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Earnings quality and firm valuation: international evidence*

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Abstract

This study uses a sample of over 7000 firms in 38 countries to investigate the relation between firm valuation and earnings quality. We find a positive and significant relation between firm valuation and an aggregate earnings quality measure based on seven earnings attributes (accruals quality, persistence, predictability, smoothness, value relevance, timeliness, and conservatism). This relation is particularly strong for firms with greater investment opportunities and more need for external finance, and for firms in low investor protection countries. Thus, firms are able to compensate for a weak legal environment by adopting higher earnings quality standards, particularly when they need to gain access to global capital markets. Overall, our findings suggest that firms with higher earnings quality are valued more highly in stock markets, supporting the idea that investors require a premium for the information risk associated with lower-quality earnings.

Key words: Earnings quality; Firm value; Investor protection

JEL classification: G15, M41

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1. Introduction

Capital markets rely on credible financial accounting information. Good-quality financial reporting helps investors to better assess firm value and performance and to make improved investment decisions. Financial scandals in the United States and Europe (like Enron, Worldcom, and Parmalat) have highlighted the

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importance of financial reporting quality, with a special emphasis on earnings quality. But do equity markets really value earnings quality?

Theoretical models show that firm-specific information risk cannot be diversified away and, thereby, is priced by investors and affects the firm's cost of equity (e.g., Easley and O'Hara, 2004; Leuz and Verrecchia, 2004). Indeed, investors require higher return to hold stocks with greater private information as they are at a disadvantage when trading against informed investors. Thus, these models predict a positive association between accounting information quality and cost of capital. Empirical studies support this hypothesis: Francis *et al.* (2004) present US evidence and Bhattacharya *et al.* (2003) present country-level evidence. As earnings are the main source of firm-specific information for investors (e.g., Francis *et al.*, 2003), we expect to find a positive relation between earnings quality and firm valuation.

To investigate the relation between earnings quality and firm valuation around the world, we use a large sample of firms in 38 countries (22 developed and 16 emerging markets) over 1990–2003. We construct a summary measure of earnings quality based on seven earnings attributes: accruals quality, persistence, predictability, smoothness, value relevance, timeliness, and conservatism. Tobin's Q is the measure of firm valuation.

We estimate cross-sectional regressions of firm value on earnings quality, controlling for firm-level characteristics and country-level characteristics that previous research has found to be related to firm valuation. We also use industry-fixed and country-fixed effects to control for industry and country unobserved heterogeneity.

We find a positive and significant relation between earnings quality and firm valuation, suggesting that firms with better earnings quality are valued more highly by stock markets. The relation is also economically significant. A move from the 25th percentile of earnings quality rankings to the 75th percentile improves firm valuation by about 4 per cent.

To further study the relation between earnings quality and firm value, we then examine the role of investment opportunities and country-level investor protection. Previous research has established that investment opportunities and the legal environment are important determinants of firm valuation (e.g., La Porta *et al.*, 2002; Durnev and Kim, 2005).

We find that the positive relation between firm value and earnings quality is stronger for firms with more investment opportunities. This is consistent with the idea that earnings quality is particularly valuable for firms that need to access capital markets to raise funds. Our results also show that the positive relation between firm value and earnings quality is stronger for firms in countries with weaker investor protection. This finding suggests that a firm can compensate for a poor legal environment by having higher earnings quality, and stock markets seem to reward these firms with higher valuations.

Finally, we check the robustness of the positive relation between earnings quality and firm valuation. One important concern is that earnings quality is just

simply capturing the effect of corporate governance on firm valuation. Indeed, financial accounting data is the primary source of information about the performance of managers and a key component of the corporate governance process (Bushman and Smith, 2001). Moreover, recent studies find that firm valuation is positively related to several corporate governance mechanisms (e.g., Klapper and Love, 2004; Durnev and Kim, 2005; Aggarwal *et al.*, 2009). We find that earnings quality is valued by investors beyond the effect of corporate governance. Similarly, we find that earnings quality is valued by investors beyond the effect of enhanced analyst coverage.

We conduct several other robustness checks to mitigate potential measurement error and endogeneity concerns and to explore the robustness of our results, including using alternative samples, estimation methods, and control variables, but our main findings and inferences are not affected. In particular, we use instrumental variables methods to address the reverse causality concern in that large investors are attracted to firms with high firm valuations, and these investors may press for higher earnings quality.

Our study provides useful information on the relation between firm value and earnings quality and makes several contributions to the literature. First, most research so far has been carried out using US data. We use instead a large sample of firms in both developed countries and emerging markets, which allows for a better understanding of the economic consequences of earnings quality. Second, most of the international studies are country-level studies. We conduct our study at the firm-level, which allows for variation within countries.

Third, most studies on the capital market consequences of earnings quality have focused on the cost of capital. We examine directly the relation between earnings quality and firm valuation. Finally, most authors have examined the capital market consequences of one earnings attribute in isolation. Our earnings quality ranking uses a wide range of earnings attributes, which allows for a broader perspective of the earnings quality effects on valuation.

The remainder of the paper is organized as follows. Section 2 discusses how firm value is likely to be associated with earnings quality. Section 3 describes the firm value and earnings quality measures. Section 4 describes the sample and variables. Section 5 presents the empirical results. Section 6 provides robustness and additional results. Finally, Section 7 concludes.

2. The relation between firm valuation and earnings quality

In this section, we examine how earnings quality is likely to be associated with firm valuation. We first present the theoretical framework, and then we summarize related empirical studies on the capital market consequences of earnings quality.

2.1. The link between information risk and cost of capital and firm valuation

Bushman and Smith (2001) identify three channels by which accounting information may affect the cost of capital. First, financial accounting should provide useful information, both directly to managers and investors about investment opportunities and indirectly through its contribution to the determination of stock prices, which should reduce estimation risk, and thereby the firm's cost of capital. Second, financial accounting should provide useful information as a direct input of corporate control mechanisms, which should reduce expropriation risk, and thereby the firm's cost of capital. Third, financial accounting information should contribute to reduce information asymmetry among investors, which should reduce liquidity risk, and thereby the firm's cost of capital.

Theoretical models show that firm-specific information risk is non-diversifiable and thus should be priced. For example, Easley and O'Hara (2004) show that, in equilibrium, the quantity and the quality of information affect asset prices and that investors demand compensation for the information risk induced by greater private information and less precise information (both public and private). Moreover, Leuz and Verrecchia (2004) show that better-quality information (or reporting precision) improves the coordination between firms and investors in terms of capital investments, reducing information risk and consequently reducing the firm's cost of capital.

Thus, by providing more and better accounting information, a firm can reduce information risk and hence reduce its cost of capital. As the firm's market value represents the unbiased present value of expected current and future cash flows discounted at the risk-adjusted cost of capital, a reduction in the firm's cost of capital, all else equal, implies an increase in firm value.

2.2. Empirical evidence on the capital market consequences of earnings quality

Earnings are closely followed by financial market participants, particularly by investors and analysts. Recent studies provide evidence that reported earnings are the premier source of firm-specific information (e.g., Francis *et al.*, 2003), as they are a good indicator of future cash flows and are more informative about a firm's economic performance than cash flows (e.g., Dechow, 1994; Dechow *et al.*, 1998).

Research on the capital market consequences of earnings quality generally focuses on the cost of capital and is based mostly on US data.[1] So far, few studies have directly examined the relation between earnings quality and firm market valuation. Moreover, most studies examine the economic consequences of one attribute of earnings in isolation.

[1] See Habib (2006) for a review of the empirical literature on the relation between information quality and the cost of capital.

Francis *et al.* (2004) examine the relation between several earnings attributes and the implied cost of equity in the United States. They find that accounting-based earnings attributes (accruals quality, persistence, predictability, and smoothness) have a more pronounced cost of equity effect than market-based attributes (value relevance, timeliness, and conservatism) and that accruals quality is the most priced attribute. In a country-level study, Bhattacharya *et al.* (2003) find that an increase in earnings opacity, defined as a composite measure of earnings aggressiveness, loss avoidance, and earnings smoothness, is linked to an increase in the cost of equity and a decline in trading volume.

Bitner and Dolan (1996) and Allayannis *et al.* (2008) explicitly link earnings quality to firm valuation (proxied by Tobin's Q). Bitner and Dolan (1996) examine the relation between income smoothing and firm valuation and provide evidence that the US market pays a premium for smooth streams of income and distinguishes between naturally and managed smooth earnings. Allayannis *et al.* (2008) find that earnings smoothness through the accruals component of earnings is not valued by the US market. In fact, they provide evidence that investors value cash flow volatility negatively but do not value earnings smoothness after controlling for the volatility of the underlying cash flows.

Overall, smoothness is the attribute of earnings that has been studied the most. Yet so far the empirical evidence on the economic consequences of earnings smoothness is not conclusive. Thus, the relation between firm valuation and earnings smoothness and other earnings attributes remains an open empirical question.

3. Measuring firm valuation and earnings quality

In this section, we describe how we measure firm value and earnings quality. First, we briefly discuss our firm value measure. Then, we present our individual earnings quality measures and describe how we compute the aggregate earnings quality rankings. We also discuss potential limitations of our earnings quality measures and how they are linked to information risk.

3.1. Firm valuation measure

We use Tobin's Q as a measure of firm valuation. Tobin's Q is widely used as a valuation proxy in studies of: corporate governance (e.g., Klapper and Love, 2004; Durnev and Kim, 2005); cross-listing (e.g., Lang *et al.*, 2003; Doidge *et al.*, 2004); corporate diversification (e.g., Lang and Stulz, 1994); equity ownership (e.g., La Porta *et al.*, 2002; Kiefer, 2004; Lang *et al.*, 2004); and earnings smoothness (e.g., Allayannis *et al.*, 2008).

