Received 9 September 2015
Revised 8 July 2016
15 October 2016
Accepted 6 November 2016

The effect of reporting quality on stock returns of listed companies on the Tehran Stock Exchange

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Abstract

Purpose – The purpose of this paper is to examine the effect of earnings quality (as a proxy for financial reporting quality) of companies listed on the Tehran Stock Exchange (TSE) and the quality of their financial information disclosure on stock returns.
Design/methodology/approach – The authors test the hypotheses by conducting panel data analysis on a sample of 1,680 firm-year observations from companies listed on the TSE during 2009-2014. The authors also conduct the variance inflation factor and unit root tests to control for the severity of multicollinearity in their ordinary least squares regression analysis and whether the time series variables are non-stationary and possess a unit root.
Findings – Using Francis *et al.* (2005) and modified Jones (1991) models as measures for earnings quality, the results are indicative of a significant and positive relationship between firms' earnings quality and their stock returns. However, the research findings suggest that earnings management as well as disclosure quality (DQ) is not significantly associated with firms' stock return.
Research limitations/implications – Although the authors controlled for some of the factors affecting stock returns, there are still some other factors such as the operating environment, institutional setting and/or information uncertainty that could influence stock returns, and accordingly, the authors were not able to exclude their possibility and get the most robust results. Moreover, there are several models proposed in different studies for measuring earnings quality which have led to mixed results particularly without a general consensus on what a good model is, and whether earnings quality is a priced risk factor.
Originality/value – Taken as a whole, the paper could provide new insights into the determinants of stock returns which has rarely been considered by prior finance literature. Furthermore, the unique institutional context of the paper could contribute substantially to the literature on the relationship between financial reporting and DQ and stock returns.

Keywords Earnings quality, Earnings management, Accruals, Financial reporting quality, Stock return
Paper type Research paper

1. Introduction

Financial reporting quality (hereafter, FRQ) as well as the increase in the volatility of stock returns has raised considerable concern and interest of regulators and market participants in the past few decades, particularly concurrent with increased globalization of financial and capital markets (Kothari, 1998/2000). Indeed, the extent to which earnings quality, and more broadly FRQ, is associated with firms' stock return has turned out to be one of the most important issues in accounting and finance literature. However, despite a sizeable body of research demonstrating that FRQ, measured using various attributes and proxies, affects costs of debt and equity capital (e.g. Botosan and Plumlee, 2002; Francis *et al.*, 2004; Aboody *et al.*, 2005; Kim and Qi, 2010), there is no general consensus on whether FRQ is significantly associated with stock return, or stock return is influenced by earnings manipulation or disclosure quality (hereafter, DQ). We argue that these topics are highly

International Journal of Productivity and Performance Management
Vol. 67 No. 1, 2018
pp. 4-19

1741-0401
DOI 10.1108/IJPPM-09-2015-0127

interrelated and of critical importance in the finance literature. More specifically, there is a remarkable gap in prior literature addressing the hitherto unexplored questions of whether transparent financial statements contribute to the reduction of stock volatility and more accurate stock valuation and whether greater transparency in financial statements results in sound credit and lending decisions by firms operating in financial services industry (e.g. banks). Moreover, to our knowledge, to date, there is neither a well-defined meaning of the terms "FRQ," "DQ" and "earnings quality" nor a generally agreed-upon proxy for measuring them. Therefore, we regard the transparency of financial information as a determining factor for earnings quality, or more broadly speaking, FRQ and accrual quality (AC)-based measures to capture the transparency embodied in financial reports numbers. From Pownall and Schipper's (1999) viewpoint, financial transparency is defined as "an accounting and disclosure system that reveals the events, transactions, judgments and estimates underlying the financial statements and their implications." Market participants often demand reliable and high-quality information primarily to reduce information asymmetry between corporate managers and external investors and consequently reap the benefits of decreased cost of capital and the volatility of stock and other securities prices (Kothari, 1998/2000). This, *per se*, provides an incentive for regulators and standard-setters around the globe to develop accounting standards of higher quality. Kothari (1998/2000) documents that, in addition to the quality of accounting standards, there are some other salient institutional factors affecting FRQ and the demand and supply of financial information, namely the nature of corporate governance (i.e. diffuse *vis-à-vis* concentrated ownership structure), the legal system and the existence and enforcement of laws governing investor protection and disclosure standards. In this respect, higher demand and supply of quality financial information could be found in countries with a common-law legal system and a good enforcement of high-quality laws protecting investors' rights. Such an institutional setup is best described as having publicly held companies, majority owned by widely dispersed, individually atomistic shareholders. By contrast, debt and equity financing in countries characterized by weak investor protection law enforcement like the prevailing legal system in Iran is quite costly. Furthermore, corporations operating in these countries show signs of concentrated ownership and are mostly controlled by shareholders such as families, institutions and/or government agencies. As will be further elaborated in the next section, unique features of Iran's economy such as a high level of concentration (more than 60 percent), prevailing code-law legal system, the domination of petroleum and petrochemical industries in the Tehran Stock Exchange (TSE) and the involvement of large religious foundations called Bonyad, whose combined budgets represent more than 30 percent of central government spending, in the corporate governance of listed companies may provide some unexpected results which are rarely attainable from those of Western or European empirical studies (Bagherpour *et al.*, 2014; Khodadadi *et al.*, 2014; Sadeghi, 2014).

