

INFLUENCE OF EARNINGS QUALITY DIMENSIONS ON THE PERCEPTION OF EARNINGS QUALITY: AN EMPIRICAL APPLICATION OF COMPOSITE PLS USING ARCHIVAL DATA

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INFLUENCE OF EARNINGS QUALITY DIMENSIONS ON THE PERCEPTION OF EARNINGS QUALITY: AN EMPIRICAL APPLICATION OF COMPOSITE PLS USING ARCHIVAL DATA

ABSTRACT

Despite the fact that empirical research on Earnings Quality (EQ) has used a wide range of earnings properties that are expected to be related to EQ, research on how these properties affect investors' perception of earnings quality is scarce, as most of the papers on EQ focus on a single EQ dimension. Moreover, extant research presents some limitations, as most studies rely on first-generation statistical methods (mainly OLS), without empirically testing the validity of the indicators used for capturing the underlying EQ dimension. This paper aims to explore how the different EQ properties described by previous literature map onto stockholders' perceptions of EQ. Using partial least squares – PLS – our results show that some of the properties more widely studied by accounting research (such as accruals quality) have little influence on stockholders' perceptions of earnings quality, whereas other, less studied properties (such as persistence and smoothing) exhibit a stronger relationship with stockholders' perceptions of EQ. Our results also show that the most usual indicators previously used in empirical research to represent accounting conservatism do not converge in a single construct, possibly indicating that those indicators may represent different underlying concepts.

1-) INTRODUCTION

Earnings Quality (EQ) is arguably the most common topic in accounting research. Given that EQ is not directly observable, prior literature has defined several desirable properties of reported earnings that can be expected to be related to it (Dechow et al. 2010). This multidimensional nature of EQ is present in previous research, as researchers have used several different proxies that represent the diverse desirable properties of EQ. Notwithstanding the general theoretical agreement on the variety of facets that are representative of EQ, empirical research on EQ presents some problems. Thus, most empirical papers on EQ deal with just one of those desirable properties, without considering the other related properties. Moreover, although some papers have tried to develop multidimensional measures of EQ, those measures are simply additions to the proxies of the different properties, without considering their possible interactions or each one's relative importance. Moreover, empirical researchers have developed a multitude of empirical proxies for each of the different EQ properties, though there is no clear consensus on which ones best represent the associated properties (Ewert and Wagenhofer 2011; Licerán-Gutiérrez and Cano-Rodríguez 2019).

In this chapter, we aim to overcome the abovementioned empirical problems in the measurement of EQ by using a second-generation regression method, specifically, the PLS method. This method allows us to measure unobservable variables, like the EQ dimensions, testing the validity of the resulting constructs. In our structural model, we analyze how the four EQ properties most commonly used in EQ literature (accruals quality, earnings smoothing, earnings persistence, and accounting conservatism) affect stockholders' perception of earnings quality. Each of the structural latent variables is measured using the most common empirical indicators previously used in empirical EQ research. In summary, we present the results of a two-step validation of PLS both for each latent variable, as measured by its indicator (measurement model), and between latent variables (structural model). Next, we compare the estimation power of the PLS method to that of the single-indicator approach in both in-sample and out-of-sample measurements.

Our study contributes to prior literature on earnings quality in several ways. First, we offer an empirical validation of earnings quality proxies. This fact is important given the existence of multiple proxies to represent heterogeneous characteristics of reported earnings and their perceived usefulness by the users of such information. Second, our results highlight which earnings properties have a greater influence on perceived EQ, which can be useful for both researchers and practitioners. Thus, by showing the earnings properties that are more relevant for investors, our results can guide researchers to focus their investigations on the more relevant facets of earnings quality; on the other hand, our results can help practitioners design their disclosure.

This chapter is structured as follows. Section 2 presents a theoretical framework to define EQ and the relationship among all its facets. Section 3 presents the research design of the model for measuring earnings quality using the PLS method. Section 4 presents the results (measurement and structural model analysis) and discussion. Section 5 presents additional analyses and robustness checks (time-series invariance, endogeneity, and unobserved heterogeneity). Section 6 concludes the chapter.

2-) THEORETICAL FRAMEWORK

2.1-) Definition of earnings quality

Empirical studies in social sciences seek to assess whether theoretical models fit well with the real world at two levels: conceptual and operational (Bisbe et al. 2007). The conceptual level specifies the relationships among conceptual variables that, together, result in a theory (Bollen 2002). The operational level determines the procedures to empirically represent those conceptual variables, defining both the proxies (empirical measures) and the way in which these proxies relate to the concept they measure (Babbie 2017).

Focusing on Earnings Quality research, at the conceptual level, there is no generally accepted definition of EQ (Chaney et al. 2008; Hermanns 2006), but previous research has identified a series of earnings properties that are expected to enhance EQ (see, among others: Dechow et al. 2010; Perotti and Wagenhofer 2014; Schipper and Vincent 2003). Given that an in-depth approach of the conceptualization of EQ and its characteristics is beyond the scope of this study, we use as a reference the conceptualization of Dechow et al. (2010), who group these characteristics into several properties that represent EQ: earnings and accruals persistence, accruals quality, earnings smoothness, and accounting conservatism. These four measures represent earnings characteristics that, theoretically, are expected to affect Earnings Quality. Besides, a relevant feature of these four characteristics is that they are constructed entirely from the accounting information revealed by companies, but not on the reaction of the users of that accounting information. These four earnings characteristics are the exogenous variables of our model. As the endogenous variable, we use perceived earnings quality. This measure aims to capture how investors (specifically, stockholders) react to the reported earnings. Next, we describe each of these properties.

2.1.1-) Perceived earnings quality

Whenever information on earnings makes a difference in decision-making, information users perceive earnings as quality. There are multiple users of financial information disclosed by companies, each of whom use it for different purposes (e.g. equity investors, debt investors, clients, suppliers, employees, public authorities, etc). Precisely because they have different goals, the perception of disclosed information will differ according to their decision-making process. In this study we focus on equity investors, who analyze financial information to make decisions about their investments in companies listed on the stock market, either with the aim of controlling the company, or just to speculate with financial investments (looking for under- or overpriced companies and seeking to benefit from the differences between price and value). Information on earnings is used by equity investors to infer the true situation of the company and confirm or update their beliefs on it (Li 2014). In any case, the better the information used to evaluate the company, the more efficient the decision is expected to be (Biddle et al. 2009; Biddle and Hilary 2006). Considering this from investors' perspective, higher-quality information on earnings is reflected in a better company valuation, which, in the case of listed firms, is observed in higher prices and returns (Perotti and Wagenhofer 2014). This is what, in other words, we can refer to as relevance, in the sense of greater perceived usefulness of information for users to make better decisions. This study, as explained in the next section, considers perceived usefulness by equity investors linking accounting information that is used for valuation purposes by investors with their reaction in the market, hence using market variables for its measurement.

2.1.2-) Earnings persistence

Earnings persistence is associated with the stability of earnings (or cash flows) over time (Dechow et al. 2010). Persistence is associated with the extent to which earnings in a given year are able to predict future earnings (Freeman et al. 1982). Hence, persistence is expected to be closely related to earnings predictability.

Prior literature supports the idea that persistence increases EQ (Ewert and Wagenhofer 2015), because of its relationship with earnings predictability, as more persistent earnings allow for more accurate forecasts (Karuna 2019; Kwon et al. 2019) and for the enhanced ability of earnings to reflect underlying firm value

(Bradshaw and Sloan 2002). Consequently, information on more persistent earnings leads to stronger reactions in the market, with greater returns and overpricing (Bradshaw and Sloan 2002; Dhole et al. 2021; Fu 2019; Karuna 2019; Nichols and Wahlen 2004; Sobrinho et al. 2014).

Given the agreement in prior literature that relevance is perceived by investors as a property that enhances EQ and makes information more useful, we propose the following Hypothesis 1:

H1: Higher levels of persistence are positively related to a better perceived EQ by investors.

2.1.3-) Accruals quality

Accruals quality is associated with the reliability of disclosed information on earnings, as managers can manipulate earnings using accruals in a less costly way. Accruals quality is usually assessed by analyzing the difference between the total and the expected levels of accruals. The higher this difference (known as abnormal or discretionary accruals), the lower the quality of accruals.

As investors make their decisions based on accounting information, if such information is not sufficiently reliable, they will get an incorrect idea about the real economic situation of the company; hence, the efficiency of their investment will decrease (Biddle et al. 2009; Biddle and Hilary 2006; F. Chen et al. 2011). Previous literature shows that earnings of the companies with a higher level of discretionary accruals (thereby lower accruals quality) are perceived as less relevant by investors (Barton et al. 2010; Kwon et al. 2019; Marquardt and Wiedman 2004), who react adversely in the stock market, as reflected in mispricing (Chan et al. 2009; Fu 2019; Ogneva 2012; Perotti and Wagenhofer 2014), and lower earnings response coefficient and returns (DeFond and Park 2001; Dimitropoulos and Asteriou 2009; Fu 2019; Kumar and Saini 2019; Mashruwala and Mashruwala 2011). Considering this, we state Hypothesis 2 as follows:

H2: Higher levels of accruals quality are positively related to a better perceived EQ by investors.

