# RISK RELEVANCE AND VOLATILITY OF OTHER COMPREHENSIVE INCOME IN THE BANKING SECTOR: EVIDENCE FROM EUROPEAN COUNTRIES

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## Abstract

The aim of this study is to examine the relationship between the risk measures and the volatility of total comprehensive income (TCI), other comprehensive income (OCI), and single OCI components in the European context. Previous studies only cover reporting jurisdictions such as the United States and Canada but never the EU. Based on these premises, this research uses a sample of 166 listed banks, selected from 15 European countries. The results show that there is a significant positive association between the stock return volatility and the volatility of TCI, of OCI, and some of the single OCI components. This study contributes to the international debate on the risk relevance of TCI and its components, observing, in addition to previous research, the association not only between the risk measures and the volatility of TCI and OCI but also between the risk measures and the volatility of single OCI components.

**Keywords:** Total Comprehensive Income, Financial Reporting, Risk Relevance, Volatility, Banks

## 1. INTRODUCTION

This study follows a call for action concerning the direction for future research about the usefulness of total comprehensive income (TCI), other comprehensive income (OCI) and components of OCI for investor and contracting purposes (Black, 2016; Khan & Bradbury, 2016). Specifically, the paper examines the relation between risk measures and the volatility of TCI, OCI and single OCI components in the European context, following recent suggestions for future research according to which many studies in finance use earnings or operating income volatility as a measure of firm risk, so future research might consider how incorporating OCI into

these measures will potentially lead to different conclusions (Bao, Billett, Smith, & Unlu, 2020).

Easton and Zmijewski (1989) state that the association between earnings and returns varies with the persistence of earnings and the firm's exposure to systematic risk in the equity market. Thus, an examination of the association between the time-series volatility of financial statements items (TCI, OCI, and single components) and the time-series volatility of the stock/equity return tries to provide evidence for the effects of price moments that does not depend on transitory innovation in the financial statement items (i.e., news about firm fundamentals).

In this manner, the study seeks to provide evidence on the risk relevance or, in other words, on

the price movements that may not cause a deviation from the mean return that would cause volatility (Black, 2016). In previous studies, the volatility of time-series equity returns is used as the benchmark for whether OCI volatilities are associated with the total risk of a firm (FASB, 2010; Ryan, 2012; Black, 2014). In doing so, researchers assume that investors efficiently impound the risk-relevant information into equity share prices and that equity share prices represent the investors' future cash flows (Black, 2016).

TCI and OCI are considered to be the earning measures that, under the requirements of IAS 1-*revised*, should provide additional disclosure to better understand or predict the progress of firm performance for the near future.

Specifically, in revising this standard and through the debate originating from the submission of the joint FASB-IASB discussion paper *"Preliminary view on financial statement presentation"* regard to providing just a single statement of comprehensive income or two, respondents highlight that the single items of the OCI are volatile. According to them, the inclusion of OCI components with core business results is going to confuse the users of financial statements and lead to significant misinterpretation of an entity's performance (Khan & Bradbury, 2016). Investors consider the OCI items to be a transitory and noisy figure to ignore (Chasan, 2014), while they prefer net income and its derived metrics, such as earning per share (EPS), as the more effective measures for understanding the earnings originating from a firm's core business activities or operations rather than a figure that reflects the holding gains and losses. Another study on the use of financial statements (Cascino et al., 2013), demonstrates that investors consider the net income characteristics to be more consistent with the aim of financial reporting than the TCI ones because net income allows them to understand sustainability and the going concern of a firm. In addition, the majority of investors think that the increased TCI volatility in comparison to that of net income (NI) is going to confound risk assessment, arguing that this volatility does not reflect management performance, as it is induced by market forces that cannot be controlled by managers (Hirst & Hopkins, 1998; IASB, 2010).

On the basis of these assumptions, this study contributes specifically to the international debate on the risk relevance (considered as a driver of the value relevance) of TCI and its components (Black, 2016). More generally, this research contributes to the current debate among financial statement users as to whether TCI/OCI has any robust conceptual foundation or not, where the general perception is that the standard setters require the use of OCI principally as a practical expedient to reduce the volatility of net income that espouses the more critical OCI items (CFA Institute, 2015).

Few studies in existing literature examine the volatility of TCI providing evidence for the higher volatility of TCI than of NI, and even fewer studies examine the volatility of this "all-inclusive" income and related consequences (Barth, Landsman, & Wahlen, 1995; Hodder, Hopkins, & Wahlen, 2006; Khan & Bradbury, 2014, 2016).

In addition to previous research, this paper observes not only whether there is an association between the risk measures and the volatility of TCI

and OCI but also between the risk measures and the volatility of single OCI components that often reflect the core business of a financial firm (Black, 2016).

Moreover, the present study examines the risk relevance of TCI in the European context while most prior research analyses this specific topic by providing evidence for the United States and New Zealand firms. It is obvious that the evidence gathered from the United States data is largely applicable to countries under the IASs/IFRSs, but it is necessary to underline that there are OCI components that differ between the US GAAP and the IFRS GAAP (Bradbury, 2016). Additionally, there are significant differences regarding the recycling mechanism. Thus, it is important to provide evidence about the real experience of the countries under the IASB standards.

A sample of listed banks from 15 European countries is employed to measure the earning volatility over the 2010-2015 period.

