beta (CAPM) = 5-year rolling data acquired from firm-specific CAPM estimations using monthly data; it requires a firm to have at least 20 monthly observations; Size = log of total assets in year *t*; Growth = log of 1 plus the percentage change in the book value of equity over the preceding 5 years; Leverage = total interest bearing debt divided by total assets in year *t*.

Column 1 shows the mean annual regressions of *IndEP* on the decile rank value of each EQ proxy plus control variables. t-statistics, in parentheses, is based on the time series standard errors of the seven yearly coefficient estimates.

Column 2 shows the pooled regressions of *IndEP* on the decile rank value of each EQ proxy plus control variables.

**Table 3**

***Panel A: Means annual regressions of IndEP on the innate and discretionary earnings quality proxy (decile rank), with control variables (Method 1)***

| | *IndEP* | *IndEP* | *IndEP* | *IndEP* |
|---|---|---|---|---|
| Beta | 0.020 | 0.019 | 0.019 | 0.020 |
| | *(1.20)* | *(1.16)* | *(1.14)* | *(1.19)* |
| Size | -0.0014 | -0.0053** | -0.0067*** | -0.0070*** |
| | *(-0.64)* | *(-2.17)* | *(-2.60)* | *(-2.69)* |
| Growth | -0.0020 | -0.00052 | -0.00048 | -0.00091 |
| | *(-1.57)* | *(-0.74)* | *(-0.54)* | *(-0.95)* |
| Leverage | 0.081*** | 0.069** | 0.075*** | 0.073** |
| | *(2.76)* | *(2.49)* | *(2.58)* | *(2.55)* |
| **AQ (*Innate*)** | 0.0064*** | | | |
| | *(6.65)* | | | |
| **AQ (*Disc.*)** | 0.0022*** | | | |
| | *(3.67)* | | | |
| **Persistence (*Innate*)** | | 0.0027*** | | |
| | | *(3.92)* | | |
| **Persistence (*Disc.*)** | | 0.0010** | | |
| | | *(2.05)* | | |
| **Predictability (*Innate*)** | | | 0.0059*** | |
| | | | *(4.78)* | |
| **Predictability (*Disc.*)** | | | 0.0037** | |
| | | | *(2.23)* | |
| **Smoothness (*Innate*)** | | | | 0.0022*** |
| | | | | *(4.24)* |
| **Smoothness (*Disc.*)** | | | | -0.000041 |
| | | | | *(-0.082)* |
| Intercept | -0.020 | 0.053** | 0.038 | 0.081*** |
| | *(-1.13)* | *(2.21)* | *(1.32)* | *(3.06)* |
| *N* | 3,527 | 3,527 | 3,527 | 3,527 |
| $R^2$ | 0.092 | 0.085 | 0.094 | 0.082 |

*** p-value <0.01, ** p-value <0.05, * p-value <0.1. *t*-statistics in parentheses and italic.

The sample contains 3,527 firm-year observations over t = 2005-2011. *IndEP* = the earnings–price ratio of a firm less the median earnings–price ratio of its industry; Beta (CAPM) = 5-year rolling data acquired from firm-specific CAPM estimations using monthly data; it requires a firm to have at least 20 monthly observations; Size = log of total assets in year *t*; Growth = log of 1 plus the percentage change in the book value of equity over the preceding 5 years; Leverage = total interest bearing debt divided by total assets in year *t*; *Innate* = the innate component of earnings quality proxy; *Disc.*= the discretionary component of earnings quality proxy.

**Table 4**
**Pooled regressions of *IndEP* on each earnings quality proxy (decile rank), the interaction between earnings quality and crisis, with control variables**