Tobin's Q is a measure of market valuation premiums, defined as the ratio of market value to replacement value of the firm's assets. A value higher than one indicates that the firm is using its resources efficiently and thereby is creating economic rents. Looking forward, Q can be interpreted as the market's expectation

of the economic returns generated by the firm's assets; hence, it can be used as a measure of the market's long-run valuation of the firm (Bitner and Dolan, 1996).[2]

Because of the difficulty in estimating the market value of debt and replacement costs, we follow common practice and compute Tobin's Q as:[3]

$$Q_{i,t} = (BVA_{i,t} + MVE_{i,t} - BVE_{i,t})/BVA_{i,t} \quad (1)$$

where $Q_{i,t}$ is the Tobin's Q value of firm i in year t; $BVA_{i,t}$ is the book value of total assets of firm i in year t; $MVE_{i,t}$ is the market value of common equity of firm i (computed as stock price times the number of common shares outstanding) in year t; and $BVE_{i,t}$ is the book value of equity of firm i in year t.

Although Tobin's Q is widely used, it has its limitations, and it is not a perfect measure of firm value. Gompers *et al.* (2010) point out several problems with using Tobin's Q in ordinary least squares pooled cross-sectional and times series regressions, which we address later.

3.2. Earnings quality measures

Prior research has studied earnings quality using a single property of earnings or a limited subset of properties of earnings. Because of the inherent difficulty of measuring earnings quality and to mitigate the potential effects of omitted variables, we use a wide range of measures and compute an aggregate ranking to study the relation between firm value and earnings quality.

We use seven earnings attributes that have been identified as related to earnings quality, classified into two groups: accounting-based attributes and market-based attributes (Francis *et al.*, 2004). Accounting-based earnings attributes include accruals quality, persistence, predictability, and smoothness. These attributes are measured using only accounting information and assume that the function of earnings is to allocate cash flows to periods correctly by using accruals. Therefore, higher-quality earnings are those that are more effective in the allocation of cash flows.

Market-based earnings attributes include value relevance, timeliness, and conservatism. These attributes are measured using both accounting and market data

[2] Like other researchers, we assume that financial markets are efficient and that the market value is an unbiased estimate of the present value of a firm's cash flows.

[3] A more precise computation of Tobin's Q would require highly detailed data. The market value of debt and the replacement costs are both difficult to determine, specially for a wide sample like ours. Besides, Perfect and Wiles (1994) suggest that the adjustment of the book value of assets to its replacement costs is not critical, and the market-to-book ratio is a reasonable proxy for Tobin's Q. Moreover, Allayannis and Weston (2001) show that several measures used in the literature to proxy for Tobin's Q are highly correlated with each other and also highly correlated with the market-to-book ratio (simple Q).

and assume that the function of earnings is to reflect economic income as proxied by stock returns. Thus, earnings are of better quality, the closer they are to stock returns.

All the earnings quality measures are computed following the procedures applied in previous research, in particular Francis *et al.* (2004). We adopt the convention that higher values of individual measures imply poorer earnings quality. Therefore, we use negative values for persistence, value relevance, timeliness, and conservatism. Firm-level earnings quality measures are estimated over the whole sample period (1990–2003) for each firm.

3.2.1. Accounting-based earnings attributes

We consider four accounting-based earnings attributes.

Accruals quality

Our accruals quality measure is derived from the Dechow and Dichev (2002) model, hereafter referred to as DD. The DD model is based on the extent to which working capital accruals map into cash flow realizations, where a poor match means low accruals quality. Therefore, we regress working capital accruals on prior, current, and future cash flows from operations:[4]

$$\mathrm{WCA}_{i,t} = \beta_{0,i} + \beta_{1,i}\mathrm{CFO}_{i,t-1} + \beta_{2,i}\mathrm{CFO}_{i,t} + \beta_{3,i}\mathrm{CFO}_{i,t+1} + \mathrm{v}_{i,t} \quad (2)$$

where $\mathrm{WCA}_{i,t}$ is firm *i*'s working capital accruals in year *t*, and $\mathrm{CFO}_{i,t}$ is firm *i*'s cash flow from operations in year *t*. All variables are scaled by total assets at the beginning of year *t*.

Working capital accruals in year *t* are:

$$\mathrm{WCA}_{i,t} = \Delta\mathrm{CA}_{i,t} - \Delta\mathrm{CL}_{i,t} - \Delta\mathrm{Cash}_{i,t} + \Delta\mathrm{Debt}_{i,t} \quad (3)$$

where $\Delta\mathrm{CA}_{i,t}$ is firm *i*'s change in current assets between year *t*−1 and year *t*; $\Delta\mathrm{CL}_{i,t}$ is firm *i*'s change in current liabilities between year *t*−1 and year *t*; $\Delta\mathrm{Cash}_{i,t}$ is firm *i*'s change in cash between year *t*−1 and year *t*; and $\Delta\mathrm{Debt}_{i,t}$ is firm *i*'s change in debt in current liabilities between year *t*−1 and year *t*.

Cash flow from operations in year *t* is:

$$\mathrm{CFO}_{i,t} = \mathrm{NIBE}_{i,t} - (\Delta\mathrm{CA}_{i,t} - \Delta\mathrm{CL}_{i,t} - \Delta\mathrm{Cash}_{i,t} + \Delta\mathrm{Debt}_{i,t} - \mathrm{Dep}_{i,t}) \quad (4)$$

where $\mathrm{NIBE}_{i,t}$ is firm *i*'s net income before extraordinary items in year *t*, and $\mathrm{Dep}_{i,t}$ is firm *i*'s depreciation and amortization expense in year *t*. Consistent with

[4] We do not add to the DD model the fundamental accounting variables from the Jones (1991) model, as suggested by McNichols (2002), because this will reduce the number of observations.

prior literature, we use the balance sheet approach to compute working capital accruals because many firms are not required to prepare, or do not consistently report cash flows statement during our sample period.

After estimating equation (2) for each firm i, we compute our accruals quality measure as the standard deviation of residuals:

$$AQ_i = \sigma(v_{it}) \tag{5}$$

Higher values of AQ indicate poorer accruals quality because less of the variation in current accruals is explained by operating cash flow realizations. As earnings are the sum of accruals and cash flows, and the cash flow component is normally considered to be objective and not manipulated, the quality of earnings depends on the quality of accruals. Therefore, poorer accruals quality implies a lower level of earnings quality.

Earnings persistence

To compute earnings persistence we estimate for each firm:

$$E_{i,t} = \mu_{0,i} + \mu_{1,i}E_{i,t-1} + \upsilon_{i,t} \tag{6}$$

where $E_{i,t}$ is firm i's net income before extraordinary items in year t divided by the weighted average number of outstanding shares during year t.

Similar to Lev (1983) and Ali and Zarowin (1992), we derive from equation (6) our measure of earnings persistence as the regression slope coefficient estimate:

$$PERS_i = -\mu_{1,i} \tag{7}$$

Higher values of PERS indicate a lower level of earnings persistence and more transitory earnings. Persistent earnings are viewed as higher-quality earnings because they are sustainable.

Earnings predictability

Lipe (1990) provides an earnings predictability measure based on the variance of earnings shocks, where higher variance implies lower predictability. We derive our earnings predictability measure from equation (6) as the square root of the estimated error variance:

$$PRED_i = [\sigma^2(\upsilon_{i,t})]^{(1/2)} \tag{8}$$

Higher values of PRED indicate a lower level of earnings predictability. More predictable earnings are viewed as higher-quality earnings. While PERS is related to both the level of earnings and the variability of innovation series, PRED is related only to the variability of innovation series.

Earnings smoothness

We measure earnings smoothness as the ratio of the firm-level standard deviation of earnings and the standard deviation of operating cash flows:

$$\text{SMOOTH}_i = \sigma(\text{NIBE}_{i,t})/\sigma(\text{CFO}_{i,t}) \tag{9}$$

where $\text{NIBE}_{i,t}$ and $\text{CFO}_{i,t}$ are both scaled by total assets at the beginning of year t. $\text{CFO}_{i,t}$ is computed as described before. Leuz *et al.* (2003) use a similar measure in their country-level study of earnings management.

Values below one indicate more variability in operating cash flows than in earnings, which implies the use of accruals to smooth earnings. Higher values of SMOOTH indicate less earnings smoothness.

Smoothness is typically seen as a desirable attribute of earnings. Financial analysts and investors view volatility of earnings as undesirable and indicative of a low quality of earnings. Smoothness is a natural result of accrual accounting. Accruals allow for a better record of real economic transactions (e.g., Dechow, 1994; Dechow *et al.*, 1998), and thereby improve the quality of earnings.

The use of accruals requires management judgement and estimates, however, which may introduce measurement error. Managers might also use accruals in an opportunistic way and thereby compromise the quality of earnings. The trade-off of these conflicting effects has been analysed in the earnings management literature, but it is beyond the scope of our study. For our purposes, we assume that smoothness is a desirable attribute of earnings, and thus less earnings smoothness implies poorer earnings quality.

3.2.2. Market-based earnings attributes

We consider three market-based earnings attributes.

Value relevance

Following Francis and Schipper (1999), we measure value relevance as the explanatory power of the regression:

$$\text{RET}_{i,t} = \lambda_{0,i} + \lambda_{1,i}\text{EARN}_{i,t} + \lambda_{2,i}\Delta\text{EARN}_{i,t} + \mu_{i,t} \tag{10}$$

where $\text{RET}_{i,t}$ is firm i's 15-month return ending 3 months after the end of fiscal year t; $\text{EARN}_{i,t}$ is firm i's net income before extraordinary items in year t, scaled by market value at the beginning of year t; and $\Delta\text{EARN}_{i,t}$ is firm i's change in net income before extraordinary items of firm i between year $t-1$ and year t, scaled by market value at the beginning of year t.

