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Value relevance of general government national accounts with ESA2010 accrual accounting framework. Association of ESA2010 reporting quality with decision making and accounting standardisation

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Abstract

Purpose: The necessity for a reliable set of international standards for the compilation of national accounts introduced the accrual accounting framework of the European System of Accounts (ESA 2010). Extensive efforts are made for convergence between Government Accounts (GA) and National Accounts (NA) under accounting standards.

Design/methodology/approach: This study investigated the quality of governmental NA, in the context of ESA 2010, from 1999 through 2019, using relative value relevance models of long-term government bond yields.

Findings: i) The accrual accounting framework ESA2010 generates value relevant (thus qualitative) NA financial reporting in EU member states and the United Kingdom (UK); ii) The financial variables that better interpret bonds' return, thus governments' necessity to borrow money, are showcased; iii) The usefulness of the ESA2010 conceptual framework for decision and policy making process considering that the accrual accounting basis fosters the financial reporting quality, is demonstrated; iv) The quality results set the premise for further discussion for the harmonization and alignment process of accounting standardisation with the ESA2010 accrual accounting framework as a resource for policy and decision making.

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Limitations: The methodology of value relevance models that is employed to assess the governmental statistical reporting quality with the ESA2010 accrual accounting framework is a private sector technique.

Originality: This study contributes theoretically as it fosters the quality of accrual accounting basis. It moreover provides an empirical and practical contribution by introducing relative value relevance econometric models that provide stakeholders with reliable information on the financial position and performance of the government. It showcases significant financial variables and coefficients of statistical reporting for each government. With its value relevant results, it supports evidence-based decision making, allows comparisons between EU governments and the UK, and contributes to increased transparency and accountability.

Keywords: IPSAS, EPSAS, ESA2010, national accounts, value relevance, bond return

JEL codes: H83, M41

1. Introduction

Public sector accrual-based accounting sets the breeding ground for the provision of high-quality statistics (European Commission (EC), 2012) at the European level for the harmonization of government accounting (GA) with financial statistical reporting. At the macroeconomic level, the United Nations System of National Accounts (SNA) 2008 draws the statistical perspective of financial reporting, whereas GA comprises the applicable micro-level point of view. National accounts (NA) have been produced and circulated with the support of the United Nations, the Organization for Economic Co-operation and Development (OECD), the International Monetary Fund (IMF), the World Bank Group, and the European Commission (EC). Since September 2014, in the European division, the corresponding variant is supported by the European System of Accounts (ESA) 2010.

National accounts are a set of macroeconomic financial records, allowing the comparison between countries while enabling decision making. The structure of ESA 2010 is in line with the global national accounting guidelines employed in the SNA2008. The Government Finance Statistics (GFS) information guidelines govern both SNA2008 and ESA2010 (González *et al*., 2018). Statistical accounting is a comprehensive framework that provides a reliable and flexible macroeconomic chart of accounts for decision making and research purposes. In the European Union (EU), the significance of GA practices being in accordance with the NA, specifically ESA2010, is inescapable. These practices serve as the foundation upon which the EU's fiscal discipline and macroeconomic convergence requirements are evaluated (Jorge *et al*., 2019).

This study primarily aims to highlight the contribution of the ESA accrual accounting framework to the value relevance (thus the quality) of statistical reporting of governmental NA. It aims to foster the analysis of accrual accounting harmonization processes in European division using the accounting frameworks of NA as key elements. In order to improve social, political, and economic decision making and accountability, it advocates value relevance tools that facilitate the examination and comparability of financial, budgetary, and aggregated statistical reports. With its findings, this study has practical implications as it i) concludes that ESA2010 generates value relevant (thus qualitative) NA financial reporting in EU member states and the United Kingdom (UK) on an accrual basis; ii) highlights the financial variables that better interpret bonds' return thus governments' necessity to borrow money iii) endorses the usefulness of the ESA2010 conceptual framework for the decision and policy making process considering that the accounting frameworks foster the financial reporting quality; iv) discusses the value relevance results in association with the harmonization and alignment process of accounting standardisation with the ESA2010 accrual accounting framework during the decision making process.

The remainder of this paper is organised as follows. Section 2 reviews the relevant literary and theoretical framework that sets the premise for the research questions developed in Section 3. Section 4 analyses the research methodology and sources. Section 5 provides the results of this research. Section 6 discusses the results in association with decision and policy making and accounting standardisation. Section 7 concludes with the contribution and the opportunities for accounting academics and practitioners.

2. Literary and theoretical framework

2.1 Value relevance in the public sector and public administration theory

According to international literature (Hung & Subramanyam, 2007) value relevance is defined as the ability of accounting figures to reflect the financial value of each legal entity. It can reflect accounting methods and accounting standards, auditing and legislation, and standard interpretation. Strong value relevance implies high quality accounting information (Ball & Brown, 1968; Ohlson, 1995, 2001). In the relative value relevance study, using the same value relevance model but with different accounting values corresponding to different standards or different periods or different groups, the R^2 ratio of the equations determines whether there is a significant value relevance difference and consequently qualitative variance in the accounting information (Lin & Chen, 2005).

Value relevance refers to the advantageous characteristics of financial statements to provide reliable and relevant accounting information as the primary criteria for

enabling standard setters to choose between accounting practices and standard alternatives (Barth *et al*., 2001). From a measurement and disclosure perspective, accounting information is relevant if there is a statistical association between financial information and prices or returns. This concept positions equity and debt holders as the focus of the definition. From Francis and Schipper's (1999) approach, value relevance influences investors' decision making as to whether or not to invest in companies' shares. So far, numerous specification models have varied in their treatment and perceptions of accounting practices and financial information depending on the valuation models used (Easton & Harris, 1991; Ohlson, 1995). Based on Kothari and Zimmerman (1995), even though price models are less biased, returns models are less problematic for econometric analysis and are commonly favoured. To associate accounting figures with returns, the accounting literature has used regression analysis of modified valuation models as a theoretical framework for this relationship.

Hung and Subramanyam (2007) defined value relevance as the ability of accounting to convey and reflect the fiscal value of legal entities, their corresponding accounting methods, and their accounting standards (auditing and legislation). Ball and Brown (1968), studying the relevance of earnings and shareholders' returns, concluded that the higher the value relevance is, the greater the quality of accounting information and therefore of earnings. Their research has established the basis for future studies to compare different accounting practices or standards. Easton and Harris (1991) contributed to the discussion by associating changes in earnings with returns, using a book valuation model to determine earnings levels' relationship with returns. Ohlson's (1995) valuation model is based on the principle that a firm's weighted value is linearly associated with owners' equity and earnings. Ohlson's model relates pricing to the major components of balance sheets and income statements. Francis and Schipper (1999) further investigated value relevance and correlated a firm's value with major components of equity and earnings. The value relevance of balance sheet measures is sensitive to the valuation principles applied to the various asset and debt components. Barth *et al.* (2001) claimed the balance sheet's distinctive roles were to provide information on liquidation values to facilitate loan decisions and monitor debt contracts.

We acknowledge certain limitations of the study. The value relevance of earnings and book value of equity on share prices and stock returns is a private sector technique to assess the quality of accounting information. The Generally Accepted Accounting Principles (GAAP) of the US and the International Financial Reporting Standards (IFRS) have long been competing for international acceptance by stock markets around the world as financial reporting standards. Subject cross-country comparisons of the value relevance of earnings and book values have been investigated between IFRS and US GAAP by Barth *et al*. (2012). Cross-country relative value relevance has also been studied during the IFRS convergence

(Srivastava & Muharam, 2021). Literature from a value relevance perspective has also focused on the transitioning period from local accounting standards to IFRS (Clarkson *et al*., 2011; Kadri *et al*., 2009; Tsalavoutas *et al*., 2009). Evaluation of financial performance in terms of the value relevance of IFRS was considered significant not only for investors or stakeholders but also for those who wanted to invest at the international level (Temiz & Güleç, 2017). As accounting information is mostly related to debt markets (Ball & Shivakumar, 2008; Givoly *et al*., 2017) this research deploys debt, equity, income and Euribor figures in association with bonds' return figures.

