

VALUE RELEVANCE OF INFORMATION IN TRANSACTION-BASED ACCOUNTING VS. FAIR VALUE ACCOUNTING FOR EQUITY VALUATION

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RESUMEN: Los diferentes regímenes contables crean diferentes fuentes de información que se revelan a través de informes contables. Una combinación de estas fuentes con otras fuentes de información será la base para los retornos esperados para los inversionistas. En este estudio, los errores de retorno esperados y los rendimientos reales se utilizan como un proxy para evaluar el error de valoración contable. Mediante el análisis de datos de panel con efectos fijos, se mide la agregación de información en informes contables basada en diferentes regímenes contables. Los resultados de 187 empresas de las 572 empresas que cotizan en la Bolsa de Teherán entre 2009 y 2015 muestran utilizando un sistema de contabilidad basado en transacciones para la información de informes, la agregación de información será mucho mayor y las discrepancias de los rendimientos residuales no basados en la contabilidad indican Los participantes del mercado no tienen suficiente información para deshacer la información contable de la información del mercado. En palabras, en algunas situaciones, la contabilidad de valor razonable, mejora la agregación de información, pero generalmente, utilizando la contabilidad basada en transacciones, la combinación de información contable e información de otras fuentes aumenta la agregación de información en el mercado.

Palabras clave: Agregación de información, valoración patrimonial, Contabilidad del valor razonable, Contabilidad basada en transacciones, Resultado integral.

ABSTRACT: Different accounting regimes create different information sources that are disclosed through accounting reports. A combination of these sources with other sources of information will be the basis for the expected returns for investors. In this study, expected return errors and real returns are used as a proxy for evaluating the accounting valuation error. Using panel data analysis with fixed effects, it measures the aggregation of information in accounting reports based on different accounting regimes. The results of 187 companies from all 572 companies listed in Tehran Stock Exchange between 2009 and 2015, show using transaction-based accounting system for reporting information, the information aggregation will be much higher and also the discrepancies of non-accounting-based residual returns indicate market participants do not have enough information for undoing accounting information from market information. In words, in some situations, fair value accounting, improves information aggregation, but generally, using transaction-based accounting, the combination of accounting information and information from other sources raise the information aggregation in the market.

Keywords: Information aggregation, equity valuation, Fair value accounting, Transaction-based accounting, Comprehensive income.

1. INTRODUCTION

Recently, standard-setters such as the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) have been gradually raising the prominence of FVA in financial reporting (Magnan, Menini, and Parbonetti 2015), this study contributes to the debate about the use of FVA as a foundation for financial reporting. Professionals and academics mostly cited around its implications for the relevance and reliability of financial statements. Due to the importance of the Controversial discussion, this article is about to examine the interaction among accounting reports, investors' private information and market valuation. In reply to demand for accounting information, accounting standard-setting boards suggest fair value accounting (FVA), which is in the direction of market valuation for companies. To improve that standpoint, many studies have also been directed about earnings quality. In fact, one of the suggested criteria introduces earnings quality as the extent that accounting value reflects market value (Schipper and Vincent 2003),(Christensen and Frimor 2006). Reasoning behind this is straightforward, provided accounting is the only source of information. If the purpose of the accounting information is the valuation of the firm, introducing fair values will certainly improve the valuation. The accounting value of the firm will be better aligned with the market value of the firm.

The discussion about FVA dates back to the 1930s (Sikalidis and Leventis 2017), and it became controversial with particular intensity among regulators, academics, and various market participants (e.g. Barth 2007; Christensen & Nikolaev 2013; Wallison 2008). Critics debate that FVA is costly and difficult to implement and actually decreases the reliability of financial reporting (Ball, 2006). In addition, it further increases managerial discretion (Hail, Leuz, and Wysocki 2010).

On the other hand, In the presence of multiple sources of information, this notation changes. Multiple information sources for the same set of objects can provide different representations, and combining their advantages may improve the predictive power for a given task. However, it is noticeable that some sources might be irrelevant or redundant (Lin, Hu, and Wu 2014). In a multiple information source setting, data are usually described by a great number of information sources(Yuan et al. 2012). Often some information is provided by the financial reports while other sources of information directly feed the market participants (Henderison and Van Bareda 1992),(Watts and Zimmerman 1986). The accounting system can only process the information, which are available to participants and lead to report information will reflect it. Accounting system, therefore, aggregates

information. In the presence of multiple sources of information, it becomes important how the private information of the investors and the accounting information interact under various regimes. Mixing information sources is complicated and adding fair values to the accounting system might have a negative effect due to the interaction (Lin et al. 2014), (Yuan et al. 2012). Magnan et. al. (2015) found that the use of fair value information in US bank's balance sheet is directly related to the dispersion of earnings forecasts. Therefore, investors might not be able to undo the accounting aggregation (Christensen and Frimor 2006) (Ronen 2008). Also, FVA creates 'noise' around decision-making (Sikalidis and Leventis 2017).