This research is motivated by the recent influential though conflicting and mixed results on whether there is a linkage between FRQ in general, and earnings quality in particular, with respect to the cost of equity capital and stock return. Specifically, our study builds on prior research that investigates the importance of FRQ and DQ. In this respect, Hutton *et al.* (2009) find a negative significant relation between idiosyncratic volatility of stocks and financial statements opacity measured as discretionary accruals. By contrast, Rajgopal and Venkatachalam (2011) and Chen *et al.* (2012) document that the absolute value of discretionary and abnormal accruals is positively associated with earnings quality. In this study, we first examine, through panel data analysis, whether earnings quality, measured as AC, affects firms' stock returns. Then, in the next steps, we attempt to examine the effect of earnings management (EM) as well as DQ on firms' stock return.

The reminder of this paper is organized as follows. In the following section, we provide a succinct review of institutional environment in Iran. Section 3 frames the study into

theoretical background and provides the hypotheses development process and extant literature. Section 4 describes the methodology used to gather evidence in order to test research hypotheses. It also details the sample selection procedure. Section 5 discusses the empirical results and, finally, Section 6 concludes this research by highlighting its main implications and limitations.

2. Institutional background and regulatory landscape

2.1 Prevailing legal system in Iran

Based on international accounting literature, there are two different legal systems (i.e. the common-law legal system vs the code-law legal system) prevailing in a given country determining the accounting system employed in that country (Nobes, 1983; Berry, 1987; Mashayekhi and Mashayekh, 2008). Accordingly, current condition of Iran's legal system implies a code-law-based country, because it possesses some major characteristics of such system. To illustrate, the TSE is regarded as a weak equity market as compared to those markets in common-law countries. Furthermore, companies listed on the TSE prefer to meet their financing needs through banks or the government and usually undermine the outsider's equity approach. The preceding argument is consistent with Porta *et al.* (1999) suggesting the role of a particular type of legal system prevailing in a given country in determining its financing policy. To put it simply, a common-law legal system focuses on shareholders' rights and offers equity-based financing, whereas the code-law system emphasizes on debt-financing and ignores investor protection policy. In the legal system of Iran, the government exerts a significant influence on setting accounting standards in line with the tax laws and consequently the financial reporting and disclosure are still of poor quality (Mashayekhi and Mashayekh, 2008). Taken together, the preceding discussions imply significant weaknesses in the financial reporting of the Iranian companies stemming from social and political factors (e.g. judicial and law enforcement inefficiencies and the lack of investor protection) rather than cultural ones (Mashayekhi and Mashayekh, 2008).

2.2 Corporate governance structure in Iran

Following the ratification of the Stock Exchange Act, the TSE established in April 1968 with limited government bonds and state-backed certificates exchanges. However, until 2000s, the primary idea of a modern corporate governance structure has not been introduced, when a special committee comprised of the TSE executive managers, members of Economic and Finance Ministry and the Islamic Parliament Research Center conducted surveys on corporate governance in Iran (Mashayekhi and Mashayekh, 2008). According to the findings of such surveys, the status of corporate governance structure among listed companies on the TSE is minority oriented or internal. More specifically, the ownership structure of companies listed on the TSE is considerably concentrated and all companies are owned or controlled by few/major shareholders, particularly the foundation charity groups, the creditor banks and the state-administered institutions (Mashayekhi and Mashayekh, 2008). The considerable involvement of pension funds, mutual funds, insurance companies and the government in the ownership structure of listed companies has provoked fierce national debate and led to the implementation of a series of five-year Economic Development Plans by the government. Moreover, the requirements of the Iran Trade law with respect to legal external supervision, stock market regulations and laws, the Iran Audit Organization statutory activity and the Iranian Standards are among other instruments put in place to change current prevalent internal control system (Mashayekhi and Mashayekh, 2008). In this regard, Mashayekhi and Mashayekh (2008) argue that there are other major weaknesses in corporate governance structure of listed companies on the TSE that merit further consideration, such as limited supervision function of major shareholders on certain

activities including the purchase of controlling stock and the role of institutional investors, lack of institution rating in Iran, lack of proper supervision of internal control systems, insignificant role of non-executive managers in boards of directors and finally the ignorance about the supervision of organizational morality. Considering the preceding weaknesses, the first edition of Code of Corporate Governance was published by the TSE Research and Development Center in 2004 to improve current status of corporate governance in Iran.

3. Theoretical backgrounds, prior literature and hypothesis development

3.1 FRQ and stock return

FRQ is generally characterized under two different approaches, namely "users' demand" and "investor protection." The former considers the needs of the users of financial information and delineates the quality of financial reporting according to the usefulness of financial reports from users' viewpoint. The latter focuses on providing further impetus for investment and primarily uses the completeness and fairness of disclosures for shareholders as proxies for FRQ. More specifically, the second approach puts emphasis on the transparency and completeness of financial disclosures, the degree of conservatism and estimates used in accounting information and the consistency and comparability of financial records as major FRQ proxies. There are some significant differences in the aforementioned approaches. The first approach primarily focuses on the provision of financial information for equity valuation and distribution decision purposes. In contrast, the second approach seeks to provide financial information users with an assurance that the information is both sufficient and transparent. High FRQ is likely to mitigate information asymmetry between firms and their external financiers and also restricts managers' incentives to participate in activities of lower or negative values (Chen *et al.*, 2011). Based on Financial Accounting Standards Board Statement of Financial Accounting Concepts No. 1 (1978), one primary goal of financial reporting is to provide equity investors with information about the firm's expected cash flows to make informed investment decisions. Accordingly, Biddle *et al.* (2009) describe FRQ as the level of precision used in preparing information about firm's expected cash flows.