With the introduction and adoption of the accrual accounting system in the public sector as a result of New Public Management (NPM) reforms, which attempted to emulate the accounting practises and procedures used in the private sector, we initiate value relevance analysis in the public domain employing the accrual accounting framework ESA2010, to assess the quality of statistical reporting via bonds' return association. The NPM model represents new advances that were made to public administration theory as a new approach to public sector governance, with the aim to improve efficiency and accountability (Gomes *et al*., 2015). The term itself was first introduced by academics to describe the techniques that developed during the 1980s as part of an effort to make public services more business-like and to improve their efficiency by using private sector management models and free market principles in the public sector (Lampropoulou & Oikonomou, 2018).

Accrual accounting, as the focal point of NPM reforms, provides significant information content to communicate financing decisions and allows the government to take a long-term view (Salato *et al*., 2022). Adoption related decisions seem to be more motivated by the objectives of accountability and transparency (Nitzl *et al*., 2020) to maintain the international harmonization process (Brito & Jorge, 2021). Developed countries, such as the UK, are leading this reform process and already have a high level of implementation of accrual accounting in the public sector (Ghani *et al*., 2019), in the belief that it will lead to better decision making (Hyndman & Connolly, 2011). Christiaens *et al*. (2015) underlined the connection of the International Public Sector Accounting Standards (IPSAS) standards with the general (NPM) approach. Subject reforms brought accrual accounting to public sector accounting (PSA) systems, in an approximation to business accounting, and the adaptation of the IPSAS framework to national standards. In EU member states, the PSA reforms seem to have been driven principally by external factors, such as EU guidelines (Directive 2011/85/UE) that mandate accrual accounting for fiscal reporting under the ESA 2010 and the Eurostat initiative to implement and develop the IPSAS-based European Public Sector Accounting Standards (EPSAS) (World Bank/ Public Sector Accounting and Reporting Program (PULSAR), 2021).

2.2 Conversion of GA to NA

The Excessive Deficit Procedure (EDP) Tables that each European country prepares, and Eurostat publishes for deficits and government debt, reflect the adjustments made for the ESA deficit from working balance thus the public accounting balance. Working balance is the only public figure that Eurostat publishes and is the broad national definition of the difference between revenue and expenditure. EDP tables record the variations between public budgetary accounting and NA for net lending/borrowing and permit the investigation of the discrepancies between the two systems through appropriate adjustments. These adjustments, made on a national level, are an indication of the deviation of public accounting standards from ESA 2010. Since this difference varies definitionally in each member state, statisticians get corresponding information from EDP inventories. Recognition criteria of the working balance (budgetary balance), whether cash, accrual, mixed or otherwise is also indicated (Dasí *et al*., 2013; Eurostat, 2014).

Alignment of the GA practises and statistics is necessary to relegate the adjustments considerably when converting data from (GA) into (NA). The variance in the accounting base and the materialism of adjustments question both the comparability and reliability of ultimate budgetary balances conducted by EU member states within the EDP requirements (Jesus & Jorge, 2014).

As far as standardisation is concerned, disparities between the accruals-based standards under IPSAS/IFRS/GAAP can be addressed since they share a common genealogy (IFRS from GAAP, IPSAS from IFRS), although certain standards are more particular, such as the ones under IPSAS that are fixated on the public sector. A recent study (Bott & Rüdiger, 2021) from the Hessian Ministry of Finance showed the close link between IPSAS and the German Commercial accounting code, in the context of the EPSAS project. It clearly stated that differences between current national GAAP (HGB) and IPSAS are manageable on the premise that accounting options are used appropriately.

3. Research questions

Statisticians convert source data from different accounting systems into their NA. Thus, the link from commercial and public accounts to NA is not specific to a particular set of accounting standards (whether IFRS, IPSAS, or GAAP). The NA and IPSAS communities regularly discuss how the two standards can be aligned to facilitate the use of PSA information in the compilation of NA (International Public Sector Accounting Standards Board (IPSASB, 2014a).

The discussions for a harmonized integrated accrual-based financial reporting, reconciling public accounts and GFS, have taken place in the EU context, as it is anticipated to broaden the Whole of Government Accounts (WGA) reporting scope. Since September 2014, GA information has been converted to NA in accordance with ESA2010 principles. In general, Eurostat focuses on the compliance of the statistical NA in output terms. There is not a certain requirement on particular inputs to be used, though some are common because these are based on other European statistical legislation. All EU member state governments are obliged to use ESA 2010. Government accounting and in general microeconomic accounting systems of EU member states vary in their source data (administrative, regulatory, surveys etc). From a statistical perspective, despite the variance, the results will follow ESA standards and ensure comparability, and this is checked by the statisticians (Eurostat, 2013). Thus meaning, as far as concerns the ESA2010, there is a recognition on the statistical side that commercial and public accounting approaches should be examined when formulating the statistical approach to an issue. Understanding the relationship between commercial and public accounts and NA is crucial since they are a significant source of data for NA.

This study introduces value relevance models in the public sector to study the impact of the ESA2010 accrual accounting framework on the general government financial statement information of NA in the European Union member states and the UK. The research proposes the analysis of the value of the general government NA for assessing the return on bond prices. The compilation method used for general government NA becomes less statistical and more accounting oriented (Lequiller & Derek, 2007). It investigates whether the accounting framework introduction in statistical financial reporting resulted in financial statement information that better serves its primary objective, which is to provide high quality information on a public entity's performance and financial position both for internal and external stockholders and enable comparability.

Using the ESA2010 statistical indicator, this research employs empirical data in addressing the following research questions to investigate the quality of statistical financial reporting using bond return association models in relevance with the balance sheet, income figures, debt and Euribor figures.
RQ$_1$: *What is the value relevance (thus the quality) of the statistical financial reporting of General Government National Accounts with the ESA2010 accrual accounting framework in EU member states and the UK?*

RQ$_2$: *Which variables provide stakeholders with high quality governmental statistics reporting that strongly associates and correlates with bonds' return in the EU member states and the UK?*

This study contributes empirically, as it introduces value relevance models that measure the quality of the general government NA towards a harmonized methodology with ESA2010 statistical indicator in relevance with decision and policy making and theoretically as it endorses the perception that the accrual accounting basis sets the breeding ground for high quality statistics.

4. Data selection and methodology – Relative value relevance models

Relative value relevance analysis of EU member states and the UK was conducted for the period 1999–2019. In EU member states, the new ESA has been in force since September 2014 (González *et al*., 2018). The full NA time series in the Eurostat database is on the ESA 2010 basis. Regardless of the year the EU member states join the European Union, countries are legally required to re-transmit back a series of data when a new ESA is introduced, so they work backwards to adjust their data to the new rules. All EU member states published ESA 2010 data (including backwards compatible time series) for the first time in 2014 – this was the legally binding moment for them to do it.

Data for long-term government bond yields were collected from the European Central Bank's statistical data warehouse. Governmental data regarding governments' deficits/surpluses, revenues, expenditures, main aggregates, financial net wealth and government debt, expressed as a percentage of GDP, were derived from the NA indicators (ESA2010 indicator) in the Eurostat database. As the period for which the ESA2010 accrual accounting framework is assessed on its quality of reporting is until 2019, we include the UK in our analysis of EU member states as Brexit occurred in 2020.

The bond return valuation models, apart from variables related to balance sheets and income statements, include Euribor rates. The Euribor (Euro InterBank Offered Rate) is a benchmark rate calculated based on contributions made by a panel of banks, which submit daily an interest rate representing the cost of lending to another large bank, known as the interbank market (Abbassi & Linzert, 2012).