We estimate equation (10) for each firm and derive the regression's explanatory power:

$$\text{RELEV}_i = -\text{R}^2_{i,\text{eq.}(10)} \tag{11}$$

Higher values of RELEV imply lower value-relevant earnings and therefore poorer earnings quality. The value relevance of earnings (that is, the ability of earnings to explain variations in returns or prices) is a desirable attribute, as it is usually seen as a direct measure of the decision usefulness of earnings.

Earnings timeliness

We compute our measures of earnings timeliness and earnings conservatism using the regression:

$$\text{EARN}_{i,t} = \varphi_{0,i} + \varphi_{1,i}\text{NEG}_{i,t} + \varphi_{2,i}\text{RET}_{i,t} + \varphi_{3,i}\text{NEG}_{i,t}\text{RET}_{i,t} + \eta_{i,t} \tag{12}$$

where $\text{NEG}_{i,t} = 1$ if $\text{RET}_{i,t} < 0$ and zero otherwise, and the other variables are as defined before. We estimate equation (12) for each firm, and like Ball *et al.* (2000) and Raonic *et al.* (2004), we measure earnings timeliness as follows:

$$\text{TIMEL}_i = -\text{R}^2_{i,\text{eq.}(12)} \tag{13}$$

Higher values of TIMEL imply less timely earnings and poorer earnings quality. Earnings that reflect the information incorporated in stock returns more quickly are seen by investors as being of higher quality.

Earnings conservatism

We measure earnings conservatism in terms of the asymmetric incorporation into earnings of economic losses (measured as negative stock returns) and economic gains (measured as positive stock returns). Following Basu (1997) and Pope and Walker (1999), our earnings conservatism measure is derived from equation (12) as follows:

$$\text{CONSER}_i = -(\varphi_{2,i} + \varphi_{3,i})/\varphi_{2,i} \tag{14}$$

Higher values of CONSER imply lower conservative earnings and a poorer quality of earnings. Conservative accounting is expected to reveal information that managers might have incentives to hide otherwise, so investors usually see conservatism as a desirable attribute of earnings.

3.2.3. *Aggregate earnings quality measure*

To compute the aggregate earnings quality measure, EQ, we start by ranking firms on a scale from zero to 100, according to each of the seven individual measures of earnings quality (AQ, PERS, PRED, SMOOTH, RELEV, TIMEL, and

CONSER). We compute the aggregate earnings quality measure for each firm by averaging its rankings for the seven individual measures. Higher rankings indicate higher levels of earnings quality.

To assess whether our aggregate earnings quality ranking is capturing different aspects of earnings quality, we compute Pearson and Spearman correlations among the seven individual measures (results not tabulated). Although there is some relation between our earnings quality measures, we conclude that each one captures different aspects of earnings quality, so we include them all. [5]

3.2.4. Limitations of earnings quality measures

The usefulness of our results depends on how well we measure earnings quality. Although all these earnings quality metrics have been used in the literature, they are not beyond criticism or free from concerns. By using an aggregate measure of earnings quality, we hope to mitigate possible concerns about measurement error and omitted variables.

One concern related to our market-based earnings attributes is how well stock returns can proxy for economic income, given less liquid capital markets in some countries in our sample, particularly emerging markets. In fact, we do not expect stock prices to be uniformly informative across countries.

Another concern is related to our accruals quality measure. Wysocki (2006) posits that the DD model, which is the base of our metric, fails to capture a firm's earnings quality because there is a strong negative correlation between contemporaneous cash flows and accruals.

Finally, while we consider that less earnings smoothness implies poorer earnings quality, some authors see smoothness as an undesirable attribute of earnings. Bhattacharya *et al.* (2003) argue that earnings smoothness increases earnings opacity, and Leuz *et al.* (2003) take earnings smoothness as a measure of earnings management.[6]

3.2.5. Earnings quality measures and information risk

Empirical research has used different proxies for the information risk associated with accounting information. For example, Bhattacharya *et al.* (2003) define information risk as the 'variety of risks that investors may face as a result of possessing inadequate or imprecise information on which to base their investment decisions' (p. 642) and focus on country-level earnings opacity to study the

[5] The highest correlation value is between RELEV and TIMEL, about 0.57 for both Pearson and Spearman correlations.

[6] As a sensitivity test, we re-compute the aggregate earnings quality rankings considering that less earnings smoothness implies higher earnings quality, and the results (not tabulated) are consistent with our primary findings.

relation between information risk and the cost of equity worldwide. Francis *et al.* (2005) define information risk as 'the likelihood that firm-specific information that is pertinent to investor pricing decisions is of poor quality' (p. 296) and identify accruals quality as a measure of information risk associated with accounting earnings.

In our study, we consider that information risk is associated with the level of imprecision and uncertainty of reported earnings and assume that each of the seven earnings attributes that compound our aggregate earnings quality measure is directly linked to information risk. As Francis *et al.* (2004) posit, accounting-based earnings attributes proxy for the uncertainty in earnings as an informative signal to investors about the payoff structure, and the market-based earnings attributes proxy for the investor's perception of that uncertainty.

4. Sample and variables

We first describe sample construction and present descriptive statistics of firm valuation and earnings quality measures. Then, we discuss the firm-level and country-level control variables used to study the relation between firm valuation and earnings quality.

4.1. Sample

Firm valuation, earnings quality measures, and firm-level variables are computed using accounting and financial data from the Worldscope database for the 1990–2003 period.

Our sample begins with all non-financial firms (financial firms SIC 6000-6999 are excluded).[7] Each firm must have income statement and balance sheet information for at least seven consecutive years. We calculate Tobin's Q for each year and take an average across the whole sample period. We compute individual and aggregate earnings quality measures over the whole sample period (1990–2003). We use a long period to estimate our measures to reduce estimation error.[8] To avoid drawing spurious inferences from extreme values, we winsorize Tobin's Q, individual earnings quality measures, and control variables at the 1st and 99th percentiles.

Table 1 reports mean values of Tobin's Q (Q) and the aggregate earnings quality ranking (EQ) by country, as well as the number of firms (*N*) for each country. The final sample consists of 7211 firms in 38 countries (22 developed and 16

[7] Financial firms are excluded to make the sample more homogeneous and the results more comparable across firms.

[8] Results (not tabulated here) using a shorter window (e.g., 1997–2003) are consistent with our primary findings.

Table 1
Firm valuation and earnings quality by country

Country	Q	EQ	GDP	MCAP	LEGAL	*N*
Argentina	1.12	39.22	8.78	0.28	21.40	23
Australia	1.56	48.35	9.96	0.73	40.00	184
Austria	1.30	50.66	10.30	0.14	20.00	47
Belgium	1.42	50.72	10.23	0.52	0.00	67
Brazil	0.96	48.51	8.31	0.25	18.96	87
Canada	1.60	46.91	9.95	0.76	50.00	341
Chile	1.34	53.01	8.41	0.80	35.10	59
China	1.34	48.03	6.62	0.23	5.35	93
Denmark	1.37	48.12	10.46	0.43	20.00	118
Finland	1.33	49.79	10.21	0.86	30.00	77
France	1.35	51.99	10.21	0.54	26.94	392
Germany	1.50	49.09	10.30	0.36	9.23	386
Greece	1.88	56.70	9.40	0.40	12.36	77
Hong Kong	1.26	43.80	10.01	2.48	41.10	216
India	1.72	50.70	6.01	0.28	20.85	185
Indonesia	1.36	39.18	6.90	0.20	7.96	108
Ireland	1.43	47.31	9.98	0.58	31.20	43
Israel	1.43	54.09	9.71	0.42	14.46	18
Italy	1.28	53.77	9.90	0.31	8.33	118
Japan	1.30	50.24	10.62	0.73	35.92	1534
Korea (South)	1.01	42.93	9.29	0.39	10.70	216
Malaysia	1.62	43.85	8.32	1.72	27.12	245
Mexico	1.33	46.53	8.22	0.28	5.35	57
Netherlands	1.57	54.06	10.23	0.96	20.00	141
New Zealand	1.54	49.43	9.71	0.46	40.00	33
Norway	1.44	47.41	10.47	0.31	40.00	85
Pakistan	1.31	52.03	6.20	0.15	15.15	41
Peru	1.18	48.75	7.72	0.17	7.50	17
Philippines	1.34	45.48	6.98	0.53	8.19	54
Portugal	1.10	52.79	9.36	0.32	26.04	53
Singapore	1.39	49.76	10.03	1.44	34.28	144
South Africa	1.49	49.48	8.24	1.51	22.10	111
Spain	1.35	52.95	9.67	0.48	31.20	98
Sweden	1.54	49.09	10.25	0.82	30.00	125
Switzerland	1.44	51.23	10.70	1.70	20.00	128
Taiwan	1.49	50.83	9.36	0.89	25.56	185
Thailand	1.32	41.85	7.83	0.48	12.50	188
United Kingdom	1.70	45.90	9.94	1.30	42.85	1117
Total	1.44	48.45	9.70	0.84	29.42	7211

This table presents the mean value of Tobin's Q (Q), the mean value of earnings quality rankings (EQ), country-level variables (GDP, MCAP, and LEGAL) and the number of observations (*N*) by country. Q is computed as total assets plus market value of equity less book value of equity over total assets. EQ is the average rank across seven individual earnings quality measures: accruals quality, persistence, predictability, smoothness, relevance, timeliness, and conservatism. Q and EQ are computed using data from Worldscope database. GDP measures the level of economic development and is the log of gross domestic product per capita. MCAP measures the level of financial development and is calculated as the stock market capitalization divided by gross domestic product. GDP and MCAP are computed using data from the World Development Indicators database. LEGAL measures the quality of legal institutions and is the product of 'anti-director rights' and 'rule of law' measures created by La Porta *et al.* (1998). The sample period is from 1990 to 2003.

emerging markets). Firms in emerging countries represent about 23 per cent of the total. The number of firms ranges from 17 (in Peru) to 1534 (in Japan).