Prior literature on the relationship between FRQ and information asymmetry about a firm's performance are indicative of a negative significant relationship between the two. In other words, the improvement of FRQ and DQ results in the reduction of stock return volatility. By contrast, poor FRQ and DQ lead to higher stock return volatility and information asymmetric component of the cost of capital (Diamond and Verrecchia, 1991; Healy *et al.*, 1999; Leuz and Verrecchia, 2000; Rajgopal and Venkatachalam, 2011). Moreover, prior finance literature finds a significant association between firms' accounting procedure as well as disclosure policy (i.e. FRQ and DQ) and their information risk. Aboody *et al.* (2005), for instance, argue and find that earnings quality measured as the unsigned abnormal accruals significantly affects information asymmetry and cost of capital. In a similar vein, Francis *et al.* (2005) investigate the relation between information risk measured as AQ (the standard deviation of residuals from regressions relating current accruals to cash flows) and earnings quality and suggest that poorer AQ (or higher information risk) leads to greater costs of debt and equity. Overall, both researches suggest that accounting earnings quality is significantly associated with firms' expected returns. Nevertheless, neither of them considers cross-sectional or time-series relation between FRQ and idiosyncratic volatility of stock returns. Consequently, this gap provided the required incentive for Rajgopal and Venkatachalam (2011) to examine changes in FRQ subsequent to the substantial increase in idiosyncratic volatility of stock returns over the 40-year period from 1962 to 2001 in the USA. After controlling for several confounding effects and control variables and factors such as accounting for technology-intensive firms, newly listed firms, merger activity and financial distress, the authors find that poorer earnings quality

measured as the Dechow-Dichev AC model and squared abnormal accruals is positively and significantly associated with rising return volatility.

The evidence provided by Leuz and Verrecchia (2000) considers the circumstance in which German firms begin to adopt the US GAAP or IAS instead of German GAAP and examines the effect of FRQ on firms' bid-ask spreads, trading volume and stock return. This switch to a better financial reporting regime has been accompanied by better commitment to increased DQ and hence a reduction in the asymmetric information component of the cost of capital as the authors reported decreased levels of bid-ask spreads and an improvement in trading volume as well as firms' stock returns. Extending the analysis conducted by Sloan (1996), Richardson *et al.* (2001) indicate that information in accruals about earnings quality is not only limited to the current accruals, but also extends to non-current accruals. Specifically, they find that this additional information about earnings quality provides relatively more information about future stock returns and future SEC enforcement actions than the original accruals considered by Sloan (1996). Their findings are indicative of a negative and significant relation between accruals and future stock returns.

Developing a simple approach to valuing stocks in the presence of learning, Pástor and Pietro (2003) indicate a positive association between market-to-book ratio and uncertainty about firm's average profitability, particularly for firms with no dividend payment. They also posit that this uncertainty significantly affects younger stocks and stocks that pay no dividends along with their return volatility. Indeed, the authors indicate that the poorer the FRQ, the higher uncertainty about a firm's future profitability. The cross-sectional or firm-level analysis conducted by Wei and Zhang (2006) also reports two variables, namely the average return-on-equity and the average sample variance of the return-on-equity, useful in explaining the upward trend in the average stock return variances in the US stock markets over 1976 to 2000.

In the domestic setting, Khoshtinat and Esmaeily (2006) investigate the relation between earnings quality and stock returns on a sample of 69 companies listed on the TSE during 1999-2004. Using the ratio of free cash flows from operation to operating income and accruals quality as proxies for earnings quality, the authors report that, consistent with their theoretical backgrounds, while discretionary accruals are significantly and negatively associated with firms' stock returns, the relationship between non-discretionary component of accruals and stock returns is not statistically significant at the 5 percent of significance level. Likewise, Haghighat and Panahi (2011) examine the relationship between earnings quality and future stock returns to assess the information content of earnings quality particularly in terms of predicting profitability and future returns and also to examine the level of investors and financial analysts' attention to the quality of reported earnings. Their results show that there is an insignificant relationship between earnings quality and its components as well as future stock returns of publicly held companies. Taken as a whole, previously mentioned studies on the relationship between FRQ and firms' stock returns and their mixed results lead us to state the following non-directional hypothesis in the null form:

H1. There is a significant relationship between earnings quality and firms' stock returns.

3.2 EM, DQ and stock returns

A large body of theoretical research, to date, has confirmed a negative relationship between DQ and a firm's cost of capital. In this respect, two major streams of research are of interest. The first stream focuses on the linkage between information asymmetry and suggests that greater DQ leads to the reduction in the cost of capital arising from information asymmetries, either between a firm and its stockholders, or between potential traders in the firm's shares (Glosten and Milgrom, 1985; Diamond and Verrecchia, 1991; Cohen, 2008).

The second stream of research considers the relation between estimation risk and the cost of capital (e.g. Barry and Brown, 1985; Easley and O'Hara, 2004). In this regard, Easley and O'Hara (2004) argue that the cost of capital is significantly influenced by the differences in the composition of information between public and private information. In this case, informed investors demand higher stock returns with greater private information, which *per se* increases the risk faced by uninformed investors since better informed investors can shift their portfolio weights to incorporate new information. Therefore, the authors suggest that the quality and quantity of information could influence asset prices and the cost of capital. In a similar vein and based on the preceding theoretical research, Francis *et al.* (2004, 2005) argue that AC is a systematic priced risk factor and information quality is likely to affect the cost of capital and stock returns.