The Euribor rate does not apply to all countries in the study. An example case is the UK, which is not a member of the Euro and therefore the Euribor rate will not apply. However, Barclays UK is among the panel banks and is a primary dealer in Gilts (UK government bonds), U.S. Treasury securities and various European Government bonds. Panel banks ensure that they reflect adequately the diversity of the euro money market and that Euribor represents its underlying market. Direct impact on banks is not the only effect changes in Euribor may produce. This is also an issue for Croatia since it will only join the Euro in 2023. Zaja *et al.* (2018) studied

the determinants of government bond yields in the Republic of Croatia to find that the Euribor as an independent variable has a positive association with interest rates on government bonds and that its growth increases the yield on government bonds.

In this context, the study deems Euribor rates relevant for all sample countries, as these interest rates, within governments are impacted, directly reflect the conditions of an economy and its interbank market. Blommestein *et al*. (2011) underline the increasing reliance of those markets on central banks and government support in both Europe and the United States.

Taking as our reference the equation of Easton and Harris (1991) and Ohlson (1995), we examined the association between return on bonds and financial components in the government sector. For the specification of the first bond return association model and the purposes of this study, the following econometric model is proposed as a basis for estimation and conclusions:

$$BR_{it} = \beta_1 + \beta_2 FE_{it} + \beta_3 (EXP_{it}) + e_{it} \quad (1)$$

where BR_{it} is the annual adjusted return of a 10-year Long-Term Government Bond i the fiscal time period *t*. We examined bond return values in association with expenditure (EXP) and financial equity (FE) or financial net worth.

Secondly, following Easton *et al*. (2009) and Givoly *et al*. (2017), we proposed the bond return (BR) model as appropriate for relating bond returns to net income figures and the book value buffer as follows:

$$BR_{it} = \delta_{0,t} + \delta_{1,t} NI_{i,t} + \delta_{2,t} \Delta NI_{i,t} + \delta_{3,t} \frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{4,t} Eur_{i,t} + e_{it} \quad (2)$$

where BRr_{it} is the annual return of a 10-year long-term government bond i (in per cent) the fiscal period t. For the independent variables, we use NI (difference in revenue-expenditure or deficit/surplus) and the difference in the net income (ΔNI) within consecutive years. We utilize the cluster of government financial equity (FE) and government debt (D) figures to check the ability of equity to cover government debt (both variables are expressed as a percentage of GDP). The last independent variable is the Euribor rate.

The third regression analysis model evaluates the association of the aforementioned buffer and the Euribor rates with bonds' returns.

$$BR_{it} = \delta_{0,t} + \delta_{1,t} \frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{2,t} Eur_{i,t} + e_{it} \quad (3)$$

For more details on measuring control variables, we define all the variables in our models in Table 1.

Table 1. Description on Variables

Variable	Symbol	Source/Measures
Long-term government bond returns	BR	European Central Bank statistical data warehouse
Government financial equity as % of GDP national currency	FE	National accounts indicators (ESA2010) in Eurostat database
Government expenditure as % of GDP in values, national currency	EXP	National accounts indicators (ESA2010) in Eurostat database
Net Income	NI	Government deficit/surplus, revenue, expenditure, and main aggregates, National accounts indicators (ESA2010) in Eurostat database
Difference in NI	ΔNI	Difference is calculated in consecutive years for the period 1999–2019
FE-Debt/Debt	FE- D/ D	Ability of government financial equity to cover government debt. These figures are expressed as % of GDP, National accounts indicators (ESA2010) in Eurostat database.
Euribor rates	Eur	Euribor is short for Euro Interbank Offered Rate. The Euribor rates are based on the average interest rates at which a large panel of European banks borrow funds from one another.

To address the first research question, we investigate the impact of the accounting frameworks as they are shaped throughout the years, between 1999-2019, in EU countries and the UK. We assess the countries' differential response of bonds return to accounting frameworks by comparing their explanatory power (the adjusted R^2) of regressions (1, 2, 3) and the probability value of the variables. The explanatory power measures the relevance (thus quality) of accounting frameworks' information with respect to bond returns, based on the ESA 2010 statistical indicator in the European Union. The bond return association results for each of the subsamples demonstrate which figures, thus independent variables, better interpret the dependent variable for each country. Relative value relevance models enable comparability of the NA statistics quality of the EU member states and the UK.

To address the second research question, the aforementioned models are split into individual analyses. Therefore, using regression and Pearson correlation analysis, we check which coefficient has the best association, thus the ability to best interpret

bonds' return and how bonds' return correlates with individual figures. This analysis enables stakeholders to check financial reports in the European division and see which statistical financial reporting elements, have gradually throughout the period 1999-2019, established strong association and correlation with long-term government bond yields. In our analysis, to determine strong regression and correlation results, we consider 0.7 as the cut-off point that underlines the high quality of financial statistical reporting (Moore *et al.*, 2015). Significance degree analysis is elaborated in Table 2.

Table 2. Interpretation of association models and Pearson correlation analysis

Association models analysis
The (R-squared), (also called the coefficient of determination), which is the proportion of variance (%) in the dependent variable that can be explained by the independent variable. Hence, as a rule of thumb for interpreting the strength of a relationship based on its R-squared value (we use the absolute value of the R-squared value to make all values positive)
if R-squared value < 0.3 this value is generally considered a None or Very weak effect size,
if R-squared value $0.3 \leq r < 0.5$ this value is generally considered a weak or low effect size,
if R-squared value $0.5 \leq r < 0.7$ this value is generally considered a Moderate effect size,
if R-squared value $r \geq 0.7$ this value is generally considered strong effect size
Note: Asterisks indicating significance at the 10% (*), 5% (**) and 1% (***) levels
Pearson correlation analysis
Perfect: If the value is near ± 1, then it said to be a perfect correlation: as one variable increases, the other variable tends to also increase (if positive) or decrease (if negative).
High degree: If the coefficient value lies between ± 0.70 and ± 0.90, then it is said to be a strong correlation.
Moderate degree: If the value lies between ± 0.50 and ± 0.69, then it is said to be a medium correlation.
Low degree: If the value lies between ± 0.30 and ± 0.49, then it is said to be a medium correlation.
Little if any (linear) correlation: When the value is less than ± 0.29

5. Results of statistical reporting quality in the context of ESA2010 accrual accounting framework

5.1 Value relevance (quality) of governmental NA of European Union member states and the UK

Driven by the perception that decision making cannot rely only on cash accounting data, and that public sector accrual accounting practices are gradually considered by both practitioners and researchers (Bergmann *et al*., 2019), value relevance analysis is performed on the accrual-based accounting frameworks of NA. We investigate whether the quality results justify the efforts for GA and NA alignment and the

standardisation and harmonization process. The requirement for transparency and the significance of GFS in the EU is reflected in ESA 2010 which analyzes its development and the reconciliation of the magnitudes of income, expenditure and net lending/borrowing.

Based on the value relevance results of the first association model, we observe that there is cohesion in the interpretation of financial equity with bonds' return. Out of 27 EU member states and the UK, 23 governments have a significant interpretation of bond return figures with equity coefficient, whilst 17 governments with expenditure one. Governments that fully interpret the model are those of Austria, Croatia, Finland, France, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia and the UK. In the latter one, estimates and government total public expenditure measurement methods are on an accrual basis. Statistical reporting of Greece and Spain has low explanatory power. The government of Luxemburg and Cyprus are not value relevant. In the majority of EU member states and the UK, stakeholders derive qualitative statistical reporting through financial equity and expenditure figures. Overall, out of the 28 sample countries, 13 governments have a strong association.