The sample mean value of Q is 1.44. A higher value of Tobin's Q indicates a higher level of firm value. The countries with the highest Q are Greece (1.88), India (1.72) and the United Kingdom (1.70), and the countries with the lowest Q are Brazil (0.96) and Korea (South) (1.01). The statistics indicate a substantial degree of variation in Tobin's Q values across countries. The mean value of Q is higher than its median value (see Panel A of Table 2), which suggests a skewed distribution.

The sample mean value of EQ is 48.45. A higher aggregate ranking implies a higher level of earnings quality. Q varies more across countries than EQ. Indeed, the coefficient of variation (ratio of standard deviation to mean) is 0.46 for Q compared to 0.28 for EQ (not tabulated).

4.2. Firm-level characteristics

To examine the relation between firm value and earnings quality, we control for firm characteristics that have been shown to be related to Tobin's Q (e.g., Doidge *et al.*, 2004; Durnev and Kim, 2005; Aggarwal *et al.*, 2009). We consider several firm-level variables: firm size, investment opportunities, external finance dependence, capital expenditures, capital intensity, insider ownership, cross-listing in the United States, and foreign sales. We take averages across the whole sample period for each firm-level control variable consistent with our procedure of estimating firm value.

Firm size and growth opportunities have been identified as important determinants of firm valuation. Financial markets value firms' growth opportunities, and earlier studies have found evidence that firm value is positively related to growth opportunities (e.g., Durnev and Kim, 2005). Therefore, as smaller and younger firms usually have more growth opportunities, we should expect a negative relation between firm size and value. Firm size (SIZE) is measured as the log of total assets in thousands of US dollars.

We use two variables to capture the effect of growth opportunities: INVOP is a direct proxy for investment opportunities, and EXTFIN is a proxy for dependence on external financing. Firms with more investment opportunities may need to raise external capital to finance these investments.

INVOP is measured as the annual sales growth rate in US dollars. Following Rajan and Zingales (1998), EXTFIN is calculated as capital expenditures minus cash flow from operations divided by capital expenditures using data from US firms in the same industry (two-digit SIC). We expect both variables to be positively related to firm value.

As an additional control for a firm's potential investment opportunities, we also use the ratio of capital expenditures to total assets (CAPEX). Consistent with prior research results (e.g., Lang *et al.*, 2003; Allayannis *et al.*, 2008), we expect this ratio to be positively related to firm value.

Table 2
Descriptive statistics and correlation matrix

Panel A: Descriptive statistics

	Mean	Median	Std Dev	Min	Max	*N*
Q	1.44	1.24	0.66	0.46	6.93	7211
EQ	48.45	48.64	13.63	7.79	85.61	7211
SIZE	12.49	12.37	1.71	6.81	18.61	7211
INVOP	0.03	0.03	0.06	−0.31	0.66	7173
EXTFIN	0.44	0.14	1.10	−2.04	15.23	7211
CAPEX	0.06	0.05	0.04	0.00	0.31	7159
PPE	0.36	0.34	0.20	0.01	0.93	7207
CLOSE	0.46	0.47	0.21	0.00	1.00	6955
ADR	0.06	0.00	0.24	0.00	1.00	7211
FXSALES	0.18	0.00	0.25	0.00	1.00	7211
GDP	9.70	9.96	1.12	6.01	10.70	7211
MCAP	0.84	0.73	0.50	0.14	2.48	7211
LEGAL	29.42	34.28	12.67	0.00	50.00	7211

Panel B: Correlation matrix

	Q	EQ	SIZE	INVOP	EXTFIN	CAPEX	PPE	CLOSE	ADR	FXSALES
Q	1.00									
EQ	0.08	1.00								
SIZE	−0.51	−0.02	1.00							
INVOP	0.53	0.22	−0.41	1.00						
EXTFIN	0.10	0.00	−0.10	0.09	1.00					
CAPEX	0.00	−0.03	0.08	0.05	0.02	1.00				
PPE	−0.22	0.01	0.21	−0.13	−0.03	0.59	1.00			
CLOSE	0.13	0.10	0.09	0.06	0.12	0.03	−0.02	1.00		
ADR	0.12	−0.11	0.25	0.11	0.01	0.11	−0.01	−0.13	1.00	
FXSALES	0.04	−0.18	−0.05	0.01	−0.01	0.08	−0.16	−0.20	0.32	1.00

This table presents descriptive statistics and correlations among firm-level variables. Variables are averages over the whole sample period. The sample period is from 1990 to 2003. Panel A reports the mean, median, standard deviation (Std Dev), minimum (Min), maximum (Max) and number of observations (*N*) for each variable. Panel B reports Pearson correlations among firm-level variables. Q is Tobin's Q value. EQ is earnings quality ranking. SIZE is the log of total assets. INVOP is investment opportunities given by annual sales growth. EXTFIN is external finance dependence computed as capital expenditures minus cash flow from operations divided by capital expenditures. CAPEX is the ratio of capital expenditures to total assets. PPE is the ratio of property, plant, and equipment to total assets. CLOSE is insider ownership measured as percentage of shares held by insiders. ADR is a dummy variable that equals one if the stock is cross-listed on a US stock market (ordinary listings or level 2 and 3 ADRs) during the sample period, and zero otherwise. FXSALES is foreign sales as percentage of total sales. Data on firm-level variables are from Worldscope database. GDP measures the level of economic development and is the log of gross domestic product per capita. MCAP measures the level of financial development and is calculated as the stock market capitalization divided by gross domestic product. GDP and MCAP are computed using data from the World Development Indicators database. LEGAL measures the quality of legal institutions and is the product of 'anti-director rights' and 'rule of law' measures created by La Porta *et al.* (1998).

We use the ratio of property, plant, and equipment to total assets (PPE) to control for the impact of capital intensity on firm value. Earlier studies have documented that firms with more intangible assets (i.e., lower capital intensity) have a higher Tobin's Q (e.g., Klapper and Love, 2004). In fact, the level of intangibles may affect Tobin's Q in two different ways. The market value of intangibles is in general higher than their book values, and the denominator of the ratio does not fully account for all intangibles. Therefore, we expect PPE to be negatively related to firm value.

Differences in firm value across firms may also be driven by differences on insider ownership concentration. According to Jensen and Meckling's (1976) convergence of interest hypothesis, we should expect to find a positive relation between firm value and insider ownership, because greater insider ownership should lead to more convergence of interest between insider and outsider shareholders on the maximization of firm value. At the same time, greater insider ownership may also result in greater degree of management entrenchment and so, according to Shleifer and Vishny's (1989) management entrenchment hypothesis, we should expect to find a negative relation between firm value and insider ownership.

In fact, prior research has documented a nonlinear relation between insider ownership and firm value (e.g., McConnell and Servaes, 1990; Kiefer, 2004), so we do not have a clear prediction for the coefficient sign of insider ownership. Insider ownership (CLOSE) is defined as the percentage of shares held by insiders ('Closely Held Shares' in Worldscope).

We also account for the possibility that valuations are higher for firms cross-listed on US exchanges. Several studies have identified cross-listing on a US exchange as having unique governance and bonding benefits, thereby reducing firms' cost of capital and hence increasing firms' value (e.g., Doidge *et al*., 2004). ADR is a dummy variable that equals one if the stock is cross-listed on a US exchange (ordinary listings, or level 2 and 3 ADRs) during the sample period, and zero otherwise. Data on foreign firms listing in the US market (NYSE, Nasdaq and AMEX) are obtained from the primary depository institutions (Citibank, Bank of New York, JP Morgan, and Deutsche Bank) and the stock exchanges. We expect ADR to be positively related to firm value.

Finally, we control for the role of firm internationalization in valuation, proxied by the percentage of foreign sales (FXSALES). A higher percentage of foreign sales may indicate a greater exposure to globalization benefits, in terms of both business risk and access to external capital markets, positively affecting the value of the firm. We expect FXSALES to be positively related to firm value.

Panel A of Table 2 reports summary statistics of firm-level control variables. The mean firm in our sample has total assets of US$266 million, an annual sales growth of 3 per cent, and 46 per cent of its shares are closely held shares. CAPEX and PPE represent on average 6 per cent and 36 per cent of its total assets. Only 6 per cent of the firms in our sample are cross-listed on a US exchange. EXTFIN and INVOP are the firm-level variables with the highest coefficient of variation values, 2.49 and 1.64, respectively (not tabulated).

Panel B of Table 2 shows the Pearson correlations among firm-level variables. Overall, the correlation values are low, which suggests that our firm-level variables capture different aspects of firm characteristics and that there are no multicollinearity concerns with our results. The absolute values range from 0.00 to 0.59.

The correlations between EQ and each control variable are low (the maximum is 0.22), which suggests that earnings quality is a distinct firm characteristic and not a by-product determined by the other firm characteristics. Q is negatively correlated with SIZE and PPE and positively correlated with EQ and the other control variables. The most highly correlated variables with Q are INVOP (0.53) and SIZE (−0.51).

