The value relevance of Other Comprehensive Income: Extensive evidence from Europe

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Abstract

The usefulness of accounting information to financial market valuation has been of a great interest for academics, financial analysts and standard setters. In this study we investigate the value relevance of the Other Comprehensive Income (OCI). Limited literature has focused on the relevance on equity price and return. In this study we go further by including the usefulness of OCI volatility on equity total risk which contributes to the inconclusive debate on how markets perceive different pieces of accounting information. After the adoption of the IAS (1), companies must disclose information about OCI, which shifts the focus from net income to comprehensive income. It shows the return that a company has made on its economic resources, thus helping to improve investors' decision-making process. To test the relevance aspects of the OCI, we focus on the European context, and in particular on the analysis of the super sector leaders in Europe, the companies of the STOXX 50 index over the period from 2010 to 2016. We find a weak negative association between OCI and equity price, and it is a firm specific effect. Similar weak mixed relationships with equity return is found and in particular it is a year-specific effect. In addition, our findings reveal that the volatility of OCI is positively related to equity total risk. Compared to U.S and other international contexts, the findings provide novel insights at the European Union level about the inconsistent valuation usefulness of OCI.

Keywords: value relevance, comprehensive income, price, return, volatility, Europe

1. Introduction

Accounting information can be translated into equity value through various channels, price, return and volatility valuation channels. According to the investment theory[1], investors try to maximize the investment return while minimize the investment risk. Studies, in this sense, give more emphases on how different accounting disclosures affect price or return valuation while focusing less on the risk

[1] Markowitz, H. (1952), Portfolio selection, Journal of Finance 7(1): 77-91.

side of the investment, an adequate value relevance of the disclosure should consider both return and risk aspects. Hence, this study comes to fill the gap on value relevance literature by studying the different channels through which the disclosure of the OCI might be translated into value.

For several years, the International Accounting Standards Board (IASB) has been revising basic accounting rules to facilitate convergence between the International Financial Reporting Standards (IFRSs) and the US Generally Accepted Accounting Principles (US GAAP).[2] One of the main topics is a shift from net income to comprehensive income[3]. Total comprehensive income is the change in equity during a period resulting from transactions and other events, other than those changes resulting from transactions with owners in their capacity as owners. Comprehensive income can show the return that a company has made on its economic assets and then improve the decision-making process of financial statement users. Total comprehensive income encompasses all constituents of 'profit or loss' and of 'other comprehensive income' (OCI). OCI includes items of income and expense (including reclassification adjustments) that are not recognised in profit or loss as required or permitted by IFRSs. Among different countries, differences can be highlighted due to the features of the market, stakeholders, internal and external aspects that influence the business of each company. As a convergence, this diversity it is reflected in the analysis of the VR of OCI. And even in the same EU context, different member states show different value relevance when controlling for country effect.

The value relevance of OCI and total comprehensive income, and their reporting location, continue to attract attention from scholars (Black, 2016; Shaberl and Victoravich, 2015). From the investor perspective, analysing the value relevance of comprehensive income versus net income, and the ability of OCI to predict future earnings and future cash flow, is perceived as essential. A a recent study carried out by the Chartered Financial Analysts (CFA, 2015) Institute on bank performance reporting criticised the limited use of OCI information by investors, promoting enhanced OCI disclosure in financial statements as a useful tool for making valuation decisions. The long-standing debate on the market reaction to OCI has led to several studies; some have focused on national contexts contexts (e.g., Kanagaretnam et al. 1999; Khan and Bradbury, 2016), while others have involved the same analysis performed on a cross-country sample (Devalle et al., 2010; Goncharov and Hodgson 2011; Mechelli and Cimini, 2014). In relation to this, Bradbury (2016) criticised Black

[2] A Roadmap for Convergence between IFRSs and US GAAP 2006–-2008, Memorandum of Understanding between the FASB and the IASB 27 February 2006 (MoU).

[3] FASB, ED, Concepts Statement 8 – Conceptual Framework of Financial Reporting, US-Statement of Financial Accounting Standard No 130 Reporting Comprehensive Income; IASB, A Review of the Conceptual Framework for Financial Reporting, Discussion Paper DP/2013/1; IASB, Basis for conclusions Exposure Draft 2015 ED/2015/3.

(2016) for considering only US companies, highlighting the need for studies that use non-US data (e.g. Cahan et al., 2000; Goncharov and Hodgson, 2011; Khan and Bradbury, 2014).

To fill this gap we analyse the European context, where accounting standards are playing a crucial role in harmonising reporting rules and practices among different countries (Kvaal and Nobes, 2010, 2012; Nobes and Parker, 2010; Nobes, 2017). Because some studies have used financial index components as the unit of investigation (e.g. Chambers et al. 2007), we analyse STOXX 50 companies as this index can be considered representation of the EU context regarding the OCI topic since index components are of the biggest in Europe and can represent the EU context. To ensure data consistency and to avoid missing values, we reply on one figure (OCI) without breaking it down into components because not all companies report all components of the OCI such as foreign currency translation or unrealized gain/loss on available-for-sale securities.

Given the debate on the usefulness of OCI information and the call to extend prior research in this area (Sridharan 2015, Black 2016), the objective of this study is to investigate the relationship between OCI, on one side, and stock price, stock return, and stock volatility, for the period from 2010 to 2016 for companies in the STOXX 50 index. Our main findings show a weak relevance of OCI, a negative relevance on stock price when controlling for firm effect, a mixed association with stock return when controlling for year effect (positive with *OCI/P* but negative with *ΔOCI/P*. In addition, this study demonstrates that OCI volatility is positively related to stock price and stock volatility.

Limited studies have been done on the EU context but, to our knowledge, is the first to provide comprehensive evidence by investigating three dimensions of value relevance of OCI: i.e. relevance of OCI on stock price and on stock return, and the volatility. The study on the EU context provides useful insights with respect to studies in other contexts, EU is a large important economic and financial arena, and even though EU states operate under the EU supranational umbrella, the states can have material structural differences in terms of legal/institutional setup, governance structures, financial development, and reporting aspects.