From the second value relevance model, net income and Euribor rates have a strong interpretation as 21 governments associate their net income figures with bonds' return and 18 governments associate their Euribor rates with bonds' return. Differences in net income during consecutive years do not provide a strong interpretation of bond returns. This second model differs from the first one, as it includes debt figures and Euribor rates apart from the balance sheet and income figures. The excess of financial equity over government debt is a significant variable only for ten governments. In this second association model, none of the governments is irrelevant. A strong bond return association is confirmed among all governments, excluding the government of Hungary and Greece.

The third model is simplified, using the Euribor rates and the excess of financial equity over government debt. Again, in this simplified model, Euribor rates have a significant interpretation for 18 out of the 27 EU member states and the UK whilst only 13 governments prove an association of the aforementioned buffer with bonds' return. The governments of Austria, Finland, France, Italy, Lithuania, Slovakia, Spain, and Sweden have a great interpretation of their independent variables with bonds' return. Overall, out of the 28 sample countries, 15 governments have a strong association.

Taking into consideration that we use the relative value relevance approach, the model that best confirms the bonds' return assessment, is the second one recording high quality levels for almost all EU member states and the UK (except for the governments of Greece and Hungary that have a moderate effect). Table 3 illustrates the value relevant results.

Table 3. RQ1: Value relevance in EU countries & the UK

EU MSs and UK	RQ1: What is the value relevance (thus the quality) of the statistical financial reporting of General Government National Accounts with ESA2010 accrual accounting framework in European Union and the UK?													
	1st model				2nd model						3rd model			
Regression Models	$BR_{it} = \beta_1 + \beta_2 FE_{it} + \beta_3 (EXP_{it}) + e_{it}$				$BR_{it} = \delta_{0,t} + \delta_{1,t} NI_{i,t} + \delta_{2,t} \Delta NI_{i,t} + \delta_{3,t} \frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{4,t} Eur_{i,t} + e_{it}$						$BR_{it} = \delta_{0,t} + \delta_{1,t} \frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{2,t} Eur_{i,t} + e_{it}$			
Variables/ BR	B_1	FE_1	EXP_2	R^2	$\delta_{0,t}$	$NI_{i,t}$	$\Delta NI_{i,t}$	$\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}}$	$Eur_{i,t}$	R^2	$\delta_{0,t}$	$\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}}$	$Eur_{i,t}$	R^2
Austria	-7.56	0.16***	0.36***	**84%**	18.98***	-0.36***	0.11	10.72***	0.55***	**97%**	31.02***	17.41***	0.36**	**92%**
	(5.90)	(0.01)	(0.11)		(5.02)	(0.07)	(0.06)	(2.93)	(0.10)		(5.79)	(3.42)	(0.12)	
Belgium	8.45	-0.75***	-0.23	**38%**	-6.96	-0.65***	0.26**	-3.67	1.21***	**90%**	4.98	1.70	0.88***	**73%**
	(8.06)	(0.02)	(0.14)		(5.44)	(0.13)	(0.10)	(2.82)	(0.11)		(7.39)	(3.93)	(0.13)	
Bulgaria	0.20	0.27***	0.08	**54%**	4.81**	-0.60***	0.22	2.20	0.66	**71%**	7.02***	3.83*	0.07	**43%**
	(5.31)	(0.06)	(0.14)		(1.97)	(0.18)	(0.17)	(1.90)	(0.39)		(2.10)	(2.03)	(0.42)	
Croatia	-0.35***	0.07***	0.87***	**72%**	3.46	-0.48***	-0.12	0.57	0.28	**73%**	NR			
	(9.23)	(0.01)	(0.19)		(0.64)	(0.10)	(0.18)	(4.72)	(0.58)					
Cyprus	NR				-7.73	-0.47***	0.17*	-6.43	0.80***	**72%**	NR			
					(0.21)	(0.09)	(0.08)	(0.10)	(0.19)					
Czech	-0.54	0.09***	0.08	**80%**	2.34	-0.27**	0.04	0.55	0.47	**83%**	4.84***	2.18**	0.19	**77%**
	(3.76)	(0.01)	(0.08)		(1.53)	(0.11)	(0.10)	(1.10)	(0.29)		(1.23)	(0.93)	(0.29)	
Denmark	-0.78	-0.10***	0.54	**57%**	0.54	-0.19**	0.02	-0.63	1.07***	**89%**	4.98	1.70	0.88***	**84%**
	(6.42)	(0.02)	(0.12)		(0.93)	(0.08)	(0.10)	(0.89)	(0.14)		(0.50)	(0.67)	(0.13)	
Estonia	-30.32**	0.64***	0.38	**47%**	-2.01	-1.57***	0.28	1.27**	0.35	**84%**	1.05	-0.04	1.30*	**43%**
	(10.89)	(0.17)	(0.230		(1.23)	(0.27)	(0.22)	(0.47)	(0.44)		(2.02)	(0.76)	(0.73)	
Finland	23.35***	-0.04***	-0.034***	**72%**	0.85**	-0.30	-0.02	-0.42	1.48***	**87%**	1.43***	-0.37	0.95***	**83%**
	(3.21)	(0.01)	(0.06)		(0.37)	(0.17)	(0.09)	(0.43)	(0.30)		(0.23)	(0.47)	(0.10)	
France	2.11	0.10***	0.11*	**95%**	12.07	-0.23	0.10	6.54*	0.64**	**91%**	20.26***	10.66***	0.32**	**90%**
	(3.29)	(0.00)	(0.06)		(6.92)	(0.15)	(0.12)	(3.68)	(0.25)		(4.26)	(2.43)	(0.14)	
Germany	-28.84**	-0.01	0.67***	**41%**	4.15	-0.40***	0.14*	1.97	0.74***	**96%**	-5.24	-4.08	0.91***	**85%**
	(9.27)	(0.05)	(0.18)		(0.23)	(0.06)	(0.07)	(2.13)	(0.06)		(0.340	(3.48)	(0.10)	
Greece	-12.46	0.06*	0.54**	**24%**	56.28***	-0.14	0.46	27.90**	-0.55	**55%**	62.79***	31.18***	0.44	**54%**
	(9.74)	(0.03)	(0.21)		(18.18)	(0.23)	(0.29)	(9.93)	(0.50)		(13.45)	(7.71)	(0.44)	
Hungary	-24.24**	0.07**	0.69***	**49%**	19.62	-0.26	0.28	8.41	0.19	**51%**	19.07	7.64	0.45	**45%**
	(10.89)	(0.03)	(0.21)		(13.52)	(0.24)	(0.26)	(7.23)	(0.42)		(0.11)	(6.15)	(0.36)	
Ireland	-1.14	0.02	0.16***	**49%**	0.81	-0.26***	0.23***	-0.21	1.15***	**90%**	8.54*	3.34	0.19	**25%**
	(1.50)	(0.01)	(0.03)		(2.10)	(0.02)	(0.03)	(1.20)	(0.19)		(4.80)	(2.84)	(0.42)	
Italy	-22.57**	0.13***	0.85***	**64%**	43.60***	-0.05	0.08	21.38***	0.28***	**82%**	44.59***	21.81***	0.27***	**82%**
	(8.70)	(0.02)	(0.19)		(8.73)	(0.21)	(0.17)	(4.40)	(0.09)		(6.74)	(3.54)	(0.08)	