In addition to preceding discussions, it can be concluded from theoretical literature that both mandated and voluntary disclosure regimes mitigate information asymmetries among informed and uninformed market participants and investors (Diamond and Verrecchia, 1991; Kothari, 1998/2000). In this respect, Leuz and Verrecchia (2000) and Kothari (1998/2000) posit that this reduced information asymmetry leads to the reduction in the cost of capital by shrinking bid-ask spreads, enhancing trading volume and diminishing stock return volatility. Using a sample of 40,000 firm-years observations from 25 common-law and code-law countries over 1985 to 1995, Ball *et al.* (2000) provide evidence concerning the shareholder governance model in common-law countries encouraging more timely disclosure of accounting information compared to code-law countries with a stakeholder governance model. More specifically, they find that code-law accounting income is less timely, particularly in incorporating economic losses. They also attribute variation among common-law countries to regulation, taxation and litigation. Altogether, we present two more hypotheses to cover preceding mixed results as follows:

H2. There is a significant relationship between EM and firms' stock returns.

H3. There is a significant relationship between DQ and firms' stock returns.

4. Research design

4.1 Data sources and sample selection procedure

We obtain our required data manually from the hardcopy financial statements held in the TSE library (Codal (www.codal.ir) and its supplementary software known as Rahavard Novin) for the period 2009-2014. To construct our sample for the paper's hypotheses, we begin with all client-year observations on the Codal database (the number of listed companies in each of the eight years was 335, 314, 318, 327, 323 and 313, yielding a potential population of 1,930 firm-year observations). We then exclude observations with non-calendar fiscal year end[1] (123 firm-year observations), observations with missing or insufficient variable data (239 firm-year observations) and observations with fiscal year change during 2009-2014 (57 firm-year observations). We also exclude firms operating in banking industry as well as financial and investment institutions (111 firm-year observations) to calculate the variables used in our equation, primarily because financial institutions and banking industry have different reporting requirements that could influence the figures associated with dependent variables. This leaves us with a primary sample of 1,400 firm-year observations. It is also noteworthy that our sample represents 41-49 percent cases for each year and does not indicate any bias regarding missing data except for a greater proportion of missing cases for the beginning and closing year of the series. Furthermore, the results of χ^2 tests suggest no significant difference in the frequency of valid and missing data for the explanatory variables. We also estimate our model by employing list-wise deletion of cases with missing data and then re-estimate the model

by using all possible missing cases and replacing these cases by mean values of nearby points. The results are similar to those of χ^2 tests, suggesting unbiased results despite the deletion of cases with missing data. Table I discusses the breakdown of sample attrition (Panel A) as well as the number of observations per industry (Panel B).

4.2 Research methodology

In this paper, we use two measures as proxies for FRQ. The following sections describe these measures in further detail.

4.2.1 Earnings quality based on Francis et al. (2005) model. We use earnings quality measure of FRQ based on the model first proposed by Dechow and Dichev (2002) and modified by Francis *et al.* (2005). Since the sum of operating cash flows and accruals can reflect the accounting earnings, Francis *et al.* (2005) regard AQ as the primary factor determining earnings quality. Indeed, the authors hypothesize that accruals either anticipate future cash flow, or reflect current cash flows or reversals of past cash flows (Rajgopal and Venkatachalam, 2011). The underlying premise of Dechow and Dichev (2002) and Francis *et al.* (2005) models is to determine the variance of either intentional (e.g. managerial incentives to manipulate earnings) or unintentional (e.g. business uncertainty) measurement errors arising from the mapping of accruals and cash flows. Such measurement errors could potentially distort the prediction ability of accruals and consequently can be used as an inverse proxy for EM. To test our hypotheses, we first estimate Francis *et al.* (2005) model and then estimate modified Jones (1991) model to measure earnings quality. The AQ estimated from Francis *et al.* (2005) reflects the mapping of earnings onto accruals. In this respect, the standard deviation of residuals is used as a measure for earnings quality. Therefore, the greater values of

Panel A: sample selection procedure

Initial population of industrial firms with required data for estimating variables derived from the TSE database for the sample period 2009-2014		1,930
Less:	Observations with non-calendar fiscal year end	123
Less:	Observations with missing or insufficient variable data	239
Less:	Observations with fiscal year change during 2009-2014	57
Less:	Observations operating in banking industry as well as financial and investment institutions	111
Equal:	Total observations in sample	1,400

Panel B: no. of observations by industry

Industry	Frequency	Percentage
Telecommunications	63	4.05
Construction	90	6.42
Automotive	270	19.28
Electronics and computer	36	2.57
Mining and metal products	45	3.21
Non-metallic minerals	194	13.85
Cement and plaster	99	7.07
Metals	81	5.78
Agriculture and animal husbandry	36	2.57
Rubber and plastic	36	2.57
Machine tools	54	3.85
Oil, gas and petrochemicals	90	6.42
Food	54	3.85
Pharmaceuticals and healthcare	252	18
Total	1,400	100.00

Table I.
Sample attrition

standard deviation of model residuals are treated as an indication of poorer earnings quality. Dechow and Dichev (2002) represented as follows:

$$TCA_{it} = a_0 + a_1 CFO_{it-1} + a_2 CFO_{it} + a_3 CFO_{it+1} + e_{it} \quad (1)$$