The study's contributions to the literature are threefold. First, our results partially confirm those of previous studies regarding the negative correlation between OCI and stock price and stock return. These findings expand knowledge about the lack of predictability of OCI across European countries. Second, we carry out a cross-country study within Europe to investigate differences in OCI value relevance among the European countries considered. We do not observe drivers connected with 'country' that can explain our results regarding OCI value relevance. Moreover, we obtain similar results regarding 'industry'; hence, we are unable to identify an influence exerted by 'country' or 'industry' on OCI value relevance, this means that EU countries are homogeneous in terms of the OCI relevance, and the only specific differences found are related to firm and year specific effects.

Third, we find that OCI volatility is positively related to risk relevance, which could increase investors' perceptions of firm risk. These findings suggest that managers should adequately monitor OCI by adopting proper risk management tools and avoid managerial discretion regarding OCI.

The remainder of the paper is structured as follows. The next section reviews the literature on OCI and the value relevance analysis, and outlines the research hypotheses development. This is followed by a description of the sample selection, the data-collection process, and the models used in the analysis. The fourth section highlights the main findings, then we present the robustness tests. Finally, the last section discusses the main results and concludes the paper.

2. Literature Review and Hypotheses Development

The value relevance of certain accounting items, such as OCI, is significant to understand the ability of accounting information to influence share value in the period in question (e.g. Lev, 1989; Lev and Zarowin, 1999; Francis and Schipper, 1999; Dhaliwal et al., 1999; Barth et al., 2001, Chambers et al., 2007). Value relevance can be viewed as one of the most important features of reporting quality (Francis et al., 1994; Barth et al., 2011; Burke and Wieland, 2017); especially following the adoption of the International Accounting Standards (IAS), many empirical studies have aimed to assess the value-relevance effects (e.g. Devalle et al., 2010; Horton and Serafeim, 2010; Tsalavoutas, 2012; Christensen et al. 2015).

The international debate regarding the relevance and consequences of comprehensive income and OCI components for different stakeholders, especially for investors, is extensive and varied (Black 2016). Comprehensive income and its individual components should be disclosed in such a way that it is useful with regard to providing current and potential investors with information to facilitate the process of making economic decisions (Conceptual Framework, 2009; Hodgson and Russell, 2014). The advantage of shifting from net income to comprehensive income is that it provides investors and creditors with a more extensive measurement of the firm's periodic performance as it represents all changes in assets and liabilities through the income statement (Kanagaretnam et al., 2009). This enhances the ability to predict future earnings and cash flows and increases the transparency and comparability of financial statements. As a consequence, analysis of the Value Relevance (VR) of OCI has become relevant for both academics and practitioners, and for policy makers and users of accounting information; however, most previous empirical studies have shown mixed evidence (Lee and Park, 2013), without providing clear insights into the actual usefulness of OCI. For example, some scholars have demonstrated the prophetic capacity of net income and comprehensive income for year-ahead cash flow from operations and net income (Dhaliwal, et al., 1999). Analysing data from 46 countries, Barton et al. (2010) showed that comprehensive income is the slightest expectable

performance indicator of the eight performance measures used (including net income). Conversely, Jones and Smith (2011) found that comprehensive income and OCI are less predictable compared to net income. Investigating a sample from 16 European countries, comprehensive income was found to have a worse predictability regarding cash from operating activities, while net income adjusted to comprise (separately) revaluation reserves, foreign currency translation adjustments, and unrealised gains and losses on Available for Sale (AFS) securities is no more predictive of cash from operating activities than net income is (Goncharov and Hodgson (2011). Chambers et al. (2007) studied whether investors in Standard & Poor's 500 firms from 1994 to 2003 prised comprehensive income and OCI components, by investigating the association between returns and comprehensive income. They found that the overall effect of OCI was significantly greater than zero, and insignificantly different from the theoretically correct value of one, while the coefficient on pre-Statement of Financial Accounting Standard SFAS 130 OCI was insignificantly different from zero.

Thus, prior research on OCI items has demonstrated that some components are value relevant, such as Special Items gains and losses (i.e. because they are linked with stock returns) (Elliott and Shaw, 1988; Elliott and Hanna, 1996; Cready et al. 2010). Other value-relevance studies of OCI components have shown mixed conclusions (Barth 1994; Soo and Soo 1994; Ahmed and Takeda 1995; Bartov 1997; Dhaliwal et al. 1999; O'Hanlon and Pope 1999; Seow and Tam 2002; Louis 2003; Ahmed et al. 2006; Chambers et al. 2007; Kanagaretnam et al. 2009; Jones and Smith 2011). For example, some investigations have shown that empirical evidence of VR on OCIs does not exist (Cheng et al., 1993; Dhaliwal et al., 1999; Dehning and Ratliff, 2004), while others have pointed out that OCI provides information for investors (Robinson, 1991; Sutton and Johnson, 1993; Johnson et al., 1995; Smith and Reither, 1996). Nevertheless, from a theoretical point of view, OCI seems to be essential to adequately report '*the financial performance of the entity'* (Nishikawa et al., 2016).

Hypotheses Development

In this section, we develop hypotheses on the valuation usefulness of OCI on equity market values, measured by stock price and stock return, and on risk.

Price and Return Relevance

An item is value relevant when its association with equity market values is statistically significant (Barth et al. 2001); therefore, value-relevance studies aim to identify firm values, such as the stock price (Holthausen and Watts, 2001), that can measure the relevance of OCI.

Focusing on the relationship between OCI and stock price/stock return, a previous study (Dhaliwal, et al. 1999) found that the association between comprehensive income and stock price/stock return is

not significant for companies, except for the OCI component – i.e. the available-for-sale securities adjustment for financial firms. This means that the correlation between OCI and stock price/stock return can depend on the sample, and particularly on the firm's industry features. Likewise, O'Hanlon and Pope (1999), considering the UK context, found little evidence of additional information content for comprehensive income items excluded from net income. Conversely, Biddle and Choi (2006), in response to Dhaliwal et al. (1999), found that comprehensive income has a greater association with stock returns than does net income. Both studies indicated that adding specific OCI items enhanced the relationship between net income and stock return. From the same perspective, Cahan et al. (2000) demonstrated that the aggregate of OCI and net income is value relevant, while individual components are not. Regarding the association between OCI and stock price, Kanagaretnam et al. (2009) demonstrated a significant association between stock price and comprehensive income by carrying out a value-relevance analysis on two OCI items; i.e. available-for-sale investments and cash flow hedges. Other investigations (Khan et al., 2014) have shown that the change in asset revaluation reserves component of OCI is positively associated with stock price and market returns, and that aggregate comprehensive income is more strongly associated with stock prices and market returns compared to net income.

