EXPLORING DETERMINANT FACTORS OF DIFFERENCES BETWEEN GOVERNMENTAL ACCOUNTING AND NATIONAL ACCOUNTS BUDGETARY BALANCES IN EU MEMBER STATES

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Abstract

Framed by the earnings management approach, this paper addresses the relationship between budgetary balances according to Governmental Accounting (GA) and National Accounts (NA), exploring factors that may explain both the materiality and diversity of the adjustments required when translating data from one into the other.

Using data from Excessive Deficits Procedure reporting for all EU member states from 2007 to 2010, the analysis confirms that GA-NA adjustments reflect conceptual differences between the two systems, namely concerning recognition criteria. Regarding potential factors explaining adjustments, while none of the economic policy variables considered was found relevant in explaining either diversity or materiality, all technical accounting variables analyzed explained materiality, although only GA accounting basis explained diversity.

The research shows that changing GA reporting basis into accruals reduces adjustments' materiality and diversity. Therefore, in order to improve the quality of Government Finance Statistics (GFS), it is highly recommendable to achieve a GA system harmonized across Europe, such as IPSASs or EPSASs, allowing only very few options and imposing the accrual basis in both budgetary and financial systems. Also relevant is the need to strengthen the role of control and auditing in the GA reporting process (by Supreme Audit Institutions and external private firms), in order to avoid accounting discretion.

Keywords: Budgetary reporting, national accounts, adjustments, accounting basis, public deficit, central government.

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1. Introduction

The Maastricht convergence criteria for EU member-States are assessed on the basis of a harmonized reporting system of National Accounts (NA) supported by the European System of National and Regional Accounts (ESA). ESA offers guidance, tables and procedures for countries to report to Eurostat, namely within the scope of Excessive Deficits Procedure (EDP). A 'full accruals basis' of accounting is implicitly used for the recognition of most financial flows.

Nevertheless, public sector data reported for the convergence criteria are derived from (micro) Governmental Accounting (GA) systems, according to the rules in practice for each country. Despite all having some kind of accrual accounting, this is not yet harmonized between countries, and in some cases, not even within a given country. Additionally, in many countries, budgets and budgetary accounting are still cash-based (Lüder and Jones, 2003; Blöndal, 2003; van der Hoek, 2005; Anessi-Pessina, Nasi and Steccolini, 2008).

Therefore, when reporting to Eurostat for the purpose of deficit assessment, countries start from the so-called 'working balance' (deficit/surplus) in GA and make adjustments to obtain the final deficit/surplus in NA for convergence evaluation. These adjustments result from conceptual differences between the two accounting systems (GA and NA), among which some concern accounting principles, such as recognition criteria – cash versus accrual basis (Keuning and van Tongeren, 2004).

In spite of recent GA reform trends in EU member states, moving from cash to accruals, differences still remain due to the existence, in some countries, of two different accounting bases in GA – accrual basis for financial accounting and modified cash basis for budgetary accounting. This is particularly relevant since the data from GA to NA are based on budgetary reporting (van der Hoek, 2005; Martí, 2006; Barton, 2007). Since in some countries the GA 'working balance' is already accrual-based while in others it is still cash-based, the adjustments to be made range from highly diverse and material, to a reduced number and of low magnitude (Jesus and Jorge, 2015).

The literature review (Keuning and van Tongeren, 2004; Martí, 2006; Sterck, 2007) and documental sources (IPSASB, 2005; 2012) additionally identify other specific issues concerning differences between GA and NA that raise the need for adjustments when translating data from one system into the other. Particularly interesting are the findings of an exploratory study pointing out the materiality of those adjustments as well as their diversity, questioning the reliability and comparability of the final budgetary balances reported by EU member-States within the EDP requirements, hence raising doubts about NA data accuracy and reliability to assess the Maastricht Treaty convergence criteria (Jesus and Jorge, 2014; 2015).

Following this line of investigation, this paper addresses the relationship between budgetary balances (after budget accomplishment) according to both GA and NA, namely assessing whether there are sufficiently significant differences and exploring what may explain those differences. Accordingly, it aims to achieve the following

general objectives:

- To analyze whether both materiality and diversity of GA-NA budgetary balance adjustments reflect the conceptual differences between the two systems, considering the adjustments' magnitude and categories reported by EU member states;
- To identify potential factors that might explain the adjustments' (i.e. GA-NA budgetary balance differences) materiality and diversity.