Assuming FAV, the accounting system has access to accounting information and market information with noise and must provide an aggregated report. The market participants, also, have access to market information. The market determines the price based upon the accounting report and the investors' private information, taking into account that the market participants learn from the price. Consequently, a rational expectations equilibrium is employed. In this setting the information processing is not invertible and the choice of accounting policy becomes more involved. FVA does not uniformly dominate transaction-based accounting (Christensen and Frimor 2006). In other words, FVA is a good choice only in some consequences, so reporting based on FVA does not increase investors all the time. And mostly the aggregation of information in the market is improved with the aid of the combination of transaction-based accounting information with other market information. Therefore, the choice of accounting policy must reflect the influence of accounting on information aggregation in the market. Transaction-based accounting can be preferred even when it seems the accounting system has comparative advantage in assessing fair values. So, at what extent does accounting help or destroy valuation process? And the financial crisis have had a dramatic impact on fair value measurements upon forecast accuracy for financial industry firms (Magnan et al. 2015) (Ayres, Huang, and Myring 2017)(Ayres et al. 2017). Ayres et al. (2017) asserted fair value measurements are positively (negatively) related to forecast accuracy during the financial crisis (non-financial crisis) period.

We, now, should point out this debate whether firms should disclosure only fair value measures in their financial statements, or these figures should be communicated alongside the transaction-based accounting. Our contribution is that publishing fair value-based accounting information cannot help participants in the capital market. Noticing in presence of multiple sources of information and a variety viewpoints about two major policies (Christensen and Frimor 2006), i.e. transaction-based accounting and fair

value based accounting, this study tests the impact of accounting policies in the market's aggregation of information, and moreover the research appraises whether they have any role in valuation of companies, so reporting accounting information becomes importantly necessary. Of course, qualitative features of fair value measurements could also have an impact on the market participants forecasting accuracy beyond mere measurement issues. Ayres et al. (2017) found the impact of fair value accounting is significant in the capital markets.

2. THEORETICAL BACKGROUND

Many studies have investigated accounting information impacts on securities' valuations and management's evaluation. With (perfect) FAV, all values are provided by the balance sheet, and no further estimations are necessary (Beisland 2013). In this situation, earnings have no relationship to equity value but serve as a measure of risk (Ronen 2008). Because of other sources of information, the reaction of market's values to the accounting system is not on time, but may be earlier or later than the time such information is released. FVA also creates transitory components in earnings (Penman 2007), which are potentially used to calculate excessive executive bonuses and high dividends (Hatherly 2013). Sikalidis and Leventis (Sikalidis and Leventis 2017) noted the unrealized fair value adjustments have significant impact on dividend policy. On the other hand, the qualitative characteristics, which is mentioned in the theoretical framework of accounting standards, does not appropriately aggregate necessary information for users of financial reports. Theorists take some essential difficulties to fair values. Hernández Hernández (2004) and Khurana and Myung-Sun (2003) concluded that if fair values cannot be achieved simply for certain assets and liabilities or it depends on their special uses, it is not clear whether fair value accounting makes easier the valuation process of the company for investors or not. According to Penman Study (Penman 2013) on the effects of financial statement analysis and valuation of securities, book value is usually a reasonable approximation for market value. And manipulation concerns are the other issue, Badia et al. (2017) showed conditional conservatism increases the strength and persistence of firms' incentives to report conservatively and decreases with firms' earnings management incentives, of course, it depends on the situations like liquid markets (Badia et al. 2017), difficulties normally associated with valuing long-lived assets that are specific to their use (Abbott and Tankantor 2017),

Accepting necessity of transaction-based accounting, Beisland (Beisland 2013) investigates about the relevance of net financial expenses with respect to equity valuation in an IFRS accounting regime, these

results show balance sheet items recorded at fair value are not applicable for valuation purposes, but these purposes, book values must combine with companies' earnings. Generally, accounting procedures used in transaction-based accounting can present relevant information for shares' valuation. Sivonen (Sivonen 2011) compared the usefulness of accounting information relative to market data to measure credit risk in credit markets. His results show that the standard coefficient of determinations (R^2) for accounting model, market model, and combination pattern, are 0.22, 0.48, and 0.56, respectively. He claimed accounting and market variables have acceptable features for defining the difference between the purchase and sale price of the credit default contracts.

Accounting information is inherently delayed compared with information from other sources, but this information determines the content of other information sources and affects them. The accounting system does not exist in a vacuum, other information sources are presented and the purpose of the accounting system cannot be analyzed without considering the existence of other information sources (Christensen, 2010). Inasmuch as, financial statements are audited by an independent auditor, this implies that accounting data are hard to manipulate (Christensen 2010). Concern about effective auditing of fair value measurements (FVMs) has risen in recent decades. FVMs have high estimation uncertainty, high subjectivity, significant/complex assumptions, and multiple valuation techniques which cause difficulties in decision making (Cannon and Bedard 2016). FVMs are uncertain estimations which associated with higher inherent risk assessments.