Based on the above discussion, we have chosen to analyse OCI, instead of the individual components of OCI, because empirically there is no a clear evidence about the most value-relevant individual component therein (Soo and Soo 1994; Dhaliwal et al., 1999; Pinto, 2005; Chambers et al., 2007; Mitra and Hossain, 2009; Jones and Smith, 2011; Khan and Bradbury, 2014). To extend several previous findings demonstrating that OCI is priced by markets (e.g. Soo and Soo 1994, Carroll et al. 2003, Louis 2003, Biddle and Choi 2006, Choi et al. 2007, Kanagaretnam et al. 2009), we have pinpointed stock price (e.g. Barth and Clinch 1996, Rees and Elgers 1997, Harris and Muller 1999) and stock return (e.g. Bandyopadhyay et al. 1994, Dhaliwal et al. 1999, Biddle and Choi 2006, Mitra and Hossain 2009, Lee and Park 2013, Shaberl and Victoravich 2015) as suitable variables to further explore the relationship between the additional information given by OCI and market-based indicators.

Given these considerations, we formulate the following hypotheses:

Hypothesis 1, H_0: OCI and stock price are not positively associated.

Hypothesis 2, H_0: OCI and stock return are not positively associated.

Volatility Relevance

In financial markets with a substantial degree of informational inefficiencies, financial statement information could be used to predict mean equity return with lower ability to provide information on

equity price volatility. Equity volatility measure as the standard deviation or the variance of equity prices is a broad measures of equity risk which also includes the firm-specific risk that can be eliminated through a proper diversification. However, investors are not always able to construct the optimal diversified portfolio, this makes equity volatility (total risk) a relevant measure for investment-making. Sridharan (2015) investigated the relevance of accounting information volatilities in predicting equity price volatility and find that incorporating accounting-based volatilities improves the predictability of equity volatility. In the context of this paper, we assume that the volatility of accounting information such as the volatility of OCI is considered a relevant piece of information in explaining the realized equity volatility measured by the standard deviation.

The volatility of OCI stems from the transitory nature of certain individual components (Mechelli and Cimini 2014), and it is important to investigate whether the volatility of OCI is associated with some risk measures and whether it is priced. For example, in the US, Khan and Bradbury (2014) demonstrated that there is no significant association between the volatility of incremental comprehensive income to net income and market risk, and that the volatility of incremental OCI is not priced. From this perspective, Khan and Bradbury (2016) later carried out a similar investigation based on a sample of 92 New Zealand firms[4]. Their findings demonstrated that income volatility has a positive strong correlation with the volatility of stock returns; however, the volatility of comprehensive income incremental to net income is not associated with market risk, while it is priced. In the same context, we extend this analysis to Europe, including both financial and nonfinancial firms, to examine the potential market reaction to the volatility of OCI items. Based on the resulting observations, assuming that OCI is able to capture firm values but is subject to the volatility of its value relevance, we posit the following hypothesis:

Hypothesis 3, H_0: OCI volatility and price volatility are not positively associated.

3. Data and Research Design

3.1 Data Collection

The sample is composed of the 50 firms making up the European financial index STOXX 50. The index comprises the Eurozone's main super sector leaders (Stokes, et al., 2013; Brechmann, and Czado, 2013), and the 50 firms are distributed among 11 sectors and eight European countries as shown in Table 1. Data is collected for the seven years from 2010 to 2016, and we paid particular attention to ensuring that companies in the index were consistent for the period studied. As the aim

[4] Comprehensive income is the sum of net income plus other comprehensive income where other comprehensive income (OCI) is the aggregate of all items that bypass net income (Khan and Bradbury, 2016)

of the paper is to analyse the value relevance of other comprehensive income of the most performing and relevant firms in Europe, we have decided to focus our attention on the universe of the STOXX 50 which represents the most established firms in terms of a blue-chip representation of super sector leaders in the Eurozone accordingly to our target organization.
Using the OLS models to a pool sample of 50 companies over seven years equates to 350 firm-year observations, with no missing data.

[Insert Tables 1]

Stock price data for December of each year was gathered using the financial websites of Bloomberg, Investing, and Reuters. Accounting values of book value per share and earnings per share were collected using Factset. Finally, we hand-collected the OCI value for the 50 companies by checking their annual financial reports for the seven years. OCI is calculated for the shareholders of the parent company by deducting the OCI related to minority interest, then normalising the OCI by the number of shares outstanding to get the value of OCI per share.

[Insert Tables 2]

The analysis is divided into two parts, one to test the study hypothesis, and the other is to provide robustness tests to support the main findings. Diagnostics statistics are also provided to justify the use of a particular regression model.

3.2 Hypotheses Testing and Models

To test the first hypothesis, which relates to the relevance of OCI on stock price, Ohlson's (1995) model is introduced; the model implies that the value of a firm is a function of its book value and the abnormal return. Similar to Dechow et al. (1999) and Graham et al. (2003) the following empirical model is applied:

$$MVE_{it} = \propto + \beta_1 BVE_{it} + \beta_2 AR_{it} + \beta_3 V_{it} \quad (1)$$

Where *MVE* is the market capitalisation of the firm at time *t*, *BVE* is the book value of shareholders' equity at time *t*, AR is the abnormal return (residual income) at time *t*, and *V* is the other information that affects future abnormal return but is not reported in the income statement.
In this hypothesis our variable of interest is the stock price, and whether it is influenced by other information, such as OCI other than book value and abnormal return; therefore, we extend the model

in Equation (1) by introducing OCI, and then normalise all variables by the number of shares outstanding to get the per-share effect, as in Barth and Clinch (1996) and Harris and Muller (1999).

$$P_{it} = \propto + \beta_1 BV_{it} + \beta_2 AR_{it} + \beta_3 OCI_{it} + \varepsilon_{it} \quad (2)$$

Where P_{it} is the stock is price of firm *i* at the end of year *t*, BV_{it} is the book value per share of firm *i* at the end of year t, AR^{5}_{it} is the abnormal return per share of firm *i* and year *t*, and OCI_{it} is the OCI per share of firm *i* and year *t*. From this model we expect to see that OCI component is positively incorporated in the equity price.