2.1.4-) Earnings smoothing

Earnings smoothing occurs when managers try to reduce abnormal variations in earnings (Beidleman 1973). It is considered that earnings smoothing can enhance earnings quality because smoothed earnings are more persistent (Francis et al. 2004; Tucker and Zarowin 2006), thereby improving earnings predictability and information about future earnings and cash flows. Investors would perceive this increase in the information content of earnings positively, increasing their valuation of earnings and increasing the market returns (Cussatt et al. 2019; Sun 2011; Tucker and Zarowin 2006). Other studies also show that smoothed earnings allow for better forecasts by analysts (Biddle and Hilary 2006; Burgstahler et al. 2006; Lang et al. 2003), thereby increasing investment efficiency (Biddle and Hilary 2006). Apart from that, smoothing has been also used by managers for conveying useful information (signaling role) to investors (Ewert and Wagenhofer 2015). We, hence, formulate Hypothesis 3 as follows:

H3: Higher levels of smoothing are positively related to a better perceived EQ by investors.

2.1.5-) Accounting conservatism

The Financial Accounting Standards Board (1980) defines conservatism as a prudent reaction to uncertainty that is reflected in accounting for the risk and uncertainty in companies' performance.

Conservatism is considered a desirable property of earnings because of its ability to reduce information asymmetry (Ball and Shivakumar 2008; L. H. Chen et al. 2014; García Lara et al. 2014; Jain et al. 2020; LaFond and Watts 2008), limiting managers' opportunistic behavior when disclosing information (Bangmek et al. 2016; Brown Jr. et al. 2006; L. H. Chen et al. 2014; Cheng et al. 2011; Ciftci 2010; Gao 2013), thereby avoiding manipulating earnings upwards (L. H. Chen et al. 2014; Gao 2013), mainly via accruals (Brown Jr. et al. 2006; Cheng et al. 2011). Additionally, conservatism is claimed to improve contracting efficiency (Brown Jr. et al. 2006; L. H. Chen et al. 2014; Jain et al. 2020; Qiang 2007). Moreover, another group of authors identify positive effects of conservatism to improve equity valuation by investors, in the sense that it improves the information environment for financial analysts, allowing for more precise forecasts (Bangmek et al. 2016; García Lara et al. 2014; Kim and Pevzner 2010). This is perceived by investors as high-quality information (more relevant) and, consequently, companies opting for conservative reporting have a better market reaction (Bangmek et al. 2016; Ciftci 2010), pricing conservative earnings more favorably than non-conservative ones (Bandyopadhyay et al. 2017; L. H. Chen et al. 2014). Overall, there is a common agreement that the key to understanding conservatism as positive

for EQ perception (and, hence, improved market reaction) is that it helps to increase the reliability of reported conservative earnings (Bandyopadhyay et al. 2010; García Lara et al. 2008, 2018). That is why accounting standards impose conservative valuation principles, prioritizing the stewardship protection role of accounting versus its valuation role (Ribeiro et al. 2019), with greater efficacy in common-law countries with higher investor protection (García Lara et al. 2008).

All these things considered, we define the hypotheses for the effect of conservatism on perceived EQ in the following way:

H4: Higher levels of conservatism are positively related to a better perceived EQ by investors.

Figure 1: Relationships between facets of earnings quality and perceived earnings quality



Note: This figure shows the relationships between the structural variables and the indicators to estimate such structural variables. The explanation and details for the indicators of each variable can be found in Section 3.2 “Measure and scale”.

3-) RESEARCH DESIGN

To empirically validate the measurement of earnings quality, we design a PLS model. Such a model will be applied to archival data on accounting information. In this section, we first describe the sample selection process to collect the archival data. Later, we explain in detail the earnings quality model that will be estimated with the PLS method and define all variables.

3.1-) Sample selection

For the analysis of the validity of earnings quality proxies, we collected archival accounting data from listed firms between 1970 and 2020. Data were collected from Standard and Poor's Compustat, whereas market data (i.e., returns) were collected from the Center for Research in Security Prices (CRSP). The sample was restricted to nonfinancial firms because the differentiation between financial and operating activities is unclear for financial firms (Richardson et al. 2005), thereby hindering the estimation of some indicators, such as those of accruals quality. We thus deleted from our database firms with SIC Codes from 6000 to 6999.

Following previous literature, we dropped observations with share prices lower than one dollar or with negative book values (Basu 1997; Beaver and Ryan 2000; Khan and Watts 2009). We also deleted firm observations with missing data for any of the variables used to calculate the different proxies (Dechow and Dichev 2002; Francis et al. 2004; Richardson et al. 2005). In addition, it is advisable to require a minimum number of firm-year observations for any two-digit SIC code in any given year of database items that are necessary to calculate the proxies that will be indicators of the different latent variables in the model to make the results more robust (Kothari et al. 2005). In this sense, although some of the referent studies consider up to ten observations to be sufficient (see, among others: Dechow and Dichev 2002; Francis et al. 2004; Kothari et al. 2005; McNichols 2002), we want to enhance robustness and thus require at least twenty observations.

Finally, regarding the treatment of outliers in our sample, we winsorize all variables at 1% and 99%. This allows us to control outliers without trimming the sample and deleting more observations. After the sample selection process, the final number of observations after estimation is 72,212.

3.2-) Measure and scale

Model design

According to the framework for measuring earnings quality discussed in the Theoretical Framework section, we describe the structural and measurement parts of the model.

Structural model

The structural model estimates the influence of the constructs representing each properties of reported earnings that are indicative of earnings quality on the *Earnings Quality Perceived by Equity Investors (PERCEIVED_EQ)* construct. That is, we analyze how the combination of different earnings properties that are expected to increase the usefulness of the earnings figure for decision-making influences the earnings quality perceived by equity investors. Next, we review the measurement models of these variables.

Measurement model

In the case of earnings quality, its different facets (both earnings properties and perceived earnings quality) have been empirically observed in prior literature through several proxies that are representative of those concepts. All these proxies have a reflective relationship with the facets that they measure because they are manifestations of such facets, and changes in the facets cause changes in those proxies. Moreover, all proxies of each facet share a common theme and are closely related to each other because they all measure the same concept; hence, the proxies are perfectly interchangeable. There are multiple proxies for each facet in prior literature (Ewert and Wagenhofer 2011) but no common agreement on which proxy best empirically represents the facet (Licerán-Gutiérrez and Cano-Rodríguez 2019). We next describe, in general, the literature on which we have based our proxy selection for both the dependent and independent variables, and Appendix A provides details on all proxies.

Dependent variable.

The dependent variable is the *Earnings Quality Perceived by Equity Investors (PERCEIVED_EQ)* construct. This variable is intended to measure the reactions of equity investors to the earnings quality level. It is thus not a directly observable concept, and it is measured using several empirical proxies that prior literature has considered to represent equity investors' reactions to earnings quality: the coefficient and the R^2 from two models, the value-relevance model (which relates the price of shares with book value per share and earnings per share), and the earnings response coefficient (ERC) model (which relates returns obtained in the stock market with earnings disclosed by companies).

Independent variables.

We include as independent variables the different properties of accounting information that determine the overall extent of earnings quality (Dechow et al. 2010): accruals quality (*ACCRUALS_QUALITY*), earnings smoothing (*SMOOTH*), persistence (*PERSISTENCE*), and conservatism (*CONSERVATISM*). To represent these earnings properties, we use the most common empirical proxies used in previous research to measure them in a reflective way.

Prior literature has typically observed a difference between the actual level of accruals and the estimated level of accruals in the absence of earnings manipulation, called discretionary accruals (Dechow et al. 2010; Ewert and Wagenhofer 2011). Then, the lower this difference is, the higher accruals quality is, as most of the observed accruals in a company come from the normal recognition of accounting earnings and not from the manipulation of earnings. Hence, *accruals quality* is the inverse of discretionary accruals and is adopted for estimation in several models (see, among others: Ball and Shivakumar 2006; Dechow et al. 1995; Dechow and Dichev 2002; Jones 1991; Kothari et al. 2005; McNichols 2002).

Regarding the *earnings smoothing* measurement, we find two proxies in prior literature: the ratio of deviation of earnings to deviation of cash flows (Leuz et al. 2003) and the correlation of total or discretionary accruals changes and cash flows changes (Leuz et al. 2003; Tucker and Zarowin 2006).

There are several proxies to measure *earnings persistence*. The most common approaches are the autoregression coefficient of earnings on lagged earnings and the R^2 of such a regression. This basement model has been adapted in other models that regress cash flows on lagged earnings or that disaggregate earnings into accruals and cash flows, and both models take either the coefficient or the R^2 of later regressions as proxies for persistence.

For *conservatism*, there is a wide variety of proxies; the most popular measure is differential timeliness in the recognition of losses versus gains, with a timelier recognition of losses. This model, proposed by Basu (1997), has been modified to improve its estimation and consider other aspects, as happens with the absolute earnings reversal model, also by Basu, and other, more recent models (see, among others: Ball and Shivakumar 2005; Barth et al. 2014; Callen et al. 2010; Cano-Rodríguez and Nunez-Nickel 2015; Dutta and Patatoukas 2017; Khan and Watts 2009). Based on different approaches, other models analyze the greater or lesser extent of conservatism according to the amount of large, negative accruals (Givoly and Hayn 2000), skewness of earnings (Gassen et al. 2006; Givoly and Hayn 2000), or market-to-book (MTB) ratio (Beaver and Ryan 2000).