| | *IndEP* | *IndEP* | *IndEP* | *IndEP* |
|---|---|---|---|---|
| Beta | 0.014*** | 0.014*** | 0.012*** | 0.014*** |
| | *(5.32)* | *(5.23)* | *(4.78)* | *(5.35)* |
| Size | -0.0047*** | -0.0051*** | -0.0068*** | -0.0055*** |
| | *(-7.15)* | *(-7.81)* | *(-10.2)* | *(-8.59)* |
| Growth | -0.0020 | -0.00046 | 0.00046 | -0.0010 |
| | *(-1.43)* | *(-0.33)* | *(0.33)* | *(-0.74)* |
| Leverage | 0.078*** | 0.072*** | 0.075*** | 0.077*** |
| | *(7.64)* | *(7.07)* | *(7.44)* | *(7.52)* |
| Crisis | 0.046*** | 0.042*** | 0.050*** | 0.051*** |
| | *(6.84)* | *(6.34)* | *(6.90)* | *(7.32)* |
| Recovery | 0.017*** | 0.016*** | 0.023*** | 0.028*** |
| | *(3.66)* | *(3.66)* | *(4.42)* | *(5.30)* |
| AQ | 0.0026*** | | | |
| | *(4.66)* | | | |
| AQ * Crisis | 0.011*** | | | |
| | *(15.5)* | | | |
| AQ * Recovery | 0.0050*** | | | |
| | *(8.76)* | | | |
| Persistence | | 0.0051*** | | |
| | | *(11.2)* | | |
| Persist * Crisis | | 0.0078*** | | |
| | | *(15.5)* | | |
| Persist * Recovery | | 0.0033*** | | |
| | | *(9.20)* | | |
| Predictability | | | 0.0062*** | |
| | | | *(12.12)* | |
| Predict * Crisis | | | 0.0098*** | |
| | | | *(16.4)* | |
| Predict * Recovery | | | 0.0043*** | |
| | | | *(8.32)* | |
| Smoothness | | | | 0.0035*** |
| | | | | *(7.32)* |
| Smooth * Crisis | | | | 0.010*** |
| | | | | *(15.6)* |
| Smooth * Recovery | | | | 0.0042*** |
| | | | | *(8.13)* |
| Intercept | 0.037*** | 0.045*** | 0.053*** | 0.050*** |
| | *(4.23)* | *(5.49)* | *(6.75)* | *(5.99)* |
| *N* | 4,214 | 4,214 | 4,214 | 4,214 |
| adj. $R^2$ | 0.124 | 0.125 | 0.129 | 0.120 |

*** p-value <0.01, ** p-value <0.05, * p-value <0.1. *t*-statistics in parentheses and italic.

The sample contains 4,214 firm-year observations over *t* = 2005-2011. *IndEP* = the earnings–price ratio of a firm less the median earnings–price ratio of its industry; Beta (CAPM) = 5-year rolling data acquired from firm-specific CAPM estimations using monthly data; it requires a firm to have at least 20 monthly observations; Size = log of total assets in year *t*; Growth = log of 1 plus the percentage change in the book value of equity over the preceding 5 years; Leverage = total interest bearing debt divided by total assets in year *t*. *Crisis* is a dummy variable equals 1 if years are 2008 and 2009 and the rest equals zero; *Recovery* is a dummy variable equals 1 if years are 2010 and 2011 and the rest equals zero.

**Table 5**
**Pooled regressions of *IndEP* on the innate and discretionary earnings quality proxy (decile rank) (decile rank), the interaction between those components and crisis, with control variables**