4.3. Country-level characteristics

We consider three country-level characteristics that prior research has shown to have an impact on Tobin's Q (e.g., Doidge *et al*., 2004; Aggarwal *et al*., 2009): the level of economic development, the level of financial development, and the quality of legal institutions.[9]

The level of economic development (GDP) is measured as the log of gross domestic product per capita. The level of financial development (MCAP) is proxied by stock market capitalization divided by gross domestic product. GDP and MCAP are computed using data from the World Development Indicators (WDI) database and are averages across the whole sample period. Following Durnev and Kim (2005), we measure the quality of legal institutions (LEGAL) as the product of the 'anti-director rights' and the 'rule of law'. These are measures of shareholder rights and enforcement, respectively, and are taken from La Porta *et al.* (1998).[10]

A better economic infrastructure should make investors more willing to value securities more highly, so we should expect GDP to be positively related to firm valuation. Similarly, investors are willing to pay more for a security when the market is more liquid and developed, and thus the estimation and liquidity risks are lower; and when their rights are better protected by the law, and thus the risk of expropriation is lower. Indeed, prior research has found that firms located in countries with more developed capital markets and better legal environments enjoy higher valuation (e.g., La Porta *et al*., 2002). Thus, we expect both LEGAL and MCAP to be positively related to firm value.

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[9] Differences in accounting practices across countries may affect Tobin's Q. To some extent, legal regime controls for differences in accounting standards and practices across countries. We also use country dummies to account for unobserved country heterogeneity.

[10] 'Anti-director rights' and 'rule of law' values for China are taken from Pistor *et al*. (2000) as they are not available in La Porta *et al*. (1998).

Table 1 presents country-level variables by country and Panel A of Table 2 presents summary statistics. On average, GDP is more than US$16,000, and market capitalization is 84 per cent of gross domestic product. MCAP presents the highest cross-country variation with a coefficient of variation of 0.60 (not tabulated).

5. Empirical results

We first investigate the relation between firm value and earnings quality around the world. Then, we study the role of investment opportunities and the role of country-level investor protection in shaping the relation between firm valuation and earnings quality.

5.1. Relation between firm valuation and earnings quality

While there is scarce empirical evidence on the relation between earnings quality and firm valuation, theory and empirical evidence on the effects of earnings quality on the cost of capital suggest that earnings of poorer quality lead to greater information risk, which results in a higher cost of capital. As the firm market valuation represents the unbiased present value of expected current and future cash flows discounted at the risk-adjusted cost of capital, a reduction in the firm's cost of capital implies an increase in firm value. Thus, we hypothesize that firms with higher earnings quality enjoy higher firm valuation, so we expect to find a positive relation between Tobin's Q and earnings quality rankings.

To test our hypothesis, we estimate the valuation cross-sectional regression:

$$\begin{aligned} Q_i = {} & b_0 + b_1 EQ_i + b_2 SIZE_i + b_3 INVOP_i + b_4 EXTFIN_i + b_5 CAPEX_i \\ & + b_6 PPE_i + b_7 CLOSE_i + b_8 ADR_i + b_9 FXSALES_i + c_1 GDP_j \\ & + c_2 MCAP_j + c_3 LEGAL_j + \varepsilon_i \end{aligned} \tag{15}$$

where Q_i is the Tobin's Q value of firm i, and EQ_i is the aggregate earnings quality ranking of firm i. The firm-level and country-level variables are as described earlier. We also consider industry dummies (two-digit SIC) to control for differences in asset structure, accounting practices, competitiveness, and regulation that may affect firm valuation (Durnev and Kim, 2005).

Table 3 reports the results. We use different specifications of the model to better test the association between firm value and the earnings quality. We find that the EQ coefficient is positive and significant in all specifications, suggesting a positive relation between firm value and earnings quality, which is consistent with our expectation that firms with better earnings quality enjoy higher market valuation.

Column (1) shows estimates of a regression of Tobin's Q on earnings quality rankings (EQ) and firm size (SIZE), as well as on country-level variables. We find that Q is positively related to EQ and negatively related to SIZE, which

Table 3
Firm valuation and earnings quality

	(1)	(2)	(3)	(4)	(5)	(6)
EQ	0.0036***	0.0018***	0.0022***	0.0031***	0.0014***	0.0018***
	(6.73)	(3.45)	(4.28)	(5.79)	(2.61)	(3.36)
SIZE	−0.0459***	−0.0395***	−0.0536***	−0.0318***	−0.0323***	−0.0500***
	(−8.98)	(−7.50)	(−9.85)	(−6.02)	(−5.69)	(−8.29)
INVOP		2.0833***	1.9625***		2.0819***	1.9873***
		(10.52)	(10.30)		(10.41)	(10.26)
EXTFIN		0.0011	−0.0002		0.0015	0.0006
		(0.05)	(−0.01)		(0.07)	(0.03)
CAPEX		3.2154***	3.0408***		2.9351***	2.8937***
		(12.15)	(11.67)		(10.62)	(10.72)
PPE		−1.0108***	−0.9993***		−0.9810***	−0.9674***
		(−18.29)	(−18.12)		(−17.28)	(−17.17)
CLOSE		−0.2061***	−0.1793***		−0.1629***	−0.1286***
		(−5.56)	(−4.89)		(−3.60)	(−2.87)
ADR			0.3197***			0.3343***
			(7.77)			(7.98)
FXSALES			0.0603*			0.0998**
			(1.81)			(2.46)
GDP	−0.0322***	−0.0497***	−0.0476***			
	(−3.46)	(−4.74)	(−4.44)			
MCAP	0.0528***	0.0691***	0.0701***			
	(2.83)	(3.81)	(3.71)			
LEGAL	0.0029***	0.0034***	0.0027***			
	(3.61)	(4.16)	(3.23)			
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Country dummies	No	No	No	Yes	Yes	Yes
Adjusted *R*-squared	0.168	0.263	0.274	0.211	0.293	0.305
N	7211	6870	6870	7211	6870	6870

This table presents estimates of coefficients of the cross-sectional regression at the firm-level of:

$$Q_i = b_0 + b_1\,EQ_i + b_2\,SIZE_i + b_3\,INVOP_i + b_4\,EXTFIN_i + b_5\,CAPEX_i + b_6\,PPE_i + b_7\,CLOSE_i + b_8\,ADR_i + b_9\,FXSALES_i + c_1\,GDP_j + c_2\,MCAP_j + c_3\,LEGAL_j + \varepsilon_i$$

where Q is Tobin's Q, defined as total assets plus market value of equity less book value of equity over total assets. EQ is earnings quality ranking, calculated as the average rank across the seven individual measures. SIZE is the log of total assets. INVOP is investment opportunities given by annual sales growth. EXTFIN is external finance dependence computed as capital expenditures minus cash flow from operations divided by capital expenditures. CAPEX is the ratio of capital expenditures to total assets. PPE is the ratio of property, plant, and equipment to total assets. CLOSE is insider ownership measured as percentage of shares held by insiders. ADR is a dummy variable that equals one if the stock is cross-listed on a US exchange (ordinary listings or level 2 and 3 ADRs) during the sample period, and zero otherwise. FXSALES is foreign sales as a percentage of total sales. Country-level explanatory variables are as follows: GDP, the log of gross domestic product per capita; MCAP, the stock market capitalization divided by gross domestic product; and LEGAL, the product of 'anti-director rights' and 'rule of law' measures. Firm-level and country-level variables are averages over the whole sample period. The sample period is from 1990 to 2003. Regressions include industry fixed-effects (two-digit SIC) and country fixed-effects in alternative to country-level variables. Robust *t*-statistics are in parentheses. ***, **, and * indicates significance at the 1, 5, and 10 per cent levels, respectively.

suggests that smaller firms with higher earnings quality rankings have higher market valuation. In the case of the country-level variables, Q is positively related to MCAP and LEGAL, which is consistent with the arguments that firms in countries with more developed capital markets and better legal environments enjoy higher valuations. The negative coefficient on GDP may indicate that economic development is of second-order importance relative to the other country-level variables in explaining firm market valuation.[11]

Column (2) shows the estimates when we add to the specification in column (1) five firm-level control variables: investment opportunities (INVOP), external finance dependence (EXTFIN), capital expenditures (CAPEX), capital intensity (PPE), and insider ownership (CLOSE). Controlling for all these firm characteristics raises the adjusted R^2 from 16.8 per cent to 26.3 per cent. Most important, we still find that the EQ is positive and significant. The coefficients on the control variables have the expected signs and are consistent with findings in previous studies. Firms with high growth opportunities, greater capital expenditures, lower capital intensity, and lower insider ownership are valued more highly.

Finally, in column (3), we present the results when we add to the regression in column (2) the last two firm-level variables: cross-listing dummy (ADR) and foreign sales (FXSALES). When we control for these variables, the adjusted R^2 increases to 27.4 per cent. Results show a positive and significant relation between Q and ADR, which is consistent with the arguments that firms that are cross-listing in a major US market are valued more highly. The FXSALES coefficient is positive but significant only at the 10 per cent level.

So far, we have controlled for the impact of the country environment on the relation between firm value and earnings quality using country-level variables. In the last three columns of Table 3, we show the results when we repeat the specifications of columns (1) through (3) using country dummies instead of country-level variables. By using country fixed-effects, we expect to control for unobserved heterogeneity and reduce the potential omitted variables bias.

Results show that EQ coefficient remains positive and significant even after controlling for all the unobserved country heterogeneity, which suggests that the relation between Q and EQ is not spurious or caused by any omitted variable. The signs and significance of the coefficients on the control variables are similar across the models. The only exception is FXSALES, which now has a positive and significant coefficient at the 5 per cent level, suggesting that firms that export more, and thereby are more exposed to globalization pressures and incentives, enjoy higher valuations. As expected, using country fixed-effects, instead of country level-variables, increases the regression adjusted R^2s. In fact, the results show that our full specification (column (6)) explains 30.5 per cent of the variation in Tobin's Q, compared with 27.4 per cent in column (3).

[11] Other studies also find a negative relation between GDP and firm value (e.g., Doidge *et al*., 2004; Aggarwal *et al*., 2009).