Table 3. (cont.) RQ1: Value relevance in EU countries & the UK

EU MSs & UK	RQ1: What is the value relevance (thus the quality) of the statistical financial reporting of General Government National Accounts with ESA2010 accrual accounting framework in European Union and the UK?													
	1st model				2nd model						3rd model			
Regression Models	$BR_{it} = \beta_1 + \beta_2 FE_{it} + \beta_3(EXP_{it}) + e_{it}$				$BR_{it} = \delta_{0,t} + \delta_{1,t}NI_{i,t} + \delta_{2,t}\Delta NI_{i,t} + \delta_{3,t}\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{4,t}Eur_{i,t} + e_{it}$						$BR_{it} = \delta_{0,t} + \delta_{1,t}\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + \delta_{2,t}Eur_{i,t} + e_{it}$			
Variables/ BR	B_1	FE_1	EXP_2	R^2	$\delta_{0,t}$	$NI_{i,t}$	$\Delta NI_{i,t}$	$\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}}$	$Eur_{i,t}$	R^2	$\delta_{0,t}$	$\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}}$	$Eur_{i,t}$	R^2
Latvia	-28.96*** (5.85)	0.28*** (0.05)	0.91*** (0.15)	**72%**	2.83* (1.47)	-1.12*** (0.09)	0.19 (0.12)	1.68 (1.15)	0.48 (0.300	**92%**	NR			
Lithuania	-19.38*** (4.45)	0.10*** (0.02)	0.66*** (0.12)	**73%**	5.49* (3.00)	-0.81*** (0.15)	-0.04 (0.21)	2.84 (2.14)	-0.04 (0.64)	**77%**	-19.38*** (4.45)	0.10*** (0.02)	0.66*** (0.12)	**74%**
Luxembourg	NR				1.68*** (0.43)	-0.15 (0.14)	-0.11 (0.12)	-0.20 (0.18)	1.21*** (0.25)	**82%**	1.40*** (0.38)	-0.08 (0.18)	1.00*** (0.21)	**80%**
Malta	-20.60*** (3.48)	0.02 (0.03)	0.63*** (0.10)	**75%**	7.41 (5.15)	-0.37*** (0.08)	0.18* (0.10)	3.04 (2.93)	0.38** (014)	**86%**	7.22 (7.54)	2.70 (4.28)	0.78*** (0.16)	**66%**
Netherlands	4.33 (6.94)	0.19*** (0.05)	0.12 (0.16)	**44%**	1.48 (3.62)	-0.27*** (0.06)	0.02 (0.08)	0.35 (2.18)	0.99*** (0.08)	**93%**	8.60* (4.30)	4.38 (2.61)	0.83*** (0.10)	**84%**
Poland	-15.04 (14.25)	0.09* (0.04)	0.52* (0.30)	**65%**	-3.27 (5.07)	-0.57*** (0.16)	0.09 (0.19)	-3.00 (2.76)	0.99*** (0.22)	**80%**	8.55* (4.63)	2.76 (2.70)	0.73** (0.26)	**63%**
Portugal	-11.38* (6.35)	0.04** (0.01)	0.41** (0.14)	**36%**	62.41*** (8.26)	-0.02 (0.11)	0.07 (0.12)	32.67*** (4.38)	0.14 (0.110	**88%**	64.29*** (5.24)	33.63*** (2.93)	0.13 (0.10)	**88%**
Romania	-9.97** (3.86)	0.07*** (0.01)	0.45*** (0.10)	**84%**	5.97*** (0.87)	-0.57*** (0.08)	0.27** (0.12)	1.87*** (0.58)	-0.03 (0.27)	**90%**	7.25*** (1.84)	1.38 (1.25)	0.14 (0.60)	**43%**
Slovakia	-0.44 (4.13)	0.13*** (0.01)	0.17 (0.10)	**76%**	4.56* (2.17)	-0.41*** (0.09)	0.11 (0.08)	2.12* (1.18)	0.53** (0.18)	**88%**	8.77*** (2.82)	3.67** (1.64)	0.48* (0.26)	**71%**
Slovenia	-7.10** (3.14)	0.10*** (0.01	0.24*** (0.06)	**78%**	8.27* (4.29)	-0.39*** (0.10)	0.13 (0.09)	5.68 (3.34)	-0.18 (0.80)	**77%**	14.46** (5.37)	9.37** (4.30)	-1.27 (1.01)	**51%**
Spain	-1.58 (5.90)	0.05** (0.02)	0.20 (0.14)	**25%**	5.07 (3.66)	-0.31*** (0.06)	0.31*** (0.08)	2.44 (1.98)	1.04*** (0.15)	**84%**	10.95* (5.59)	4.61 (3.16)	0.40** (0.18)	**44%**
Sweden	-2.07 (7.59)	-0.08*** (0.02)	0.11 (0.14)	**81%**	0.40 (0.34)	-0.28* (0.13)	0.04 (0.11)	-1.86*** (0.62)	0.77*** (0.15)	**94%**	0.09 (0.33)	-2.52*** (0.54)	0.55*** (0.10)	**91%**
United Kingdom	17.20*** (2.15)	0.07*** (0.01)	-0.26*** (0.05)	**88%**	15.10*** (4.5)	0.31*** (0.07)	-0.04 (0.08)	7.02*** (2.29)	0.59*** (0.19)	**96%**	0.14 (4.52)	-0.14 (2.47)	1.27*** (0.15)	**90%**

5.2 Value relevance and Pearson correlation results of bonds' return association with individual financial figures

To address the second research question, in addition to the aforementioned models, we also analyze the value relevance of bonds' return in governmental NA with the ESA2010 accounting framework individually with financial equity, net income, Euribor, government debt, expenditure, excess of financial equity over government debt (see Table 4). Pearson correlation of individual figures with bond returns is investigated as well (see Table 5). This research perspective intends to highlight the coefficients that correlate with long-term government bond yields, the figures that a stakeholder should examine to interpret the return configuration of bonds and that provide stakeholders with qualitative statistical reporting,

As far as concerns financial equity, there is cohesion in the association with bond yields. Governments that are non-value relevant are those of Cyprus, Germany, Greece, Ireland, Latvia, Luxembourg and Portugal. Based on OECD/International Federation of Accountants (IFAC) (2017) Portuguese and Greek governments were still in the transitioning phase from cash to accrual financial reports in 2016. The rest of the governments extend cash financial reports. Outcomes in Latvia, whose government is based on accrual basis accounting, are irrelevant. During the Eurostat EDP dialogue visit to Latvia (EC, 2019) Eurostat highlighted the need for the compilation of annual financial accounts based on ESA rules, prioritizing the GA over other data sources. Results that provide qualitative statistical reports concern the governments of Austria, the Czech Republic, France, Slovakia, Sweden and the UK. Their Pearson correlation is also of a high degree. Financial equity in the Netherlands has a qualitative and significant association with bonds' return but not from an income perspective. In the Netherlands, the statistical office prepares the balance sheet that relies on entities' individual financial reports. These also encompass national public agencies, whose accounts base on an accrual basis.

Income association figures demonstrate that the governments of Belgium, Bulgaria, Denmark, Finland, France, Ireland, the Netherlands and Spain are not value relevant. The same applies to Bulgaria, Finland, the Netherlands and Spain from an expenditure approach. Even though the governments of Belgium, Denmark, France and Ireland are not value relevant from the net income approach, these are relevant from the expenditure approach. In Ireland, the budget includes fiscal estimates for general government revenue and expenditure prepared in accordance with the European Statistical Standard ESA 2010. Conversely, Cyprus, Estonia, Portugal, Slovakia and Slovenia are not value relevant from an expenditure perspective but value relevant from a net income approach. Pearson correlation results for these two coefficients range from low to moderate scale. The difference in net income is not relevant for EU member states and the UK (therefore not presented in Table 4) and also has no linear correlation in the EU division (see Table 5).

Regarding governments' debt coefficient, 19 governments interpret bonds' return. Excess financial equity over government debt coefficient is confirmed for 22 governments out of 28. France, Luxembourg and the UK not only are relevant but have the highest explanatory power in both variables. In France, accrual-based data is used to establish the NA (statistics), albeit after several restatements. Corresponding to these two variables, the average correlation analysis for EU member states and UK is of little and low degree.