As for AR calculation, NI is the net income for year *t*, and Rf[6] and BV are the risk-free rate of interest and the book value for the preceding year. All values are normalised by the number of outstanding shares.

For the second hypothesis, on the relevance of OCI on stock return, the following extended model is provided similar to Bandyopadhyay et al. (1994), Amir and Lev (1996), Dhaliwal et al. (1999), and Biddle and Choi (2006):

$$RET^{7}_{it} = \propto + \beta_1 \Delta(AR/P)_{it} + \beta_2 (OCI/P)_{it} + \beta_3 \Delta(OCI/P)_{it} + \varepsilon_{it} \quad (3)$$

Where RET_{it} is geometric return measured as the natural logarithm of current year's price over the previous year's price, $\Delta AR/P_{it}$ is the first difference of abnormal return per share deflated by stock price, OCI/P_{it} is the other comprehensive income per share deflated by stock price, and $\Delta OCI/P_{it}$ is the change in other comprehensive income per share deflated by share price. According to Equation (3) we expect find positive and significant coefficients for OCI.

For the third hypothesis, following Sridharan (2015) and Khan & Bradbury (2016), we construct the following expression to catch the impact of accounting-based volatility (OCI in this case) in explaining the equity price volatility, the hypothesis is tested by utilising the following expression:

$$STD\_P_{it} = \propto + \beta_1 STD\_EPS_{it} + \beta_2 STD\_OCI_{it} + \varepsilon_{it} \quad (4)$$

Where STD_EPS_{it} is the standard deviation of the earnings per share for firm *i* and year *t*, STD_OCI is the standard deviation of OCI per share for firm *i* and year *t*, and STD_P_{it} is the standard deviation of the stock price for firm *i* and year *t* (standard deviations are measured on two-period variance).

[5] Abnormal return is calculated as follows: $AR_t = NI_t - Rf_{t-1}(BV_{t-1})$

[6] *Rf* is the annual yield on a 10-year AAA European Treasury bond.

[7] $RET_{it} = \log(\frac{P_{it}}{P_{i,t-1}})$

Our expectation is that OCI volatility is positively related to price volatility in which it contributes to pricing equity risk.

Each model presented above is tested using the OLS general form, fixed effect form, random effect form, and the robust regression, diagnostic statistics are provided to specify the appropriate form of each regression model[8]. Our general model results to be the following:

$$Y_{it} = \propto + \sum_1^k \beta_1 X_{k,it} + \sum_1^n \gamma_2 D_n + \sum_1^t \delta_2 T_t + \varepsilon_{it} \quad (5)$$

Y_{it} Is the dependent variable that can take a form of Price, Return or Volatility;

$X_{k,it}$ Represents the independent variables: in this case are the accounting information including OCI;

D_n Represents the entity dummies included in the model such as firm, sector, and region;

T_t Is Year dummy variable, so we have t-1 years;

ε_{it} Is the error term (between-entity error or within entity error);

We account in all the regressions for 'fixed firm, sectors, country, traded and year effects', specifically we include intercept dummies for each of the dummies. These fixed effects capture constant specific factors, such as financial risk, not directly incorporated in the models.

4. Main Findings

The descriptive statistics reported in Table 3 show the volatilities of EPS and AR (5.15 and 4.90 respectively) which are higher than the volatility of OCI reported as 2.59; however, adding another column showing the coefficient of variations makes the volatility of OCI the highest, 39.8 for OCI compared to 14.8 and 1.60 for EPS and AR respectively. These initial results offer a glimpse on to how extent the OCI volatility behaves differently and might have different value relevance.

[Insert Table 3]

The correlation matrix in Table 4 shows the basic two-tailed correlation coefficients among the variables. Price is positively related to the weight of the firm in the index, the book value, earnings per share, abnormal return, and standard deviations of both EPS and OCI. Stock return is positively related to EPS, AR, and price standard deviation, which confirms the risk–return trade-off. The matrix also provides initial insights on the variables on interest, OCI and Price are negatively but not

[8] For each regression presented in the analysis section, we performed the diagnostic tests to present the model that appropriately fits the data with robust coefficients such as: Hausman test (fixed or random model); Breusch-Pagan Multiplier (OLS or random model); and heteroscedasticity test (to use robust model when heteroscedasticity exists). Tests are not presented here for not being statistically exhaustive but they are available upon request.

significantly correlated, Return and OCI are positively but also not significantly correlated (more insights are provided in the regression analysis). On the other hand, price standard deviation is positively correlated with the standard deviation of both EPS and OCI, which reveals how the volatilities of income and OCI contribute to the volatility of the stock price.

[Insert Table 4]

In Table 5 we demonstrate the results for testing the price relevance hypothesis, which pertains to the relationship between stock price and OCI. We show that there is no strong statistical evidence on the relationship between OCI and price except when we control for the firm-specific feature as shown in Model 2. Country, year - or sector-specific characteristics are not statistically significant in driving the OCI-Price relationship, however, differences among sectors, years, and countries exist. Based on the diagnostic statistics, the Hausman test and the heteroscedasticity test support use of the robust-random effect rather than the fixed effect, and that the random effect model support the negative association between equity price and OCI.

[Insert Table 5]

These results in Table 5 reveal that the association between OCI and stock price is not strongly evident except the Model with firm effect and the robust Model, which would mean that the higher the value of OCI a firm reports, the lower its stock price. These results may be due to one of the following explanations. First, it can be seen that, on average, firms in our sample had short positions in their OCI accounts.[9] Second, higher OCI values may be perceived as a negative signal by market investors, wherein they do not value each euro reported as OCI as a euro reported in the income statement. Third, investors seem to perceive OCI as lower-quality income reported at the expense of ordinary income in the income statement; in other words, there is a trade-off between OCI and Net Income (NI), which means that when OCI increases, EPS decreases, followed by stock price decrease.
The preliminary results of the correlation matrix show that incremental values of EPS and OCI are negatively correlated, and affect stock price differently. More emphasis on these test are presented in the robustness check.

[9] The components of OCI are risk-management tools designed to lower the firm's exposure to different types of risk.