Attention is focused on banks, other than the lack of literature on this specific sector, for the following reasons. First of all, because of their fundamental role in the economic system, as well as their significant impact in terms of capitalization: this means that their performance significantly affects not only the stock exchanges but the entire economies of the countries and consequently also the wealth of investors and savers, such as the recent financial crisis of 2008 has shown. Secondly, because these institutions have a large asset and liability amounts with gains or losses recorded in OCI statements. In the banking sector, available-for-sale (AFS) securities and cash-flow hedges are the main OCI items because they represent the strategic policy tools of risk management and earnings/accounting management in banks. For example, recognising a financial asset as a financial instrument through profit and loss or as an AFS by banks might be used to smooth the regulatory capital. Investors could ignore important information, such as the realised and unrealised gains and losses, which might affect the evaluation of periodic business activity (CFA Institute, 2015). Finally, our study could support bank regulators for finalising Basel III post-crisis reforms regarding regulatory capital calculations to include components of accumulated other comprehensive income (Black, 2014; Bratten, Causholli, & Khan, 2016).

The remainder of this paper is organised as follows. Section 2 describes the background and hypotheses development. Section 3 describes the methodology. Section 4 reports the results. The last section concludes the study.

## 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

In recent years, there is an increasing interest in academic studies on the usefulness of OCI components, both total and line items. Several of these papers mainly focus on the economic information content of OCI components and the valuation relevance of OCI line items.

From the perspective of economic research, the format of accounting information presentation should be irrelevant as long as the same items are included. However, empirical and experimental accounting research shows that the presentation

format might influence the investors' decisions (e.g., Hirst & Hopkins, 1998; Maines & McDaniel, 2000). Consequently, the usefulness of presenting the TCI instead of net income as the bottom line of the income statement has been the research focus of many empirical studies (Xu & Qi, 2017; Lin, Martinez, Wang, & Yang, 2018; Wang, Jiang, & Lu, 2019).

Many other studies examine the *value relevance* of TCI, OCI and OCI line items, covering various reporting jurisdictions (e.g., the United States, Canada, UK, and the European Union). They observe the *predictive value* (Dhaliwal, Subramanyam, & Trezevant,1999; Kanagaretnam et al., 2009; Biddle & Choi, 2006; Evans, Hodder, & Hopkins, 2014; Incollingo, Lucchese, & Di Carlo, 2014; Bataineh & Rababah, 2016), the *persistence* (Jones & Smith, 2011; Campbell, 2015; Bratten et al., 2016) and the *value relevance* of TCI and the OCI, including both its single components and totals (O'Hanlon & Pope, 1999; Cahan, Courtenay, Gronnewoller, & Upton, 2000; Chambers, Linsmeier, Shakespeare, & Sougiannis, 2007; Goncharov & Hodgson, 2011; Mechelli & Cimini, 2014; Kim, 2017; Jahmani, Choi, Park, & Jiayun Wu, 2017; Yousefinejad, Ahmad, & Embong, 2017; D'Achille, 2018; Elshamy, Alyousef, & Al-Mudhaf, 2019).

There is little academic evidence, instead, for the *risk relevance* of TCI and its special OCI items (Barth et al., 1995; Hodder et al., 2006; Khan & Bradbury, 2014, 2016) and the majority of studies that do provide such evidence using US data.

Barth et al. (1995) do not examine TCI specifically, but they do compare the volatility of fair value-based earnings to the historical cost-based earnings. They use a sample of 137 US banks and their findings show that the volatility of fair value-based earnings is higher than that of historical cost-based earnings and that the share price does not reflect this incremental volatility.

Hodder et al. (2006) examine a sample of 202 US commercial banks. They explore the risk relevance of the standard deviation of three different performance measures: NI, TCI, and another income measure, full fair value (FFV) income, that includes the unrealised fair value gains and losses of the financial instruments and derivatives for a bank (including the gain and losses of held-to-maturity securities, loans deposits, other

financial liabilities, and certain types of derivatives). Their findings highlight that TCI is more volatile than net income and that both TCI volatility and NI volatility are positively associated with stock return volatility and long-term interest beta. They also find that TCI volatility presents a significant negative association with equity market beta, while NI volatility presents an insignificant negative association with equity market beta. In this study, the authors also show that incremental TCI volatility is not associated with the implied cost of equity.

Khan and Bradbury (2014) observe risk relevance on a sample of 2,519 non-financial US firms. They find that TCI is more volatile than NI and that TCI volatility is associated with market measures of risk (volatility of stock returns and beta). Instead, the volatility of the TCI incremental to net income is not associated with market risk.

Khan and Bradbury (2016) explore the risk relevance of comprehensive income in a sample of 92 non-financial firms from New Zealand. This study differs from the previous one because it observes the behaviour of OCI volatility in a country that determines the TCI under IAS/IFRS where TCI excludes property, plant and equipment revaluation adjustments, which are allowed under the US GAAP. The authors show that TCI is more volatile than NI, while the TCI incremental to NI is not related to market risk. Furthermore, the incremental volatility of TCI does not modify the pricing of net income.

On the other hand, Black (2014) focuses his study on the association between the OCI component volatility and the investors' returns volatility. He uses a sample of bank holding companies from the US S&P 500 Index. The findings show that the volatilities of unrealised gains and losses on AFS securities and cash-flow hedges are negatively associated with risk, while the volatilities of other-than-temporary impairment (OTTI) losses are positively associated with risk. The authors indicate than the volatility of non-OTTI AFS unrealised gains and losses as an informative signal is relatively less risk-relevant than the volatility of OTTI losses as an informative signal about risk.