Also, multiple information sources for the same set of objects can provide different representations, and combining their advantages may improve the predictive power for a given task. However, it is noticeable that some sources might be irrelevant or redundant (Lin et al. 2014). So, it is meaningful to select a set of good information sources that could improve the learning performance from the information (Lin et al. 2014). Finally, many studies have been done on the impact of accounting information on stock prices that reflect the information content of accounting figures of the current regime, which is often based on historical cost accounting.

Aboddy et al. (2002) suggest that market inefficiency considerations play a more important role for value relevance of markets information, they connotate that market inefficiency impact on measuring the value relevance of earnings and book value, but arbitrage has a prominent effect on it. Also, decreasing the coefficient of determination in regression models of value relevance over time can result from non-informed trading (Dontoh Nyu, Radhakrishnan, and Ronen Nyu

(2004). This content, therefore, suggests that market inefficiency and lack of sufficient information for transactions resulted in a late reaction to the accounting information.

So by splitting information into accounting and non-accounting information (i.e. information from other sources), and assuming the accounting system only uses the accounting information, but market uses both of them, we can say the accounting valuation process uses less information than does the market (Antle, et al. 1994). In line with this discussion, Magnan et al. (2015) believe that with appropriate disclosure, analysts can deconstruct the reported values and predict future earnings, also, volatility in FVA figures reflects the fundamentals of a business and needs to be reported, not smoothed away. On the other hand, Ayres et al. (2017) employed a measure of firms' fair value intensity, they showed that firms with higher fair value intensity have more accurate analyst earnings forecasts, which is a significant main effect elusive to Magnan et al. (2015).

Christensen and Frimor (2006) conceived when multiple sources of information are available to market participants and accounting information is one of these sources. Fair value information is available in the economy and the extent of aggregation depends on the confluence of accounting information and other sources of information. Compared to FVA, in a transaction-based accounting regimes the aggregation of information content in the market is greater. They show accounting reports should often be prepared on transaction-based accounting.

The information content of abnormal stock exchanged in Tehran Stock Exchange (TSE) confirms that at the days which the quantities of exchanged stock increase sharply, residual returns earned. And also there is a significant relation between the quantity of exchanges and the next days' returns. They, therefore, can be predicted from the quantity of exchanges. These results directly exhibit the information content of the quantity of exchanges and indirectly connote inefficient of TSE (Talaneh, et al., 2013). All the market participants included those who do not have any private information can encounter a better informativeness position by urging companies to release information about atypical stock exchanges, consequently market efficiency rises. These are only some simple ways for valuation, using the accounting and non-accounting information is vital for valuing companies' shares. As the language of valuation provides accounting's scale. This scaling is restricted, however, by recognition the rules that keep some information outside the accounting system (Antle et al. 1994).

3. THE MODEL

In modeling the price formation, we will use a version of the Hellwig (1980) model in which the number of investors/agents in the economy is infinite. As noted, agents trade and consume over two periods, i.e., trade takes place in the first period and the proceeds from first-period trade are consumed in the second. Admati (1985) considers a continuum agent economy, and argues that in such an economy a unique linear rational expectations equilibrium exists. Let the agents in the economy be indexed by $\epsilon \in [0,1]$. Each agent allocates his individual initial wealth, W_{0i} , between the riskless and the risky asset (Grossman and Stiglitz, 1980). At $t=2$, the risky asset pays \tilde{x} units of the single consumption good, while the riskless asset pays off. Taking the riskless asset as a numeraire and letting P be the price of the risky asset, the agent's terminal wealth, \tilde{W}_{1i} , is in Equation 1.

$$\begin{aligned} \tilde{w}_{1i} & \\ &= w_{0i} + z_i(\tilde{x} - P) \end{aligned} \quad (1)$$

Where z_i is the agent's holdings of the risky asset. Agents maximize their expected utility of consumption, $E_i[u_i(\tilde{w}_{1i})|Inf_i]$, where u_i is the agent's utility function and Inf_i is the agent's information. Assuming, agents have negative exponential utility with risk aversion, r . Thus, $u_i(w_{1i}) = -e^{-rw_{1i}}$, which implies individual demand for the risky asset is independent of the agent's initial wealth (Christensen and Frimor, 2006).

Also by assuming per capita supply of the risky asset, \tilde{z} , is random. More specifically, assumed $\tilde{z} \sim N(0, \sigma_z^2)$ and independent of any other stochastic variable.