Since banking and financial firms may apply special accounting rules in their income generating process, we controlled for this possible bias by running the model only on "Financials[10]", and we find no evidence that the model with "Financials" performs differently from the standard model.

Table 6 shows the results of the OCI relevance on equity returns. Among different models, the diagnostic statistics indicate the use of the OLS with dummies to generate more robust coefficients.

[Insert Table 6]

The Models show that OCI variables are not statistically significant in explaining the stock return; however, Model 3, which considers the year fixed effects, shows a significant positive relationship at a 90% confidence interval between OCI/P and a negative association between the changes in OCI/P. economically, this indicates that this relationship between OCI and stock return is only a year-specific effect, rather than a country-, firm-, or sector-specific effect. It also implies that reporting OCI separately is considered a positive signal that improves stock returns, whereas higher changes in OCI indicate a negative signal that affects stock returns. Statistically, the model with year effect seem to fit because R^2 improved substantially (34%) and the *RMSE* reduce also (0.179). Model 6 we find that there is also a significant differences among firms traded above BV with respect to those traded below, however, in this Model, OCI variables are not significant. Finally, differences among sectors, firms, and countries are not evident in the Return Models.

As a robustness test, we run the model only for the "Financial Firms", and we find no evidence that the model with "Financial" perform differently.

In general, we find no conclusive evidence on the relationship between OCI and Price and Return in the EU context except for some specific factors, in this case we cannot provide a strong evidence on the value relevance in this specific context, and thus we can't reject the null hypotheses on price and return associations.

Regarding the volatility relevance of OCI, we tested the relationship between OCI volatility and equity volatility.

[Insert Table 7]

It is evident from Table 7 that there exists a statistically positive relationship between STD_OCI (as a measure of volatility) and equity volatility (measured by its standard deviation). This relationship is persistent through all models, except for firm effect; this means that the 50 firms do not significantly

[10] "Financials" in our sample are 10 companies (6 banks and 4 insurance companies). Results are not reported in the paper but they are available upon request.

differ from each other in terms of the relationship between the volatilities of OCI and price. On the other hand, the results in Table 6 show that this positive relationship is a year-, sector-, and country-specific feature, which indicates that there are significant differences within years, sectors, and countries in which clusters within these dummies might exist. These findings indicate that investors value the volatility of OCI more than they do with the magnitude of OCI and that volatility of accounting information matters in market valuation of firm's risk. Additionally, even though we show no strong evidence of value relevance on price and Return, the value relevance of OCI on stock volatility is more statistically and economically evident, since OCI is volatile income category, firms with higher OCI variations experience higher stock price volatility. In this sense, investors seem to be less concerned about the magnitude of the OCI (that's why little relevance on Price and Return) and that financial markets incorporate volatilities of accounting information into the market risk.

5. Robustness Tests

To enrich the main findings and to account for the dynamic relationships, we extend analysis to additional robustness checks as follows:

One: Price lag test: since there is no definite correspondence between stock price and the disclosure of financial statements, and since the value of OCI is not necessarily realized during the current year, we test the relationship between OCI and price lag. Equation (6) gives us a glimpse when OCI can be realised so that the current OCI might influence the subsequent period's price.

$$LagP_{it} = \propto + \beta_1 BV_{it} + \beta_2 AR_{it} + \beta_3 OCI_{it} + \varepsilon_{it}$$

$LagP_{it}$ is the first price lag for firm *i* and year *t.* (6)

[Insert Table 8]

The results presented in Table 8 show that OCI and price lag are negatively correlated at the 1% and 10% significance levels in the OLS and random effect models. This result may indicate one of the following: either the subsequent year's price is a better representation of the current price since OCI is typically disclosed during the first quarter of the succeeding year; or the one-year maturity of OCI is enough for it to be realised and to influence stock price. These findings support the negative relevance of OCI on equity price.

Two: First difference relationship: we test the relationship between the incremental values of OCI (first difference) and the equity price according to the following regression form:

$$P_{it} = \propto + \beta_1 BV_{it} + \beta_2 AR\_D1_{it} + \beta_3 OCI\_D1_{it} + \varepsilon_{it} \quad (7)$$

AR_D1 is the first difference of abnormal return per share for firm *i* and year *t* and OCI_D1 is the first difference of OCI per share for firm *i* and year *t.*

In Table 9, we show the results of the regressions regarding the relationship between the first difference in OCI and stock price.

[Insert Table 9]

It shows that the incremental value of OCI is also a value relevant to stock price. This result confirms the main findings related Hypothesis 1, regarding the negative relationship between OCI and stock price.

Three: The non-linearity test is to investigate whether the relationship between OCI and stock price remains constant until OCI reaches a certain value or inverts according to the following equation:

$$P_{it} = \propto + \beta_1 BV_{it} + \beta_2 AR_{it} + \beta_3 OCI_{it} + \beta_4 OCI_{it}^2 + \varepsilon_{it} \quad (8)$$

OCI^2 is the squared of the OCI per share for firm *i* and year *t*

[Insert Table 10]

The results of this test are presented in Table 10, which shows that there is no evidence that the relationship inverts at any point, as the $\mathrm{OCI}_{\mathrm{sqrd}}$ is not statistically significant.

Four: Equation (9) is to test the OCI and EPS trade-off as one explanation of the negative coefficients of OCI in the price relevance equation. We regress the incremental value of EPS on the incremental value of OCI to check the extent to which they co-move.

$$OCI\_D1_{it} = \propto + \beta_1 BV_{it} + \beta_2 EPS\_D1_{it} + \varepsilon_{it} \quad (9)$$

EPS_D1 is the first difference of earnings per share for firm i and year *t.*

[Insert Table 11]

The results are presented in Table 11, and indicate that there exists a statistically negative relationship between incremental values of OCI and EPS. This can be explained by the fact that when companies generate more OCI, it is seen by investors as being at the expense of income generated from normal firm operations, this might explain why OCI is negatively related to stock price in our models.

6. Discussion and Conclusions

The valuation usefulness of financial performance has been largely debated by academics, standard setters, practitioners, and investors. The Value Relevance analysis is essential to provide investors with useful additional information about firm performance to support their valuation judgements and assign realistic firm value. Nevertheless, the IASB's Exposure Draft Conceptual Framework (IASB 2015) cannot provide a conceptual basis for OCI. Hence, it is essential to carry out empirical studies across countries to obtain an overview of OCI reporting practices and their effects on financial markets (Black 2016).