To increase the comprehension of previous literature results about the risk relevance of TCI and its components primary information is summarized in Table 1 below.

**Table 1.** Summary of previous studies on risk relevance of TCI correlated with research questions

| Authors | Sample | Country | Observation period | Results |
|---------|--------|---------|--------------------|---------|
| Hodder et al. (2006) | 202 Banks | United States | 1995-2004 | - TCI more volatile than NI;<br>- σSR positively associated with σNI;<br>- σSR positively associated with σTCI;<br>- σSR positively associated with σFFV;<br>- σSR positively associated with (σFFV - σNI);<br>- BETA negatively associated with σTCI;<br>- BETA negatively associated with σFFV;<br>- BETA negatively associated with (σTCI - σNI);<br>- BETA negatively associated with (σFFV - σNI). |
| Khan and Bradbury (2014) | 2519 non-financial firms | United States | 2005-2010 | - TCI more volatile than NI;<br>- σSR positively associated with σNI;<br>- σSR positively associated with σTCI;<br>- BETA positively associated with σNI;<br>- BETA positively associated with σTCI. |
| Khan and Bradbury (2016) | 92 non-financial firms | New Zealand | 2003-2010 | - TCI more volatile than NI;<br>- σSR positively associated with σNI;<br>- σSR positively associated with σTCI;<br>- σSR positively associated with σACI. |

It is a widely held opinion that the inclusion of OCI with core business results may confuse the users of financial statements and lead to significant misinterpretation of firm performance. The main causes of this misinterpretation derive from the fact that the OCI items are different in nature, less controllable, difficult to predict and not attributable to management performance. Indeed, OCI includes unrealised items that are not a part of the NI but are added to it, giving the user a bigger, more comprehensive picture of the entity performance, both actual and prospective. These transactions are often referred to as "dirty surplus (non-all-inclusive) components of income for the period". Since its inception, TCI has been considered to be strongly subject to high volatility – because this aspect, as has been sustained by Bamber, Jiang, Petroni, and Wang (2010), represents one of the main reasons for the aversion to the adoption of TCI as a principal result of external financial information even if it seems to be more predictive than net income. Indeed, the main opinion among users is that OCI items are infrequent, transitory and price-sensitive and that including them with core earnings is going to make TCI volatile in relation to net income. This leads to our first hypothesis:

*H1: Total comprehensive income (TCI) is more volatile than net income (NI).*

Assuming that TCI results in additional volatility, then a second important question is raised regarding whether this increased volatility confounds the risk assessment. Is OCI volatility more "beyond the control of management" than NI volatility? The increased volatility of TCI is an important issue because it implies a perception of increased risk. Accounting measures reflect both systematic and firm-specific risk components. Beaver, Kettler, and Scholes (1970) find a high degree of contemporaneous association between accounting and market risk measures. Subsequent studies investigate the relation between the market risk and accounting risk measures, by incorporating additional or different accounting measures of risk. This leads to the second hypothesis:

*H2: The volatility of total comprehensive income (TCI), incremental to net income (NI), is associated with an entity risk measure.*

Black (2016), when recommending areas for future research on risk relevance of TCI, gives evidence of different behaviours of single OCI components that are related to risk and advice on how the managers could read it. This leads to the third hypothesis:

*H3: The volatility of single OCI components is associated with an entity risk measure.*

## 3. SAMPLE AND MODEL SPECIFICATION

The initial sample for this study included all the banks listed on the stock exchanges of 15 European countries (Austria, Belgium, Germany, Denmark, Spain, Finland, France, the United Kingdom, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, and Sweden) over the 2011-2015 period.

The analysis takes into consideration only banks because OCI components are more significant to the investors making economic decisions in this sector, than in non-financial firms. In fact, the AFS and cash-flow hedges re-measurements, as OCI statement items, have economic information content and are predictive of future cash flows. Specifically, a bank's balance sheets, particularly the commercial ones, consist almost entirely of financial instruments. Thus, an analysis of how different income metrics could contribute to providing different pictures of profitability and income volatility over time is relevant. It is important to remember that NI includes many, but not all, effects of the core banking activities (interest revenues and expenses, credit losses, realised gains and losses on investments, operating expenses, fees, and taxes. TCI is a more complete measure of performance than net income (it includes fair value gains and losses on AFS investment securities and on cash-flow hedges), but not the most complete one (it excludes fair-value gains and losses on financial instruments such as held-to-maturity securities, loans, financial liabilities, and non-term deposit) (Hodder et al., 2006).

For this reason, an analysis of the single OCI components was performed in this study and the sample results are composed in Table 2 as follows.