3.3-) Data analysis

To estimate our model, we run a PLS Path Modeling using the Smart-PLS 3 software (Ringle et al. 2015). The selection of the statistical technique of PLS is based on the following reasons. First, given the large amount of proxies that consider different and heterogeneous aspects that make earnings more useful for decision making, with non-zero correlations between them (see, for example, Beaver et al. 2012; L. H. Chen et al. 2014; Dechow et al. 2010; Dechow and Dichev 2002; García Lara et al. 2005; Pae 2007), traditional OLS techniques may not be sufficient. In this sense, Ewert and Wagenhofer (2015), point out that a limitation of previous studies of EQ is the fact that although some of them use more than one measure, they consider neither the relationships between the facets of EQ (some are negatively related to each other), nor whether what they measure is aligned what with they represent. More modern methods (second-generation methods), such as partial least squares (PLS), have been proven to overcome traditional methods in such situations, allowing empirical testing of assumptions about conceptual (latent) variable measurement. In particular, PLS has the advantage of analyzing multiple relationships simultaneously in a single, systematic, and comprehensive way (Hair and Sarstedt 2019; Nitzl 2016; Ramli et al. 2018, 2019), and the model analyzes the relationships between those latent variables only after proving that latent variables are appropriately represented in reality by the proxies that they measure (Fornell 1982; Fornell and Larcker 1981). Second, the measurement of EQ, as previously exposed, shows a proxy-selection problem, given the existence of multiple proxies with no clear superiority of any of them. PLS is especially indicated for models with a large number of indicators, because of its ability to deal with multicollinearity (Hair Jr. et al. 2017). Finally, recent research on PLS highlights its advantages when analyzing secondary (archival) data, because PLS allows for good integration and treatment of archival data (Hair and Sarstedt 2019; Nitzl 2018), such as, specifically, data from financial statements (Nitzl 2018).

4-) RESULTS

4.1-) Descriptive statistics

Table 1 shows a detailed summary of the descriptive statistics (Panel A) as well as the correlation matrix (Panel B) of all the indicators. The mean values of the different indicators are in line with those reported in previous research considering a time-series approach.

Regarding the correlation matrix (Panel B), among the indicators that proxy for earnings quality perceived by investors, the correlation is not very high compared to that of indicators obtained from the two different models used for the estimation (earnings response coefficient, on the one hand, and value relevance of book value and earnings, on the other hand). In this sense, the only indicators that show a slightly higher correlation (0.1874) are those that refer to the coefficient for earnings (*PERC_EQ1_ERC_coeff* and *PERC_EQ4_RELEV_Earn_coeff*). For the indicators measuring persistence, the correlations between the proxies are positive, with values ranging from 0.1062 to 0.6811; the indicators estimated with the earnings persistence model (*PERS1_earn_coeff* and *PERS2_earn_R2*) have better correlations with the rest of the indicators. However, it is noteworthy that there is a low correlation between the variance of earnings (*PERS7_var_earn*) and the rest of the proxies for persistence, even with negative values, ranging from -0.0111 to 0.0416. The correlations among the indicators of accruals quality are mostly high, with values ranging between approximately 0.4 and 0.9, except for the indicators *AQ5_Dechow_Dichev* and *AQ6_Mc_Nichols*. These two indicators show a different behavior from the others. This can be explained by the fact that, by definition, these two models use a different approach in the sense that the dependent variable is not total accruals but working capital, and they consider the effect of past, current, and future cash flows on working capital instead of the proportion of total accruals that is not explained by the expected level of accruals absent earnings manipulation. In addition, as can be observed in detail in Appendix A, these two indicators are calculated with the standard deviation of the error term in a rolling window of five years, while the rest of the indicators consider the error term only on an annual basis. Finally, the correlations among the different conservatism metrics are near zero, and even negative for some cases. These low correlations are, however, in line with concerns in prior literature that the different proxies for conservatism do not measure a single and clear theoretical concept (Wang et al. 2009), with empirical papers demonstrating low or even negative correlations between some of the proxies (Givoly et al. 2007; Ryan 2006; Wang et al. 2009).

Next, we analyze the results from the model estimation partial least squares.

4.2-) Measurement validity assessment

In this section, we analyze the validity of the measurement models. We consider each proxy as individually and the different proxies as aggregately explaining the same theoretical facets of earnings quality. To this end, we follow recent advances in measurement validity assessment suggested by Hair, Howard and Nitzl (2020), who propose a step-by-step procedure including, at the indicator level, the analysis of individual indicator reliability and statistical significance with a bootstrapping procedure, and at the construct level the assessment of composite reliability, convergent validity, and discriminant validity.

This analysis is presented for each latent variable individually. However, to facilitate comparison between variables, as well as the changes from the initial to the final situation, we display all of the results regarding measurement validity assessment in Table 2. For each of these latent variables, we display three blocks of results. First, we report the outer loadings for each individual indicator. Second, the values of the composite reliability index for each construct are presented. Finally, we report the average variance extracted (AVE) for the convergent validity assessment.

To ensure that we are using valid constructs of the different earnings quality proxies, the three former measures have to be evaluated (Hair et al. 2016, 2017), considering the usual thresholds (see, for example: Hair et al. 2016, 2017, 2020; Henseler 2021): indicator loadings above 0.7, composite reliability above 0.7, and AVE above 0.5. About indicator loadings, however, a researcher can consider retaining loadings between 0.4 and 0.7 if the construct reliability and validity of the concept they measure are not affected (Chin 1998; Henseler 2021; Mehmetoglu and Venturini 2021). Values for loadings below 0.4 indicate that the indicator is not able to empirically represent the concept (Henseler 2021; Mehmetoglu and Venturini 2021) and thus must be deleted from the model. Additionally, although not tabulated in Table 2, we run a bootstrapping test with 5,000 subsamples to check the statistical significance of each individual indicator, and the results shows p-values of 0.000 for all indicators. Hence, we can affirm that every indicator that is selected in the final model after the depuration not only shows an adequate extent of reliability but also that it is statistically significant.

Table 1. Descriptive statistics

A: DESCRIPTIVE STATISTICS

Variable	N	mean	sd	p25	p50	p75	min	max
PERC_EQ1_ERC_coeff	72,212	3.180	8.010	-0.283	1.901	5.812	-21.825	34.892
PERC_EQ2_ERC_R2	72,212	0.331	0.285	0.070	0.263	0.548	0.000	0.971
PERC_EQ3_RELEV_Book_v_coeff	72,212	0.934	4.883	-0.873	0.738	2.643	-17.267	20.101
PERC_EQ4_RELEV_Earn_coeff	72,212	3.244	13.733	-1.193	1.419	6.312	-45.777	63.011
PERC_EQ5_RELEV_R2	72,212	0.670	0.274	0.479	0.744	0.905	0.028	0.998
PERS1_earn_coeff	72,212	0.193	0.571	-0.162	0.157	0.498	-1.317	2.243
PERS2_earn_R2	72,212	0.235	0.257	0.029	0.126	0.378	0.000	0.936
PERS3_disagg_coeff	72,212	0.229	0.855	-0.233	0.204	0.663	-2.536	3.300
PERS4_disagg_R2	72,212	0.499	0.298	0.232	0.498	0.763	0.009	0.992
PERS5_CFO_coeff	72,212	-0.064	1.444	-0.592	0.001	0.560	-5.571	4.740
PERS6_CFO_R2	72,212	0.252	0.254	0.039	0.160	0.409	0.000	0.930
PERS7_var_earn	72,212	-0.011	0.058	-0.005	-0.001	0.000	-1.116	0.000
AQ1_DAngelo	72,212	0.938	0.079	0.926	0.962	0.983	0.443	1.000
AQ2_Industry	72,212	0.946	0.062	0.931	0.965	0.985	0.473	1.000
AQ3_Jones	72,212	0.943	0.071	0.929	0.965	0.985	0.501	1.000
AQ4_Dechow_95	72,212	0.941	0.074	0.927	0.964	0.984	0.490	1.000
AQ5_Dechow_Dichev	72,212	0.967	0.066	0.976	0.994	0.998	0.411	1.000
AQ6_Mc_Nichols	72,212	0.966	0.071	0.976	0.994	0.998	0.364	1.000
AQ7_Kothari	72,212	0.945	0.064	0.930	0.965	0.985	0.587	1.000
AQ8_Ball_Shivakumar_year	72,212	0.938	0.077	0.927	0.962	0.983	0.484	1.000
AQ9_Ball_Shivakumar_industry	72,212	0.947	0.063	0.934	0.967	0.985	0.532	1.000
SMOOTH1_dev_earn_cfo	72,212	0.746	0.485	0.383	0.668	0.994	0.076	2.771
SMOOTH2_corr_accr_cfo	72,212	-0.696	0.409	-0.963	-0.877	-0.608	-0.998	0.844
CONS1_Skewness	72,212	-0.145	0.694	-0.643	-0.163	0.337	-1.462	1.410
CONS2_Givoly_Hayn	72,212	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CONS3_MTB	72,212	2.312	3.393	0.948	1.597	2.706	-9.734	28.130
CONS4_Basu	72,212	0.028	1.716	-0.062	0.000	0.120	-8.953	9.041
CONS5_abs_earn_rev	72,212	4.222	9.962	0.000	1.600	3.838	0.000	75.428
CONS6_Cano_Nunez	72,212	0.022	0.515	-0.137	-0.003	0.142	-1.937	2.394

Note: Sd is standard deviation; p25, p50, and p75 are, respectively, the percentiles 25, 50 (median value), and 75 of the distribution; min is the minimum value of the distribution; and max is the maximum value of the distribution.