Francis *et al.* (2005) and McNichols (2002) modified and improved model (1) by controlling for two significant determinants of accruals, i.e. growth in firm's revenues and the level of firm's property, plant and equipment. Their augmented equation is reflected in the following equations:

$$TCA_{it} = a_0 + a_1 CFO_{it-1} + a_2 CFO_{it} + a_3 CFO_{it+1} + a_4 \Delta REV_{it} + a_5 PPE_{it} + e_{it} \quad (2)$$

where TCA is the total current accruals, calculated as Equation (3); CFO the free cash flow from operation computed as Equation (4); ΔREV the change in revenues; and PPE the gross value of property, plant and equipment:

$$TCA_{it} = \Delta CA - \Delta CL - \Delta CASH + \Delta SHDEBT \quad (3)$$

where TCA is the total current accruals; ΔCA the changes in current assets; ΔCL the changes in current liabilities; ΔCASH the changes in cash; and ΔSHDEBT is the changes in debts in current liabilities:

$$CFO = IBEX - TCA + DEPN \quad (4)$$

where CFO is the free cash flow from operation; IBEX the net income before extra-ordinary items; and DEPN the depreciation and amortization expense.

Altogether, Equation (2) higher TCA_{it} as an indication of AQ implies that accruals capture most of the variation in past, current and future cash flows. In addition, as discussed earlier, the residuals obtained from Equation (2) (i.e. e_{it}) capture the basis of our proxy for earnings quality.

4.2.2 Earnings quality based on modified Jones (1991) model. We use the modified version of Jones (1991) model as an alternative measure of earnings quality, in particular and more broadly, as an alternative measure for FRQ. Based on the principal premise of this measure, changes in a firm's fundamentals such as changes in revenues, accounts receivables, property, plant and equipment are significantly associated with changes in accruals and, as a consequence, in the earnings quality and FRQ. To put it more simply, modified Jones (1991) model captures abnormal accruals in the following regression model:

$$TA_{it} = a_0 + a_1(\Delta REV_{it} - \Delta AR_{it}) + a_2 PPE_{it} + a_3 ROA_{it} + e_{it} \quad (5)$$

where TA is the total accruals computed as the difference between earnings and cash flow from operations; ΔREV the change in revenues; PPE the gross value of property, plant and equipment; ΔAR the change in accounts receivable; and ROA the return on assets, computed as the ratio of net income to net total assets.

4.3 DQ index in the TSE

The information concerning financial DQ indexes of listed companies on the TSE is publicly disclosed by the TSEO on an annual basis. These indexes are computed based on two scores, namely the reliability and timeliness scores of firms' financial information. The timeliness score typically refers to the time of financial information disclosure (e.g. forecasted EPS, unaudited midterm financial statements, portfolio statements, auditors' opinion on forecasted EPS and unaudited financial statements) and its conformity with the

TSE regulation on information disclosure and financial reporting lag. The reliability score measures the volatility or changes of forecasted values as well as the differences between actual and standard values and results. It is also noteworthy that the scores of investment institutions in our sample are calculated in isolation, primarily because they are not required to disclose their forecasted EPS under the new regulation on financial information disclosure.

4.4 Regression models

To test our hypotheses, we estimate a set of regression models on two proxies of FRQ and two scores of DQ, after including several control variables and other determinants of stock returns and potential confounding effects. These regression models are presented as follows:

$$RET_{it} = a_0 + a_1 EQ_{it-1} + a_2 FEARN_{it+1} + a_3 CFO_{it-1} + a_4 CFO_{it} + a_5 CFO_{it+1} + a_6 VCFO + a_7 BM_{it-1} + a_8 SIZE_{it-1} + a_9 LEV_{it} + a_{10} BETA_{it} + e_{it} \quad (6)$$

$$RET_{it} = a_0 + a_1 EM_{it-1} + a_2 FEARN_{it+1} + a_3 CFO_{it-1} + a_4 CFO_{it} + a_5 CFO_{it+1} + a_6 VCFO + a_7 BM_{it-1} + a_8 SIZE_{it-1} + a_9 LEV_{it} + a_{10} BETA_{it} + e_{it} \quad (7)$$

$$RET_{it} = a_0 + a_1 FRQ_{it} + a_2 FEARN_{it+1} + a_3 CFO_{it-1} + a_4 CFO_{it} + a_5 CFO_{it+1} + a_6 VCFO + a_7 BM_{it-1} + a_8 SIZE_{it-1} + a_9 LEV_{it} + a_{10} BETA_{it} + e_{it} \quad (8)$$

In the above equations, RET represents stock returns and is computed as follows:

$$RET = \frac{(1+\alpha_1+\alpha_2)P_1 + DPS - P_0 - \alpha_1(\text{par value})}{P_0 + \alpha_1(\text{par value})} \quad (9)$$

where α_1 is the percentage increase in paid-in capital from cash and receivable inflows; α_2 the percentage increase in paid-in capital from provisions; α_1(par value) the percentage increase in paid-in capital from cash and receivable inflows in par value of shares; DPS the dividends per share; and p the stock price.

Following Dechow *et al.* (2010) and Rajgopal and Venkatachalam (2011), we control for several factors affecting all earnings quality proxies and are likely to be correlated with the fundamental earnings process such as the volatility of cash flows (VCFO), the ratio of book-to-market value of stock (BM), the natural log of firm's total assets (SIZE), firm's leverage (LEV) and firm's β coefficient (BETA).