In the current study, we investigated the information usefulness of OCI to financial market valuation of equities using a larger scope than that of previous research. Different contexts and realities may produce different findings related to OCI relevance, and in order to add more insights to discussion, we compare our results and findings with those of different settings especially in the U.S, Canada, and New Zealand and we provide that our findings are not significantly different of those in the compared countries. To our knowledge, this study is the first conducted at the European level to investigate three relevance aspects of OCI; i.e. the price, return and volatility relevance to add to the inconclusive debate on the usefulness and relevance of accounting information to financial markets. We also pay a particular attention to the methodological checks and diagnostics. We investigated the European financial index STOXX 50 over seven years (2010–2016, beginning one year after the IAS 1 Revised entered into force[11]). Our final sample comprised 350 firm-year observations with no missing data. We tested three hypotheses related to the impact of OCI on stock price, stock return, and stock volatility, utilising pooled OLS, fixed or random effect models depending on the appropriate diagnostics statistics.

Our results show that there is no significant association between OCI and stock price except a negative relationship in certain models with firm fixed effects, which might be explained in relation to the signalling effect of OCI as lower-quality income at the expense of ordinary income. We document that OCI is not perceived by the market as sufficiently influencing stock return expect when we control for year effect. OCI volatility is positively related to stock volatility. Moreover, the results of the robustness checks confirm that OCI is negatively correlated with the first price lag. Additionally, the incremental value of OCI is also negatively related to stock price. We also show that there is no proof of a quadratic relationship between OCI and stock price. Finally, the incremental values of OCI and EPS are negatively correlated, confirming the premise of the trade-off between OCI and ordinary income.

[11] The revised IAS 1 became effective for annual periods beginning on or after 1 January 2009.

The negative association between OCI and stock price is consistent with results found in previous studies (e.g. Dahaliwal et al. 1999, Landsman et al., 2011, Jones and Smith, 2011). Our results are consistent with those found by Dahaliwal et al. (1999) regarding the lack of relationship between OCI and stock returns. Overall, it is worthwhile noting that OCI has no clear value relevant, investors do not always include OCI information in their price and returns assessment, and that the relevance is a specific factors rather than a systematic issue since it only appears in certain fixed effect models such as year and firm.

On the other hand, as per our third hypothesis, we show a positive relationship between OCI volatility and stock volatility, this means that OCI volatility is strongly incorporated in the total equity risk, this finding is consistent-in general terms- with Sridharan (2015) who finds that accounting information volatilities area able to predict equity realized and implied volatilities, and in strict terms with Khan and Bradbury (2014, 2016) in which volatility of comprehensive income can explain both price and price volatility. These previous studies investigated only non-financial firms, while our study did not remove financial firms from the analysis but we controlled for this potential bias; hence, our results serve as an extension of their findings. Moreover, most prior studies have focused only on US data (Hodder et al. 2006, Bamber et al. 2010, Khan and Bradbury 2014), while our study focuses on the European listed companies, in this sense, comparing the results from other countries (America, Europe, Canada, and New Zealand) we conclude that findings are still mixed and there is no concrete evidence that OCI adds to the usefulness of accounting information in terms of value relevance, the EU context presented in this study does not demonstrate significant differences from other contexts in terms of confirming or rejecting the relevance of the OCI, and that it is a context-specific relevance. Based on these findings, we can argue that investors in the financial market interpret information regarding OCI by discounting their valuation of securities issued by firms. This insight seems to be in line with the positive relationship between OCI volatility and equity risk relevance.

As policy implications: This paper should concern accounting policy makers, because our findings highlight several criticisms and the need for standard setters to enhance the conceptual basis of OCI. Our study could also be useful to managers, as it confirms the volatility of OCI, its lack of predictive value, and the difficulties related to its control, indicating that management should monitor OCI and seek to reduce performance measurement volatility (Black 2016).

Finally, further research is needed at the European level to verify the volatility hypothesis, especially by breaking down the volatilities of OCI components. We could not test the causality between OCI and price due to the limited number of years considered; therefore, more research is needed to analyse the directional association between OCI and price, since the OCI value depends on the closing price of the period.

This study is not free of limitations, first we limited the analysis to the 50 firms of the STOXX, we did because we believe that these companies can represent the EU context and they are big enough to report consistent OCI, however, extending the dataset would be a chance for future research. Second, the explanatory variable is limited to the OCI without breaking down into its main components, we proceeded in this way because we are sure that the 50 companies report OCI but not all companies report all components of the OCI, this would have resulted in many missing values that would affect the analysis given the limited number of firms, this would also be an opportunity for future research to deepen the analysis or at least including dummies for OCI categories.

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Table 1: Distribution of firms among sectors and countries

Sector	No. Of firms	Weight	Country	No. Of firms	Weight
Industrials	13	26%	France	18	36%
Banks	6	12%	Germany	15	30%
Consumer Goods/services	6	12%	Netherlands	6	12%
Energy	6	12%	Spain	5	10%
ICT (Telecum. & Tech.)	5	10%	Italy	3	6%
Insurance	4	8%	BELGIUM	1	2%
Auto	3	6%	Finland	1	2%
Health Care	3	6%	Ireland	1	2%
Food and Beverage	2	4%			
Retail	2	4%			
Total	**50**	**100%**	**Total**	**50**	**100%**

Table 2: Description of variables

Variable	**Symbol**	**Description**
Price	P	is the share price of the firm at the end of year t
Weight	W	is the weight of the firm in the EuroStoxx 50 financial index
Book value	BV	is the book value per share
Earnings per share	EPS	is the earnings per share
Other comprehensive income	OCI	is the other comprehensive income per share
Abnormal return	AR	is the abnormal return per share
Rate of return	RET	is the natural logarithm of the total return of the stock price for two-year period
Price standard deviation	STD_P	is the stock price standard deviation
EPS standard deviation	STD_EPS	is the EPS standard deviation
OCI standard deviation	STD_OCI	is the OCI standard deviation
Age	LnAge	is the natural logarithm of the age of the firm
EPS first difference	EPS_D1	is the first difference of the EPS
OCI first difference	OCIS_D1	is the first difference of the OCI
AR first difference	AR_D1	is the first difference of the AR
Price lag	lagPrice	is the first price lag
Traded	Traded	is a dummy variable taking a value of 1 if the stock is traded above its book value and zero otherwise