The assumption underlying this research is that since, in principle, EU member states have to comply with deficit limits and other restrictions concerning the Stability and Growth Pact, accounting management discretion might be used to manage the reported deficit by means of managing GA-NA budgetary balance adjustments. Therefore, some literature on earnings management, particularly by public sector organizations (Eisner, 1984; Christensen and Mohr, 1995; Petersen, 2003; Stalebrink, 2007; Anessi-Pessina and Steccolini, 2009a, 2009b) seems to be useful as a conceptual framework for this study. In fact, if the main issue to be analyzed concerns what leads EU member-States to report more or less material and more or less diverse GA-NA adjustments in their budgetary balances, factors pointed out as a possible explanation of variability across countries might be seen as 'incentives' to use some accounting creativity in order to report a more convenient position in terms of EDP.

The use of accounting discretion has been studied within the literature on earnings management, which is particularly rich concerning the private sector, but still very scarce in the public sector (Stalebrink, 2007; Anessi-Pessina and Steccolini, 2009a). In any case, the general idea is that earnings management occurs when decision-makers within organizations resort to some creativity by means of accounting discretion to manage/change the reported financial performance/position. The main intention is to signal a certain situation to stakeholders, by not reporting the accurate picture.

In the public sector, authors such as Eisner (1984) and Petersen (2003) addressed practices to measure, manage and report budgetary deficits which, although in the USA context, seem somehow related to some of the GA-NA budgetary balance adjustment categories analyzed in this study. Eisner (1984) refers, among others, to off-budget items and credit extension, contingent expenditure and not systematically accounting for investment assets. Petersen (2003) explains that deficit reductions tend to be achieved by practices other than raising taxes or reducing spending, namely by changing the assumptions underlying the budget, altering the timing and recognition of various flows, or even redefining what constitutes revenue and expenditure. He also refers to techniques contributing to an apparently balanced budget, such as: over-estimation of revenues, internal borrowing, assets sales, acceleration of revenue and delays in spending, and anticipated future savings. GA-NA budget balance adjustments regarding the recognition of certain operations, the concepts of budgetary revenue/expenditure and the accounting basis, might find some relation to the above-mentioned 'creative' practices.

Stalebrink (2007) and Anessi-Pessina and Steccolini (2009a) were pioneers in developing studies that address possible determinants of earnings management in public

sector organizations, using rather similar independent variables – the former in the context of Swedish municipalities and the latter in Italian public health-sector organizations. Among several determinant factors, those authors use: change of administration/CEO, organizational eligibility for bailout funds, operating revenues as a proxy for organization size, organization's operating margin, change in total debt, organization's administrative/resource capacity and changes to the organization's assets. Nevertheless, these determinants are at the organizational level and hence not applied to the context of this research.

Therefore, it can be said that the scarce literature regarding the public sector, and particularly in the field of GA and NA, does not address the topics of this study. This might be an opportunity for this paper to be innovative, but it also creates difficulties in identifying the possible determinants of GA-NA budgetary balances differences, despite the above-mentioned framework of accounting management discretion. However, it is empirically observable that some factors are able to determine those differences and they can be classified into two groups: those related to economic policy and those regarding technical-accounting issues.

Henceforth, this paper is organized as follows. Section 2 presents the systems of GA and NA, highlighting their purposes, main differences and how they relate. Subsequently, Section 3 addresses the main categories of adjustments needed when translating information from one into the other, in terms of EDP reporting procedures. Section 4 addresses the methodology, starting by presenting the research questions, formulated from an exploratory perspective; furthermore, the sample, variables, statistical procedures and models associated with the empirical study are described. Section 5 presents and discusses the main findings. Finally, Section 6 summarizes the main conclusions, contributions and limitations.

2. Governmental accounting and national accounts

In the last decades, under New Public Management (NPM) trends, GA has undergone considerable reform processes whose main common features must be underlined, as identified by authors such as Brusca and Condor (2002) and Benito, Brusca and Montesinos (2007): (i) adoption of the accrual basis with a progressive approach to business accounting; (ii) a trend towards harmonization of accounting systems between different levels of government; and (iii) a move to approach GA and NA, so that adjustments, reclassifications and eliminations are easier and safer.