**Table 2.** Composition of sample

| *Austria* | *Spain* | *United Kingdom* | *Italy* |
|---|---|---|---|
| Raiffeisen Bank International AG | Banco Bilbao Vizcaya Argentaria SA | Aberdeen Asset Management Plc | Mediobanca SpA |
| BKS Bank AG | Bankinter SA | Bankers Investment Trust Plc | Banca Popolare di Milano SCaRL |
| Oberbank AG | Banco Popular Espanol SA | Brewin Dolphin Holdings Plc | Banca popolare dell'Emilia Romagna |
| Bank für Tirol und Vorarlberg AG-BTV (3 Banken Gruppe) | Banco de Sabadell SA | Rathbone Brothers Plc | Brioschi Sviluppo Immobiliare S.P.A |
| Erste Group Bank AG | Banco Santander SA | Schroders Plc | Intesa Sanpaolo |
| Wiener Privatbank SE | Caixabank, S.A. | Electra Private Equity Plc | Banca Intermobiliare di Investimenti e Gestioni |
| Volksbank Vorarlberg e.Gen. | Renta 4 Banco, S.A. | Foreign & Colonial Investment Trust Plc (The) | Banca Finnat Euramerica SpA |
| *Belgium* | *Finland* | Standard Chartered Plc | Banca Popolare di Sondrio |
| KBC Groep NV/ KBC Groupe SA-KBC Group | Alandsbanken Abp-Bank of Aland Plc | Private & Commercial Finance Group Plc | Banco di Sardegna SpA |
| Dexia SA | eQ Plc | Polar Capital Technology Trust Plc | Banca Generali SpA-Generbanca |
| *Germany* | Aktia Bank Plc | HSBC Holdings Plc | Banco di Desio e della Brianza SpA-Banco Desio |
| Deutsche Bank AG | *France* | Dunedin Enterprise Investment Trust plc | Banca Profilo SpA |
| Aareal Bank AG | Rothschild & Co | Murray International Trust Plc | Dea Capital Spa |
| Comdirect Bank AG | Altarea S.A. | RIT Capital Partners Plc | Mittel SpA |
| MLP Ag | Foncière de Paris SIIC | Close Brothers Group Plc | Credito Emiliano SpA-CREDEM |
| Deutsche Postbank AG | Union Financière de France Banque SA | Arbuthnot Banking Group Plc | Banca Ifis SpA |
| DVB Bank SE | Eurosic S.A. | Lloyds Banking Group Plc | Azimut Holding SpA |
| Wüstenrot & Württembergische | SOFIBUS Patrimoine SA | Blackrock Throgmorton Trust PLC | Unione di Banche Italiane Scpa-UBI Banca |
| Oldenburgische Landesbank - OLB | Credit Agricole Alpes Provence | Witan Investment Trust Plc | Conafi Prestito SpA |
| HSBC Trinkaus & Burkhardt AG | Crédit agricole mutuel de Normandie-Seine | Barclays Plc | Mid Industry Capital |
| Grenke Ag | Crédit Agricole S.A. | ICAP Plc | Gruppo Mutuionline S.P.A. |
| Commerzbank AG | Crédit Agricole de l'Ille-et-Vilaine | London Capital Group Holdings Plc | Ergycapital S.P.A. |
| *Denmark* | Crédit Agricole Loire Haute-Loire | Alliance Trust Plc | Banca Mediolanum SpA |
| Nordfyns Bank A/S | Credit Agricole de la Touraine et du Poitou | Investec Plc | Gabetti Property Solutions S.P.A. |
| Salling Bank A/S | Credit Agricole Sud Rhône Alpes | International Personal Finance Plc | Monte dei Paschi di Siena |
| Oestjydsk Bank A/S | Crédit Agricole d'Ile-de-France | 3i Group plc | Banca Carige SpA |
| Laan & Spar Bank A/S | Crédit Agricole Mutuel Toulouse 31 CCI | Provident Financial Plc | *Luxembourg* |
| Bank of Greenland-Gronlandsbanken A/S | Crédit Agricole du Morbihan | Paragon Group of Companies Plc | Quilvest SA |
| Kreditbanken A/S | Viel & Compagnie SA | Secure Trust Bank Plc | IdB Holdings SA |
| Danske Bank A/S | Bourse Direct SA | BGEO Group Plc | *Netherlands* |
| Skjern Bank | Natixis SA | Royal Bank of Scotland Group Plc (The) | Van Lanschot NV |
| Vestjysk Bank A/S | Locindus S.A. | Jupiter UK Growth Investment Trust Plc | BinckBank NV |
| Jyske Bank A/S (Group) | Groupe IRD | Rasmala Plc | Kas Bank NV |
| Sydbank A/S | Société Générale SA | Henderson Group Plc | Delta Lloyd NV |
| Alm. Brand A/S | BNP Paribas | *Greece* | ING Groep NV |
| Lollands Bank A/S | Crédit Agricole Atlantique Vendée | Attica Bank SA-Bank of Attica SA | *Sweden* |
| Nordjyske Bank A/S | Crédit Agricole Nord de France | National Bank of Greece SA | Skandinaviska Enskilda Banken AB |
| Spar Nord Bank | ABC Arbitrage SA | Bank of Greece | Swedbank AB |
| Totalbanken A/S | Crédit Industriel et Commercial SA - CIC | Piraeus Bank SA | Nordnet AB |
| Moens Bank A/S | Crédit Agricole Mutuel du Languedoc SC | Alpha Bank AE | Nordea Bank AB (publ) |
| Hvidbjerg Bank Aktieselskab | Crédit Agricole Brie Picardie | Marfin Investment Group Holdings SA | HQ AB |
| Djurslands Bank A/S | *Portugal* | Eurobank Ergasias SA | Svenska Handelsbanken |
| Danske Andelskassers Bank A/S | Banco Comercial Português | *Ireland* | |
| Fynske Bank A/S | Banco BPI SA | Permanent Tsb Group Holdings P.L.C | |
| BankNordik P/F | Sociedade Comercial Orey Antunes, S.A. | Allied Irish Banks plc | |

The research for the study was conducted over the 2011-2015 period. This period was selected to eliminate the misrepresenting and negative effects on the financial statements from our dataset, which were produced since the 2007-2008 period due to the financial crisis and the requirements of the IASB and UE regarding fair value and classification of financial asset and liabilities.