Table 3: Descriptive statistics

Variable	Obs	Mean	STD	Min	Max	CV
Price	350	50.50	46.71	1.29	234.40	0.92
Weight	350	0.02	0.01	0.01	0.04	0.51
BV	350	32.54	38.04	-0.54	198.66	1.17
EPS	350	3.49	5.15	-4.52	46.45	1.48
OCI	350	0.07	2.59	-17.32	20.91	39.80
AR	350	3.06	4.90	-5.60	42.56	1.60
RET	350	0.06	0.22	-0.85	0.69	3.72
STD_P	350	3.93	4.87	0.0030	30.12	1.24
STD_EPS	350	0.71	1.78	0.0000	20.66	2.49
STD_OCI	350	0.86	1.92	0.0009	19.11	2.22
Age	350	82.34	65.64	8.00	351.00	0.80

Note: in this table, we present the basic descriptive statistics fir the major variables utilized. They are stock price, weight of firm in the index stoxx50, book value per share, earnings per share, and other comprehensive income per share, abnormal return per share, geometric return, price standard deviation, EPS standard deviation, OCI standard deviation, and firm age. We added the CV (coefficient of variation) to show the normalized standard deviation (standard deviation for each unit of mean).

Table 4: Correlation matrix

	Price	Weight	BV	EPS	OCI	AR	RET	STD_P	STD_EPS	STD_OCI	EPS_D1	OCI_D1	lagPrice
Price	1												
Weight	0.1074*	1											
BV	0.7805*	-0.0232	1										
EPS	0.7825*	0.0236	0.8130*	1									
OCI	-0.0078	-0.0088	0.0978*	-0.0465	1								
AR	0.7370*	0.1183*	0.6925*	0.9197*	-0.0519	1							
RET	0.2175*	0.0302	0.0291	0.1350*	0.0131	0.1540*	1						
STD_P	0.6371*	0.0389	0.4700*	0.4901*	-0.0466	0.4394*	0.3462*	1					
STD_EPS	0.3652*	-0.1473*	0.5049*	0.4604*	0.0201	0.3712*	0.0171	0.3539*	1				
STD_OCI	0.4362*	0.0509	0.5572*	0.4260*	0.1180*	0.3632*	0.0287	0.2592*	0.1116*	1			
EPS_D1	0.0331	0.0222	-0.0019	0.3304*	-0.0431	0.3498*	0.1645*	-0.0271	-0.2341*	-0.0209	1		
OCI_D1	-0.0304	-0.0046	0.0115	-0.087	0.8197*	-0.0836	-0.0324	-0.0603	0.1138*	0.034	-0.1575*	1	
lagPrice	0.9710*	0.1058*	0.7986*	0.7500*	-0.0189	0.6962*	0.0106	0.5487*	0.3975*	0.4518*	-0.0325	-0.0064	1

*Note: in this table, we present the correlation matrix among variables utilized in this research. They are stock price, weight of firm in the index stoxx50, book value per share, earnings per share, other comprehensive income per share, abnormal return per share, geometric return, price standard deviation, EPS standard deviation, OCI standard deviation, natural logarithm of firm age, ESP first difference, OCI first difference, and first price lag. *** p<0.01, ** p<0.05, * p<0.1.*

Table 5: Price value relevance

Dependent Variable	*Pooled OLS*						RE-robust
Equity Price	1	2	3	4	5	6	7
BV	0.65***	1.284***	0.634***	0.882***	0.598***	0.833***	1.05***
	12.44	14.18	12.45	20.70	11.73	16.97	11.65
AR	3.51***	1.033***	3.52***	2.09***	3.52***	2.19***	1.26***
	8.68	3.93	8.96	6.67	9.01	5.83	2.7
OCI	-0.732	(0.786)***	-0.652	-0.607	-0.483	-0.012	(0.741)***
	-1.32	-2.83	-1.19	-1.49	-0.91	-0.03	-3.57
Constant	18.66***	41.197***	12.94***	0.311	50.75***	24.94***	12.58**
	10.05	31.673	3.44	0.06	5.32	14.37	4.01
Observations	350	350	350	350	350	350	350
R-squared	0.685	0.942	0.710	0.841	0.723	0.759	
Critical value	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Root MSE	26.33	12.23	25.59	18.97	24.96	23.05	
Firm effect	No	Yes	No	No	No	No	
Year effect	No	No	Yes	No	No	No	
Sector effect	No	No	No	Yes	No	No	
Country effect	No	No	No	No	Yes	No	
Traded effect	No	No	No	No	No	Yes	
Rho							0.767

*Note: in this table we show the test the relevance OCI on stock price under various models, where BV is the book value per share, AR is the abnormal return per share, OCI is the other comprehensive income per share. Models implemented are simple pooled OLS (Model 1), then pooled OLS with dummies of entity, year, sector, country and traded (Models 2-6). Model 7 is dedicated for Robust-random effect regressions, Robust is used when there exits heteroscedasticity to get more robust standard errors. Each independent variable is presented by the coefficient and t-statistics or z-statistics. 50 firms, 7 years, 11 sectors and 8 countries. *** p<0.01, ** p<0.05, * p<0.1*

Table 6: Return value relevance

Dependent Variable	*Pooled OLS*					
Equity Return	1	2	3	4	5	6
ΔAR/P	0.73***	0.59***	0.65***	0.73***	0.708***	0.653***
	5.00	3.82	5.09	4.67	4.79	4.54
OCI/P	0.020	-0.42	0.53*	-0.086	0.007	0.299
	0.05	-0.86	1.64	-0.23	0.02	0.83
ΔOCI/P	0.032	0.27	-0.37*	0.075	0.038	-0.077
	0.13	0.88	-1.66	0.29	0.15	-0.32
Constant	0.064***	0.21**	-0.14***	0.037	0.14	0.027
	5.25	2.37	-5.23	0.76	1.64	-1.11
Observations	300	300	300	300	300	300
R-squared	0.079	0.20	0.339	0.136	0.097	0.134
Critical value	0.000	0.19	0.000	0.000	0.000	0.000
Root MSE	0.209	0.214	0.179	0.207	0.210	0.204
Firm effect	No	Yes	No	No	No	No
Year effect	No	No	Yes	No	No	No
Sector effect	No	No	No	Yes	No	No
Country effect	No	No	No	No	Yes	No
Traded effect	No	No	No	No	No	Yes