Investors commonly invest in the two assets so as to maximize his expected utility of consumption. Provided agents are rational (Bayesian) the expectation, and use Bayesian rule (Christensen and Demski 2003). They are affected by public as well as private information available to the agent and, hence, each agent's demand depends on his private information. If individual demand is affected by private information, then in general market clearing price(s) is a function of the information available to all the agents in the economy. Sophisticated investors realize this and thus price may provide investors with information in addition to their private information. At the individual level the information available in the economy is the private information, y_i , the accounting information, V_i , and the market price of the risky asset, P . Rational investors form a conjecture regarding the price formation, $f(0)$. This conjecture influences individual demand through their expectation, and thus the market clearing price is a function of the conjecture, $T(f(0))$. $T(f(0))$ shows forming price based on estimations of all individual demand for information in the market. If the market clearing price is formed according the conjecture - if

$f(0)$ is a fixed point in the mapping T - then the conjectured price functional is a self-fulfilling rational expectations equilibrium (Hellwig 1980).

Based on the above concept, we consider a two-period pure exchange economy with a single firm, an accountant, a riskless asset, and a set of atomistic investors. Trade takes place in the first period while consumption takes place in the second. Prior to the opening of the market each investor costlessly observes two pieces of information pertaining to the payoff from the firm's assets, \tilde{x} (Christensen and Frimor 2006). Firstly, an accountant assists in the release of a public signal, V_t , concerning the future value of the risky asset and secondly, each agent observes a private signal, \tilde{y}_i , pertaining to the same (Christensen and Demski 2003).

Assumed the payoff of the risky asset consists of two elements shown in Equation 2.

$$\tilde{x} = \tilde{\varepsilon}_A + \tilde{\varepsilon}_E \quad (2)$$

Let $\tilde{\varepsilon}_A$ denotes the fact that accountant is uniquely qualified in assessing this part of the payoff, while the comparative advantage is less pronounced when it comes to assessing the remaining component, $\tilde{\varepsilon}_E$. By assuming the accountant observes two signals, \tilde{y}_A and \tilde{y}_E . For simplicity, it can be assume; $\tilde{y}_A = \tilde{\varepsilon}_A$ and $\tilde{y}_E = \tilde{\varepsilon}_E + \tilde{\varepsilon}_{AU}$. These can be written as Equation 3.

$$\begin{aligned} \tilde{x} &= \tilde{\varepsilon}_A + \tilde{\varepsilon}_E \\ &= \tilde{y}_A + (\tilde{\varepsilon}_E + \tilde{\varepsilon}_{AU}) \end{aligned} \quad (3)$$

That is, the accountant can assess $\tilde{\varepsilon}_A$ but cannot assess $\tilde{\varepsilon}_E$ perfectly. This corresponds to a situation in which the accountant observes information contained in the books of a company, \tilde{y}_A , but also observes additional information, \tilde{y}_E , which is not on the company's records.

The question to addressed to this is whether all available information should be reflected in the released financial statement, $(\tilde{y}_E, \tilde{y}_A)$, or whether only information reflecting transactions and the largely mechanical accounting treatment thereof should be reported, \tilde{y}_A . The accounting report, V_t , is designed to be the expected payoff given the information which is released in the accounting system. Consequently, it depends on the particular accounting policy chosen or invoked through regulation.

In the artificial world of the model, the solution, of course, is simple, both pieces of information should be released separately. Though the problem exists in our simple setting, the problem is of particular concern, when many pieces of information are aggregated. In practice, for example, line items are reported with a single number. That is, the underlying transactions and the effects of accounting treatment - including effects of valuation - are aggregated and not reported separately.

Based on Christensen and Frimor (2006) study, in the mentioned particular model, it can say the accounting policy/regime is transaction-based if $V_t = V_T$, where $\tilde{V}_T = E[\tilde{x} | \tilde{y}_A]$, and accounting is said to be market based if $V_t = V_M$, where $\tilde{V}_M = E[\tilde{x} | \tilde{y}_A, \tilde{y}_E]$. Assuming all stochastic variables, $\tilde{\varepsilon}_A$, $\tilde{\varepsilon}_E$, $\tilde{\varepsilon}_{AU}$, are normally distributed. Therefore, from the above present, below Equation 4 and Equation 5.

$$\tilde{V}_T = \tilde{y}_A \quad (4)$$

$$\tilde{V}_M = \tilde{y}_A + \frac{\sigma_E^2}{\sigma_E^2 + \sigma_{AU}^2} \tilde{y}_E \quad (5)$$

Similarly, the investor's private information is obtained as Equation 6.

$$\tilde{y}_i = \tilde{\varepsilon}_E + \tilde{\varepsilon}_i \quad (6)$$

Where $\tilde{\varepsilon}_i \sim N(0, s^2)$ is another independent stochastic variable.

In order to evaluate the results of various accounting policies, we analyze the issue of how the price of logical expectation equations is consistent with the various accounting policy choices. Therefore, this model can examine the effects of various accounting policies (transaction or fair value based accounting) on reasonable expectations and then on price.