TABLE 1: DESCRIPTIVE STATISTICS (CONTINUED)

PANEL B: CORRELATION MATRIX

CORRELATIONS FOR PERCEIVED EARNINGS QUALITY INDICATORS					
	<i>PERC_EQ1_ERC_coeff</i>	<i>PERC_EQ2_ERC_R2</i>	<i>PERC_EQ3_RELEV_Book_v_coeff</i>	<i>PERC_EQ4_RELEV_Earn_coeff</i>	<i>PERC_EQ5_RELEV_R2</i>
<i>PERC_EQ1_ERC_coeff</i>	1.0000				
<i>PERC_EQ2_ERC_R2</i>	0.3041*	1.0000			
<i>PERC_EQ3_RELEV_Book_v_coeff</i>	0.0140*	0.0271*	1.0000		
<i>PERC_EQ4_RELEV_Earn_coeff</i>	0.1874*	0.0648*	-0.4753*	1.0000	
<i>PERC_EQ5_RELEV_R2</i>	0.0621*	0.0736*	0.1102*	0.0889*	1.0000

CORRELATIONS FOR PERSISTENCE INDICATORS							
	<i>PERS1_earn_coeff</i>	<i>PERS2_earn_R2</i>	<i>PERS3_disagg_coeff</i>	<i>PERS4_disagg_R2</i>	<i>PERS5_CFO_coeff</i>	<i>PERS6_CFO_R2</i>	<i>PERS7_var_earn</i>
<i>PERS1_earn_coeff</i>	1.0000						
<i>PERS2_earn_R2</i>	0.4349*	1.0000					
<i>PERS3_disagg_coeff</i>	0.6811*	0.2735*	1.0000				
<i>PERS4_disagg_R2</i>	0.2553*	0.5701*	0.2006*	1.0000			
<i>PERS5_CFO_coeff</i>	0.3020*	0.1404*	0.1860*	0.0472*	1.0000		
<i>PERS6_CFO_R2</i>	0.1062*	0.2638*	0.0615*	0.1525*	-0.0167*	1.0000	
<i>PERS7_var_earn</i>	0.0416*	0.0383*	0.0191*	0.0233*	-0.0111*	0.0325*	1.0000

CORRELATIONS FOR ACCRUALS QUALITY INDICATORS									
	<i>AQ1_DAngelo</i>	<i>AQ2_Industry</i>	<i>AQ3_Jones</i>	<i>AQ4_Dechow_95</i>	<i>AQ5_Dechow_Dichev</i>	<i>AQ6_Mc_Nichols</i>	<i>AQ7_Kothari</i>	<i>AQ8_Ball_Shivakumar_year</i>	<i>AQ9_Ball_Shivakumar_industry</i>
<i>AQ1_DAngelo</i>	1.0000								
<i>AQ2_Industry</i>	0.4921*	1.0000							
<i>AQ3_Jones</i>	0.3557*	0.6465*	1.0000						
<i>AQ4_Dechow_95</i>	0.3553*	0.6669*	0.9560*	1.0000					
<i>AQ5_Dechow_Dichev</i>	0.1313*	0.1089*	0.1969*	0.1964*	1.0000				
<i>AQ6_Mc_Nichols</i>	0.1242*	0.0970*	0.2161*	0.2123*	0.8737*	1.0000			
<i>AQ7_Kothari</i>	0.3847*	0.7348*	0.8387*	0.8697*	0.1769*	0.1851*	1.0000		
<i>AQ8_Ball_Shivakumar_year</i>	0.3887*	0.4564*	0.3853*	0.3867*	0.1367*	0.1277*	0.4205*	1.0000	
<i>AQ9_Ball_Shivakumar_industry</i>	0.4069*	0.5752*	0.5144*	0.5069*	0.2061*	0.2078*	0.5480*	0.4131*	1.0000

TABLE 1: DESCRIPTIVE STATISTICS (CONTINUED)

<i>CORRELATIONS FOR SMOOTHING INDICATORS</i>						
	<i>SMOOTH1_dev_earn_cfo</i>	<i>SMOOTH2_corr_accr_cfo</i>				
<i>SMOOTH1_dev_earn_cfo</i>	1.0000					
<i>SMOOTH2_corr_accr_cfo</i>	0.5829*	1.0000				
<i>CORRELATIONS FOR CONSERVATISM INDICATORS</i>						
	<i>CONS1_Skewness</i>	<i>CONS2_Givoly_Hayn</i>	<i>CONS3_MTB</i>	<i>CONS4_Basu</i>	<i>CONS5_abs_earn_rev</i>	<i>CONS6_Cano_Nunez</i>
<i>CONS1_Skewness</i>	1.0000					
<i>CONS2_Givoly_Hayn</i>	0.0136*	1.0000				
<i>CONS3_MTB</i>	0.0118*	0.0093*	1.0000			
<i>CONS4_Basu</i>	-0.0176*	0.0039	-0.0056	1.0000		
<i>CONS5_abs_earn_rev</i>	-0.0287*	-0.0037	-0.0204*	0.0003	1.0000	
<i>CONS6_Cano_Nunez</i>	-0.0646*	0.0104*	-0.0139*	0.0556*	0.0215*	1.0000

According to the aforementioned rules, we applied the following process for depurating our constructs. We first estimated the model using all the indicators listed in Appendix A. This model, including all the indicators, was our original model. After estimating the model, we removed indicators that did not accurately represent their associated latent variable. To decide which indicator should be removed from the model, we ordered the loadings of all the indicators and removed the indicator with the smallest value. After dropping that indicator, the model was estimated again. This process was repeated until the aforementioned thresholds for measurement reliability and validity were met: For the sake of brevity, we do not report the results of the intermediate steps.

Next, we discuss the results of the validity tests for the different latent variables. We start with the analysis of the validity of the dependent variable (*PERCEIVED_EQ*); next, we discuss the validity of four earnings properties: persistence (*PERSISTENCE*), accruals quality (*ACCRUALS_QUALITY*), earnings smoothing (*SMOOTH*), and conservatism (*CONSERVATISM*).

4.2.1. Validity of the dependent variable

First, the indicator *V_RELEV1_Book_v_coeff* exhibits a high, negative loading for the original model. This value indicates a strong relationship between the latent variable and the indicator, but its sign is the opposite of what we expected. For the indicators to be positively related to earnings quality, we changed the computation of *V_RELEV1_Book_v_coeff*, calculating it as the coefficient for book value in the value relevance model multiplied by -1. Hence, all the further results from the PLS estimation, for both the measurement and the structural model, are derived from taking this additive inverse for *V_RELEV1_Book_v_coeff*.

In the original model, there are three indicators with values below 0.4: *PERC_EQ3_RELEV_Book_v_coeff* and *PERC_EQ5_RELEV_R2*. Additionally, the proxy of the R^2 for the earnings response coefficient (*PERC_EQ2_ERC_R2*) yields a value that only slightly exceeds 0.4. After the depurative process, we delete these three indicators because their inclusion affects the construct reliability and validity. In other words, neither the R^2 from the two models nor the coefficient for book value of value relevance of accounting information are sufficiently correlated with the common, aggregated representation of the extent of earnings quality as perceived by investors. In fact, in this original situation, the low correlation of these indicators with the construct means that the aggregated measure is not representative of all of its indicators (composite reliability index = 0.641) and that those indicators are not able to explain a sufficient amount of the behavior of perceived earnings quality (AVE = 0.288).

The former three indicators were therefore removed from the model, leaving only two indicators in the final model: *PERC_EQ1_ERC_coeff* and *PERC_EQ4_RELEV_Earn_coeff*, both considering the earnings coefficient for the estimation models. In the final situation, the coefficient for the ERC model exceeds the minimum value for loadings of 0.7. With respect to the coefficient for the value relevance model, this indicator is slightly below 0.7. However, we decided to maintain this indicator given that the metrics for the reliability of the construct reach the minimum values (composite reliability = 0.737; AVE = 0.588).

4.2.2. Persistence measurement validity

The results shown in Table 2 (original situation) indicate no evidence of problems in most of the persistence indicators. There are two indicators with loadings above 0.7: *PERS1_earn_coeff* (loading = 0.862) and *PERS3_disagg_coeff* (loading = 0.761). Additionally, two of the indicators show loadings between 0.4 and 0.7 (*PERS2_earn_R2* (loading = 0.690) and *PERS4_disagg_R2* (loading = 0.517)). We must evaluate whether these indicators affect construct reliability and validity to decide whether they should be retained in or removed from the model.

After the iterative depurative process, the three indicators with loadings below 0.4 in the original model (*PRED7_var_earn*, *PERS5_CFO_coeff*, and *PERS6_CFO_R2*) were deleted. With respect to *PERS2_earn_R2* and *PERS4_disagg_R2*, although the loadings remained below 0.7 after the deputation, we kept them because both construct reliability (composite reliability index = 0.821) and validity (AVE = 0.544) met the thresholds.