One important discussion emerging from these reforms concerns the introduction of the accrual basis in budgetary accounting systems. However, many international studies have shown that most countries adopting the accrual basis in GA have not introduced it in their budgetary systems, namely concerning budget preparation and reporting of budgetary performance (Lüder and Jones, 2003; Bastida and Benito, 2007; Sterck, 2007; Benito and Bastida, 2009).

Additionally, van der Hoek (2005) distinguishes between budgeting and reporting systems. While the former are connected to mixed cash/commitment accounting bas-

es, reporting systems are mostly linked to modified or full accrual accounting, with different practices and degrees of implementation across countries. Consequently, the lack of harmonization is a great problem in GA systems, namely among EU member states.

On the other hand, National Accounts (NA) is the first internationally harmonized reporting system, aiming to calculate key aggregate indicators (Gross Domestic Product (GDP), volume growth, national income, disposable income, savings and consumption) so that the whole national economy might be evaluated, including comparison with other countries' aggregates (Bos, 2008).

Concerning EU countries, all member states are obliged to adopt the European System of National and Regional Accounts (ESA) in preparing their NA. One of the specific purposes of this system is to help control European monetary policy, namely national aggregates such as GDP, deficit and debt. ESA is therefore the harmonized conceptual framework for EU member states' NA in order to obtain accurate values for the ratios established in the EU Treaty and required by the EDP Protocol to assess and monitor the budgetary discipline of EU member states under the European Monetary Union - EMU (Benito and Bastida, 2009).

One question that might be raised concerns knowing whether the current GA systems in EU countries are able to meet ESA requirements, namely relating to data provided by Sector S.13 – General Government Sector (GGS), established in the EDP Protocol as the institutional sector in NA that supports macroeconomic aggregates – deficit and debt – according to which the convergence criteria of the Maastricht Treaty are evaluated.

Consequently, the relationship between GA and NA is an important issue mainly concerning GGS data to NA, since they are obtained from GA, whose diversity and divergences from macro accounting systems may question the relevance, reliability and comparability of the aggregates that sustain the financial decisions of EU member States (Benito and Bastida, 2009). Several authors, such as Cordes (1996), Jones and Lüder (1996), Montesinos and Vela (2000) and Jones (2003), emphasize the main differences between the two accounting systems, such as: (i) divergences related to the definition of the reporting entity; (ii) differences related to the moment of recognizing transactions, which occur on a 'full accrual basis' in the NA perspective[1], and on a

1 Nevertheless, the ESA general recognition criterion was later modified regarding taxes and social contributions, allowing member states to recognise them according to three different methods, thus becoming an exception to the accrual basis regime: (i) Accrual basis – recognition when the tax-generating factor occurs (e.g. in the year income tax relates to); (ii) Adjusted cash basis – recognition of taxes under cash basis sources, considering when possible a time adjustment so that the amounts received can be attributed to periods when the economic activity generating the fiscal obligation occurs; and (iii) Cash basis – when it is not possible to apply any of the other methods.

modified cash or modified accrual basis in the GA perspective; and (iii) differences related to the measurement of recognized transitions, which NA considers to be market price while in GA historic cost (acquisition or production cost) is preponderant.

Regarding differences between GA and NA, the International Public Sector Accounting Standards Board (IPSASB) developed a working program concerning the convergence of IPSASs with NA systems, starting in January 2005 with a Research Report aiming to identify differences in financial reporting provided by statistical-based accounting systems (NA) and the financial information reported under the IPSASs (GA) (IPSASB, 2005). More recently, the IPSASB issued a Consultation Paper (IPSASB, 2012), which describes the relationship between IPSASs for accrual-based financial statements and Government Finance Statistics (GFS) reporting guidelines, reviewing progress since the IPSASB's last GFS harmonization initiative and identifying possible further opportunities to reduce the differences. Topics causing differences between the two reporting systems were classified as: resolved if countries adopt updated IPSASs (e.g. GGS reporting is solved by IPSAS 22); opportunities to reduce differences (e.g. reporting entity definition, inventory measurement, presentation of financial statements, including classification and aggregates, measurement of assets, liabilities and net assets/equity) and differences that will remain in any case, due to the different objectives of the two systems, and therefore have to be managed in between (e.g., recognition criteria, measurement of assets/liabilities, particularly market value *versus* historical cost).