To summarize, we find a positive relation between firm value and earnings quality, controlling for industry heterogeneity, as well as for firm and country characteristics that have been considered determinants of firm valuation. The relation remains positive and statistically significant even after controlling for all the unobserved country heterogeneity. Moreover, the relation is economically significant. A move from the 25th percentile of EQ to the 75th percentile increases firm valuation by about 4 per cent (for a mean Tobin's Q of 1.44). Therefore, our results support our hypothesis that firms with better earnings quality enjoy higher market valuations, suggesting that the market punishes poor earnings quality firms.[12]

5.2. *Role of investment opportunities*

Investment opportunities have been considered in the literature to be an important determinant of firm valuation (e.g., Durnev and Kim, 2005). In our early tests, we have found a positive relation between the level of investment opportunities and firm's value. Apart from its direct effect on firm valuation, however, the level of investment opportunities may also have interaction effects with earnings quality. Thus, we now investigate the role of investment opportunities in shaping the relation between firm value and earnings quality.

We use three different interaction variables: EQ × INVOP, EQ × EXTFIN, and EQ × CAPEX. All variables are defined as before. We add these interaction variables to the cross-sectional regression in equation (15) and present the results in Table 4.

We find that the coefficients on the interaction variables are positive and significant (EQ × EXTFIN only at the 10 per cent level), which suggests that the impact of earnings quality on firm valuation is conditional on the level of investment opportunities available to the firm. For example, the results indicate that an increase in sales growth of one percentage point increases the impact of earnings quality on firm valuation by 5 per cent (see column (1)). Moreover, the EQ coefficient is no longer significant in columns (1) and (3), which emphasizes the role of investment opportunities and the need to access capital markets in the relation between earnings quality and firm valuation.

5.3. *Role of investor protection*

Legal environment has also been considered in the literature to be an important determinant of firm valuation (e.g., La Porta *et al.*, 2002). In our first tests, we find that LEGAL, our proxy for the quality of legal institutions, is positively

[12] As robustness, we estimate the valuation cross-sectional regression equation (15) for each earnings quality measure and the results are similar to those presented to the aggregate earnings quality rankings. The effect is stronger for accounting-based earnings attributes than for market-based earnings attributes.

Table 4
Firm valuation and earnings quality: role of investment opportunities

	(1)	(2)	(3)
EQ	0.0004	0.0014**	0.0007
	(0.78)	(2.31)	(0.76)
SIZE	−0.0529***	−0.0533***	−0.0535***
	(−9.72)	(−9.90)	(−9.83)
INVOP	−0.4217	1.9645***	1.9675***
	(−0.77)	(10.32)	(10.33)
EXTFIN	−0.0017	−0.0796**	−0.0006
	(−0.08)	(−2.02)	(−0.03)
CAPEX	2.9626***	3.0440***	1.7157**
	(11.35)	(11.67)	(2.53)
PPE	−0.9895***	−1.0054***	−0.9987***
	(−17.98)	(−18.14)	(−18.11)
CLOSE	−0.1744***	−0.1796***	−0.1789***
	(−4.77)	(−4.90)	(−4.88)
ADR	0.3171***	0.3207***	0.3200***
	(7.69)	(7.80)	(7.78)
FXSALES	0.0552*	0.0616*	0.0623*
	(1.66)	(1.84)	(1.86)
GDP	−0.0457***	−0.0481***	−0.0477***
	(−4.26)	(−4.52)	(−4.45)
MCAP	0.0695***	0.0704***	0.0693***
	(3.69)	(3.72)	(3.66)
LEGAL	0.0027***	0.0027***	0.0027***
	(3.23)	(3.25)	(3.27)
EQ × INVOP	0.0525***		
	(4.47)		
EQ × EXTFIN		0.0017*	
		(1.73)	
EQ × CAPEX			0.0264**
			(2.05)
Industry dummies	Yes	Yes	Yes
Adjusted *R*-squared	0.274	0.276	0.275
N	6870	6870	6870

This table presents estimates of coefficients of the cross-sectional regression at the firm-level of:

$$Q_i = b_0 + b_1\,EQ_i + b_2\,SIZE_i + b_3\,INVOP_i + b_4\,EXTFIN_i + b_5\,CAPEX_i + b_6\,PPE_i + b_7\,CLOSE_i + b_8\,ADR_i + b_9\,FXSALES_i + c_1\,GDP_j + c_2\,MCAP_j + c_3\,LEGAL_j + \varepsilon_i$$

where Q is Tobin's Q, defined as total assets plus market value of equity less book value of equity over total assets. EQ is earnings quality ranking, calculated as the average rank across the seven individual measures. SIZE is the log of total assets. INVOP is investment opportunities given by annual sales growth. EXTFIN is external finance dependence computed as capital expenditures minus cash flow from operations divided by capital expenditures. CAPEX is the ratio of capital expenditures to total assets. PPE is the ratio of property, plant, and equipment to total assets. CLOSE is insider ownership measured as percentage of shares held by insiders. ADR is a dummy variable that equals one if the stock is cross-listed on a US exchange (ordinary listings or level 2 and 3 ADRs) during the sample period, and zero otherwise. FXSALES is foreign sales as a percentage of total sales. Country-level explanatory variables are as follows: GDP, the log of gross domestic product per capita; MCAP, the stock market capitalization divided by gross domestic product; and LEGAL, the product of 'anti-director rights' and 'rule of law' measures. Firm-level and country-level variables are averages over the whole sample period. The sample period is from 1990 to 2003. Regressions also include industry fixed-effects (two-digit SIC). Robust *t*-statistics are in parentheses. ***, **, and * indicates significance at the 1, 5, and 10 per cent levels, respectively.

related to firm valuation. To further explore the relation between firm value and earnings quality, we now investigate the role of investor protection.

To examine whether the impact of earnings quality on valuation is conditional on the level of investor protection, we split the sample into two groups of countries: high investor protection, those with a LEGAL index above the median, and low investor protection, those with a LEGAL index below the median. LEGAL is the product of 'investor rights' and the 'rule of the law' measures, as defined before. Table 5 presents the results.

The results show that the EQ coefficient is positive and significant in both groups of countries, with the exception of column (2) for the high investor protection sample (Panel A). The effect of EQ on Tobin's Q is, however, much stronger in low investor protection countries (Panel B) than in high investor protection countries (Panel A). The EQ coefficient in column (3) for the low investor protection sample is more than double that in column (3) for the high investor protection country, and the difference is statistically significant. This finding suggests that the positive relation between earnings quality and firm value is stronger in poorer-quality legal environments. It seems that a firm can compensate a poor legal environment by adopting higher earnings quality and that the stock markets reward these firms with higher valuations. Durnev and Kim (2005) and Klapper and Love (2004) also find that the positive relation between corporate governance and firm valuation is stronger in less investor-friendly countries.

6. Robustness and additional results

We conduct several sensitivity tests to examine the robustness of our results: additional firm-level control variables, alternative sample compositions, and alternative model specifications. We also address the endogeneity issue in the last section.

6.1. Additional firm-level variables

We examine whether our primary results are sensitive to the inclusion of additional firm characteristics. We re-estimate the valuation cross-sectional regression in equation (15) with alternative new firm-level control variables and present the results in Table 6.

Column (1) of Table 6 shows the results when we control for the impact of the level of cash holdings (CASH) and financial leverage (DEBT) on firm valuation. CASH is measured as the ratio of cash and equivalents to total assets and DEBT is measured as the ratio of long-term debt to total assets.

Results show that our previous findings are not affected; the EQ coefficient remains positive and significant. Like Aggarwal *et al.* (2009), we find that the coefficient on CASH is positive and significant and the coefficient on DEBT is negative but not significant, suggesting that firms with higher levels of cash are

Table 5
Firm valuation and earnings quality: role of investor protection

	Panel A: High investor protection			Panel A: Low investor protection		
	(1)	(2)	(3)	(1)	(2)	(3)
EQ	0.0025***	0.0011	0.0016**	0.0051***	0.0031***	0.0033***
	(3.34)	(1.46)	(2.25)	(6.60)	(3.88)	(4.25)
SIZE	−0.0397***	−0.0411***	−0.0611***	−0.0452***	−0.0403***	−0.0548***
	(−5.62)	(−5.49)	(−7.88)	(−6.12)	(−5.30)	(−6.90)
INVOP		2.1021***	2.0048***		1.9927***	1.9267***
		(7.38)	(7.31)		(7.71)	(7.65)
EXTFIN		−0.0179	−0.0200		0.0156	0.0152
		(−0.78)	(−0.87)		(0.51)	(0.50)
CAPEX		3.5162***	3.3818***		2.8534***	2.7968***
		(8.48)	(8.25)		(7.76)	(7.84)
PPE		−1.0402***	−0.9905***		−0.9650***	−0.9892***
		(−12.73)	(−12.23)		(−12.37)	(−12.63)
CLOSE		−0.4001***	−0.3722***		0.0049	0.0184
		(−6.62)	(−6.24)		(0.11)	(0.40)
ADR			0.3130***			0.3472***
			(5.80)			(5.32)
FXSALES			0.1765***			0.0370
			(3.30)			(0.78)
GDP	−0.1195***	−0.0589**	−0.0138	−0.0245**	−0.0530***	−0.0566***
	(−4.54)	(−2.30)	(−0.54)	(−2.42)	(−4.49)	(−4.54)
MCAP	−0.0434	−0.0061	−0.0236	0.1477***	0.1933***	0.2007***
	(−1.63)	(−0.24)	(−0.82)	(5.16)	(6.87)	(7.21)
LEGAL	0.0145***	0.0044*	0.0009	−0.0008	−0.0010	−0.0013
	(5.53)	(1.72)	(0.36)	(−0.56)	(−0.69)	(−0.90)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted *R*-squared	0.200	0.306	0.32	0.167	0.241	0.252
N	3854	3766	3766	3357	3104	3104