To derive a rational expectations equilibrium, it is assumed investors conjecture the equilibrium price in an affine function of aggregate economic information and the random per capita supply of the risky asset (Equation 7).

$$\begin{aligned} \tilde{P}_t &= \pi_0^t + \pi_1^t \tilde{V}_t + \pi_2^t \tilde{\varepsilon}_E \\ &- \gamma^t \tilde{z} \end{aligned} \quad (7)$$

Note the parameters π_i^t and γ^t depend on the accounting policy governing the reporting. To test the above model, \tilde{z} is the proportional average of the quantity exchanged stocks for companies at t period for company i . And investors directly observe below statistic (Equation 8).

$$\hat{y}_t = y_i - \frac{cov(\tilde{y}_i, \tilde{V}_t)}{Var(\tilde{V}_t)} V_t \quad (8)$$

Whereas investors neither observe $\tilde{\varepsilon}_E$ nor \tilde{z} , but they are able to infer the following statistic (Equation 9).

$$\begin{aligned} \hat{P}_t &= \pi_2^t \tilde{\varepsilon}_E - \gamma^t \tilde{z} \\ &- \frac{cov(\pi_2^t \tilde{\varepsilon}_E - \gamma^t \tilde{z}, \tilde{V}_t)}{Var(\tilde{V}_t)} V_t. \end{aligned} \quad (9)$$

Though $(V_t, \hat{y}_t, \hat{P}_t)$ is a simple transformation of (V_t, y_t, P_t) , each set has the same information content, but the former is easier to work with. So instead of the parameters, their alternatives (statistics) are used. Now, it seems that we need to extract two equations of rational expectations, one under a transaction based policy and the other under the fair value based policy.

The equation below shows that the more the variance of the above variable ($\tilde{\epsilon}_{AU}$), the closer the pricing based on the two policies. That is, the greater the variance of the unpredictable variable indicates that more information is observed by the accountant (as well as the investor) and is included in the expected value equation (Equation 10).

$$\lim_{\sigma_{AU}^2 \rightarrow \infty} V_M = V_T \quad (10)$$

The above equation follows the rational expectation equilibrium under the transaction based policy, but the equilibrium under a market based policy is a particular case of the model.

4. METHODOLOGY

The data are collected from TSE's site. The sample consisted of 187 companies from the total of 572 companies listed on TSE until the beginning of 2009. We first calculated the total returns based on market information and then accounting returns founded on information in financial statements for 2009-2015. Then, we analyzed correlations and relations between dependent and independent variables. We finally examined two introduced models for transaction/fair value-based accounting policies based on panel data analyses with fixed effect.

To test the extent of information aggregation in transaction/fair value-based accounting, we use an adjusted model offered by Hellwig (1980). Shipper and Vincent (2003) cited that earnings qualities are included persistence, predictive ability, decision usefulness, variability. Christensen and Frimor (2006) specify that earning quality can be used for valuation.

In previous studies, the Helwig model (1980) has been tested for investors in a chain of economic systems. In this study, for the first time, the Helwig model (1980) has been tested at the level of companies listed in TSE. Therefore, \tilde{Z} is per capita supply of the risky asset which is the relative average number of shares were traded during period t .

As FVA does not uniformly dominate transaction based accounting (Christensen & Frimor, 2006). We believe the market value accounting is only appropriate in certain circumstances. Fair value-based accounting reporting does not always lead to an increase in

information aggregation, but the information aggregation in the market are often improved by combining transaction-based accounting information with other market information (Christensen & Frimor, 2006). So, choosing accounting policy should reflect the accounting impact on the aggregation of information in the market. Even when the accounting system seems to have a competitive advantage in determining fair values in the market, transaction-based accounting can also be preferred.

The choice of accounting policy must reflect. Considering that today's, there are different views on the two policies. This study examines the impact of accounting policies on the aggregation of information in the market and their role in valuing corporate shares, so that, despite the various sources of information, the information provided by the transaction-based accounting system is important and necessary.

5. STATISTICAL SAMPLE

The study period is from 2009 to 2015. The surveyed companies are all the 572 listed companies on Tehran Stock Exchange. Sampling is based on a systematic criteria-filtering. Accordingly, the companies are part of the sample, if they meet the following conditions:

1. Their fiscal year ends at the end of March each year.
2. The company did not change their fiscal year over the research period.
3. Their financial statements would be fully and continuously available since the beginning of 2009.
4. The equity book value should be positive over the research period. Then, companies with a negative book value have been removed.
5. The activity of the sample companies should not be investment and financial intermediation, such as banks and leasing companies.
6. The stock of the company has been traded during the sample period continuously, without stopping more than four months.
7. The information of the companies is available for research.

Finally, by applying the above conditions, 187 companies, 1309 observations, were selected as the statistical. Panel tests with fixed effect pattern were performed using the EViews software. Also, outliers with abnormal and exceptional data winsorized in the 0.05% up and down range of variation variables to prevent their abnormal effect.