The governments of Austria, Czech Republic, Lithuania, Malta, Romania, Sweden and the UK have qualitative statistical reporting and association with bonds' return for all coefficients. Respectively, a high degree of correlation is evidenced in the governments of Austria, the Czech Republic, Romania and the UK which follow an accrual basis in governmental accounting for over a decade. Value relevance results hereby endorse the efforts of Austria and the UK to harmonize the accounting basis and coverage of fiscal reports (budget, financial statements, and statistics). This harmonization allows greater use of the accounting data for financial analysis and greater transparency of the state of public finances (OECD/IFAC, 2017) and this is hereby confirmed. In the case of Romania, the consolidation of subsidies, transfers and interests, non-financial and financial accounts are made by the Ministry of Finance, the National Institute of Statistics and the National Bank of Romania, following the ESA 2010 requirements. The Swedish government which proves to generate qualitative statistical reporting, measures the net lending and budget balance, based on statistical standards. As OECD/IFAC (2017) highlights, these are key fiscal elements that draw most the political and public consideration.

Table 4. RQ2: Which variables provide stakeholders with financial statistical reporting that best associate with bonds' return in EU MSs and the UK?

EU MSs	Financial Equity $BR_{it} = \delta_{0,t} + \delta_{1,t}FE_{i,t} + e_{it}$			Net Income $BR_{it} = \delta_{0,t} + \delta_{1,t}NI_{i,t} + e_{it}$			Euribor $BR_{it} = \delta_{0,t} + \delta_{1,t}Eur_{1,t} + e_{it}$			Government debt $BR_{it} = \delta_{0,t} + \delta_{1,t}G.Debt_{i,t} + e_{it}$			Expenditure $BR_{it} = \delta_{0,t} + \delta_{1,t}EXP_{i,t} + e_{it}$			Excess of FE over G. Debt $BR_{it} = \delta_{0,t} + \delta_{1,t}\frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + e_{it}$		
Variables	$\delta_{0,t}$	**Fe**	R^2	$\delta_{0,t}$	**NI**	R^2	$\delta_{0,t}$	**Eur**	R^2	$\delta_{0,t}$	**Debt**	R^2	$\delta_{0,t}$	**Exp**	R^2	$\delta_{0,t}$	***(FE-Debt)/ G. Debt***	R^2
Austria	11.22*** (1.12)	0.17*** (0.02)	74%	1.17*** (0.57)	-0.71*** 0.20)	35%	1.40*** (0.24)	0.95*** (0.10)	79%	15.00*** (3.28)	-0.16*** 0.04	35%	-30.40*** (8.73)	0.65*** (0.16)	39%	45.18*** (3.63)	25.67*** (2.21)	87%
Belgium	-4.09 (2.44)	-0.08*** (0.02)	40%	NR			1.63*** (0.27)	0.90*** (0.12)	73%	-5.89 (3.70)	0.08** (0.03)	21%	18.62** (8.58)	-0.28* (0.16)	11%	-19.56 (12.49)	-12.16* (6.54)	13%
Bulgaria	3.20*** (0.38)	0.27*** (0.06)	53%	NR			2.92*** (0.51)	0.79** (0.28)	32%	NR			NR			7.35*** (1.06)	4.12*** (1.21)	43%
Croatia	6.06*** (0.05)	0.05* (0.02)	26%	2.72*** (0.45)	-0.53*** (0.10)	67%	NR		NR	7.54*** (1.77)	-0.50* (0.02)	20%	-27.05* (13.97)	0.66** (0.29)	28%	NR		
Cyprus	NR		NR	4.04*** (0.42)	-0.27** (0.10)	30%	3.96*** (0.48)	0.46* (0.23)	18%	NR		NR	NR		NR	NR		
Czech Republic	3.08*** (0.17)	0.09*** (0.01)	78%	1.99*** (0.37)	-0.49*** (0.10)	55%	2.01*** (0.29)	0.83*** (0.13)	69%	8.69*** (1.59)	-0.16*** (0.04)	42%	-10.97 (6.85)	0.33* (0.16)	20%	5.62*** (0.38)	2.74*** (0.37)	76%
Denmark	2.11*** (0.39)	-0.11*** (0.02)	56%	NR			1.28*** (0.23)	0.99*** (0.10)	83%	-2.93** (1.32)	0.14*** (0.02)	50%	-11.71 (8.38)	0.28* (0.15)	12%	-1.82 (1.96)	-4.06** (1.70)	24%
Estonia	-15.13** (5.52)	0.62*** (0.17)	40%	4.23*** (0.84)	-0.98* (0.51)	16%	0.94 (0.860	1.26*** (0.35)	43%	9.47*** (2.75)	-0.81** (0.39)	19%	NR			-1.96 (2.01)	1.44*** (0.47)	34%
Finland	6.41*** (1.26)	-0.06** (0.02)	28%	NR			1.34*** (0.22)	0.97*** (0.10)	84%	9.65*** (2.13)	-0.12*** (0.04)	27%	NR			NR		
France	7.85*** (0.25)	0.08*** (0.00)	95%	NR			1.49*** (0.23)	0.90*** (0.10)	79%	12.02*** (0.75)	-0.11*** (0.00)	85%	36.24*** (8.97)	-0.59*** (0.16)	37%	29.26*** (2.42)	15.72*** (1.45)	85%
Germany	NR			2.14** (0.30)	-0.63 (0.10)	62%	1.02*** (0.22)	1.00*** (0.99)	83%	NR			-24.47*** (5.27)	0.59*** (0.11)	55%	-25.86** (10.69)	-18.17** (6.74)	26%
Greece	NR			5.35*** (1.71)	-0.39* (0.22)	12%	NR			NR			-12.02 (10.16)	0.40* (0.20)	14%	65.83*** (15.57)	32.79*** (8.80)	38%
Hungary	10.03*** (2.11)	0.07* (0.03)	17%	3.91*** (0.88)	-0.49** (0.17)	32%	4.75*** (0.50)	0.88*** (0.24)	43%	NR			-28.37** (12.04)	0.70** (0.24)	33%	30.21*** (7.16)	13.55*** (4.04)	40%
Ireland	NR			NR			2.68*** (0.60)	0.65** (0.26)	23%	NR			-1.93 (1.66)	0.17*** (0.04)	49%	11.23*** (1.98)	4.78*** (1.34)	35%

Table 4. (cont.) RQ2: Which variables provide stakeholders with financial statistical reporting that best associate with bonds' return in EU MSs and the UK?