3. Adjustments from GA to NA

Considering the first objective of this research, this section addresses the practical consequences of the conceptual differences identified. As Keuning and van Tongeren (2004) explained, the conceptual differences between the two accounting systems (GA and NA) imply making adjustments and corrections based on estimations of GA data to determine macroeconomic ratios such as deficit and debt, which has consequences for their reliability and comparability.

According to the Inventories of Sources and Methods each EU member state discloses (hereafter called 'Inventories'), conceptual differences give rise to the need to make adjustments from GA data into NA. The main adjustment categories are related to: (i) cash/accrual adjustments for taxes, social contributions, primary expenditure and interest and (ii) reclassification of some transactions, namely capital injections in state-owned corporations, dividends paid to GGS entities, military equipment expenditure and EU grants (Jesus and Jorge, 2010).

Regarding cash-to-accrual adjustments, related to different recognition criteria, the Inventories describe the adjustments each country makes in order to transform cash-based data into accrual-based data, considering issues like taxes and social contributions and other receivables, interest and primary expenditure. The analysis of the Inventories allows observing that procedures are not harmonized between countries,

both in terms of the issues adjusted and the way the adjustments are made (Jesus and Jorge, 2014; 2015).

As for reclassification adjustments, the procedures described in the Inventories are similar and concern: (i) capital injections in state-owned corporations – analyzing whether they meet the requirements of a financial transaction (not considered in the deficit/surplus) or of a non-financial transaction, considered in the deficit/surplus)[2]; (ii) dividends paid to GGS – according to ESA MGDD, each transaction is analyzed in order to determine whether the whole amount received from dividends can be considered as income with a positive impact on the deficit; (iii) military equipment expenditure (time difference adjustments regarding time of payment and time of delivery) and EU grants (time adjustments to assure the neutrality of Community grants).

The adjustments' quantitative impact may be measured through the EDP Reporting Notifications each country is obliged to send to Eurostat twice a year[3]. From those EDP Notifications, Table 2A provides data related to Central Government (CG) deficit/surplus reported by EU member states, explaining the transition from CG accounts budgetary execution balance (GA) into CG final deficit/surplus (NA). Table 2A is based on Central Government Accounts (CGA) budgetary execution deficit/surplus, designated as 'working balance', which represents the balance between all revenue and expenditure. This table shows data adjustments to reach the final deficit/surplus – net borrowing/lending of Central Government Sector (S.131), according to NA requirements. The 'working balance' concerns mostly budgetary execution deficit/surplus of the State sub-sector (S.13111), as the deficit/surplus of other CG entities is disclosed as a whole in a separate item. However, in some countries the 'working balance' is cash-based while in others it is reported under accrual or mixed (when countries use cash for some transactions and accruals for others) bases.

Therefore, Table 2A shows the various adjustment categories from the CG 'working balance' in GA into CG deficit/surplus in NA. It can be observed that some of those categories are related to the conceptual differences identified in Section 2 and some are not. Table 1 demonstrates that relationship.

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2 According to the rules of the ESA Manual on Government Deficit and Debt (MGDD), it is necessary to analyse whether state-owned corporations are profitable in order to decide whether it is expectable that GGS may obtain future income (financial transaction – without impact on deficit/surplus) or whether a capital injection was made to cover accumulated losses (capital transfer – with impact on the deficit/surplus).

3 According to EDP requirements, EU Member-States are obliged to prepare the Reporting of Government Deficit and Debt Levels twice a year: 1st Notification in April (N), covering planned data (year N), estimated data (year N-1), half finalised data (year N-2) and final data (years N-3 and N-4); 2nd Notification in October (N), only differing regarding year N-1 data, which are already half-finalised.

Table 1: Adjustment categories and conceptual differences between GA and **NA**

Adjustment categories	Conceptual differences
A. Financial transactions included in the 'working balance'	Recognition criteria differences
B. Non-financial transactions not included in the 'working balance'	Not related
C. Accounting basis adjustments C.1. Differences between interest paid and interest accrued C.2. Other accounts receivable C.3. Other accounts payable	Recognition criteria differences
D. Balance (net borrowing or net lending) of other CG entities* D.1. 'Working balance' (+/-) of entities not part of Central Government D.2. Net borrowing (+) or lending (-) of other Central Government bodies	Definition and scope of reporting entity under GA and NA Preparation and disclosure of consolidated financial statements
E. Other adjustments	Relationship between government and government business enterprises and other reclassifications of specific transactions

* As explained, the budgetary balance of other entities not included in the State sub-sector is reported separately for all those entities and added to the State deficit/surplus ('working balance').