5. Research findings

5.1 Descriptive statistics and Pearson correlation matrix

Table II presents descriptive statistics of the continuous variables used to calculate the earnings quality measures and the control variables over the six-year sample window. As it is evident, the mean and median values of firms' stock return (RET) are 27.603 and 14.750, respectively. Although we winsorized our raw variables at the 1 and 99 percent levels to control for outliers, the min (−66.510) and max (238.2) values of RET are indicative of high return volatility over our sample period. However, the lowest (0.038) and highest (8.435) values of earnings quality (EQ) suggest lower volatility than stock returns. Median total assets as proxy for company's size (SIZE) are $1,041,497. Other noteworthy median financial figures are book-to-market ratio (BM) of 68 percent, leverage ratio (LEV) of 61 percent and return on assets (ROA) of 0.01. The medians and means of the aforementioned variables are typically plausible. Finally, with respect to the descriptive statistics of our earnings management variable (EM), we note that the magnitude of

Continuous variables	Min.	25th percentile	Median	75th percentile	Max.	SD	Mean
RET	−66.510	4.257	14.750	178.825	238.200	52.109	27.603
EQ	0.038	0.157	0.327	6.324	8.435	1.396	0.920
EM	0.003	0.033	0.068	0.321	0.427	0.075	0.088
FEARN	−207.102	−57.360	95.989	180.190	513.162	99.531	110.924
CFO_{t-1}	−0.669	−2.310	0.100	14.423	18.553	1.374	0.473
CFO_t	−0.940	−0.254	0.112	15.667	18.553	1.725	0.575
CFO_{t+1}	−0.940	−0.453	0.128	0.156	18.168	1.980	0.647
VCFO	0.015	0.042	0.075	0.452	0.561	0.068	0.096
LEV	0.040	0.254	0.619	0.812	0.978	0.180	0.602
BM	0.050	0.361	0.680	1.527	3.056	0.542	0.836
ROA	−1.232	0.014	0.010	0.075	0.116	0.116	0.012
SIZE	15.967	17.794	19.504	22.341	25.167	1.602	19.686

Table II.
Descriptive statistics

discretionary accruals is on average 8 percent of lagged total assets. The mean values of the discretionary accruals are not significantly different from the median values. As expected, the min value of the discretionary accruals is close to 0.

Table III demonstrates the Pearson correlation matrix for all variables included in Equations (6), (7) and (8). As the results suggest, forecasted earnings (FEARN), natural log of firm's total assets (SIZE) and firm's β coefficient (BETA) are significantly and positively correlated with our variable of interest, stock return (RET), at the 0.01 of significance level. This significant correlation implies that as the corporate managers give rise to forecasted earnings, it is expected and more likely that stockholders get more stock returns. By contrast, the correlation results reported in Table III indicate that stock returns (RET) are negatively and significantly correlated with past (CFO_{t-1}), current (CFO) and future (CFO_{t+1}) operating cash flows. Likewise, the negative correlation of book-to-market (BM)

Variable	RET	EQ	EM	FEARN	CFO_{t-1}	CFO_t	CFO_{t+1}	VCFO	BM	SIZE	LEV	BETA	FRQ
EQ	0.30	*1*											
	0.30												
EM	−0.20	−0.03	*1*										
	0.47	0.39											
FEARN	0.80***	−0.04	−0.02	*1*									
	0.00***	0.17	0.36										
CFO_{t-1}	−0.70**	−0.01	0.05	−0.04	*1*								
	0.20	0.67	0.15	0.62									
CFO_t	−0.70**	−0.02	0.04	0.01	0.87	*1*							
	0.01	0.52	0.72	0.81	0.00								
CFO_{t+1}	−0.70**	−0.06	0.02	0.01	0.72	0.81	*1*						
	0.01	0.07	0.52	0.75	0.00	0.00							
VCFO	0.50	−0.01	0.01	−0.02	0.10**	0.10**	0.13**	*1*					
	0.08	0.87	0.76	0.44	0.00	0.00	0.00						
BM	−0.52**	0.02	0.04	−0.31***	0.06	0.05	0.05	−0.18	*1*				
	0.00	0.85	0.61	0.00	0.04	0.08	0.09	0.00					
SIZE	0.91***	0.02	−0.05	0.73**	−0.02	−0.04	−0.03	0.06	−0.24	*1*			
	0.00***	0.54	0.09	0.00	0.49	0.23	0.28	0.06	0.00				
LEV	−0.80**	0.12	0.02	−0.54***	0.04	0.04	0.02	0.02	0.03	−0.32	*1*		
	0.01	0.00	0.59	0.00	0.19	0.19	0.62	0.60	0.38	0.00			
BETA	0.61***	0.06	−0.02	0.00	0.09	0.07	0.08	0.10	0.00	0.15	0.03	*1*	
	0.00***	0.05	0.48	0.89	0.00	0.03	0.01	0.00	0.94	0.00	0.30		
DQ	0.01	0.11	0.04	0.61**	0.04	0.05	0.01	−0.01	0.03	−0.05	0.01	−0.02	*1*
	0.71	0.00	0.29	0.00	0.21	0.16	0.86	0.74	0.34	0.17	0.87	0.49	

Notes: *,**,***Two-tailed statistical significance at the 10, 5 and 1 percent levels, respectively

Table III.
Pearson correlation matrix among regression variables

and leverage ratios (LEV) with stock returns (RET) is evident in the aforementioned table. The stock returns of firms with higher leverage ratios can be affected by two different aspects. On the one hand, firms' financial leverage through interest costs pressures negatively affects firms' profitability and consequently decreases their stock returns. On the other hand, firms' financial leverage gives rise to their investment risks, which *per se* lessens firms' stock price and returns.