EU MSs	Financial Equity $BR_{i,t} = \delta_{0,t} + \delta_{1,t} FE_{i,t} + e_{it}$			Net Income $BR_{i,t} = \delta_{0,t} + \delta_{1,t} NI_{i,t} + e_{it}$			Euribor $BR_{i,t} = \delta_{0,t} + \delta_{1,t} Eur_{i,t} + e_{it}$			Government debt $BR_{i,t} = \delta_{0,t} + \delta_{1,t} G.Debt_{i,t} + e_{it}$			Expenditure $BR_{i,t} = \delta_{0,t} + \delta_{1,t} EXP_{i,t} + e_{it}$			Excess of FE over G. Debt $BR_{i,t} = \delta_{0,t} + \delta_{1,t} \frac{(FE_{i,t} - D_{i,t})}{D_{i,t}} + e_{it}$		
Variables	$\delta_{0,t}$	**Fe**	R^2	$\delta_{0,t}$	**NI**	R^2	$\delta_{0,t}$	**Eur**	R^2	$\delta_{0,t}$	**Debt**	R^2	$\delta_{0,t}$	**Exp**	R^2	$\delta_{0,t}$	***(FE-Debt)/ G. Debt***	R^2
Italy	14.73*** (3.04)	0.09*** (0.02)	33%	0.62 (0.84)	-1.22*** (0.24)	53%	2.93*** (0.29)	0.55*** (0.13)	47%	12.73*** (4.29)	-0.07* (0.03)	13%	NR	NR	NR	82.89*** (13.07)	41.63*** (6.95)	60%
Latvia	NR			2.14*** (0.53)	-1.03*** (0.15)	72%	3.27*** (0.91)	0.84* (0.42)	19%	NR		NR	NR		NR	NR		NR
Lithuania	4.93*** (0.71)	0.10** (0.04)	25%	2.44*** (0.62)	-0.81*** (0.16)	57%	2.79*** (0.84)	0.96** (0.40)	24%	8.33*** (2.17)	-0.14* (0.06)	19%	-20.63*** (5.86)	0.68*** (0.16)	51%	7.10*** (1.56)	2.70* (1.34)	19%
Luxembourg	NR	NR	NR	2.42*** (0.58)	0.43* (0.22)	14%	1.14*** (0.25)	0.95*** (0.11)	78%	6.58*** (0.66)	-0.24*** (0.04)	58%	22.18*** (7.82)	-0.45** (0.18)	20%	0.76 (0.51)	0.64*** (0.13)	52%
Malta	-1.55 (2.45)	-0.11* (0.05)	21%	2.40*** (0.28)	-0.51*** (0.07)	72%	2.30*** (0.31)	0.88*** (0.14)	66%	-6.83*** (1.73)	0.16*** (0.02)	67%	-19.98*** (3.33)	0.58*** (0.08)	75%	23.88** (10.01)	11.66* (5.76)	19%
Netherlands	9.35*** (1.67)	0.18*** (0.04)	42%	NR	NR	NR	1.26*** (0.23)	0.96*** (0.10)	81%	NR	NR	NR	NR	NR	NR	24.82*** (7.66)	13.56** (4.75)	29%
Poland	9.97*** (1.01)	0.16*** (0.03)	59%	2.87*** (0.83)	-0.59*** (0.19)	35%	3.64*** (0.38)	0.99*** (0.18)	61%	18.43*** (4.39)	-0.27*** (0.08)	37%	-37.63*** (8.83)	0.98*** (0.20)	58%	18.21*** (3.42)	8.13*** (2.12)	46%
Portugal	NR			3.30*** (1.04)	-0.38* (0.19)	14%	NR			NR			NR			64.12*** (5.37)	33.39*** (3.01)	85%
Romania	6.66*** (0.35)	0.09*** (0.02)	60%	4.16*** (0.67)	-0.52*** (0.16)	44%	5.16*** (0.44)	0.78*** (0.25)	40%	9.48*** (1.05)	-0.12*** (0.03)	48%	-15.59** (6.70)	0.59*** (0.18)	45%	7.66*** (0.65)	1.65*** (0.52)	43%
Slovakia	6.59*** (0.52)	0.12*** (0.01)	72%	1.24 (0.72)	-0.63*** 0.16	46%	3.78*** 0.39)	0.73*** (0.23)	44%	8.33*** (2.52)	-0.10* (0.05)	18%	NR			12.92*** (1.75)	5.95*** (1.14)	64%
Slovenia	4.42*** (0.36)	0.10*** (0.02)	59%	3.09*** (0.65*)	-0.24* (0.13)	17%	2.57*** (0.54)	0.94*** (0.28)	39%	6.82*** (1.04)	-0.06*** (0.01)	39%	NR			6.88*** (1.43	2.56* (1.34)	20%
Spain	6.84*** (1.03)	0.05** (0.01)	25%	NR	NR	NR	2.61*** (0.37)	0.62*** (0.16)	41%	7.52*** (1.38)	-0.04** (0.01)	21%	NR			NR		
Sweden	3.78*** (0.19)	-0.10*** (0.10)	80%	3.67*** (0.44)	-0.55** (0.21)	23%	1.33*** (0.23)	0.94*** (0.10)	80%	-5.52*** (1.24)	0.19*** (0.02)	70%	-27.20*** (3.33)	0.58*** (0.06)	79%	1.31 (1.08)	-2.59** (1.09)	19%
United Kingdom	7.51*** (0.57)	0.09*** (0.01)	76%	5.34*** (0.64)	0.54*** (0.13)	43%	0.40 (0.24)	1.26*** (0.10)	90%	9.15*** (0.63)	-0.10*** (0.01)	82%	23.36*** (3.53)	-0.49*** (0.08)	60%	33.93*** (4.26)	17.45*** (2.42)	71%

Note: ΔNI is not value relevant and therefore omitted.

Table 5. Pearson Correlation analysis

RQ2: Which variables provide stakeholders with financial statistical reporting that best correlate with bonds' return in EU MSs and the UK?

EU MSs	Financial Equity	Net Income	Euribor	Gov't Debt	Expend.	Diff. in Net Income	(FE-DEBT)/ DEBT
Austria	0.86	-0.59	0.89	-0.59	0.63	-0.27	0.94
Belgium	-0.55	0.04	0.89	0.44	-0.41	-0.26	-0.41
Bulgaria	0.73	-0.39	0.57	-0.05	0.10	-0.47	0.66
Croatia	0.51	-0.82	0.43	-0.45	0.53	-0.15	0.42
Cyprus	0.23	-0.55	0.43	-0.35	0.09	-0.25	0.20
Czech Republic	0.89	-0.75	0.84	-0.60	0.45	-0.22	0.87
Denmark	-0.75	-0.15	0.91	0.74	0.35	-0.34	-0.49
Estonia	0.63	-0.40	0.67	-0.44	0.20	-0.10	0.59
Finland	-0.53	0.18	0.91	-0.52	-0.05	-0.31	0.10
France	0.98	0.03	0.89	-0.92	-0.61	-0.16	0.92
Germany	0.10	-0.79	0.91	-0.33	0.74	-0.09	-0.51
Greece	0.27	-0.35	-0.27	0.10	0.38	-0.01	0.61
Hungary	0.42	-0.57	0.66	-0.22	0.57	0.16	0.63
Ireland	0.22	-0.29	0.48	0.15	0.63	-0.45	0.59
Italy	0.57	-0.73	0.69	-0.37	0.30	-0.32	0.78
Latvia	0.37	-0.85	0.47	-0.17	0.42	-0.47	0.32
Lithuania	0.50	-0.76	0.49	-0.44	0.72	0.06	0.44
Luxembourg	0.25	0.37	0.88	-0.76	-0.45	-0.10	0.73
Malta	-0.46	-0.85	0.81	0.82	0.86	-0.23	0.44
Netherlands	0.65	-0.33	0.90	0.09	0.32	-0.24	0.54
Poland	0.77	-0.60	0.79	-0.60	0.76	-0.10	0.68
Portugal	0.29	-0.38	0.20	-0.24	0.09	-0.22	0.93
Romania	0.77	-0.67	0.63	-0.70	0.67	0.13	0.65
Slovak Republic	0.85	-0.68	0.66	-0.42	-0.07	0.05	0.80
Slovenia	0.77	-0.41	0.63	-0.63	0.41	0.24	0.45
Spain	0.49	-0.21	0.64	-0.46	0.12	0.29	-0.33
Sweden	-0.90	-0.48	0.90	0.84	0.89	-0.29	-0.44
United Kingdom	0.87	0.66	0.95	-0.91	-0.78	0.03	0.84
Average of EU	**0.35**	**-0.40**	**0.67**	**-0.25**	**0.28**	**-0.15**	**0.43**

6. Discussion and implications of the reporting quality results in association with decision making and accounting standardisation

6.1 Association of ESA2010 reporting quality with decision and policymaking

Statistics undoubtedly play a significant role in the international economy and are an important resource for policymakers, business leaders and the general public. They support evidence-based decision making, allow comparisons over time between policies, countries and economies, and help increase transparency and accountability. Statistical indicators such as ESA2010 must be commonly accepted by EU member states and based on a methodology of common acceptance. European statistics, as produced and disseminated by Eurostat and the EU national statistical institutes, meet the highest quality requirements. The fact that the ESA2010 accounting framework relies on an accrual accounting basis is itself a precondition for high quality information for fruitful decision making. Previous studies have globally perceived the usefulness of accrual accounting based financial information for accountability and for supporting decision making in public sector organizations (Andriani *et al*., 2010; Ismail, 2022; Kober *et al*., 2010). However, relative value relevance is examined in the European accrual accounting framework to affirm its quality and usefulness, considering that other authors (Brusca & Montesinos, 2013; Caruana & Farrugia, 2018) find higher usefulness of cash data.