Table 2. Results from the measurement validity assessment

		<i>Original situation</i>			<i>Final situation</i>		
		Indicator loadings	Composite reliability	AVE	Indicator loadings	Composite reliability	AVE
Perceived earnings quality (PERCEIVED_EQ) construct:			0.641	0.288		0.737	0.588
<i>PERC_EQ1_ERC_coeff</i>	0.786				0.872		
<i>PERC_EQ2_ERC_R2</i>	0.423						
<i>PERC_EQ3_RELEV_Book_v_coeff</i>	0.300						
<i>PERC_EQ4_RELEV_Earn_coeff</i>	0.653				0.644		
<i>PERC_EQ5_RELEV_R2</i>	0.357						
Persistence (PERSISTENCE) construct:			0.735	0.325		0.821	0.544
<i>PERS1_earn_coeff</i>	0.862				0.896		
<i>PERS2_earn_R2</i>	0.690				0.680		
<i>PERS3_disagg_coeff</i>	0.761				0.805		
<i>PERS4_disagg_R2</i>	0.517				0.514		
<i>PERS5_CFO_coeff</i>	0.266						
<i>PERS6_CFO_R2</i>	0.266						
<i>PERS7_var_earn</i>	0.258						
Accruals quality (ACCRUALS_QUALITY) construct:			0.875	0.483		0.915	0.614
<i>AQ1_DAngelo</i>	0.546				0.558		
<i>AQ2_Industry</i>	0.842				0.843		
<i>AQ3_Jones</i>	0.893				0.887		
<i>AQ4_Dechow_95</i>	0.902				0.896		
<i>AQ5_Dechow_Dichev</i>	0.158						
<i>AQ6_Mc_Nichols</i>	0.164						
<i>AQ7_Kothari</i>	0.906				0.902		
<i>AQ8_Ball_Shivakumar_year</i>	0.559				0.559		
<i>AQ9_Ball_Shivakumar_industry</i>	0.734				0.748		

Table 2. Results from the measurement validity assessment (Continued)

Earnings smoothing (SMOOTH) construct:		0.879	0.785		0.881	0.788
<i>SMOOTH1_dev_earn_cfo</i>	0.836			0.849		
<i>SMOOTH2_corr_accr_cfo</i>	0.933			0.924		
Conservatism (CONSERVATISM) construct:		0.260	0.178		1.000	1.000
<i>CONS1_Skewness</i>	0.842			1.000		
<i>CONS2_Givoly_Hayn</i>	0.077					
<i>CONS3_MTB</i>	0.283					
<i>CONS4_Basu</i>	-0.024					
<i>CONS5_abs_earn_rev</i>	0.431					
<i>CONS6_Cano_Nunez</i>	-0.292					

4.2.3. Accruals-quality measurement validity

In broad terms, we can observe in the original situation in Table 2 for the construct of *ACCRUALS_QUALITY* that most of the indicators represent the same theoretical concept, as evidenced by the high magnitudes of the indicator loadings. Two of the indicators, however (*AQ5_Dechow_Dichev* and *AQ6_Mc_Nichols*), do not meet the threshold to be individually considered good representations of the concept they measure, as they have loadings below 0.4 (0.158 and 0.164, respectively). This result is in line with previous comments regarding the different approaches of the models by Dechow and Dichev (2002) and McNichols (2002). In this sense, we want to highlight that these concepts have been traditionally considered as measuring the same concept of accruals quality in prior literature, being used as alternative proxies of any of the other models. According to the results from the PLS validation process, these two measures do not represent the same concept of accruals quality, and one should be cautious when using them as alternatives to the other proxies because they do not actually measure the same concept. Regarding the aggregate representation of *ACCRUALS_QUALITY*, even after these two indicators are deleted, the results support the validity of the latent variable, as shown by a high composite reliability index (0.875). However, the fact that these two indicators do not measure the same concept means that, aggregately, the indicators (if all are kept) are not able to explain half of the variance of accruals quality (AVE = 0.3483).

After the depuration of the model, *AQ5_Dechow_Dichev* and *AQ6_Mc_Nichols* were deleted, slightly increasing the construct reliability (0.915) and yielding acceptable levels for the AVE (0.614).

4.2.4. Earnings-smoothing measurement validity

We continue with the analysis of measurement validity for the accounting properties of earnings with the latent variable representing earnings smoothing (*SMOOTH*). The results show that the two proxies used in prior literature do represent the same theoretical concept. This is evidenced by the high indicator loadings (even exceeding 0.8), as well as the values for composite reliability (0.879) and average variance extracted (0.785). After the model depuration, both indicators remained, with no significant changes in the construct reliability or validity.

4.2.5. Conservatism measurement validity

We conclude the analysis of measurement validity for the accounting properties of earnings with the latent variable representing the extent of conservatism (*CONSERVATISM*). The results for the measurement validity of *CONSERVATISM* demonstrate the existence of problems in empirically representing this theoretical concept. First, the results reported in the original situation for the *CONSERVATISM* construct in Table 2 indicate that the different proxies used in prior literature to measure conservatism do not truly represent a single, common concept. In fact, even at the individual indicator level, we can observe how most of the proxies have loadings that are low, even negative in some cases. The only exception is *CONS3_Skew*, with an acceptable loading magnitude (0.842). These results provide empirical evidence that the proxies of conservatism do not measure the same concept. We have to indicate, however, that our *CONSI_Basu* measure is estimated on a time-series basis, which can affect the validity of these indicators, as prior literature documents problems with the time-series estimation of these metrics (Artiach and Clarkson 2011; Cano-Rodríguez and Nunez-Nickel 2015; Givoly et al. 2007; Ryan 2006; Wang et al. 2009).

Our results, then, empirically confirm the theoretical concerns that the research on conservatism has not been able to find a proper way of measuring it. In fact, prior literature highlights the low correlations between the different empirical measures of conservatism (Givoly et al. 2007; Ryan 2006; Wang et al. 2009). Proxies in conservatism research have focused only on single aspects of conservatism, and this focus does not provide accurate assessment of the overall extent of conservatism, especially when such aspects are not independent of each other (Givoly et al. 2007). Apart from the problem of the different theoretical views of conservatism, the literature also points out that the lack of positive associations between the proxies of conservatism is due to the existence of measurement errors in the estimation of the variables, such as the omission of variables or the difficulties in setting a correct time window (Roychowdhury and Watts 2007; Wang et al. 2009). In summary, the results for indicator loadings indicate that there is no group of proxies that can measure the concept individually considered. Our results are in line with those of several empirical works that evidence contradictions between the different aspects reflected by conservatism

measures (Ball et al. 2000; Beaver and Ryan 2005; Giner and Rees 2001; Givoly et al. 2007; Roychowdhury and Watts 2007; Wang et al. 2009).

Such heterogeneity observed in the low magnitudes of the loadings reflects that each proxy measures a different concept. These concerns are confirmed by the unacceptable values for aggregated concept valuation (composite reliability index = 0.260 and AVE = 0.178).

After we delete indicators with loadings that are too low, only one final indicator remains: *CONS3_Skew*. Throughout the iterative process, construct reliability and validity did not meet the thresholds, and we subsequently eliminated the different indicators for *CONSERVATISM*. Given that this measure is represented by a single indicator, we must be cautious about the true nature of this construct, as we cannot properly speak of “conservatism”; we can only speak of a reflection of a specific aspect of conservative accounting practices (in this case, for *CONS3_Skew*, the observation of greater skewness in the distribution of earnings). Then, from this point on in our study, when we talk about conservatism, we consider this specific aspect.

In summary, the results of the validation of individual proxies demonstrate the claimed lack of validity of the measures to reflect the extent of conservatism. Each proxy measures different concepts. Consequently, the main conclusion we can extract from empirical evidence is that conservatism cannot be considered a single theoretical concept measured with several proxies; rather, it is represented by different aspects denoting conservative practices in accounting recognition.

4.2.6. Analysis of discriminant validity

Discriminant validity analysis empirically tests whether different latent variables actually represent different or the same theoretical concept; that is, if concepts that are empirically represented are distinguishable.

To test discriminant validity, we estimate Heterotrait-Monotrait (HTMT, hereafter) and HTMT2. To be considered acceptable, the value of HTMT should not exceed 0.9 (less restrictive) or 0.85 (more conservative) (Roemer et al. 2021). The classical HTMT criterion considers arithmetic mean values (Henseler et al. 2015), whereas new versions of this criterion improve its calculation by considering geometric mean values (Roemer et al. 2021). We present in Table 3 each pair of variables (presented in matrix form): The first one (at the top) refers to the results for HTMT in its classical version, whereas the second one (below, written into square brackets []) presents the HTMT2.

These results are presented only for the final model, with deputed indicators in the construct measurement validity assessment.

Table 3. Discriminant validity. HTMT and HTMT2 criterion

	<i>ACCRUALS_QUALITY</i>	<i>CONSERVATISM</i>	<i>PERCEIVED_EQ</i>	<i>PERSISTENCE</i>
<i>CONSERVATISM</i>	0.0221			
	[0.0221]			
<i>PERCEIVED_EQ</i>	0.0752	0.1260		
	[0.0684]	[0.1245]		
<i>PERSISTENCE</i>	0.0339	0.0445	0.2246	
	[0.0301]	[0.0446]	[0.2175]	
<i>SMOOTH</i>	0.0667	0.1107	0.2029	0.1159
	[0.0670]	[0.1104]	[0.1734]	[0.0602]

After the iterative process, the results for all the properties yield acceptable values for both HTMT and HTMT2, which are, by and large, far from even 0.85. In conclusion, the results for discriminant validity indicate that the facets of earnings quality are different from each other because they represent different concepts.

4.3-) Structural model valuation

After assessing the validity of the measurement model, we present the results for the valuation of the structural model. This assessment indicates whether the properties of earnings quality explain the expected outcomes for earnings quality in terms of investor responsiveness to accounting information. To do so, we

analyze the in-sample and out-of-sample power of the model, also following the step-by-step procedure suggested by Hair et al. (2020).

The first step is to check the absence of collinearity concerns. In this regard, we obtain the VIF values for the explanatory variables *ACCRUALS_QUALITY* (VIF = 1.002), *PERSISTENCE* (VIF = 1.011), *CONSERVATISM* (VIF = 1.01), and *SMOOTH* (VIF = 1.019). Given that all of them have VIF values below the threshold of 5, we can confirm the absence of collinearity.

Next, PLS offers tests of R^2 , f^2 , and Q^2 . R^2 and f^2 analyze the in-sample predictive power of the model, whereas Q^2 indicates the out-of-sample predictive power. The results for these tests are shown in Table 4.