Source: Authors' findings

4. Methodology

4.1. Research questions

The literature on the relationship between GA and NA is scarce and, as presented above, mainly addresses the relationship and the conceptual differences between the two systems regarding recognition and measurement bases. All in all, it is acknowledged that differences exist because the purposes and users of both GA and NA systems are different. Therefore, it is also recognized that adjustments are needed and sometimes unavoidable.

Empirical evidence (Jesus and Jorge, 2014; 2015) has highlighted the magnitude in terms of weight in each country's deficit, as well as the diversity of those adjustments, especially within the EU context. These studies also show non-harmonized procedures to reach the NA final balance, indicating reliability and comparability problems. Regarding the second study focused on five EU countries (Jesus and Jorge, 2015), the analysis reveals each country discloses different cash-to-accrual adjustments and different treatment procedures to convert GA data into NA. Yet, so far no attempt has been made either to discuss factors that might explain the magnitude or diversity of such adjustments, or to develop quantitative analyses thereof.

However, questions might be raised, laying the foundation to justify this exploratory research:

- Do the magnitude and diversity of GA-NA balance differences (adjustments) reflect the conceptual differences between the two systems?
- Which category of adjustments accounts more to the magnitude of GA-NA budgetary balance adjustments?
- Are there economic policy issues that might explain the magnitude and diversity of GA-NA budgetary balance adjustments? e.g.:
  - Is it possible that each country's economic growth affects both the materiality and diversity of adjustments to be made?

  - What about the GA budgetary balance sign (deficit/surplus) as a result of each country's budgetary accomplishment?
  - Does inclusion in the Euro-Zone make a difference in explaining both the materiality and diversity of adjustments to be made?
  - Does fulfillment of the Maastricht Treaty criteria[4] explain both the materiality and diversity of adjustments to be made?
- Are there technical-accounting issues that might explain the magnitude and diversity of GA-NA budgetary balance adjustments? e.g.:
  - Is it relevant the fact that the GA budgetary balance ('working balance' as the starting point for NA budgetary balance) is cash-based or accrual-based?
  - What about the sign of the NA budgetary balance (deficit/surplus) as a result of adjustments?
  - Is the sign of the total adjustments, as representing the positive/negative impact of adjusting the GA budgetary balance due to conceptual differences between the two systems, important for the adjustments' materiality and diversity?

While the first two questions relate to objective 1 presented in the Introduction, the others come under objective 2. The following sections will try to answer these questions, making an original contribution towards understanding which factors might explain the differences between budgetary balances of GA and NA, as well as taking a quantitative approach for the first time. By doing so, this research also tries to fill gaps in the literature.

4.2. Research design and sample

This research is of a clearly exploratory character, as an attempt is made to develop an inductive explanation for different magnitudes and diversity of GA-NA adjustments, using the above mentioned possible factors. Additionally, it is positivist since it seeks to describe certain phenomena, while keeping researchers independence; it applies quantitative tools, adapting methods used in exact sciences to social sciences in order to find causality relationships (Davila and Oyon, 2008; Moreira, 2009).

Central Government data are used, gathered from both EDP Reporting notifications (Tables 2A) and Eurostat statistics. The sample consists of all 27 EU member States, for the years 2007 to 2010 (Eurostat, 2012), with a total of 108 observations. Table 2 presents descriptive information about the sample for each year.

Over the period, mean and median values of budgetary balances both in GA and NA generally decrease, with a slight increase in 2010. NA budgetary balance is, on average, lower (higher average deficit) than GA balance, except in 2008. Both balances (GA and NA) are, on average, significantly negative over the period, while showing very high dispersion – standard deviations range between approximately 15,000 mil-

4 According to Article 104 of The Maastricht Treaty concerning budgetary discipline, convergence criteria are public deficit and public debt. The former cannot exceed 3% of GDP, while the latter cannot exceed 60% of GDP.

lion to 46,500 million Euro in GA balance, and between approximately 16,000 million to 45,500 million Euro in NA balance. 2009 is the year when the range between maximum and minimum values is widest, for budgetary balances both in GA and NA, approaching 200,000 million Euro.