6. HYPOTHESES

To specify whether or not accounting information reported in a transaction-based accounting system versus information released by a fair value-based accounting system can better confluent with market information aggregation, two following hypotheses organized and examined:

H1: Information aggregation in a transaction-based accounting system is greater than a fair value-based accounting system

H2: Offering accounting information based on fair value prevents identifying market information from accounting information by investors.

7. VARIABLES

In order to evaluate the consequences of alternative accounting policies, we analyze how the price is formed in rational expectations equilibria corresponding to the alternative accounting policies. With this model the influence of alternative accounting policies (based on transaction or fair value) on rational expectations can be measured.

Assuming all information is available to market participants, the total returns are the same as the return on market value for the company i , market value based return, V_M , computed as Equation 11.¹

$$V_{M,i} = \frac{(P_{t,i} - P_{t-1,i}) + DPS_{t,i} + \text{other payoff}}{P_{t-1,i} + \text{other pays}_{t,i}} \quad (11)$$

Where, for company i in period t , $P_{t,i}$ is share's market value at t , P_{t-1} is share's market value at $t-1$. DPS_t is dividend per share at t . other payoffs is any other return earned and other pays is any other payment. Transaction-based return for company i , $V_{T,i}$, computed as Equation 12.

$$V_{T,i} = \frac{\text{Income}_{t,i}}{BV_{t-1,i}} \quad (12)$$

Where Income_t and BV_{t-1} are Comprehensive income² at t , Book Value per Share at $t-1$, respectively. As mentioned before, blew equation is held, $\tilde{x} = \tilde{\epsilon}_A + \tilde{\epsilon}_E = \tilde{y}_A + (\tilde{\epsilon}_E + \tilde{\epsilon}_{AU})$. So, non-accounting-based return computed as Equation 13.

$$\tilde{\epsilon}_{E,i} = V_{M,i} - V_{T,i} \quad (13)$$

In that equation, $\tilde{\epsilon}_{AU}$ cannot be specified and depends on some non-predictable factors in the market, but based on some measures it can be appraised and estimated.

8. CONTROL VARIABLES

To control other potential factors affecting the efficiency of accounting returns and stock prices, we used the variables in the previous studies, "size" using the natural logarithm of total market value (Barron, et al., 2008), and for performance using the return on equity (ROE) (Parbonetti, et al., 2011). Barth et al. (1998) suggest that the effort, and probably the quality, of analysts' forecasts change according to the amount of tangible assets. In the same vein, Barron et al. (Barron, Donal, et al., 2002) find that the analyst consensus is negatively affected by the amount of intangible assets. Therefore, we include the market to book value (MB) as control for companies' growth opportunities.

9. EMPIRICAL RESULTS

The data gathered from TSE, then to examine the hypotheses, first Pearson and Spearman correlation between variables computed and analyzed. In Table 1, Pearson and Spearman correlation coefficients are displayed above and below the diagonal, respectively, for the cited variables. Results display strong relations among them except for the proportional average exchanged stocks which have fairly weak relation. This might have occurred due to some non-accounting factors which are not in the direction of this article (Talaneh et al. 2013). In spite of the fact that mentioned in the model, there is a negative relation between share's prices and the quantity of exchanged stocks. This, anyway, will not deface the literature of the study. As it can be inferred from the Pearson and Spearman correlations, there is a strongly reversed association (at 1% level) between the amount of exchanged stocks and stock prices.

Pearson and Spearman correlation coefficients are displayed above and below the diagonal, respectively, for the following variables: stock price (P), market value based return (VM), transaction value based return (VT), non-accounting-based residual return ($\tilde{\epsilon}_E$), the ratio of exchanged stock (\tilde{z}), return on equity (ROE), market to book value ratio (MB), natural logarithm of market value (size) and number of observations (N). The sample includes firms that were listed on the TSE between 2009 and 2015. Correlation is significant at the 0.01 level (2-tailed).

Comparing correlation coefficients implies significant price reaction to information in transaction-based

¹ Since the transaction-based information and market-based information affect the shares' prices, and finally, theorists measure the impact of this information by Changes in returns, so, following Schipper and Vincent (2003), Leuz et al. (2003) instead of R_{it} we use V_{it}

² Kanagaretnam et al. (2009) find that in Canadian capital market, aggregate comprehensive income is more strongly associated (in terms of explanatory power) with both stock price and returns compared to net income. This results offered for TSE (ArabMazar and Radmehr, 2003).

accounting at 1% level for Pearson and Spearman correlation coefficients, 0.258 and 0.611, respectively. Also, these results for FVA are significant, 0.297 and 0.358, respectively. On the other spectrum, the stock market reaction is weak to information released from outside of transaction-based accounting system as the two correlation coefficients for $\tilde{\epsilon}_E$ are 0.061 and -0.081, respectively, which are significant at 5% level. Despite significant statistics for fair value-based accounting, correlation coefficients hold on low level indicating discrepancies in the market information.