The data analysis was conducted in two phases that are linked to the specified research questions. The first phase explored whether the volatility of TCI is higher than the volatility of *retained income,* that in this case has been likened to a specific version of *net income,* independent from any

contamination, to provide consistency for the assumptions of this study in the banking sector through the empirical findings from previous literature.

The following regression models were employed:

*Model 1*

$$MEASURE\ RISK_{it} = \beta_0 + \beta_1\sigma IVOL_{it} + \beta_2 BTM_{it} + \beta_3 LEV_{it} + \varepsilon_{it} \qquad (1)$$

*Model 2*

$$MEASURE\ RISK_{it} = \beta_0 + \beta_1\sigma RI_{it} + \beta_2\sigma INCVOL_{it} + \beta_3 BTM_{it} + \beta_4 LEV_{it} + \beta_{5-20}Country\_d_{it} + \beta_{20-23}Year\_d_{it} + \varepsilon_{it} \qquad (2)$$

*Model 3*

$$RISK\ MEASURE_{it} = \beta_0 + \beta_1\sigma RI_{it} + \beta_2\sigma TRANS_{it} + \beta_3\sigma AFS_{it} + \beta_4\sigma HEDGE_{it} + \beta_5\sigma OTHERHEDGE_{it} + \beta_6\sigma REV_{it} + \beta_7\sigma PENS_{it} + \beta_8\sigma EQMETH_{it} + \beta_9\sigma OTHER_{it} + \beta_{10}BTM_{it} + \beta_{11}LEV_{it} + \beta_{12-27}Country\_d_{it} + \beta_{28-30}Year\_d_{it} + \varepsilon_{it} \qquad (3)$$

In consistency with previous literature, the risk measure is considered to be a proxy of the volatility of stock return and beta, while IVOL is an income volatility measure (Hodder et al., 2006; Khan & Bradbury, 2014).

When the effects of accounting data on the volatility of the stock return were tested, a random

effect regression was employed after carrying out the Hausman and the Breush-Pagan Lagrange multiplier tests. When the effects of accounting data on the volatility of beta were tested, a pooled regression was employed.

All variables included in the regression models are defined in Table 3, specifying the source of data.

**Table 3.** Definition of variables included in the regression model

| Variables | Description |
|---|---|
| σTCI | The volatility of TCI, measured by the rolling standard deviation of comprehensive divided by average total assets over the last three years (source: Orbis Bank Focus). |
| σRI | The volatility of RI, measured by the rolling standard deviation of retained income divided by average total assets over the last three years (source: Orbis Bank Focus). |
| σTRANS | The volatility of foreign currency translation gains and losses, measured by the rolling standard deviation of this OCI item divided by average total assets over the last three years (source: Orbis Bank Focus). |
| σAFS | The volatility of AFS investment adjustment, measured by the rolling standard deviation of this OCI item divided by average total assets over the last three years (source: Orbis Bank Focus). |
| σHEDGE | The volatility of net gains/losses to the cash-flow hedging reserve from changes in fair value, measured by the rolling standard deviation of this OCI item divided by average total assets over the last three years (source: Orbis Bank Focus). |
| σOTHERHEDGE | The volatility of other changes to cash-flow hedging reserve, measured by the rolling standard deviation of this OCI item divided by average total assets over the last three years (source: Orbis Bank Focus). |
| σREV | The volatility of revaluation of property and other fixed assets, measured by the rolling standard deviation of this OCI item divided by average total assets over the last three years (source: Orbis Bank Focus). |
| σPENS | The volatility of minimum pension liability adjustment, measured by the rolling standard deviation of this OCI item divided by average total assets over the last three years (source: Orbis Bank Focus). |
| σEQMETH | The volatility of OCI/loss of associates and joint ventures share accounted for by the equity method, measured by the rolling standard deviation of this OCI item divided by average total assets over the last three years (source: Orbis Bank Focus). |
| σOTHER | The volatility of other TCI gains/losses, measured by the rolling standard deviation of this OCI item divided by average total assets over the last three years (source: Orbis Bank Focus). |
| BTM | Book-to-market, measured by book value on price ratio (source: Datastream). |
| LEV | Leverage, measured by debt on equity ratio (source: Datastream). |
| INCVOL | Incremental volatility of TCI compared to the volatility of RI, measured by the difference between σTCI and σRI. |
| σSTOCK RETURN | The volatility of the stock return, measured by the rolling standard deviation of the average of daily percentage stock price variations per year over three years (source: Datastream). |
| BETA | The market beta of the single firm (source: Datastream). |
| Country_dummy | Dummy variable for each country considered in the sample. |
| Year_dummy | Dummy variable for each year considered in the sample. |

## 4. RESULTS: ASSOCIATION BETWEEN COMPREHENSIVE INCOME AND MARKET RISK

*Panel A* in Table 4 provides descriptive statistics of firm-specific volatility of income measures. The mean (median) of σRI is 0.4786 (0.00329), and of σTCI is 0.6964 (0.00433). The rolling standard

deviation of TCI is higher than the rolling standard deviation of RI.