This table presents estimates of coefficients of the cross-sectional regression at the firm-level of:

$$Q_i = b_0 + b_1\,EQ_i + b_2\,SIZE_i + b_3\,INVOP_i + b_4\,EXTFIN_i + b_5\,CAPEX_i + b_6\,PPE_i + b_7\,CLOSE_i + b_8\,ADR_i + b_9\,FXSALES_i + c_1\,GDP_j + c_2\,MCAP_j + c_3\,LEGAL_j + \varepsilon_i$$

where Q is Tobin's Q, defined as total assets plus market value of equity less book value of equity over total assets. Panel A shows the results for firms in high investor protection countries. Panel B shows the results for firms in low investor protection countries. Countries are in the high (low) investor protection group if LEGAL is above (below) the median. EQ is earnings quality ranking, calculated as the average rank across the seven individual measures. SIZE is the log of total assets. INVOP is investment opportunities given by annual sales growth. EXTFIN is external finance dependence computed as capital expenditures minus cash flow from operations divided by capital expenditures. CAPEX is the ratio of capital expenditures to total assets. PPE is the ratio of property, plant, and equipment to total assets. CLOSE is insider ownership measured as percentage of shares held by insiders. ADR is a dummy variable that equals one if the stock is cross-listed on a US exchange (ordinary listings or level 2 and 3 ADRs) during the sample period, and zero otherwise. FXSALES is foreign sales as a percentage of total sales. Country-level explanatory variables are as follows: GDP, the log of gross domestic product per capita; MCAP, the stock market capitalization divided by gross domestic product; and LEGAL, the product of 'anti-director rights' and 'rule of law' measures. Firm-level and country-level variables are averages over the whole sample period. The sample period is from 1990 to 2003. Regressions also include industry fixed-effects (two-digit SIC). Robust *t*-statistics are in parentheses. ***, **, and * indicates significance at the 1, 5, and 10 per cent levels, respectively.

valued more highly. Adding these two control variables raises the adjusted R^2 from 27.4 per cent (Table 3) to 30.9 per cent.

We next control for the effect of firm profitability on valuation, as capital markets are likely to reward more profitable firms with a premium. Following Bitner and Dolan (1996), we use the sales profit margin (SALESM) as our measure of profitability. SALESM is the ratio of operating income to net sales. Column (2) of Table 6 shows that the EQ coefficient remains positive and significant. As expected, the coefficient on SALESM is also positive and significant, suggesting that more profitable firms are valued more highly.

The production of information by analysts can also have an impact on firm valuation. Lang *et al.* (2004) find that the number of analysts following a firm is positively related to Tobin's Q, especially in firms with poor corporate governance that are located in poor legal environments. We control for analyst activity using the number of analysts (ANALYSTS) covering a firm, taken from IBES database.

Column (3) of Table 6 shows that the ANALYSTS coefficient is indeed positive and strongly significant. The significance of the EQ coefficient, however, is not affected, which suggests that earnings quality is valued by investors beyond the effect of enhanced analyst coverage. Adding this variable raises the adjusted R^2 from 27.4 per cent (Table 3) to 32.3 per cent.

Finally, we test the robustness of our results by controlling for the impact of corporate governance on firm valuation. Prior research has documented a positive relation between corporate governance and firm value (e.g., Klapper and Love, 2004; Durnev and Kim, 2005; Aggarwal *et al.*, 2009). We use two different

Table 6
Firm valuation and earnings quality: additional control variables

	(1)	(2)	(3)	(4)	(5)
EQ	0.0014***	0.0014**	0.0015***	0.0086***	0.0053***
	(2.77)	(2.30)	(3.02)	(2.86)	(3.02)
SIZE	−0.0486***	−0.0588***	−0.1174***	−0.1850***	−0.1320***
	(−9.22)	(−11.29)	(−17.82)	(−5.04)	(−7.65)
INVOP	1.9926***	1.8639***	1.5365***	2.5399**	4.2727***
	(11.10)	(9.38)	(8.47)	(2.30)	(6.73)
EXTFIN	−0.0015	−0.0003	−0.0006	0.0006	−0.0254***
	(−0.07)	(−0.02)	(−0.03)	(0.06)	(−2.85)
CAPEX	2.9977***	2.8587***	2.3931***	5.0319***	3.1811***
	(11.82)	(10.71)	(9.39)	(3.72)	(3.58)
PPE	−0.7085***	−0.9855***	−0.9055***	−1.5504***	−0.9667***
	(−12.76)	(−17.88)	(−17.10)	(−4.91)	(−5.39)
CLOSE	−0.1691***	−0.1881***	−0.0986***	0.2030	0.1422
	(−4.87)	(−5.21)	(−2.71)	(1.01)	(1.15)
ADR	0.2839***	0.3248***	0.2484***	0.0397	0.2444***
	(7.43)	(7.91)	(5.94)	(0.48)	(3.87)

Table 6 (continued)

	(1)	(2)	(3)	(4)	(5)
FXSALES	0.0910***	0.0565*	−0.0239	0.1799	−0.0757
	(2.85)	(1.70)	(−0.74)	(1.16)	(−0.82)
CASH	1.3645***				
	(12.01)				
DEBT	−0.0668				
	(−1.21)				
SALESM		0.6580**			
		(2.43)			
ANALYSTS			0.0350***		
			(16.65)		
GOV_SP				0.0047*	
				(1.65)	
GOV_ISS					0.0026***
					(3.42)
GDP	−0.0590***	−0.0383***	−0.0463***	−0.0232	0.0005
	(−5.52)	(−3.58)	(−4.51)	(−0.36)	(0.01)
MCAP	0.0529***	0.0638***	0.0364**	0.2662***	0.2371***
	(2.81)	(3.39)	(2.10)	(3.26)	(4.04)
LEGAL	0.0023***	0.0027***	0.0045***	0.0067	−0.0022
	(2.80)	(3.33)	(5.58)	(1.41)	(−0.94)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Adjusted *R*-squared	0.309	0.278	0.323	0.491	0.456
N	6814	6870	6870	540	1059

This table presents estimates of coefficients of the cross-sectional regression at the firm-level of Tobin's Q (Q), defined as total assets plus market value of equity less book value of equity over total assets. EQ is earnings quality ranking, calculated as the average rank across the seven individual measures. SIZE is the log of total assets. INVOP is investment opportunities given by sales growth. EXTFIN is external finance dependence computed as capital expenditures minus cash flow from operations divided by capital expenditures. CAPEX is the ratio of capital expenditures to total assets. PPE is the ratio of property, plant, and equipment to total assets. CLOSE is insider ownership measured as percentage of shares held by insiders. ADR is a dummy variable that equals one if the stock is cross-listed on a US exchange (ordinary listings or level 2 and 3 ADRs) during the sample period, and zero otherwise. FXSALES is foreign sales as percentage of total sales. CASH is cash holdings, measured as the ratio of cash and equivalents to total assets. DEBT is financial leverage, computed as the ratio of long-term debt to total assets. SALESM is sales margin measured as the ratio of operating income to total net sales. ANALYSTS is the number of analysts covering a firm taken from IBES database. GOV_SP is the Standard and Poor's Transparency and Disclosure Rating. GOV_ISS is the Corporate Governance Quotient created by the Institutional Shareholder Services. Country-level variables are as follows: GDP, the log of gross domestic product per capita; MCAP, the stock market capitalization divided by gross domestic product; and LEGAL, the product of 'anti-director rights' and 'rule of law' measures. Firm-level and country-level variables are averages over the whole sample period, except GOV_SP and GOV_ISS that are observed in 2003. The sample period is from 1990 to 2003. Regressions also include industry fixed-effects (two-digit SIC). Robust *t*-statistics are in parentheses. ***, **, and * indicates significance at the 1, 5, and 10 per cent levels, respectively.

corporate governance ratings to measure overall corporate governance quality: the Standard & Poor's Transparency and Disclosure Rating (GOV_SP), and the Corporate Governance Quotient (GOV_ISS) created by the Institutional Shareholder Services. These ratings are observed in 2003.

Results in Columns (4) and (5) of Table 6 show that the EQ coefficient is robust to the inclusion of corporate governance controls; it remains positive and significant. The coefficients on GOV_SP and on GOV_ISS are both positive and significant (GOV_SP only at the 10 per cent level). Notice that when we control for corporate governance variables, the LEGAL coefficient becomes insignificant. This finding seems to be consistent with the Durnev and Kim (2005) results that firm-level governance dominates a country's legal environment in determining firm valuation. Adding corporate governance control variables raises the adjusted R^2 significantly, from 27.4 per cent (Table 3) to 49.1 per cent (GOV_SP) and 45.6 per cent (GOV_ISS).[13]

6.2. *Alternative samples*

A legitimate concern related to our results is whether they depend on the inclusion of two countries with a large number of firms in our sample. Indeed, firms in Japan (1534 firms) and the United Kingdom (1117 firms) represent about 37 per cent of the total firms. Therefore, we re-estimate our cross-sectional regression in equation (15) eliminating firms from these two countries.

We also exclude Canada, given its proximity to the United States and the significant number of Canadian firms. Finally, we test the robustness of our results by including US firms in our sample. The addition of US firms increases the sample size from 7211 to 9893 firms.[14]

Results show that our primary findings are robust to these alternative samples. The EQ coefficient is positive and statistically significant in all the specifications, which suggests that our main conclusion – that firm value and earnings quality are positively related – is not driven by the results of any particular country.

6.3. *Alternative estimation methods*

Our measure of firm valuation is not completely exempt from criticisms. We are aware that Tobin's Q is estimated with error. Therefore, we conduct several tests using alternative estimation methods to check the robustness of our results. Panel A of Table 7 summarizes the results.