Table 2: Sample characterization

Budgetary balances	Statistic	Year			
		2007	2008	2009	2010
GA -Working balance (million euros)	Mean	-4,299.31	-14,729.78	-25,451.71	-23,297.77
	SD	15,076.93	27,528.16	46,540.84	41,747.07
	Minimum	-54,273.69	-97,699.97	-192,002.81	-164,137.88
	Median	-631.91	-3,461.16	-7,080.00	-8,509.87
	Maximum	25,905.00	14,615.95	9,730.00	911.00
NA - EDP B9 of Central Government (million euros)	Mean	-6,137.99	-11,916.54	-26,216.41	-25,067.83
	SD	15,773.21	23,837.50	45,488.13	40,085.93
	Minimum	-54,872.16	-98,974.19	-194,814.64	-166,520.76
	Median	-524.71	-3,025.00	-7,825.00	-7,405.12
	Maximum	12,147.00	8,570.32	-116.00	-78.00
Magnitude of GA-NA difference (million euros)	Mean	-1,838.68	2,813.25	-764.69	-1,770.06
	SD	3,838.74	18,461.21	10,698.14	11,364.22
	Minimum	-13,878.00	-12,132.00	-29,619.00	-29,313.00
	Median	-289.66	-275.72	-143.51	-85.00
	Maximum	2,220.00	89,503.00	17,745.00	36,775.00

Total obs: 108 (Current EU at 27 x 4 years)

Source: Authors' findings

The magnitude of the GA-NA difference, i.e. total amount of adjustments, shows a higher mean in 2008 while positively impacting on the balances. In 2007 and 2010 the mean values become closer, negatively decreasing the balances (increasing deficits). Median values of this difference are much higher (less negative) than mean values, except in 2008, when the median is negative and the mean is positive. Again, throughout the period the dispersion around the mean values of GA-NA differences is very high, especially in 2008.

4.3. Variables

In this study, the two dependent variables used to measure the materiality and diversity of adjustments are:

- $Materiality_i = \left| \frac{GA\ balance_i - NA\ budgetary\ balance_i}{NA\ budgetary\ balance_i} \right| \times 100$

  Materiality is always a positive number representing the weight of difference (either positive or negative) in NA budgetary balance (%).

- $Diversity_i$ is the total number of adjustments from CG 'working balance' in GA into CG deficit/surplus in NA.

  Diversity in theory ranges from 0 (no adjustments made) to 8 (all types of adjustments made). The eight adjustment categories are those referred to in Table 1[5].

5 For categories C and D, the subcategories were considered.

In order to answer the research questions related to objective 1, the independent variables used were the weight of each adjustment category (A, B, C, D and E, in Table 1) in the NA budgetary balance, both in absolute value and in percentage. For instance, for the first category A: financial transactions included in the working balance:

$$Weight\ of\ Category\ A_i = \left| \frac{Adjustment\ amount\ of\ Category\ A_i}{NA\ budgetary\ balance_i} \right| \times 100$$

For category D: balance (net borrowing or net lending) of other CG entities:

$$Weight\ of\ Category\ D_i = \left| \frac{Adjustment\ amount\ Category\ D1_i + Adjustment\ amount\ Category\ D2_i}{NA\ budgetary\ balance_i} \right| \times 100$$

Additionally, to answer the research questions related to objective 2, the following independent variables were used, classified into three dimensions:

- Economic policy variables: Euro-Zone (country belongs to the Euro area: yes/no); GDP % change from the previous period; economic growth (the sign of GDP % change from the previous period); GA budgetary balance sign (deficit/surplus); meeting both convergence criteria (yes/no); deficit/surplus fulfillment (yes/no);
- Technical-accounting variables: NA budgetary balance sign (deficit/surplus); GA accounting basis (cash, accrual or mixed); and the sign of total adjustments (representing the positive/negative impact of adjusting GA budgetary balance);
- Control variables (variables characterized as being constant, unchanged and usually explaining the dependent variable): natural logarithm of the population (as a proxy of the country's size); and GDP per capita (as a proxy of the country's wealth).

4.4. Statistical analyses and models

The data analysis starts with a brief description of the dependent variables: GA-NA adjustments' materiality and diversity. To find out which category of adjustments has the greatest contribution for the magnitude of GA-NA budgetary balance adjustments; for materiality, the following empirical regression model is used:

$$Materiality_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \varepsilon_i,$$

where $X_k (k = 1,2,...,5)$ are the five adjustment categories (A to E),

β_j $(j = 0,1,...,5)$ are the six parameters to be estimated, and ε_i is the error term.