Table 1: The Results of Pearson and Spearman Correlations

		P	V _M	V _T	$\tilde{\epsilon}_E$	$\tilde{\epsilon}_Z$	ROE	MB	Size
P	Coefficients	1	0.3	0.258	0.061	-0.058	0.267	0.47	0.35
	Sig.		0	0.03	0	0.03	0	0	0
V _M	coefficients	0.358	1	0.071	0.708	0.12	-0.07	0.252	0.17
	Sig.	0		0.01	0	0	0.016	0.016	0
V _T	coefficients	0.611	0.16	1	-0.614	-0.012	0.014	-0.01	0.15
	Sig.	0	0		0	0.666	0.609	0.797	0
$\tilde{\epsilon}_E$	coefficients	-0.087	0.65	-0.53	1	0.103	-0.04	0.202	0.03
	Sig.	0	0	0		0	0.12	0	0.27
$\tilde{\epsilon}_Z$	coefficients	0.011	0.17	-0.03	0.179	1	-0.1	0.036	-0.04
	Sig.	0.686	0	0.375	0		0	0.2	0.16
ROE	coefficients	0.59	0.03	0.603	-0.362	-0.083	1	0.086	0.14
	Sig.	0	0.3	0	0	0		0	0
MB	coefficients	0.793	0.35	0.333	0.108	0.078	0.357	1	0.21
	Sig.	0	0	0	0	0	0		0
Size	coefficients	0.477	0.2	0.354	-0.054	0.083	0.324	0.379	1
	Sig.	0	0	0	0.06	0	0	0	
N		1277	1258	1248	1248	1276	1269	1274	1277

9.2 The examination results for hypotheses

For testing hypotheses, two models introduced: model 1 for transaction-based accounting system and model 2 for fair value-based accounting system.

9.2.1. Model 1

Examines relation between independent variables and stocks prices. In the model, independent variables are included transaction-based accounting return, non-accounting-based residual return, and the ratio of exchanged stock.

$$\text{Model (1)} \quad \tilde{P}_t = \pi_0^t + \pi_1^t \tilde{V}_t + \pi_2^t \tilde{\epsilon}_E - \gamma^t \tilde{z} + \pi_3^t \text{size} + \pi_4^t \text{ROE} + \pi_5^t \text{MB}$$

The results shown in the Table 2, there is a significant relation between transaction-based accounting returns and non-accounting-based residual returns with stock prices.

This tells that when information from accounting system is combined with information from other sources in the market, the information aggregation will improve. This model indicates that accounting is not a unique source of information, but there are some other sources of information in the market. The variance of

$\tilde{\epsilon}_E$ (= 131.21) denotes the extent of discrepancies in non-accounting-based information and also the investors' private information. So, this can be evidence of investor reliance on accounting information. The F statistic and its significant level validate a linear relation among dependent variable and descriptive independent variables. As introduced in the basic model a negative relation is running between share prices and exchanged stocks. Incidentally, According to Durbin-Watson statistic, when the value is about 2 indicates non-autocorrelation among errors in the model. In the Table 2 this statistic equals to 1.81, that is, there isn't any error in the elements of the model.

Table (2). Model (1), the test of relation between stock price and independent variables at transaction-based accounting

Part A: results of variables in the model (1)							
	constant	V _T	$\tilde{\epsilon}_E$	$\tilde{\epsilon}_Z$	ROE	MB	size
Coefficients	-25257.3	10.21	5.36	-937	9.8	438.3	5054
t Test	-24.67	10.99	10.7	-9.09	8.54	14.78	27.23
Sig.	0	0	0	0	0	0	0
Variance		86.97	131	0.493	49.93	2.8	0.74
Part B: statistic results for model (1)							
R	R ²	Adj. R ²	F test	Sig. F	Standard deviation	Durbin Watson	
0.933	0.87	0.84	35.3	0	3352.9	1.81	

9.2.2. Model 2

Tests relation among stock prices and independent variables (returns in fair value-based accounting system, proportion of exchanged stocks) in a fair value-based accounting system.

$$\text{Model (2)} \quad \tilde{P}_t = \pi_0^t + \pi_1^t \tilde{V}_t - \gamma^t \tilde{z} + \pi_3^t \text{size} + \pi_4^t \text{ROE} + \pi_5^t \text{MB}$$

The model assumes accounting is a sole source of information, and all information is distributed from the accounting system. Reported results in Table 3 for model (2) show significant relation among independent variables and stock prices. As the model is supposed, all the information should be disclosed in fair value based accounting, therefore, accountant and investor observe all their necessary information uniquely in accounting reports. Noticing that independent variables explained 75% of stock price changes, i.e., $R^2 = 0.75$ which this feature in the model (1) equals to 87%. Then it can be deduced that information users couldn't appreciate and identify the information in financial statements. From this, the second hypothesis couldn't be rejected, that is, releasing accounting information based on fair value prohibits undoing market information from accounting information. The F statistic (=16.25) and its significant level (= 0.00) validate a linear relation among dependent variable and descriptive independent variables. Like the results of model (1), in the Table 3

value for Durbin-Watson equals 1.70, that is, there is no autocorrelation among errors in the model.