Table 4. Structural model valuation. R-Square and Q-Square

	<i>Adjusted R²</i>	<i>f² (effect size)</i>	<i>Q²</i>
Complete	0.028		0.016
<i>PERSISTENCE</i>	0.014	0.011	0.008
<i>ACCRUALS_QUALITY</i>	0.002	0.001	0.001
<i>SMOOTHING</i>	0.012	0.008	0.007
<i>CONSERVATISM</i>	0.005	0.004	0.003

In Table 5, we can observe how the consideration of a single facet of earnings quality in the model has an in-sample power of approximately 0.2% – 0.5%, as indicated by the adjusted R^2 . The only exceptions are *PERSISTENCE* and *SMOOTH*, which show similar, higher levels of estimation power (1.40% and 1.20%, respectively). For the model with all latent variables, the estimation power is 2.80%. Henceforth, the reported values for the estimation power are not very high. In line with these low values of R^2 , for effect size, f^2 values show a low value, ranging from 0.001 (*ACCRUALS_QUALITY*) to 0.011 (*PERSISTENCE*). Considering that the exogenous variables are determinants of earnings quality, and the endogenous variable is the response of earnings quality information perceived by users (equity investors), a future debate is needed regarding whether the consideration of the outcomes of earnings quality reflects an appropriate empirical representation of the earnings quality concept. Actually, other previous study have already called the attention on the loose of informativeness of earnings (Dechow 1994; Dechow et al. 2014; Ewert and Wagenhofer 2015; Karuna 2019; Sloan 1996; Thinggaard and Damkier 2008). Some of the alleged reasons are that earnings are most times available for investors untimely, making it less relevant for them (Caylor et al. 2007; Dechow et al. 2014; Karuna 2019; Thinggaard and Damkier 2008), as well as the bias introduced in earnings information (Dechow et al. 2014; Ewert and Wagenhofer 2015). Other authors also justify it because of the inability of reported earnings to incorporate certain issues such as the intangibles, research and development, special items... (Ciftci 2010; Karuna 2019) This theoretical reasoning is also reflected in the empirical studies analyzing value relevance of earnings, where the explanatory power (adjusted R^2) also shows very low values, even below 10% (to cite some examples, see: Bandyopadhyay et al. 2010; Caylor et al. 2007; Ciftci 2010; Dechow 1994; DeFond and Park 2001; Tucker and Zarowin 2006). Thus, despite our analysis shows a low explanatory power, it is not unusual when considering perceived relevance of earnings information.

The out-of-sample estimation power in earnings quality measurement can be observed by analyzing the values for Q^2 . These values, calculated as one minus the sum of the squared errors divided into the sum of squared residuals, considers the estimation error in the PLS Path Modeling. The closer this value is to one, the lower the error generated in the estimation. In Table 5, it is noteworthy how properties have low values for Q^2 (in a range of 0.001 to 0.003), except for *PERSISTENCE* and *SMOOTH*, which exhibit considerably higher out-of-sample predictive power than the rest of the properties. When we include all the properties, Q^2 is 0.016, which keeps on showing a low value.

In the second step, we check the sign, magnitude, and statistical significance of each coefficient from the latent variables of the accounting properties to explain the perception of earnings quality in Table 5.

Table 5. Magnitude and significance of the relationships

	<i>Coefficient</i>	<i>St Dev</i>	<i>T-Statistics</i>	<i>P-Values</i>	<i>C.I. 5%</i>	<i>C.I. 95%</i>	<i>Hypothesis confirmation</i>
<i>PERSISTENCE</i>	0.106	0.004	27.101	0.000	0.099	0.112	Supported
<i>ACCRUALS_QUALITY</i>	0.036	0.003	10.416	0.000	0.031	0.042	Supported
<i>SMOOTHING</i>	-0.091	0.004	25.919	0.000	-0.097	-0.085	Rejected
<i>CONSERVATISM</i>	0.059	0.004	16.766	0.000	0.053	0.065	Supported

Note: St Dev is standard deviation; and C.I. is the Confidence Interval for hypotheses testing.

Table 5 shows that all the properties are statistically significant in explaining the perception of earnings quality. Regarding the hypotheses, results confirm, as expected, the positive relationship between both persistence (H1) and accruals quality (H2) with perceived EQ. These results are in line with the wide agreement in prior literature that these two properties are valuable for investors, who can make better investment decisions if accounting information is persistent and reliable (good accruals quality).

About earnings smoothing, our results do not confirm that smoothing enhances perceived EQ, but that it is negatively associated with earnings quality. Those results that do not confirm the hypothesis, however, can be explained with the idea supported by part of the extant literature that the possible increase in the predictive ability of earnings which is attributed to earnings smoothing (potentially increasing perceived usefulness for investors) happens at the expense of the reliability of earnings, because earnings smoothing may be due to earnings manipulation strategies, rather than a real signal of the usual activity of the company (Chua et al. 2012; Dechow et al. 2010; Ewert and Wagenhofer 2015; Schipper and Vincent 2003), thereby introducing biased information for investors (Ewert and Wagenhofer 2015). Actually, stockholders' reaction to a stable growth in performance creates an incentive for managers to smooth earnings (Myers et al. 2007): companies that exhibit a stable history of improvements in their performance are usually rewarded with abnormally high returns, whereas companies that report too volatile earnings get usually abnormally low returns. Apart from that, managers also have incentives to show smoothed earnings when they are paid with stock options based on the performance of the company, preventing them from earning less when performance is weak (Grant et al. 2009). In short, when earnings smoothing is linked to manipulation, the link between accounting and true economic performance is weaker, increasing earnings opacity and, hence, having adverse effects on the market (Bhattacharya et al. 2003) and eliminating or reducing the information content of earnings (Mayberry et al. 2015). For smoothed earnings to be actually useful for investors, they should arise from usual activity (Ben-Hsien and De-Hsien 2004; Kothari et al. 2005; Schipper and Vincent 2003), so that investors perceive that smoothed earnings imply higher EQ (Barton et al. 2010). Otherwise, smoothing is not associated with long-term higher market returns (Lilien et al. 2020) or even lower valuation weight in the market (Lapointe-Antunes et al. 2006). Hence, that negative sign has a theoretical justification.

Lastly, about conservatism, results show that conservatism improves the utility of reported earnings, thus confirming H4. Hence, despite there is an open debate in prior literature about the pros and cons of conservatism as a property that represents EQ, there is empirical evidence that conservatism is generally used as a protective mechanism for investors, and they perceive it as a desirable property for reported earnings.

However, it is surprising that, although accruals quality is the most commonly analyzed property of EQ (Licerán-Gutiérrez and Cano-Rodríguez 2019), its coefficient is smaller than that of the rest of the properties of accounting information (thereby explaining a lower proportion of the level of earnings quality perceived by equity investors) that have been less adopted in earnings quality models, such as smoothing or persistence.

Finally, we also run a PLS-Predict procedure to reinforce the conclusions of the out-of-sample predictive power of the model. The results yield a value for $Q^2_{predict}$ of 0.028; hence, because a positive value implies that the prediction error of the PLS-SEM results is smaller than the prediction error of simply using the mean values (Evermann and Tate 2016; Shmueli et al. 2016, 2019), then our model estimated with PLS offers better predictive performance. In any case, to analyze the strength of the prediction, we compare the results of the errors from PLS-PM with the ones of LM (Evermann and Tate 2016; Shmueli et al. 2016, 2019) for the two indicators of the dependent variable, *PERCEIVED_EQ*, and check that the error is lower in PLS-PM for *PERC_EQ4_RELEV_Earn_coeff*, but it is higher for *PERC_EQ1_ERC_coeff*. Then, the

condition that errors in PLS-PM are lower than in LM is true for half of the indicators, concluding that the model has a medium out-of-sample predictive power.

In conclusion, taking together the results for R^2 , f^2 , and Q^2 , we can conclude that both in-sample and out-of-sample power are low when analyzing how determinants of EQ explain $PERCEIVED_EQ$, even if we include all of the properties that define EQ . However, despite this low predictive power, there is a property that shows considerably better power to explain the extent of earnings quality perceived by equity investors; this property is *PERSISTENCE*. This result is in line with prior literature on users of financial information that have obtained empirical evidence of a perception of the persistence of earnings as the most relevant property of accounting information (Tucker and Zarowin 2006). Notwithstanding its higher predictive value, persistence is surprisingly not usually considered a representative property for earnings quality. Other properties are more widely adopted in prior literature as appropriate representations of earnings quality, such as accruals quality or conservatism (Licerán-Gutiérrez and Cano-Rodríguez 2019).

4.4-) Additional analyses

To ensure that our results are robust, we present in this subsection a brief comment on several robustness tests.

First, given that our model has estimated the indicators on a time-series basis, it is advisable to check time-series invariance; that is, the absence of autocorrelation effects. To this end, we have run the Lagrange-multiplier test, in which, through a chi-square distribution, the null hypothesis of absence of autocorrelation effects is tested, both for first and second order. The results yield p-values above 0.1 both for the first order (p-value = 0.802) and the second order (p-value = 0.798). Because we cannot reject the null hypothesis, we can confirm the absence of autocorrelation effects.