In addition to above-mentioned correlations, whereas forecasted earnings indicate (FEARN) is negatively and significantly correlated with book-to-market ratio of stock returns (BM) and financial leverage ratio (LEV), it is positively correlated with firm size (SIZE) and DQ. In addition, the volatility of operating cash flows (VCFO) is also positively correlated with past (CFO_{t-1}), current (CFO) and future (CFO_{t+1}) operating cash flows.

5.2 Panel unit root testing and diagnostics

5.2.1 Im-Pesaran-Shin (IPS) and Fisher tests. To test for the unit root in heterogeneous panels and whether a time series variable is non-stationary and possesses a unit root, we conduct the IPS and Fisher tests for our data set. Indeed, the primary premise of unit root tests is to prevent spurious regression arising from a linear relationship between independent non-stationary variables. The null hypothesis of these tests is defined as the presence of a unit root and the alternative hypothesis is stationarity, trend stationarity or explosive root. Although the majority of the unit root tests assume a balanced panel data set, the IPS and Fisher-type tests allow for unbalanced panels. As it is evident in Table IV, the results of IPS and Fisher tests suggest that all variables included in our regression models are stationary and possess unit root since the prob. values are strongly significant at 0.01 margin of error ($p = 0.000 < 0.01$).

5.2.2 Variance inflation factor (VIF) test. We use VIF test to measure the extent to which the variance of the estimated regression coefficients are inflated as compared to when the predictor variables are not linearly related. In other words, we use VIF test to measure the potential multicollinearity (i.e. correlation between predictors) in our regression models. Multicollinearity is assumed problematic since it can increase the variance of the regression coefficients, making them unstable and difficult to interpret. VIF values equal to 1 imply the lack of multicollinearity, VIF values between 1 and 5 imply moderate multicollinearity and finally VIF values more than 5 indicate high multicollinearity or highly correlated predictors. Table V reports the results of VIF test. As the results show, VIF values for all regression models are merely equal to 1 and accordingly there is no multicollinearity in our regression analysis.

5.2.3 Chow test. The present paper uses the Chow test in order to determine whether data set can be pooled together. In other words, we use this test to examine whether the coefficients in our linear regressions on different data sets are equal. As the results of this test shown in Table VI suggest ($p > 0.10$), it is feasible to estimate the regression models using pooled data model. Hence, there was no need to conduct Hausman test.

5.2.4 Estimation results of the relation between FRQ and stock returns (H1). As reflected in *H1*, we hypothesize that there is a significant relationship between FRQ and firm's stock return. Table VII presents the estimation results of model 6 (FRQ model). As the Durbin-Watson (DW) statistic implies ($1.5 < DW = 1.84 < 2.5$), there is no autocorrelation (a relationship

Table IV. Results of IPS and Fisher unit root tests

Test	Statistic	*p*-value
IPS	−45.94	0.000
Fisher	1,067.1	0.000

Variable	Model 6 VIF	Model 7 VIF	Model 8 VIF
EQ	1.02	–	–
EM	–	1.01	–
DQ	–	–	1.06
FEARN	1.88	1.83	1.85
CFO_{t-1}	4.22	4.22	3.88
CFO_t	6.14	6.91	5.02
CFO_{t+1}	3.35	3.41	2.98
VCFO	1.07	1.04	1.13
BM	1.33	1.3	1.32
SIZE	1.43	1.42	1.46
LEV	1.77	1.7	1.86
BETA	1.07	1.05	1.05

Table V.
Results of VIF test

Statistic	Model 6 Statistic	Model 6 *p*-Value	Model 7 Statistic	Model 7 *p*-Value	Model 8 Statistic	Model 8 *p*-Value
F	0.11	0.98	0.35	0.87	0.82	0.53
χ^2	0.58	0.98	1.81	0.87	4.22	0.51

Table VI.
Results of Chow test

between values separated from each other by a given time lag) in the residuals (prediction errors) of regression model. Furthermore, the results show that F-statistic is significant at the 0.01 of significance level ($p = 0.00 < 0.01$) and consequently the validity of our regression results is confirmed at 95 percent confidence interval. Adjusted R^2 (0.34) also indicates that 34 percent of variation in dependent variable is explained by independent variables included in model (6).

The results reported in Table VII show that the coefficient on earnings quality (EQ) measured as Francis *et al.* (2005) model is significantly and positively associated with stock return ($C = 1.68; p = 0.00 < 0.01$), providing supporting evidence for *H1*. This suggests that the increase in standard deviation of accruals results in negative response by the capital market.

Variable	Coefficient	*t*-Value	*p*-Value
EQ	1.68	2.83	0.00***
FEARN	−0.07	−4.91	0.00***
CFO_{t-1}	−3.35	−2.49	0.01***
CFO_t	3.14	2.37	0.02***
CFO_{t+1}	−2.76	−3.17	0.00***
VCFO	4.18	2.47	0.01***
BM	−2.84	−1.49	0.00***
SIZE	0.44	0.68	0.50
LEV	−4.88	−6.82	0.00***
Adjusted R^2	0.34		
F-statistic	4.53		
F-statistic prob.	0.00***		
Durbin-Watson statistic	1.84		

Notes: *,**,***Two-tailed statistical significance at the 10, 5 and 1 percent levels, respectively

Table VII.
Estimation results of FRQ model

In addition, while forecasted earnings (FEARN), past and future operating cash flows (CFO_{t-1} and CFO_{t+1}), book-to-market ratio (BM) and leverage ratio (LEV) indicate statistically significant and negative relationship with stock returns, current operating cash flows (CFO) and volatility of cash flows (VCFO) show statistically significant but positive relation with stock returns. Finally, the results show that the relation between firm size (SIZE) and stock returns is statistically insignificant.