| | *IndEP* | *IndEP* | *IndEP* | *IndEP* |
|---|---|---|---|---|
| Beta | 0.016*** | 0.015*** | 0.015*** | 0.015*** |
| | *(5.33)* | *(4.89)* | *(4.77)* | *(4.91)* |
| Size | -0.0011 | -0.0047*** | -0.0059*** | -0.0061*** |
| | *(-0.88)* | *(-5.57)* | *(-7.61)* | *(-8.37)* |
| Growth | -0.0020 | -0.00040 | -0.00080 | -0.0010 |
| | *(-1.17)* | *(-0.23)* | *(-0.48)* | *(-0.61)* |
| Leverage | 0.078*** | 0.066*** | 0.072*** | 0.070*** |
| | *(6.92)* | *(5.80)* | *(6.44)* | *(6.16)* |
| Crisis | 0.027** | 0.017** | 0.012 | 0.042*** |
| | *(2.01)* | *(1.99)* | *(0.36)* | *(4.11)* |
| Recovery | -0.0028 | -0.0069 | -0.0097 | 0.020** |
| | *(-0.27)* | *(-1.03)* | *(-0.26)* | *(2.45)* |
| AQ (Innate) | 0.0033*** | | | |
| | *(2.84)* | | | |
| AQ (Disc.) | 0.00025 | | | |
| | *(0.41)* | | | |
| AQ (Innate) * Crisis | 0.0053*** | | | |
| | *(2.92)* | | | |
| AQ (Disc.) * Crisis | 0.0022 | | | |
| | *(1.34)* | | | |
| AQ (Innate) * Recovery | 0.0029** | | | |
| | *(1.99)* | | | |
| AQ (Disc.) * Recovery | 0.0030** | | | |
| | *(2.21)* | | | |
| Persistence (Innate) | | 0.00087* | | |
| | | *(1.69)* | | |
| Persistence (Disc.) | | 0.000047 | | |
| | | *(0.11)* | | |
| Persistence (Innate) * Crisis | | 0.0061*** | | |
| | | *(3.39)* | | |
| Persistence (Disc.) * Crisis | | 0.0033** | | |
| | | *(2.53)* | | |
| Persistence (Innate) * Recovery | | 0.0053*** | | |
| | | *(3.71)* | | |
| Persistence (Disc.) * Recovery | | 0.0018* | | |
| | | *(1.95)* | | |
| Predictability (Innate) | | | 0.0020** | |
| | | | *(2.17)* | |
| Predictability (Disc.) | | | 0.0018* | |
| | | | *(1.89)* | |
| Predictability (Innate) * Crisis | | | 0.0075** | |
| | | | *(2.36)* | |
| Predictability (Disc.) * Crisis | | | 0.0029 | |
| | | | *(0.88)* | |
| Predictability (Innate) * Recovery | | | 0.0046* | |
| | | | *(1.68)* | |
| Predictability (Disc.) * Recovery | | | 0.0026 | |
| | | | *(0.72)* | |
| Smoothness (Innate) | | | | 0.00017 |
| | | | | *(0.25)* |
| Smoothness (Disc.) | | | | -0.00022 |
| | | | | *(-0.43)* |
| Smoothness (Innate) * Crisis | | | | 0.0035** |
| | | | | *(2.04)* |
| Smoothness (Disc.) * Crisis | | | | 0.00095 |
| | | | | *(0.70)* |
| Smoothness (Innate) * Recovery | | | | 0.0032** |
| | | | | *(2.30)* |
| Smoothness (Disc.) * Recovery | | | | -0.0012 |
| | | | | *(-1.12)* |
| Intercept | -0.022 | 0.044*** | 0.034*** | 0.057*** |
| | *(-1.09)* | *(4.06)* | *(2.77)* | *(5.75)* |
| *N* | 3,527 | 3,527 | 3,527 | 3,527 |
| adj. $R^2$ | 0.131 | 0.134 | 0.131 | 0.125 |

*** p-value <0.01, ** p-value <0.05, * p-value <0.1. *t*-statistics in parentheses and italic.

The sample contains 3,527 firm-year observations over *t* = 2005-2011. *IndEP* = the earnings–price ratio of a firm less the median earnings–price ratio of its industry; Beta (CAPM) = 5-year rolling data acquired from firm-specific CAPM estimations using monthly data; it requires a firm to have at least 20 monthly observations; Size = log of total assets in year *t*; Growth = log of 1 plus the percentage change in the book value of equity over the preceding 5 years; Leverage = total interest bearing debt divided by total assets in year *t*. *Crisis* is a dummy variable equals 1 if years are 2008 and 2009 and the rest equals zero; *Recovery* is a dummy variable equals 1 if years are 2010 and 2011 and the rest equals zero, *Innate* = the innate component of earnings quality proxy; *Disc.*= the discretionary component of earnings quality proxy.

**Table 6**

***Panel A: Means annual regressions of Easton model and Modified Easton model on each earnings quality proxy (decile rank), with control variables***