*Note: in this table we show the tests for the relevance OCI on stock return under various models, where ΔAR/P is the first difference of abnormal return to price, OCI/P is the ratio of other comprehensive to price, and ΔOCI/P is the change in the ration of OCI to price. Models presented are simple pooled OLS, then pooled OLS with dummies of entity, year, sector, country and traded.. Each independent variable is presented by the coefficient and t-statistics or z-statistics. 50 firms, 7 years, 11 sectors and 8 countries. *** p<0.01, ** p<0.05, * p<0.*

Table 7: Volatility value relevance

Dependent Variable				Pooed OLS			Fixed Effect
Equity Price STD	1	2	3	4	5	6	7
STD_EPS	0.90***	0.17	0.89***	0.74***	0.78***	0.94***	0.18
	6.7	1.06	6.68	5.38	5.95	7.1	1.13
STD_OCI	0.56***	0.052	0.61***	0.54***	0.36***	0.61***	0.095
	4.53	0.36	4.78	4.4	2.86	4.94	0.63
Constant	2.8***	6.71***	2.62***	5.97***	5.52***	3.23***	3.54***
	10.23	4.79	4.11	5.81	3.4	10.99	6.49
Observations	350	350	350	350	350	350	350
R-squared	0.174	0.51	0.210	0.298	0.25	0.21	
Critical value	0.000	0.000	0.000	0.000	0.000	0.000	0.042
Root MSE	4.43	3.69	4.39	4.15	4.27	4.36	
Firm effect	No	Yes	No	No	No	No	
Year effect	No	No	Yes	No	No	No	Yes
Sector effect	No	No	No	Yes	No	No	
Country effect	No	No	No	No	Yes	No	
Traded effect	No	No	No	No	No	Yes	
Rho							0.45

*Note: in this table, we test the volatility hypothesis on how volatilities of EPS and OCI (measured by standard deviation, STD_EPS, and STD_OCI) are incorporated in equity price standard deviation (price STD). Model 1 is the implementation of the simple OLS, 2-6 are the OLS with dummies, models 7 is for the panel fixed effect. Each independent variable is presented by the coefficient and t-statistics or z-statistics. 50 firms, 7 years, 11 sectors and 8 countries. *** p<0.01, ** p<0.05, * p<0.*

Robustness check[12]

Table 8: Price lag check

Dependent Variable	Pooled OLS	Random Effect
Equity Price lag		
BV	0.70***	1.13***
	13.59	15.88
AR	2.36***	-0.165
	5.93	-0.62
OCI	(0.89)*	(0.87)***
	-1.66	-3.07
Constant	17.39***	11.05***
	9.06	2.87
Observations	300	300
R-squared	0.683	
Critical value	0.000	0.000
Root MSE	25.3	
Rho		0.761

*Note: in this table, we present the first robustness check, OLS and the random effect models are used. In these regressions, we verified the relationship between other comprehensive income OCI and the first price lag to see if one year is enough to realize OCI. Each independent variable is presented by the coefficient and t-statistics or z-statistics. *** p<0.01, ** p<0.05, * p<0.*

Table 9: First difference check

Dependent variable	Pooled OLS	Random Effect
Equity Price		
BV	0.96***	1.13***
	21.41	16.21
AR_D1	0.54	0.085
	0.97	0.36
OCI_D1	-0.36	(0.46)***
	-0.92	-2.8
Constant	20.3***	11.2**
	8.83	2.41
Observations	300	300
R-squared	0.609	
Critical value	0.000	0.000
Root MSE	30.3	
Rho		0.822

*Note: in this table, we present the second robustness check using the pooled OLS and random effect. In these regressions, we verified the relationship between the first difference of other comprehensive income (OCI_D1) and the first difference of abnormal return (AR_D1) and the first price to verify the value of the incremental amount of OCI and AR on stock price. Each independent variable is presented by the coefficient and t-statistics or z-statistics. *** p<0.01, ** p<0.05, * p<0.*

[12] For each regression presented in this section, we performed the Hausman test to present the model that appropriately fits the data with robust coefficients (fixed or random model). Tests are not presented here for not being statistically exhaustive but they are available upon request.

Table 10: Non-linearity check

Dependent Variable	Pooled OLS	Random Effect
Equity Price		
BV	0.67***	1.05***
	12.27	12.25
AR	3.53***	1.22***
	8.73	4.56
OCI	-0.59	(0.79)***
	-1.04	-2.73
OCIsqrd	-0.05	0.023
	-1.08	1
Constant	18.4***	12.6***
	9.8	3.23
Obervations	350	350
R-squared	0.686	
Critical value	0.000	0.000
Root MSE	26.3	
Rho		0.769

*Note: in this table, we present the third robustness check using pooled OLS and random effect. In these regressions, we verified whether the relationship between stock price and OCI remains constant or inverts at a certain level of OCI. Each independent variable is presented by the coefficient and t-statistics or z-statistics. And OCIsqrd is the squared of OCI. *** p<0.01, ** p<0.05, * p<0.*

Table 11: OCI and EPS trade-off

Dependent Variable	Pooled OLS	Fixed Effect
OCI_D1		
BV	0.0013	0.099**
	0.2	2.07
EPS_D1	(0.22)***	(0.22)**
	-2.75	-2.49
Constant	-0.154	(3.62)**
	-0.45	-2.32
Observations	300	300
R-squared	0.025	
Critical value	0.024	0.011
Root MSE	4.49	
Rho		0.4

*Note: in this table, we present the fourth robustness check using pooled, OLS and fixed effect. In these regressions. We regressed the incremental value of EPS on the incremental value of OCI to verify the premise that there is a trade-off between OCI and EPS. Each independent variable is presented by the coefficient and t-statistics or z-statistics. *** p<0.01, ** p<0.05, * p<0.*