To assess the relative σTCI in comparison to σRI, a standard deviation ratio (σTCI/σRI) is determined. The mean standard deviation ratio of TCI to retained income is 2.0711 showing that TCI is 100% more volatile than RI. Considering that the

total number of observations is 498, the σTCI is observed to be higher than the σRI in 335 (67,3%) observations and lower in 162 (32.5%) observations. The standard deviation ratio is equal to 1 (0,2%) for only one observation.

Hence, the *H1* is confirmed, which is consistent with previous literature that affirms the higher volatility of TCI in comparison to RI.

**Table 4.** Descriptive statistics

| Variable | Mean | Std. Dev. | Min | 1st quartile | Median | 3rd quartile | Max |
|---|---|---|---|---|---|---|---|
| *Panel A: Descriptive statistics of the measure of income volatility and the standard deviation ratio* | | | | | | | |
| σTCI | 0.6963951 | 5.996452 | 0 | 0.0017432 | 0.0043346 | 0.0185474 | 39.71556 |
| σRI | 0.4786709 | 4.304429 | 0 | 0.0011602 | 0.0032983 | 0.0144194 | 18.65782 |
| σTCI/σRI | 2.071094 | 4.349175 | 0.2654713 | 0.9780413 | 1.023048 | 1.708892 | 24.43142 |
| *Panel B: Descriptive statistics of market-based and accounting-based risk measures* | | | | | | | |
| σSTOCK RETURN | 0.0061102 | 0.0495811 | 0.0000347 | 0.0005421 | 0.0009474 | 0.0015096 | 0.1658337 |
| BETA | 0.8685987 | 1.249191 | -0.24 | 0.32 | 0.75 | 1.19 | 2.32 |
| σTRANS | 0.0577692 | 0.6437645 | 0 | 0 | 0 | 0.0002839 | 1.478736 |
| σAFS | 0.0746713 | 0.8423896 | 0 | 0 | 0.0003656 | 0.0018685 | 1.371259 |
| σHEDGE | 0.0072226 | 0.0936609 | 0 | 0 | 0 | 0 | 0.0288679 |
| σREV | 0.0004748 | 0.0087047 | 0 | 0 | 0 | 0 | 0.0021485 |
| σPENS | 0.0013795 | 0.006074 | 0 | 0 | 0.0001015 | 0.00447 | 0.0382313 |
| σEQMETH | 0.2181717 | 2.87122 | 0 | 0 | 0 | 2.10e-08 | 0.007781 |
| σOTHER | 0.0021435 | 0.0235035 | 0 | 0 | 0 | 0.0000326 | 0.0292924 |
| BTM | 1.762652 | 3.718649 | 0.0873363 | 0.7518797 | 1.204819 | 1.818182 | 16.66667 |
| LEV | 21.2112 | 27.04161 | 1.21 | 6.53 | 10.11 | 18.54 | 98.85 |

Moreover, *Panel B* in Table 4 shows that the mean (median) for the volatility of stock return is 0.00611 (0.00094), and the mean (median) for the beta is 0.8685987 (0.75). The mean (median) for the beta is, on average, lower than the market-wide of 1, suggesting that the sample of banks has, on average, less volatility than the market.

**Table 5.** Pearson correlation

| | *σSR* | *BETA* | *σTCI* | *σRI* | *σTRANS* | *σAFS* | *σHED* | *σOTH* | *σREV* | *σPENS* | *σEQM* | *σOT* | *BTM* | *LEV* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| σSR | 1.0000 | | | | | | | | | | | | | |
| BETA | 0.0353 | 1.0000 | | | | | | | | | | | | |
| σTCI | 0.0058 | -0.0375 | 1.0000 | | | | | | | | | | | |
| σRI | -0.0131 | -0.0465 | 0.8942** | 1.0000 | | | | | | | | | | |
| σTRANS | 0.0256 | 0.0379 | 0.0614 | 0.1261*** | 1.0000 | | | | | | | | | |
| σAFS | 0.0081 | -0.0046 | 0.7436*** | 0.3779*** | 0.0408 | 1.0000 | | | | | | | | |
| σHED | 0.0073 | -0.0066 | 0.6788*** | 0.3493*** | -0.0069 | 0.9070** | 1.0000 | | | | | | | |
| σOTH | 0.0700 | 0.0217 | 0.0888* | 0.0661 | 0.5342** | 0.0144 | -0.0042 | 1.0000 | | | | | | |
| σREV | -0.0389 | -0.0348 | 0.0033 | 0.0358 | 0.4324*** | -0.0091 | -0.0191 | 0.2531*** | 1.0000 | | | | | |
| σPENS | -0.0288 | 0.2861*** | 0.7167** | 0.7631*** | -0.0198 | 0.3549** | 0.4756** | -0.0108 | -0.0284 | 1.0000 | | | | |
| σEQM | 0.0003 | -0.0075 | 0.7308** | 0.3763*** | -0.0068 | 0.9677** | 0.9766** | -0.0042 | -0.0190 | 0.4319** | 1.0000 | | | |
| σOT | 0.0423 | 0.0353 | 0.0675 | 0.1182*** | 0.9200** | 0.0208 | -0.0070 | 0.6675*** | 0.4353*** | -0.0182 | -0.0069 | 1.0000 | | |
| BTM | 0.1111** | -0.0247 | 0.0066 | 0.0045 | -0.0114 | 0.0060 | 0.0044 | -0.0080 | -0.0432 | -0.0281 | 0.0058 | -0.0129 | 1.0000 | |
| LEV | -0.0945** | 0.0445 | 0.1056* | 0.1119* | 0.0923* | 0.1174** | 0.0901* | -0.1345*** | -0.0079 | 0.0835* | 0.0924** | 0.0551 | -0.0921** | 1.0000 |