Second, we prove whether the model presents endogeneity problems. In cases of endogeneity, the explanatory variable is correlated with the residuals in the estimated model, thereby violating conditions for OLS estimators to be unbiased and compromising the generalizability of research findings (Ullah et al. 2021). Then, according to the definition, we prove whether there exists any statistically significant correlation between the residuals of $PERCEIVED_EQ$ and the four explanatory variables in our model. Results show that the magnitude of the correlation is 0 in all cases, and, in any case, none of them are statistically significant, as evidenced by p-values clearly above even 0.1 for the correlation of the residuals with *ACCRUALS_QUALITY* (0.9999), *PERCEIVED_EQ* (0.9995), *CONSERVATISM* (0.9998), and *SMOOTH* (0.9996). Additionally, we test for potential dynamic endogeneity, observing whether past values of the dependent variable ($L.PERCEIVED_EQ$, where the time set is 1 month) affect current values, including it as a control variable (Ullah et al. 2021). Results show that this lagged variable is not statistically significant (p-value = 0.200), thereby indicating that past values do not affect current outcomes. Finally, we also check whether the explanatory variables significantly define the current perception of earnings quality but not such perception in the following period ($F.PERCEIVED_EQ$, where the time set is 1 month). The results show, as expected, that whereas the coefficients for the four properties significantly explain the current perception of earnings quality, they are not statistically significant to explain perceived earnings quality one month later (p-values for *ACCRUALS_QUALITY*, *PERSISTENCE*, *CONSERVATISM*, and *SMOOTH* are, respectively: 0.556, 0.367, 0.781, and 0.156). Thus, we can conclude that there is no evidence of endogeneity, neither general nor dynamic, in the definition of the model.

Finally, as suggested by Sarstedt et al. (2020), we also consider it interesting observing the potential unobserved heterogeneity in our data. To this end, we run the Finite-Mixture Partial Least Squares (FIMIX-PLS) procedure, which can detect heterogeneity. Our results are inconclusive because fit indices are better whenever the number of segments is increased, but the segment sizes are not sufficient. Furthermore, if we continue increasing the number of segments, the fit indices always point to the highest number of segments. This leads us to conclude that our sample does not suffer from unobserved heterogeneity, and it is not necessary to cluster the sample in segments to get a better explanatory power of the proposed model.

4.5-) Discussion of the results

In this subsection we briefly summarize a discussion of the results. To begin with, a validation of the proxies used in prior literature to measure each of these properties can be performed to select only the properties that correctly and empirically represent the theoretical facet of earnings quality they aim to measure. This way, the application of a PLS model can help solve the traditional proxy selection problem

about earnings quality that is so widely discussed in prior literature (Dechow et al. 2010; Ewert and Wagenhofer 2011; Leuz and Wysocki 2016; Licerán-Gutiérrez and Cano-Rodríguez 2019).

Second, while we find no surprising results about the appropriateness of accruals quality measurement, the most traditional and widely used property associated with earnings quality, despite this appropriate measurement, the fact is that it is the property with a lesser incidence on perceived earnings quality by investors. On the other hand, other properties that are less considered in the literature, such as persistence or earnings smoothing, are proven to correctly measure earnings quality, yet they show the highest incidence of the perception of earnings quality.

Third, in line with the discussions and criticisms of the different proxies used in prior literature for conservatism, there is evidence of scant connections between them (Givoly et al. 2007; Ryan 2006; Wang et al. 2009), as shown by the fact that the proxies are not measuring the same, common concept (if kept together, composite reliability and AVE yield unacceptable values). In any case, we want to highlight that this does not mean that the measures are incorrect, but that they are not representative, aggregately, of the same concept, but rather of different aspects that are indicative of a conservative attitude by managers when disclosing accounting information. This opinion of conservatism proxies capturing different aspects is in line with Givoly et al. (2007), and with a group of authors whose studies show contradictions between conservatism proxies (Ball et al. 2000; Beaver and Ryan 2005; Giner and Rees 2001; Givoly et al. 2007; Roychowdhury and Watts 2007; Wang et al. 2009).

Finally, there is a need to connect the theoretical understanding that earnings quality is explained by different aspects with the empirical research design, given that, as shown by our results, the explanatory power when considering the simultaneous effect of the different properties of earnings increases both the in-sample and out-of-sample predictive ability of the model. This fact, which is improved by the use of methods such as PLS, confirms the intuition of Leuz and Wysocki (2016) that structural equation modeling is suitable for measuring earnings quality.

5-) CONCLUSIONS, LIMITATIONS, AND FUTURE RESEARCH LINES

Earnings quality is a pervasive topic in empirical accounting finance, but researchers have used many different proxies for representing EQ. Those proxies present several statistical estimation problems (Leuz and Wysocki 2016) and they capture different aspects of earnings quality, making it difficult to assess which EQ characteristics are more relevant for investors. In addition, the extant literature reveals the existence of weak or negative correlations among proxies measuring the same concept, which raises doubts about whether those proxies all really capture the desired EQ characteristic. In this paper, we use PLS to assess whether each proxy appropriately measures its associated EQ characteristic. The results show that the empirical proxies of accruals quality, smoothing, and persistence all represent the same underlying concept, whereas the proxies for conservatism fail to represent a single common theoretical concept. Given the extended use of these two proxies in prior literature as alternative measures of accruals quality, researchers should be cautious when concluding that the concept to which these two proxies refer is equivalent to the concept to which other proxies refer.

Apart from the validity assessment for the measurement, PLS also analyzes the predictive power of the model. In our model, we relate EQ properties with the EQ perceived by equity investors. Our results show that, although EQ properties explain only a small portion of the variance of perceived EQ, some properties exhibit greater explanatory power than others: Persistence of earnings shows the strongest explanatory power in terms of both in-sample (adjusted R^2) and out-of-sample (Q^2) predictive power. Given that prior literature has focused less on this property as representative of earnings quality than on other properties, such as accruals quality or conservatism, our study offers new insights for earnings quality measurement in future research. Considering the higher predictive power and appropriate validity measurement of persistence, we suggest that this property be considered more frequently in earnings quality studies. On the other hand, although accruals quality results show that this property is best measured by its indicators, it is less important to explain the level of earnings quality perceived by equity investors. We consider that future studies of earnings quality should continue to consider accruals quality but correct the weight given to this property to explain the outcomes of earnings quality.

Our study must be interpreted considering that it presents several limitations. To apply the PLS method, we required that all the indicators were measured at the firm level. Despite many of them usually being estimated in a firm-specific way in prior literature, there are various indicators whose typical estimation is not made at this level. One example would be Basu's model coefficients, for which we have used a time-

series estimation, despite previous literature warning about the potential problems associated with this type of estimation for this measure. Thus, we cannot determine if the low validity observed for this measure is produced by a real lack of validity or by the estimation method. Additionally, we were unable to use some additional indicators, such as the C-Score (Khan and Watts 2009) or the Ball and Shivakumar (2005) measure for conservatism, because their inclusion in our study would produce serious attrition problems because of the loss of observations.

A second set of limitations related to our empirical model is produced by the fact that this is a first and exploratory study. Because of the exploratory nature of our study, we included only those earnings properties that are commonly used in previous literature (namely, persistence, accruals quality, smoothness, and conservatism), as well as the empirical proxies most commonly used to represent them. There are, however, other earnings properties that would arguably affect earnings quality, such as comparability, timeliness, understandability, etc., which were not included in our model, mainly because of the lack of research and empirical indicators for representing them. Another limitation is the lack of control variables in our study. Given that our aim was to focus on the validity of the measure of the different earnings properties, we did not include other variables that may influence equity investors' perception of earnings quality. This lack of additional control variables can be the cause of the low explanatory power of the model.

In future research, we aim to use the PLS technique in further research to obtain more accurate conclusions about earnings quality, with higher predictive power and a lower reduction of the bias in estimated parameters. In particular, further research can be oriented towards the application of PLS to estimate the effects of earnings quality on other dependent variables, such as tax effect, investment efficiency, firm performance, cost of equity, or cost of debt. This research can be used to provide more robust evidence of the advantages of PLS in terms of higher predictive power and lower estimation bias, as well as to revise the validity of the conclusions from previous empirical studies that focus on a single facet of earnings quality. Additionally, this study contributes to a validation of the main proxies used in prior literature to measure earnings quality using a systematic process that has been widely employed in other fields of research, such as management accounting, marketing, or organizational behavior, and can also be applied in financial accounting issues such as earnings quality measurement. Thus, we could apply the validation scale process in other fields of finance and accounting. Furthermore, there is a chance for earnings quality research to work towards the improvement of conservatism measurement. First, it is necessary to make clear what to understand as conservatism. In this sense, it would be interesting to join the efforts of researchers and accounting standards regulators, towards common agreement. Second, once the concept is clear, future research lines could be orientated to the development of new measures of conservatism that correctly reflect the theoretical concept from an empirical point of view. Finally, this quantitative analysis could be enriched by a complementary qualitative analysis considering the opinions of experts and practitioners such as auditors, managers, investors, or regulators. This would help to deepen the importance given by the different users of accounting information, comparing it with what quantitative analysis indicates.

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APPENDIX A: ESTIMATION MODELS

In this Appendix, we present a detailed description of the process of calculating the proxies (empirical indicators) that are more commonly used in the earnings quality literature to measure the different facets of earnings quality that are not directly observable (latent variable, construct). The indicators are sorted according to the latent variable to which they are related. All estimated indicators will be winsorized at 1%.

Construct 1: EARNINGS QUALITY PERCEIVED BY EQUITY INVESTORS (PERCEIVED_EQ)

All of the following indicators are calculated for each firm following a longitudinal approach using a 5-year rolling window:

1-) **ERC1_coeff** and **ERC2_R2**: Coefficient (β_1) and adjusted R² (respectively) from the earnings response coefficient (ERC) model:

$$Returns_t = \beta_0 + \beta_1 \frac{EPS_t}{P_{t-1}} + \varepsilon_t.$$

2-) **V_RELEV1_Book_v_coeff**, **V_RELEV2_Earn_coeff** and **V_RELEV3_R2**: Coefficients (β_1 and β_2) and adjusted R² (respectively) from the value relevance of the earnings model (proportion of price explained by earnings):

$$Price_t = \beta_0 + \beta_1 Book\ Value\ per\ Share_t + \beta_2 EPS_t + \varepsilon_t.$$

For all of the aforementioned equations, the variables are defined as follows:

$Returns_t$ = Returns from CRSP (Ret).