Although various regression models can be used to analyze a panel data sample, the Ordinary Least Squares (OLS) regression was applied as this study is exploratory. For reassurance, a model including year dummies was also estimated but the results (not reported) showed that those variables were not significant. So the year is not relevant in explaining the dependent variables.

For the second objective, to identify potential factors that might explain adjustments' materiality and diversity, the relationship between each independent variable

and both dependent variables was analyzed, firstly using descriptive statistics. As in the previous objective, two OLS regressions were then applied, one for materiality and another for diversity. The general model is:

$$Y_i = \alpha + \beta X_i' + \varepsilon_i,$$

where Y is the dependent variable, X_i' is the vector of independent variables, α and the vector β are the parameters to be estimated, and ε_i is the error term.

In order to introduce qualitative variables in the model, so called 'dummy variables' were created (variables that take on values of 1 and 0, 1 meaning something is true). For the binary variables (X1, and X5 to X10) the reference category is 0. For the accounting basis (X2 and X3) the reference category is mixed (both systems)[6].

5. Findings and discussion

To facilitate the discussion, results are presented considering the sequence of the objectives established in the Introduction.

5.1. Materiality and diversity of GA-NA budgetary balance adjustments

Tables 3 and 4 present descriptive statistics concerning the materiality and diversity of GA-NA budgetary balance differences (adjustments). As explained, while materiality is represented by the weight of GA-NA budgetary balance differences in the NA balance, diversity is represented by the number of adjustment categories.

Concerning materiality, during the whole period adjustments were on average more than 100% of the NA balance, although the values were highly dispersed (standard deviation around 370%), ranging from 0% to 3,115%. The median value for the whole period indicates that 50% of observations show materiality values above 27%, while 5% of observations demonstrate materiality values above 216%. The statistics for the whole period are affected mostly by those of 2007 and 2008, which seem to inflate the average values. There is a clear change in 2010, where materiality's mean and median values significantly decrease, as well as dispersion, which is considerably reduced. This might relate to the fact that 2010 data are not yet final, so possibly still not including all adjustments.

Regarding diversity, over the period the average number of adjustments tends to be very high, with a total mean of six categories and without relevant variability across the years. Half the observations are equal to, or below this value, while the other half is spread between six and eight categories. The maximum of eight categories empirically shown throughout the period 2007-2010, when considering the adjustment types

6 The multicollinearity problem was checked and since the entire variance inflation factor (VIF) indicator is under 5, it is assured that all independent variables are not highly correlated. The regression model was found to be significant (tested with ANOVA F-test), meaning that at least one partial regression coefficient is not zero and so the associated independent variable does explain materiality and diversity.

Table 3: GA-NA adjustment Materiality by year (%)[7]

	Year				
	2007	**2008**	**2009**	**2010**	**Total**
Mean	124.47	184.38	62.99	33.65	**101.37**
Standard Deviation	395.99	592.40	186.50	43.38	**368.36**
Minimum	0.50	1.29	0.02	0.22	**0.02**
Percentile 05	1.09	2.98	0.49	0.66	**1.09**
Percentile 25	16.14	16.02	7.76	3.70	**13.01**
Median	28.62	32.10	22.29	19.21	**27.34**
Percentile 75	66.47	113.82	36.24	41.11	**52.97**
Percentile 95	202.20	352.95	148.92	118.64	**216.17**
Maximum	2087.84	3115.32	983.99	186.84	**3115.32**

Note: Current EU at 27

Source: Authors' findings

Table 4: GA-NA adjustment Diversity by year

	Year				
	2007	**2008**	**2009**	**2010**	**Total**
Mean	5.96	5.85	5.96	6.04	**5.95**
Standard Deviation	1.13	1.17	1.13	1.26	**1.16**
Minimum	2	2	2	2	**2**
Percentile 05	4	5	5	4	**4**
Percentile 25	6	5	6	5	**6**
Median	6	6	6	6	**6**
Percentile 75	7	6	6	7	**7**
Percentile 95	7	8	8	8	**8**
Maximum	8	8	8	8	**8**

Note: Current EU at 27

Source: Authors' findings

in Tables 2A (including sub-categories), reflect most of the diversity of adjustments highlighted in Section 3, namely those concerning recognition criteria differences between GA and NA, one relevant conceptual difference identified in Section 2. There is a minimum of two adjustments (curiously made by one single country – the UK) in the period.