*Notes: * p < 0.10; ** p < 0.05; *** p < 0.01.*

Table 5 shows the Pearson correlation statistics between the income volatility measures and the market-based ones. It indicates a higher significant correlation between TCI and RI. The σTCI presents a positive not significant correlation with the σSR, while the σRI presents a negative not significant correlation with the σSR. Both the σTCI and σRI present a negative not significant correlation with the *beta*.

To verify the *H2, Panel C* and *D* in Table 6 provide regression coefficients from Equations (1a and 1b), (2) and (3) in which the risk measures that are the dependent variables are represented by the stock return and *beta,* respectively.

It is important to remember that the stock return is considered to be a proxy for the total firm risk, while the *beta* is a proxy for the systematic risk.

In *Panel C,* the findings in column 1a exhibit a significant positive association between the volatility of stock return and the volatility of TCI. The findings in column 1b show a not significant negative association between the σSTOCK RETURN and the σRI. These results are substantially consistent with previous literature (Hodder et al., 2006; Khan & Bradbury, 2014, 2016) and seem to confirm *H2,* suggesting that TCI volatility can provide incremental risk-relevant information.

The findings in column 2b, of *Panel D,* show that both the σTCI and σRI are significantly negatively associated with the BETA. These results are only consistent with the literature that observes a sample of banks (Hodder et al., 2006), at least in terms of the association between the volatility of TCI and beta. Such data suggest that any of the income

volatility measures provide incremental risk-relevant information. These results could depend on the fact that the *beta* captures the volatility of a security or a portfolio. Thus, when the sample selected regards just one sector, future income measures volatility cannot exprime the volatility of the systemic risk of a market, as demonstrated in Khan and Bradbury (2014, 2016) that observed a sample of non-financial firms operating in different industries.

Model (2) of *Panel C* indicates a significant negative relation between the volatility of stock return and the volatility of RI, while the incremental volatility between the σTCI and the σRI is significantly positively associated with the volatility of stock return. The additional volatility between the σTCI and the σRI can represent a proxy of the OCI volatility. These assumptions can affirm that the incremental volatility of TCI provides additional risk-relevant information for the total risk. *Panel D* shows that the incremental volatility of TCI does not offer incremental risk-relevant information for the systematic risk, being partially not consistent with the previous literature. The findings are consistent with Hodder et al. (2006) that investigate the ability

of the incremental volatility to capture the risk explicitly.

To the scope to confirm *H3,* this study explored the association between the volatility of the market risk and the single OCI components.

*Panel C* reveals that there is a significant positive association between the standard deviation of the market risk and the σAFS and σHEDGE. The findings further show that the σAFS and the σHEDGE provide incremental risk-relevant information for the entire risk, remembering the crucial role of these two OCI components in the assessment of financial information for banks. In this case, as there is not any previous literature on the volatility of single OCI elements, we can't have any consistency with other authors on the issue.

*Panel D* exhibits a significant positive association between the BETA and the σOTHERHEDGE that suggests that the volatility of other changes to cash flow hedging reserve, different from fair value, provides incremental risk-relevant information for the systematic risk.