| | (1) $r_{PEG}$ | (2) $r_{PEG}$ | (3) $r_{PEG}$ | (4) $r_{PEG}$ | (1) $r_{MPEG}$ | (2) $r_{MPEG}$ | (3) $r_{MPEG}$ | (4) $r_{MPEG}$ |
|---|---|---|---|---|---|---|---|---|
| Beta | 0.0025*** | 0.0027*** | 0.0025*** | 0.0026*** | 0.0025*** | 0.0027*** | 0.0025*** | 0.0025*** |
| | *(4.87)* | *(5.54)* | *(5.59)* | *(5.13)* | *(4.73)* | *(5.32)* | *(5.36)* | *(4.91)* |
| Size | -0.0020*** | -0.0023*** | -0.0025*** | -0.0023*** | -0.0020*** | -0.0023*** | -0.0025*** | -0.0023*** |
| | *(-5.87)* | *(-6.85)* | *(-6.80)* | *(-6.80)* | *(-5.94)* | *(-6.87)* | *(-6.77)* | *(-6.78)* |
| Growth | -0.00051* | -0.00027 | -0.00018 | -0.00021 | -0.00055* | -0.00031 | -0.00022 | -0.00026 |
| | *(-2.06)* | *(-1.01)* | *(-0.70)* | *(-0.81)* | *(-2.29)* | *(-1.16)* | *(-0.86)* | *(-1.01)* |
| Leverage | 0.0096*** | 0.0090*** | 0.0092*** | 0.0094*** | 0.0094*** | 0.0088*** | 0.0090*** | 0.0092*** |
| | *(4.34)* | *(3.97)* | *(4.04)* | *(4.01)* | *(4.67)* | *(4.29)* | *(4.34)* | *(4.30)* |
| AQ | 0.00061*** | | | | 0.00061*** | | | |
| | *(8.74)* | | | | *(10.4)* | | | |
| Persistence | | 0.00023** | | | | 0.00024** | | |
| | | *(2.94)* | | | | *(2.54)* | | |
| Predictability | | | 0.00036*** | | | | 0.00037*** | |
| | | | *(4.35)* | | | | *(4.20)* | |
| Smoothness | | | | 0.00032*** | | | | 0.00029*** |
| | | | | *(5.54)* | | | | *(6.14)* |
| Intercept | 0.032*** | 0.037*** | 0.039*** | 0.037*** | 0.033*** | 0.038*** | 0.040*** | 0.038*** |
| | *(7.59)* | *(9.55)* | *(9.32)* | *(9.07)* | *(7.61)* | *(9.49)* | *(9.17)* | *(8.88)* |
| *N* | 3,795 | 3,795 | 3,795 | 3,795 | 3,781 | 3,781 | 3,781 | 3,781 |
| $R^2$ | 0.152 | 0.138 | 0.140 | 0.140 | 0.152 | 0.139 | 0.140 | 0.140 |

***Panel B: Means annual regressions of the economy-wide growth model, the modified the economy-wide growth model and the mean of the four cot of equity capital proxies on each earnings quality proxy (decile rank), with control variables***

| | (1) | (2) | (3) | (4) | (1) | (2) | (3) | (4) | (1) | (2) | (3) | (4) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $r_{ojn}$ | $r_{ojn}$ | $r_{ojn}$ | $r_{ojn}$ | $r_{GM}$ | $r_{GM}$ | $r_{GM}$ | $r_{GM}$ | $r_{Mean}$ | $r_{Mean}$ | $r_{Mean}$ | $r_{Mean}$ |
| Beta | 0.00030 | 0.00031 | 0.00031 | 0.00030 | 0.0020*** | 0.0022*** | 0.0020*** | 0.0021*** | 0.0022*** | 0.0024*** | 0.0022*** | 0.0023*** |
| | *(1.40)* | *(1.43)* | *(1.53)* | *(1.44)* | *(4.21)* | *(4.66)* | *(4.70)* | *(4.39)* | *(4.44)* | *(5.09)* | *(5.02)* | *(4.76)* |
| Size | -0.00063*** | -0.00068*** | -0.00072*** | -0.00069*** | -0.0019*** | -0.0022*** | -0.0023*** | -0.0022*** | -0.0021*** | -0.0024*** | -0.0026*** | -0.0024*** |
| | *(-4.73)* | *(-4.91)* | *(-4.57)* | *(-4.93)* | *(-5.51)* | *(-6.27)* | *(-6.09)* | *(-6.23)* | *(-6.28)* | *(-7.37)* | *(-7.10)* | *(-7.24)* |
| Growth | 0.000047 | 0.00012* | 0.00011** | 0.00012* | -0.00051** | -0.00028 | -0.00023 | -0.00025 | -0.00051* | -0.00026 | -0.00017 | -0.00022 |
| | *(1.00)* | *(2.44)* | *(2.54)* | *(2.35)* | *(-2.45)* | *(-1.15)* | *(-0.97)* | *(-1.10)* | *(-2.08)* | *(-0.96)* | *(-0.68)* | *(-0.86)* |
| Leverage | 0.0025** | 0.0023** | 0.0024** | 0.0024** | 0.0082*** | 0.0076*** | 0.0079*** | 0.0080*** | 0.0094*** | 0.0087*** | 0.0089*** | 0.0091*** |
| | *(3.38)* | *(3.21)* | *(3.29)* | *(3.11)* | *(4.64)* | *(4.26)* | *(4.32)* | *(4.28)* | *(4.29)* | *(4.09)* | *(4.12)* | *(4.17)* |
| AQ | 0.00014*** | | | | 0.00053*** | | | | 0.00061*** | | | |
| | *(5.59)* | | | | *(14.5)* | | | | *(10.4)* | | | |
| Persistence | | 0.000085** | | | | 0.00023* | | | | 0.00026** | | |
| | | *(2.79)* | | | | *(2.14)* | | | | *(3.04)* | | |
| Predictability | | | 0.000048 | | | | 0.00031** | | | | 0.00038*** | |
| | | | *(1.16)* | | | | *(3.02)* | | | | *(4.49)* | |
| Smoothness | | | | 0.000070* | | | | 0.00028*** | | | | 0.00030*** |
| | | | | *(1.96)* | | | | *(5.73)* | | | | *(5.43)* |
| Intercept | 0.027*** | 0.028*** | 0.029*** | 0.028*** | 0.044*** | 0.048*** | 0.050*** | 0.048*** | 0.039*** | 0.044*** | 0.046*** | 0.044*** |
| | *(31.4)* | *(31.1)* | *(28.4)* | *(29.4)* | *(12.1)* | *(14.8)* | *(13.9)* | *(14.1)* | *(10.00)* | *(12.9)* | *(11.7)* | *(11.8)* |
| *N* | 3,519 | 3,519 | 3,519 | 3,519 | 3,843 | 3,843 | 3,843 | 3,843 | 4,010 | 4,010 | 4,010 | 4,010 |
| $R^2$ | 0.111 | 0.106 | 0.105 | 0.106 | 0.150 | 0.139 | 0.139 | 0.140 | 0.154 | 0.140 | 0.142 | 0.141 |