EPS_t = Earnings Per Share (Basic) including Extraordinary Items (#53).

$Price_t$ = Price from CRSP (Prc).

P_{t-1} = Price from CRSP (Prc).

$Book\ Value\ per\ Share_t$ = Book Value Per Share from CRSP (Bkvlps).

Construct 2: Persistence (PERSISTENCE)

All of the following indicators are calculated for each firm following a longitudinal approach using a 5-year rolling window:

1-) **PERS1_earn_coeff** and **PERS2_earn_R2**: Slope coefficient (β_1) and adjusted R² (respectively) from the regression of earnings persistence:

$$Earnings_{t+1} = \beta_0 + \beta_1 Earnings_t + \varepsilon_t.$$

2-) **PERS3_disagg_coeff** and **PERS4_disagg_R2**: Slope coefficient (β_1) and adjusted R² (respectively) from the regression of disaggregated earnings persistence:

$$Earnings_{t+1} = \beta_0 + \beta_1 CFO_t + \beta_2 TA_t + \varepsilon_t.$$

3-) **PERS5_CFO_coeff** and **PERS6_CFO_R2**: Slope coefficient (β_1) and adjusted R² (respectively) from the regression of cash flow persistence on earnings:

$$CFO_{t+1} = \beta_0 + \beta_1 Earnings_t + \varepsilon_t.$$

4-) **PERS7_var_earn**: Variance of Earnings Before Extraordinary Items (#18) multiplied by -1 ().

For all of the aforementioned equations, the variables are defined as follows:

$Earnings_{t+1}$ = Earnings Before Extraordinary Items (#18) in the following fiscal year.

$Earnings_t$ = Earnings Before Extraordinary Items (#18).

CFO_t = Net Operating Cash Flows (#308).

TA_t = Total accruals = $\Delta CA_t - \Delta CL_t - \Delta Cash_t + \Delta STD_t - Dep_t$.

- ΔCA_t = Change in current assets (#4) from the previous year to the current year.
- ΔCL_t = Change in current liabilities (#5) from the previous year to the current year.
- $\Delta Cash_t$ = Change in cash and cash equivalents (#1) from the previous year to the current year.
- ΔSTD_t = Change in debt included in current liabilities (#34) from the previous year to the current year.
- Dep_t = Depreciation and Amortization (Income Statement) (#14)

CFO_{t+1} = Net Operating Cash Flows (#308) in the following fiscal year.

Construct 3: Accruals Quality (*ACCRUALS_QUALITY*)

All of the following indicators are calculated as 1 – absolute value of the residuals from the following regressions, estimated by year-sector. For the sectors, we considered the Fama and French classification of 45 sectors:

1-) **AQ1_Dangelo**: Residuals from DeAngelo (1986) model:

$$TA_t = TA_{t-1} + \varepsilon_t.$$

2-) **AQ2_Industry**: Residual from the Industry model by Dechow and Sloan (1991):

$$TA_t = \alpha_1 + \alpha_2 \text{Median}(TA_t) + \varepsilon_t.$$

3-) **AQ3_Jones**: Residual from Jones (1991) model:

$$TA_t = \beta_0 + \beta_1(1/AT_{t-1}) + \beta_2\Delta REV_t + \beta_3PPE_t + \varepsilon_t.$$

4-) **AQ4_Dechow_95**: Residual from the Dechow, Sloan and Sweeney (1995) model:

$$TA_t = \beta_0 + \beta_1(1/AT_{t-1}) + \beta_2(\Delta REV_t - \Delta REC_t) + \beta_3PPE_t + \varepsilon_t.$$

5-) **AQ5_Dechow_Dichev**: Residual from the Dechow and Dichev (2002) model:

$$\Delta WC_t = \beta_0 + \beta_1CFO_{t-1} + \beta_2CFO_t + \beta_3CFO_{t+1} + \varepsilon_t.$$

6-) **AQ6_Mc_Nichols**: Residual from the McNichols (2002) model:

$$\Delta WC_t = \beta_0 + \beta_1CFO_{t-1} + \beta_2CFO_t + \beta_3CFO_{t+1} + \beta_4\Delta REV_t + \beta_5PPE_t + \varepsilon_t.$$

7-) **AQ7_Kothari**: Residual from the Kothari, Leone and Wasley (2005) model:

$$TA_t = \alpha_0 + \beta_1(1/AT_{t-1}) + \beta_2(\Delta REV_t - \Delta REC_t) + \beta_3PPE_t + \beta_4ROA_{t-1} + \varepsilon_t.$$

8-) **AQ8_Ball_Shivakumar**: Residual from the Ball and Shivakumar (2006) model, estimated by year:

$$TA_t = \beta_0 + \beta_1CFO_{t-1} + \beta_2CFO_t + \beta_3CFO_{t+1} + \beta_4\Delta REV_t + \beta_5PPE_t + \varepsilon_t.$$

9-) **AQ9_Ball_Shivakumar**: Residual from the Ball and Shivakumar (2006) model, estimated by industry (sectors by Fama and French):

$$TA_t = \beta_0 + \beta_1CFO_{t-1} + \beta_2CFO_t + \beta_3CFO_{t+1} + \beta_4\Delta REV_t + \beta_5PPE_t + \varepsilon_t.$$

For all of the aforementioned equations, the variables are defined as follows:

TA_t = Total accruals (Previously calculated)

$\text{Median}(TA_t)$ is the median value of total accruals (TA_t) for firms in with same 2-digit SIC Code.

TA_{t-1} is total accruals (TA_t) at the beginning of the fiscal year.

AT_{t-1} = Total assets (#6) at the beginning of the fiscal year.

ΔREV_t = Change in net sales (#12) from the previous year to the current year.

PPE_t = PPE total gross (#7).

ΔREC_t = Change in net accounts receivable (#2) from the previous year to the current year.

ΔCFO_t = Change in Net Operating Cash Flows (#308) from the previous year to the current year.

ΔWC_t = Working Capital variation = $\Delta AR_t + \Delta Inventory_t + \Delta AP_t + \Delta TP_t + \Delta Other\ assets_t$.

- ΔAR_t = Change (increase) in accounts receivable (#302).
- $\Delta Inventory_t$ = Change (increase) in inventories (#303).
- ΔAP_t = Change (decrease) in accounts payable (#304).
- ΔTP_t = Change (decrease) in taxes payable (#305).
- $\Delta Other\ assets_t$ = Change (increase) in other assets net (#307).

CFO_{t-1} = Net Operating Cash Flows (#308) at the beginning of the fiscal year.

CFO_t = Net Operating Cash Flows (#308).

CFO_{t+1} = Net Operating Cash Flows (#308) in the following fiscal year.

BTM_t = Book-to-Market ratio = BV_t/MV_t

- BV_t is book value of common equity (#60)
- MV_t is market value of common equity = Number of common shares outstanding (#25) x Price close of fiscal year (#199).

ROA_{t-1} = Change in the ratio of Income Before Extraordinary Items (#18) / total assets at the beginning of the fiscal year (#6).

$DCFO_t$ = Dummy variable = 1 if $\Delta CFO_t < 0$, = 0 otherwise.

NOTE: All variables except BTM and ROA are deflated by total assets at the beginning of the fiscal year, AT_{t-1} (#6).

Construct 4: Earnings smoothing (SMOOTH)

All of the following indicators are calculated for each firm following a longitudinal approach using a 5-year rolling window:

1-) *SMOOTH1_dev_earn_cfo*: Ratio of standard deviation of earnings before extraordinary items (#18) over standard deviation of net operating cash flows (#308).

2-) *SMOOTH2_corr_accr_cfo*: Correlation between total accruals (TA_t) (calculated as previously indicated) and net operating cash flows (#308).

Construct 5: Conservatism (CONSERVATISM) ¹

All of the following indicators are calculated for each firm following a longitudinal approach using a 5-year rolling window:

1-) *CONS1_Skewness*: Skewness of Earnings Before Extraordinary Items (#18) by Givoly and Hayn (2000).

2-) *CONS2_Neg_Accr*: Large negative accruals by Givoly and Hayn (2000): Sum of total accruals (TA_t) (previously calculated).

3-) *CONS3_MTB*: Market-to-Book ratio: Value of MTB_t , previously calculated.

4-) *CONS4_Basu*: Slope coefficient (β_l) from the model of differential timeliness based on returns by Basu (1997):

$$\frac{EPS_t}{P_{t-1}} = \alpha_0 + \alpha_1 DR_t + \beta_0 R_t + \beta_1 DR_t \cdot R_t + \varepsilon_t.$$

5-) *CONS5_abs_ear_rev*: Absolute value of the slope coefficient (β_l) from the model of mean earnings reversal by Basu (1997):

$$\frac{\Delta X_t}{P_{t-1}} = \alpha_0 + \alpha_1 D_t + \beta_0 \frac{\Delta X_{t-1}}{P_{t-2}} + \beta_1 D_t \frac{\Delta X_{t-1}}{P_{t-2}} + \varepsilon_t.$$

6-) *CONS6_Cano_Nunez*: The difference between the slope coefficient for negative and positive returns ($\beta_2 - \beta_l$) from the model of differential timeliness based on the differential effect of positive and negative returns by Cano-Rodríguez and Nunez-Nickel (2015).

¹ There are two additional popular measures for conservatism in previous literature that are not included in our analysis: the metric from Ball and Shivakumar's (2005) model and the C-Score from Khan and Watts' (2009) model. The reason for excluding these metrics is their strong data requirements, which would cause an attrition bias problem in our sample.