**Table 6.** Regressions of market risk measures on the accounting-based risk measures

| Panel C: Regression results of stock return volatility on accounting-based risk measures | | | | |
|---|---|---|---|---|
| | (1) | | (2) | (3) |
| | 1a | 1b | | |
| Intercept | 0.0241948 (4.99)*** | 0.0331167 (8.08)*** | 0.0243764 (4.89)*** | 0.0228085 (5.58)*** |
| σTCI | 0.0001045 (2.17)** | | | |
| σRI | | -0.000941 (-0.56) | -0.0091744 (-4.25)*** | 0.0268246 (1.53) |
| σINCVOL | | | 0.0056208 (4.43)*** | |
| σTRANS | | | | -0.0376665 (-2.22)** |
| σAFS | | | | 0.0342373 (1.63)* |
| σHEDGE | | | | 0.8176572 (1.71)* |
| σOTHERHEDGE | | | | 1.90031 (0.91) |
| σREV | | | | -2.932278 (-1.93)** |
| σPENS | | | | -.4737122 (-1.11) |
| σEQMETH | | | | -0.0504297 (-1.62)* |
| σOTHER | | | | -0.0921602 (-1.84)* |
| BTM | 0.0010183 (3.55)*** | 0.0013389 (5.46)*** | 0.0009753 (3.36)*** | 0.0009946 (3.37)*** |
| LEV | -0.0001338 (-3.03)*** | -0.0001203(-3.46)*** | -0.0001079 (-3.24)*** | -0.0001211 (-3.95)*** |
| d_Country | YES | YES | YES | YES |
| d_Year_ | YES | YES | YES | YES |
| CHI-value | 741.23*** | 1339.44*** | 765.48*** | 992.43*** |
| R-sq | 30.50% | 25.68% | 32.13% | 32.53% |
| Panel D: Regression results of beta on accounting-based risk measures | | | | |
| | (1) | | (2) | (3) |
| | 1a | 1b | | |
| Intercept | 0.5514042 (11.67)*** | 0.4621209 (8.84)*** | 0.552167 (9.93)*** | 0.4787376 (4.63)*** |
| σTCI | -0.0089317 (-6.73)*** | | | |
| σRI | | -0.0165261 (-2.25)** | 0.0362571 (2.21)** | -0.2959755 (-0.87) |
| σINCVOL | | | -0.0357728 (-3.94)*** | |
| σTRANS | | | | 0.4407991 (1.29) |
| σAFS | | | | -0.3972147 (-1.00) |
| σHEDGE | | | | -7.813819 (-0.84) |
| σOTHERHEDGE | | | | 123.8057 (2.53)*** |
| σREV | | | | -60.70397 (-1.65)* |
| σPENS | | | | -5.809842 (-0.54) |
| σEQMETH | | | | 0.5224148 (0.87) |
| σOTHER | | | | -1.823959 (-0.98) |
| BTM | 0.0002544 (0.06) | 0.0001285 (0.03) | 0.0003604 (0.09) | -0.0004682 (-0.12) |
| LEV | 0.0009707 (1.11) | .000917 (1.05) | 0.0008466 (0.97) | 0.0011545 (1.13) |
| d_Country_ | YES | YES | YES | YES |
| d_Year_2014 | YES | YES | YES | YES |
| F-value | 214.41*** | 210.49*** | 177.61*** | 173.98*** |
| R-sq | 50.13% | 49.88% | 50.52% | 51.27% |

*Notes: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

## 5. CONCLUSION

The TCI, and consequently the OCI, are a widely debated and controversial income figure that, according to IFRSs and SFASs, should have to represent the accounting value, which synthesizes the firm future cash flow perspectives.

The debate on the real definition of new performance measures and specifically on the concept behind the formation of TCI is still open, as demonstrated by the IASB *"Disclosure Initiative – Principles of Disclosures"* project. Even the latest version of the IASB Conceptual Framework does not resolve the main conceptual problems about the notion of performance, giving more discretion to the preparers about the collocation of the single income elements. Despite these uncertainties about the correct definition of the income measures, literature, and practice investigated this topic focusing on the usefulness and the impact of it (predictability, value relevance, readers' perspective).

This study examines whether the volatility of the TCI, OCI, and individual OCI components, affect the risk relevance of the firm risk measures (stock return and beta). Many studies in finance use earnings and operating income volatility as a measure of firm risk (Easton & Zmijewski, 1989; FASB, 2010; Ryan, 2012; Black 2014; Bao et al., 2020). Thus, this work considers how incorporating TCI and OCI in these measures will potentially lead to different conclusions. Notably, starting from the assumption that FASB and IASB calculate the comprehensive income slightly differently, the study focuses on the European banking sector that provides our financial reporting under IFRSs to compare the results with the previous studies mostly conducted on the US.

The findings show that the higher volatility of the TCI and the OCI is positively associated with the stock return volatility. That suggests that TCI, and specifically OCI, provide risk-relevant information about the specific condition of the entity, useful for investors and bank regulators. In financial firms, as we already said, the OCI statement contains the accounting value of some items that are strategic for their business performance. Thus, the higher volatility of TCI than NI demonstrated in the first part of the work might justify how the volatility of the accrual estimates – provided by the OCI section – influence the perception of the firm global risk.

The negative association between the volatility of TCI and OCI and the beta provides some evidence about the ability of the volatility of TCI and OCI to capture the firm-specific risk and not the systemic risk that depends only on the market risk. The beta represents a risk measure of a security or a portfolio; therefore, in our analysis, in which we observe a specific sector, these income measures do not absorb a different level of risk in an industry substantially homogeneous. The findings are consistent with the conclusion of Hodder et al. (2006); differently, they are inconsistent with Khan and Bradbury (2014), but their results, for the reasons set out above, could depend on the fact that the sample comprises different sectors.

The study also examines the association between the volatility of the individual OCI components and the risk measures. The findings show a positive association both between AFS and the stock return volatility, and net gains/losses to the cash-flow hedging reserve from changes in fair value volatility and the stock return volatility. This result might confirm that in the banking sector, AFS and HEDGE are more significant OCI components observed by investors. Thus these unrecognized fair-value changes in financial instruments seem useful to capture the firm-specific risk.

Finally, this study does suffer some limitations. First, we select a sample of European banks, including just fifteen countries that represent mainly Western Europe. Future studies might consider all the other European countries banks that employ IFRSs. Second, we measure the volatility as the rolling measure calculated over the last three years. Future studies might consider a rolling measure calculated during the previous five years.

Despite these limitations, we believe these results are useful to capital-markets participants and researchers that aim to explain stock returns and risks in banks and in firms that provide their financial reports according to IFRSs. Further, we expect these findings to help support the Basel III approach in including accumulated other comprehensive income in Tier 1 Capital (Bratten et al., 2016) contradicting criticism regarding the inclusion of OCI in regulatory capital showing that OCI captures the firm-specific risk of an entity.

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