*** p-value <0.01, ** p-value <0.05, * p-value <0.1. t-statistics in parentheses and italic.

The sample ranges between 3,519 and 4,010 firm-year observations for *t* = 2005 to 2011. Beta (CAPM) = 5-year rolling data acquired from firm-specific CAPM estimations using monthly data; it requires a firm to have at least 20 monthly observations; Size = log of total assets in year *t*; Growth = log of 1 plus the percentage change in the book value of equity over the preceding 5 years; Leverage = total interest bearing debt divided by total assets in year *t*.

**Table 7**

**Fixed and random panel regressions of *IndEP* on each earnings quality proxy (decile rank), with control variables**

| | *IndEP* *Fixed* | *IndEP* *Random* | *IndEP* *Fixed* | *IndEP* *Random* | *IndEP* *Fixed* | *IndEP* *Random* | *IndEP* *Fixed* | *IndEP* *Random* |
|---|---|---|---|---|---|---|---|---|
| Beta | 0.014*** | 0.0095*** | 0.013*** | 0.0093*** | 0.012*** | 0.0078*** | 0.013*** | 0.0093*** |
| | *(3.97)* | *(3.69)* | *(3.82)* | *(3.63)* | *(3.41)* | *(3.07)* | *(3.87)* | *(3.64)* |
| Size | 0.018*** | -0.0037*** | 0.020*** | -0.0036*** | 0.013*** | -0.0061*** | 0.019*** | -0.0040*** |
| | *(3.96)* | *(-3.35)* | *(4.31)* | *(-3.39)* | *(2.75)* | *(-5.68)* | *(4.26)* | *(-3.77)* |
| Growth | -0.0044** | 0.0017 | -0.0042** | 0.0025* | -0.0023 | 0.0038*** | -0.0042** | 0.0022 |
| | *(-2.07)* | *(1.24)* | *(-2.00)* | *(1.77)* | *(-1.09)* | *(2.72)* | *(-2.01)* | *(1.60)* |
| Leverage | 0.017 | 0.065*** | 0.013 | 0.062*** | 0.022 | 0.065*** | 0.014 | 0.065*** |
| | *(0.80)* | *(5.14)* | *(0.60)* | *(4.86)* | *(1.01)* | *(5.14)* | *(0.67)* | *(5.11)* |
| **AQ** | 0.0018* | 0.0020* | | | | | | |
| | *(1.93)* | *(1.95)* | | | | | | |
| **Persistence** | | | 0.0015* | 0.0018*** | | | | |
| | | | *(1.91)* | *(3.10)* | | | | |
| **Predictability** | | | | | 0.0070*** | 0.0051*** | | |
| | | | | | *(5.40)* | *(7.11)* | | |
| **Smoothness** | | | | | | | 0.0018** | 0.0010* |
| | | | | | | | *(1.99)* | *(1.72)* |
| Intercept | -0.19*** | 0.055*** | -0.22*** | 0.048*** | -0.17*** | 0.059*** | -0.22*** | 0.057*** |
| | *(-3.49)* | *(4.02)* | *(-4.08)* | *(3.85)* | *(-3.20)* | *(5.08)* | *(-4.06)* | *(4.60)* |
| *N* | 4,214 | 4,214 | 4,214 | 4,214 | 4,214 | 4,214 | 4,214 | 4,214 |
| *Hausman* | | 0.0000 | | 0.0000 | | 0.0000 | | 0.0000 |