Further to this approach, the basis of high-quality statistics is not the absolute precondition for making relevant indicator policy and statistical reports. Formal statisticians, researchers and experts need to be aware of the impact of the growing role of statistical reporting in policymaking and adapt the statistical indicators and accounting frameworks that justify the methodology from which they emerge. They need to work with decision makers to understand their needs and expectations, but also to guide the correct interpretation and use of these indicators, as well as their limitations. The growing role of statistics in policymaking and decision making requires quality assurance, even if the primary data source arises from different accounting methods (cash or accrual) but also from different accrual-based standards under IFRS/IPSAS/GAAP. This research study demonstrates econometric models that confirm the high quality of the NA of General Government financial statements of EU member states and the UK through their indicators, which is in line with stakeholders' expectations for a high standard of excellence from NA. However, this study shows which data are most important for better decision making by decision-policy makers and all pertinent stakeholders since indicators need to provide information that fulfils individual needs, be precisely assessed, fast, comprehensive, and simple.

6.2 Association of ESA2010 reporting quality with accounting standardisation

In the last years, there has been a continuous two-way effort by the statistical and accounting community to converge macro and micro-economic government accounting information through harmonized, integrated reporting on an accrual basis (EC, 2013a; IPSASB, 2014a). Bracci *et al*. (2015) underlined that in most European countries, cash accounting persisted at the centre of the budget process, which prevailed over financial reporting in its significance (Heiling *et al*., 2013).

The variance between financial and statistical reports is traced in terms of measurement, timeline, recording and conceptual framework (Chan & Heiling, 2012). At the European level, the alignment effort is reflected in the harmonization of IPSAS by those governing the European system (ESA2010). PricewaterhouseCoopers's (PwC's) (2014) survey on behalf of Eurostat, confirmed the suitability of IPSAS as a reference to developing EPSAS in EU member states (EC, 2013b, 2014) which in turn can contribute to improving the reliability of ESA. In the EU, IPSAS as the reference point of EPSAS development was initiated to achieve a homogeneous EU-landscape of PSA governance and reporting (Lorson *et al*., 2019) aimed at harmonization (Pontoppidan & Brusca, 2016). EU authorities are creating policies and projects like EPSAS, based on the SNA, in an effort to close the information gap between GA and NA (Dasí *et al*., 2013). The integration of national accounts, budgetary and financial reporting standardizes conciliation on their information, facilitates the internal use of national accounts and constitutes EPSAS a comparative source among EU countries (Manes-Rossi *et al*., 2016).

In the EPSAS workshop that took place in Brussels (Directorate-General for Internal Policies – Policy Department D: Budgetary Affairs, 2015), it was highlighted the interconnection of EPSAS with the ESA as a facilitator of translating public sector accounts into financial statistics which would enable Eurostat to check fiscal data more easily. The same workshop considered that GFS would improve its quality on the premise that the interconnectedness of PSA and ESA strengthens, setting prerequisites that EPSAS base on ESA and suggesting changes to ESA where needed. Verrinder (2021) endorses the EC proposal (EC, 2014) of the Framework Regulation which includes fundamental EPSAS principles such as accrual-based accounting, double entry book-keeping and therefore endorses accounting standards consistent with ESA principles, having IPSAS as the first reference base. Considering EPSAS, the importance of the alignment of GA with the NA, namely ESA2010, became prevalent, considering that the figures from the former are input for the latter, based on which, the EU fiscal discipline and macroeconomic convergence criteria are assessed (Jorge *et al*., 2019). Essentially, financial reporting and statistical reporting have separate yet complementary functions in terms of the interconnection of EPSAS and ESA2010. Both are needed, EPSAS cannot be

expected to fully align with ESA but by utilizing IPSAS convergence efforts with NA, some differences may be eliminated.

Value relevance results endorse the quality and therefore usefulness of statistical reporting information to decision and policymakers. The NA proves to be a rich statistical source, with legislated rules in Europe (ESA 2010) to ensure comparability. Given the importance of statistical reporting to policymakers, debt managers, ratings agencies and investors in determining the progress being achieved in an economy, the contribution of the ESA accounting framework proves to be of high quality resulting in statistical reporting of great value relevance, reliability, and perceiving the interconnection efforts of accounting standardisation with ESA2010 to improve their mutual quality.

7. Conclusions

Financial reporting and statistical accounting are studied by Heald and Hodges (2018) as independent GA approaches that have been integrated under the influence of international agencies. The GFS is capable of providing a unified structure of the whole economy, its components, and its relationships with other total economies owing to the international standards ESA2010 and SNA2008 (Lorson *et al*., 2019).

High relative value relevance results in the majority of sample governments, clearly demonstrate the quality of statistical reporting, perceiving the evident European efforts for the "unconcealed ambition to build a uniform accrual-based budgeting and accounting system for all EU member states" to achieve unification in the context of the EPSAS project (Mussari, 2014). This study does not overlook the discrepancies between GA and NA. It does not connive that envisaging compilation of GFS as a result of expedient IPSAS reconciliation entails awareness of issues of entity concept, consolidation, recognition, and measurement valuation. Neither it implies that EPSAS can be expected to fully align with ESA.

This study investigates the quality of GFS reporting with the ESA2010 accrual accounting framework. It presents the theoretical and practical implications of national account information on evaluating bond returns, constructed on global standards of accrual accounting premise. It considers an incentive the contribution of accrual accounting frameworks to the quality of statistical reporting for the interconnectedness of EPSAS with ESA2010 when formulating standards (IPSASB, 2014b). This study endorses harmonization efforts of EPSAS with the ESA framework as the alignment of micro-macro will lead to ESA changes where necessary fostering both financial and statistical reporting quality. In line with the 2015 EPSAS workshop (Directorate-General for Internal Policies – Policy Department D: Budgetary Affairs, 2015), it endorses the efforts for harmonizing the

accounting basis and coverage of fiscal reports (budget, financial statements, and statistics) and proves that indeed this harmonization has allowed greater use of the accounting data for fiscal analysis and greater transparency of the state of public finances and also proves that in such cases (e.g., governments of Austria and the UK) provides fiscal reporting of high quality (OECD/IFAC, 2017).

This study underlines ESA2010 as a significant event in NA, further validating their critical economic function, and emphasising the calibre of their reporting. It is in line with Caruana *et al*. (2019), that despite the different objectives of NA, budgetary and financial reporting, aggregated systems should enable comparability. These should be integrated into a comprehensive financial and management information system (Barton, 2011) that produces adequate reports on governments' performance.

Evidence of value relevance analysis proves that cash-based governments yield qualitative results when converted to accrual, confirming the statistical perspective, that despite the variance in input terms, results will follow ESA standards and ensure comparability facilitating policy and decision making. As budgetary and accrual accounting systems have been integrated to a great extent and contain budgetary and ESA 2010 codes, an account of budget implementation needs to be drafted, complementary to the financial statement reporting (Christiaens & Vanhee, 2007).

With this study, there are opportunities for accounting academics and practitioners to research the quality of public sector governmental accounting comparative analysis with corresponding statistics, using promoted value relevance tools. Bergmann (2021), underlines that "if financial statements do matter economically, their quality should also matter" and approaches this issue from an audit surveillance perspective ensuring their quality. Indeed, improvements in government and national accounts reporting alignment efforts should always strive to improve their reporting quality proactively to facilitate both reporting and audit purposes.

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