5.2.5 Estimation results of the relation between EM and stock returns (H2). We used model (7) to examine the relation between second measure of FRQ as a proxy for EM and stock returns. The estimation results of this model are shown in Table VIII using pooled data model. Again, the DW statistic indicates that there is no autocorrelation in the residuals of regression model and *F*-statistic is also significant at the 0.01 significance level ($p = 0.00 < 0.01$), confirming the validity of regression model. Independent variables explain 32 percent of variations of stock returns as the adjusted R^2 shows a value of 0.32, which is not a significant portion comparing with prior studies (e.g. Dechow *et al.*, 2010; Rajgopal and Venkatachalam, 2011).

The results indicate a statistically insignificant and negative relation between earnings quality measured as modified Jones (1991) model (EM) and stock returns ($p = 0.08 > 0.05$). Therefore, we are able to reject *H2*. However, except for CFO_t, other variables are significantly and negatively associated with stock returns.

5.2.6 Estimation results of the relation between DQ and stock returns (H3). Table IX reports the estimation results of model (8) concerning the relation between DQ measured as the TSE reliability and timeliness scores and stock returns. The DW statistic (1.84) implies that the residual of regression model are not auto-correlated. Furthermore, model (8) is also valid as the *F*-statistic is again significant at the 0.01 significance level ($p = 0.00 < 0.01$). The adjusted R^2 surprisingly indicates a weak value of 0.15, suggesting that merely 15 percent of variations in stock returns are explained by the explanatory variables included in model (8). As it is evident in Table IX, the coefficient on DQ ($C = 0.02$) is statistically insignificant ($p = 0.80 > 0.10$). Therefore, our results do not provide supporting evidence for *H3*. Finally, the figures shown in Table IX indicate that FEARN, BM and LEV negatively affect firms' stock returns.

6. Conclusions and limitations

The present paper aims to examine the effect of FRQ measured as two accrual-based proxies proposed by Francis *et al.* (2005) and Jones (1991) on firms' stock returns. Moreover, we attempt to shed light on the relationship between the quality of financial information

Variable	Coefficient	*t*-Value	*p*-Value
EM	−2.03	−1.75	0.08*
FEARN	−0.07	−5.06	0.00***
CFO_{t-1}	−2.85	−2.02	0.04**
CFO_t	2.68	1.97	0.05**
CFO_{t+1}	−2.58	−2.69	0.01***
VCFO	2.65	1.73	0.08*
BM	−2.79	−1.33	0.00***
SIZE	0.07	0.09	0.93
LEV	−5.33	−7.11	0.00***
Adjusted R^2	0.32		
F-statistic	3.80		
F-statistic prob.	0.00***		
Durbin-Watson statistic	1.83		

Notes: *,**,***Two-tailed statistical significance at the 10, 5 and 1 percent levels, respectively

Table VIII.
Estimation results of EM model

Variable	Coefficient	*t*-Value	*p*-Value
DQ	0.02	0.25	0.80
FEARN	−0.08	−2.98	0.00***
CFO_{t-1}	−1.16	−0.42	0.68
CFO_t	−0.39	−0.15	0.88
CFO_{t+1}	−1.2	−0.74	0.46
VCFO	2.91	1.06	0.29
BM	−3.36	−8.36	0.00***
SIZE	−0.64	−0.44	0.66
LEV	−7.01	−4.94	0.00***
Adjusted R^2	0.155		
F-statistic	8.8		
F-statistic prob.	0.00***		
Durbin-Watson statistic	1.84		

Notes: *,**,***Two-tailed statistical significance at the 10, 5 and 1 percent levels, respectively

Table IX.
Estimation results of DQ model

disclosure and stock returns. Using unique stock return data collected manually from the TSE library and its supplementary software with DQ scores data handpicked from the information disclosed annually by the TSEO, our results demonstrate that, consistent with our primary expectation, earnings quality as a proxy for FRQ is significantly and positively associated with firms' stock returns. However, our findings suggest that DQ and EM are insignificantly associated with stock returns.

Our findings should be interpreted cautiously as we are subject to the following limitations, which, *per se*, provide future research opportunities. First, despite the large body of research investigating factors affecting the volatility of stock returns, particularly earnings quality, little known about the determinants of stock returns. Therefore, there may be other reasons for this issue than mispricing or earnings quality. For instance, stock returns can be affected by the operating environment, institutional setting and/or information uncertainty. In this paper, while we controlled for some of these factors to some extent, they are still likely to influence our results and we are not able to exclude this possibility. Second, there are several models proposed in different studies for measuring earnings quality which have led to mixed results without a general consensus on what a good model is, and whether earnings quality is a priced risk factor. This could present a promising avenue for future research.

Note

1. To observe comparability of our sample data and also the fact that the fiscal year is identical to the solar calendar year (i.e. March 20 or its equivalent, Esfand 29) for about 90 percent of publicly traded companies in the TSE, we have excluded firms with fiscal year not ending on March 20.

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