*** p-value <0.01, ** p-value <0.05, * p-value <0.1. t-statistics in parentheses and italic.

The sample contains 4,214 firm-year observations for *t* = 2005 to 2011. *IndEP* = the earnings–price ratio of a firm less the median earnings–price ratio of its industry; Beta (CAPM) = 5-year rolling data acquired from firm-specific CAPM estimations using monthly data; it requires a firm to have at least 20 monthly observations; Size = log of total assets in year *t*; Growth = log of 1 plus the percentage change in the book value of equity over the preceding 5 years; Leverage = total interest bearing debt divided by total assets in year *t*.

**Table 8**
**Means annual regressions of *IndEP* on the discretionary earnings quality proxy (decile rank), with control variables (Method 2)**

| | *IndEP* | *IndEP* | *IndEP* | *IndEP* |
|---|---|---|---|---|
| Beta | 0.021 | 0.021 | 0.021 | 0.021 |
| | *(1.19)* | *(1.21)* | *(1.19)* | *(1.23)* |
| Size | -0.0069* | -0.0077* | -0.0092** | -0.0078* |
| | *(-2.07)* | *(-2.26)* | *(-2.66)* | *(-2.21)* |
| Growth | -0.0014 | -0.00015 | 0.00060 | -0.00062 |
| | *(-1.17)* | *(-0.17)* | *(0.61)* | *(-0.63)* |
| Leverage | 0.078** | 0.075** | 0.076** | 0.077** |
| | *(2.72)* | *(2.68)* | *(2.68)* | *(2.71)* |
| $\sigma$(CFO) | 0. 000027** | 0. 000031*** | 0. 000025** | 0. 000030** |
| | *(3.33)* | *(3.97)* | *(3.25)* | *(3.68)* |
| $\sigma$(Sales) | 0.00000084 | 0.0000011 | 0.0000017 | 0.00000082 |
| | *(0.38)* | *(0.49)* | *(0.82)* | *(0.39)* |
| OperCycle | -0.0041* | -0.0036* | -0.0039* | -0.0036 |
| | *(-2.03)* | *(-1.95)* | *(-2.15)* | *(-1.92)* |
| NegEarn | 0.0028*** | 0.0031*** | 0.0022** | 0.0033*** |
| | *(4.63)* | *(4.73)* | *(3.47)* | *(3.91)* |
| **AQ (*Disc.*)** | 0.0022** | | | |
| | *(3.68)* | | | |
| **Persistence (*Disc.*)** | | 0.0012* | | |
| | | *(2.11)* | | |
| **Predictability (*Disc.*)** | | | 0.0029*** | |
| | | | *(5.93)* | |
| **Smoothness (*Disc.*)** | | | | 0.00014 |
| | | | | *(0.24)* |
| Intercept | 0.090** | 0.10** | 0.11** | 0.11** |
| | *(2.60)* | *(2.77)* | *(2.99)* | *(2.86)* |
| *N* | 3,527 | 3,527 | 3,527 | 3,527 |
| $R^2$ | 0.099 | 0.098 | 0.104 | 0.095 |

*** p-value <0.01, ** p-value <0.05, * p-value <0.1. *t*-statistics in parentheses and italic.

The sample contains 3,527 firm-year observations over t = 2005-2011. *IndEP* = the earnings–price ratio of a firm less the median earnings–price ratio of its industry; Beta (CAPM) = 5-year rolling data acquired from firm-specific CAPM estimations using monthly data; it requires a firm to have at least 20 monthly observations; Size = log of total assets in year *t*; Growth = log of 1 plus the percentage change in the book value of equity over the preceding 5 years; Leverage = total interest bearing debt divided by total assets in year *t;* $\sigma$(CFO) = the standard deviation of operating cash flow of a firm computed over the preceding 10 years, $\sigma$(Sales) = the standard deviation of net revenue of a firm computed over the preceding 10 years, OperCycle = the log of operating cycle of a firm in year *t*, NegEarn = the number of years that a firm reported net income < 0 out of the preceding 10 years; *Innate* = the innate component of earnings quality proxy; *Disc.*= the discretionary component of earnings quality proxy.