Table (3): Model (2), the test of relation between stock price and independent variables in fair value based accounting

Part A: results of variables in the model (1)					
constant	V _T	\bar{z}	ROE	MB	size
-42355.8	5.58	-1648	6.57	455.4	8079.6
-5	3.26	-5.77	2.05	2.92	5.65
0	0	0	0.04	0	0
Part B: statistic results for model (1)					
R ²	Adj. R ²	F test	Sig. F	Standard deviation	Dorbin Watson
0.75	0.71	16.25	0	3645	1.7

Based on the results of the two models, it can be concluded when the dispersion of non-accounting-based surplus decreases, using market value for accounting system improves the information aggregation. As a consequence of above discussion, using fair value based accounting system improves information aggregation only in some situations. Since σ_z^2 is rather high ($\sigma_z^2 = 0.493$), i.e. exogenous noise, σ_z^2 , is large, then it is expected that price reveals enough information from other source of information (Demski, 2004).

10. DISCUSSION AND CONCLUSIONS

Accounting information is formed by an aggregation of the information available to the accounting system. Introducing FVA represents a new solution to the accounting aggregation problem as market information is merged into the accounting system (Christensen and Frimor 2006). Various accounting regimes generate different information sources which will be released through accounting reports. Overall, the results indicate that in the target statistic population, a combination of information resources lead to improving the information aggregation, that is, using market-based accounting obstacles undoing accounting information from market information, therefore, in our target market, adoption a fair value-based accounting system is corrupt information. On the contrary, market participants gather accounting information from transaction-based accounting systems, and other information obtained from other sources, so then, they combine them to achieve optimal returns.

As a result of the research, the transaction-based accounting system is flowing at TSE, and investors are dependent on the information released by the

accounting system. They also directly receive some information from other sources.

The study is tried to examine how various accounting policies (that is, transaction/ fair value-based accounting policies) affect the information contents of all informative variables in the economic system. What can say about this is that risk aversion and noise in investors' private information play a rational role. If the results of these parameters are relatively large, then we should expect the amount of information revealed by price to be modest. Also, if exogenous noise, σ_z^2 , is large we expect price to reveal little, and if the accountant and investors know the information and consequences in the market then their private information would have small variances. So, the market mechanism is very appropriate for the investors' aggregation information. This makes a little opportunity for accounting system to release market information. In other words, information is distributed from other sources of information, so FVA is not needed. In fact, given the market is this well informed, going to FVA is inferior to transaction-based accounting. Aggregating the market information into the accounting reports makes them less useful to investors because doing this makes the market participants less able to infer the underlying state of nature.

Accounting, on the other hand, is in some sense less modest. For example, accounting rules often mandate how things must enter in the financial statement or, it is possible to use either historical cost, current cost, realizable value, or present value as measurement basis according to IASB standards. In the case, utilizing a FVA can improve the aggregation of information. So, the FVA incorporates the full effect of the accountant's perception of current fair value(Christensen and Frimor, 2006; Christensen, 2010). According to Christensen and Frimor (Christensen and Frimor, 2006) when the accountant and investors apply Bayesian rule, more noise is not necessarily bad, but when they do not use it, more noise and FVA can be a really sour combination (Christensen and Frimor, 2006).

As Demski (2004) warned in opposition to the partial view of the real world, For example, assuming that accounting is the sole source of information, an incomplete view of information content has a significant impact on market-based accounting, so as market-based accounting excels in transaction-based accounting. On this concept, market-based accounting reports are more informative than transaction-based accounting reports. A less partial more inclusive view reveals this is not always the case. Once other sources of information are considered, the aggregate informativeness may be 'higher' in a transaction-based regime than in a market-based regime. We propose a single accounting system, with only two policies and choosing one of them is unavoidable. We believe total

informativeness considerations both in the sense of this paper and in the sense of manipulation concerns (,or ethical hazard) should inform the decision on transaction-based accounting principle, for instance, Badia et al. (2017) found conditional conservatism increases the strength and persistence of firms' incentives to report conservatively and decreases with firms' earnings management incentives.

Our findings support the findings of Magnan et al. (2015), but in some aspects dispute the results of Ayres et al. (2017). The high level of dispersion of non-accounting-based surplus returns indicates that investors cannot recognize accounting information from market information. In general, the use of transaction-based accounting improves the information aggregation, but when the dispersion of the non-accounting-based surplus returns is reduced, market value accounting is a special case of the transaction-based system. Thus, in some circumstances, the aggregation of information is improved by applying FVA, which is a particular model of transaction-based accounting, but overall, using transaction-based accounting, then combining accounting information with other sources of information will improve the information aggregation in the market.

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