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[13] Notice that the introduction of corporate governance variables reduces the sample size substantially, so we should interpret the results carefully.

[14] Results (not tabulated) for these alternative samples are available from the author upon request.

Table 7
Firm valuation and earnings quality: alternative estimation methods

	Panel A: Alternative estimation methods					Panel B: 2SLS	
	Industry Global Q	Dep. variable Log Q	Dep. variable −1/Q	Cluster Country	Median Regression	First stage EQ	Second stage Q
EQ	0.0025***	0.0010***	0.0004**	0.0022**	0.0008**		0.0098***
	(4.79)	(3.56)	(2.19)	(2.05)	(2.04)		2.8110
SIZE	−0.0574***	−0.0250***	−0.0122***	−0.0536***	−0.0221***	0.7765***	−0.0598***
	(−10.80)	(−9.24)	(−6.81)	(−5.76)	(−6.35)	(7.11)	(−9.19)
INVOP	2.2650***	1.0303***	0.6317***	1.9625***	1.3508***	45.1521***	1.9487***
	(11.62)	(11.28)	(11.22)	(8.27)	(13.80)	(12.36)	(8.16)
EXTFIN	0.0501***	−0.0041	−0.0037	−0.0002	−0.0063	−0.2750**	0.0539***
	(4.05)	(−0.43)	(−0.60)	(−0.01)	(−0.72)	(−1.97)	(4.25)
CAPEX	3.5875***	1.9825***	1.4768***	3.0408***	2.6032***	23.7475***	3.5348***
	(14.00)	(14.22)	(15.48)	(6.67)	(15.21)	(4.62)	(13.17)
PPE	−1.0027***	−0.5842***	−0.4042***	−0.9993***	−0.6237***	−10.5003***	−0.9961***
	(−19.83)	(−19.43)	(−18.74)	(−5.71)	(−16.50)	(−9.16)	(−20.46)
CLOSE	−0.1511***	−0.1110***	−0.0806***	−0.1793*	−0.0878***	5.7884***	−0.1712***
	(−3.93)	(−5.64)	(−5.89)	(−1.67)	(−3.35)	(7.03)	(−3.89)
ADR	0.3994***	0.1583***	0.0884***	0.3197***	0.1685***	−3.8142***	0.4208***
	(9.60)	(8.59)	(8.16)	(6.61)	(7.34)	(−5.48)	(9.75)
FXSALES	0.0457	0.0292*	0.0174	0.0603	0.0312	−1.5667**	0.0614*
	(1.34)	(1.75)	(1.57)	(0.71)	(1.44)	(−2.38)	(1.77)
GDP	−0.0509***	−0.0199***	−0.0085***	−0.0476	−0.0143**	0.5890***	−0.0594***
	(−4.61)	(−3.93)	(−2.59)	(−1.55)	(−2.53)	(3.25)	(−4.88)
MCAP	0.0810***	0.0339***	0.0133*	0.0701	0.0518***	−0.2672	0.0914***
	(4.16)	(3.30)	(1.79)	(1.21)	(4.26)	(−0.70)	(4.62)
LEGAL	0.0037***	0.0016***	0.0012***	0.0027	0.0031***	−0.0034	0.0033***
	(4.33)	(3.79)	(4.31)	(1.09)	(5.49)	(−0.20)	(3.89)

Table 7 (continued)

	Panel A: Alternative estimation methods					Panel B: 2SLS	
	Industry Global Q	Dep. variable Log Q	Dep. variable −1/Q	Cluster Country	Median Regression	First stage EQ	Second stage Q
GLOBALQ	−0.0029						
	(−0.23)						
STDSALES						−42.8874***	
						(−14.57)	
OPERCYCLE						−4.1206***	
						(−12.14)	
Industry dummies	No	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted *R*-squared	0.206	0.290	0.263	0.274			
N	6870	6870	6870	6870	6870	6748	6748

This table presents estimates of coefficients of the cross-sectional regression at the firm-level of:

$$Q_i = b_0 + b_1\,EQ_i + b_2\,SIZE_i + b_3\,INVOP_i + b_4\,EXTFIN_i + b_5\,CAPEX_i + b_6\,PPE_i + b_7\,CLOSE_i + b_8\,ADR_i + b_9\,FXSALES_i + c_1\,GDP_j + c_2\,MCAP_j + c_3\,LEGAL_j + \varepsilon_i$$

with alternative estimation methods. Variables are defined as before. Panel A reports estimates using the median Tobin's Q of the global industry to which a firm belongs (GLOBAL_Q) as control variable; estimates using the log of Tobin's Q as the dependent variable; estimates using the negative of the reciprocal of Tobin's Q as the dependent variable; estimates when adjusting the standard errors for country-level clustering; and estimates of a median regression. Panel B reports estimates of coefficients of the two-stage least squares (2SLS) cross-sectional regression system of equations at the firm-level of earnings quality (EQ) and Tobin's Q (Q). Earnings quality is instrumented with sales volatility (STDSALES), measured as the standard deviation of sales revenues scaled by total assets, and the length of the operating cycle (OPERCYCLE), measured as the log of the sum of days inventory and days accounts receivable. Firm-level and country-level variables are averages over the whole sample period. The sample period is from 1990 to 2003. Regressions also include industry fixed-effects (two-digit SIC). Robust *t*-statistics are in parentheses. ***, **, and * indicates significance at the 1, 5, and 10 per cent levels, respectively.

So far, we have not controlled for a direct valuation benchmark. We begin by re-estimating our cross-sectional regression including the median value of Tobin's Q of the global industry (GLOBAL_Q) to which a firm belongs as a control variable. Results show that considering industry median values instead of industry dummies does not affect our main results. The EQ coefficient remains positive and significant.[15]

Gompers *et al.* (2010) point out several problems with using Tobin's Q in ordinary least squares regressions. Following Gompers *et al.* (2010), we use three alternative estimation specifications to alleviate measurement error concerns. We first estimate regression equation (15) using the log (Q_i) and $-1/Q_i$ as dependent variables to reduce the potential impact of outliers. We then estimate a median regression to also mitigate the impact of outliers. The results in all cases are qualitatively similar to those previously reported and are consistent with our main findings of a positive relation between earnings quality and firm value.

Finally, we adjust standard errors for country-level clustering to take into account that the residuals are likely to be correlated across firms within a country. Again, the results are broadly consistent with those reported before, and our main findings are not affected.

6.4. *Endogeneity*

So far, our results provide evidence of a positive relation between earnings quality and firm valuation. One concern here is that the relation may be endogenous, potentially biasing the results. Our design implicitly assumes that causality runs from earnings quality to firm valuation, but it could be that large investors are attracted to firms with high firm valuations, and these investors may press for higher earnings quality.

To address the endogeneity issue, we estimate the Tobin's Q and EQ regressions using a two-stage least squares (2SLS) method. While this estimation technique allows for endogeneity of earnings quality, we need to identify some exogenous parameters that affect only earnings quality, but not firm valuation except indirectly through other independent variables. Identifying truly exogenous parameters is difficult, so the results should be interpreted with caution.

We use sales volatility (STDSALES), calculated as the standard deviation of sales revenues, scaled by total assets; and the length of the operating cycle (OPERCYCLE), measured as the log of the sum of days inventory and days accounts receivable as instruments for earnings quality. We assume that these innate variables do not affect firm valuation (at least directly) but do affect earnings quality. *F*-tests that the instruments can be excluded from the first-stage regressions are strongly rejected (*F*-statistic is 134.5). Thus, we conclude that our

[15] In unreported results, we also consider industry-adjusted Q as the dependent variable in the regression and obtain similar results.

instruments are not only associated with EQ in the predicted direction, but also that our specifications do not appear to suffer from 'weak instruments' concerns. We use the same set of control variables as in Table 3 for Tobin's Q in the second-stage regression. The results reported in Panel B of Table 7 support our primary finding that earnings quality positively impacts firm valuation, even when we take into account the possibility that earnings quality is endogenous.[16]

7. Conclusion

We explore the link between earnings quality and firm value using a broad sample of firms worldwide. We construct an aggregate earnings quality measure based on seven earnings attributes (accruals quality, persistence, predictability, smoothness, value relevance, timeliness, and conservatism) and use Tobin's Q as proxy for a firm's market valuation.

Results show a statistically and economically reliable association between earnings quality and firm value. Earnings quality is positively related to market valuation, even after controlling for the unobservable industry and country heterogeneity, suggesting that the market really values earnings quality.

We also find that country-level investor protection and investment opportunities play important roles in shaping the relation between firm valuation and earnings quality. Results show that the positive relation between firm value and earnings quality is stronger in countries with poorer legal environments, and in firms with more investment opportunities. Thus, firms are able to compensate for a weak legal environment by having higher earnings quality, particularly when they need to gain access to global capital markets.

Our findings are as good as our measures of firm value and earnings quality. Several tests designed to mitigate potential measurement error and endogeneity concerns indicate that our main results are not affected. The results are consistent across different sample compositions, estimation procedures, and variable specifications and are robust to the inclusion of corporate governance control variables.

We believe this analysis provides useful information on the relation between firm valuation and earnings quality. It contributes to the growing literature on the economic consequences of earnings quality by taking an international approach and by using a summary earnings quality measure that gives an overall earnings quality perspective.

Earnings are closely followed by market participants, and financial scandals have raised considerable concern about the quality of reported earnings. Thus, our results have practical implications for investors and analysts in the evidence that firms with higher-quality earnings are valued more highly. Our results also

[16] We obtain consistent results using simultaneous equations and three-stage least squares (3SLS) estimation. The results are available from the authors upon request.

support the idea that investors perceive information risk in lower-quality earnings, a risk that cannot be diversified away.

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