To complement the analysis, and referring to the five main categories of adjustment (without considering sub-categories), Table 5 presents the results of the regression analysis trying to assess which of those categories contributes most to explaining total adjustment's (GA-NA budgetary differences) materiality.

The results show that 98% of the variance of materiality is essentially explained by the weight of only three categories of adjustments, since the other two (X2 and X5) are not statistically significant. While both the weight of adjustments concerning financial transactions included in the working balance and concerning balance of other CG entities are significant at 1% significance level, the weight of accounting basis adjustments is significant at 10% level. All the significant categories present a positive

7 All materiality values have been transformed in positive, using mathematical modulus (absolute value).

Table 5: Adjustment categories and Materiality

	Independent variables	Coefficient	Std. Error	Standardized Coefficient	t-Statistic	
	Constant	7.698	5.831		1.320	
X1	AbsWeight Financial transactions included in the working balance	1.026	0.016	0.836	62.568	***
X2	AbsWeight Non-financial transactions not included in the working balance	0.064	0.293	0.003	0.217	
X3	AbsWeight Accounting basis adjustments	0.214	0.116	0.039	1.847	*
X4	AbsWeight Balance (net borrowing or net lending) of other CG entities	0.703	0.026	0.488	27.065	***
X5	AbsWeight Other adjustments	-0.150	0.123	-0.019	-1.218	
	Adjusted R-squared	0.982				
	F statistic (df:5,102)	1,192.53	***			
	Std. Error of regression	48.928				

Notes: Dependent variable is the materiality of the GA-NA budgetary balances adjustments (absolute and %). Total obs: 108.
*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' findings

relationship with GA-NA (total) adjustments' materiality. Therefore, it may be concluded that, for the period 2007-2010, not all adjustments when transforming GA into NA data were empirically confirmed as material.

Focusing on the three statistically significant variables the results (not reported) show that the mean values go above 100% for those more significant ones: for the weight of adjustments of financial transactions included in the working balance (X1) the average reaches almost 159% in 2008, while for the weight of adjustments concerning balance of other CG entities (X4) the average reaches 124% in 2007. For the weight of accounting basis adjustments (X3) the average over the period ranges from 18% in 2009 to 35% in 2007. The dispersion of values is much lower for this variable (X3 – 66%) than for the other two (X1 – 300%; X4 – 256%). For the whole period, while in X1 the values range from 0% to 3,015%, in X4 they range from 0% to 2,657%; the two maximum values being clearly outliers.

5.2. Potential factors explaining adjustments' materiality and diversity

Tables 6 and 7, in relation to GA-NA adjustments' materiality and diversity, show the descriptive statistics of both qualitative and quantitative variables in the regression analysis, including control variables (population and GDP per capita).

Throughout the period 2007-2010, cases of a deficit in NA balance predominate. Materiality's mean values are much higher in countries and years where the NA balance is positive (surplus). However, dispersion around the mean is similar in both cases and very high. Regarding diversity, the dispersion around the mean is also similar in cases of both deficit and surplus, but very low.

Regarding GA accounting basis, cash basis prevails. Both materiality and diversity's mean values are higher in these cases, followed by those of a mixed (cash plus accruals) basis. Materiality values are much more scattered when cash basis is used than when accrual or mixed bases are applied.

Between 2007 and 2010 a negative sign in GA-NA budgetary balance difference prevailed. Materiality's mean values are, however, much lower and much less scattered in these cases than otherwise. There are no important differences concerning diversity.

Table 6: Materiality and Diversity by qualitative independent variables

Independent variables		Count	Materiality			Diversity		
			Mean	SD	Median	Mean	SD	Median
Surplus NA (No/Yes)	Deficit	87	46.7	114.1	22.7	6.0	1.2	6.0
	Surplus	21	328.0	776.5	66.5	5.8	0.7	6.0
Accounting basis	Accrual	8	25.0	37.9	13.6	3.5	1.6	3.5
	Cash	77	117.4	432.9	27.3	6.3	0.9	6.0
	Mixed	19	67.6	94.3	27.7	5.7	0.6	6.0
Sign of GA-NA difference	Negative	73	45.2	54.7	27.4	5.9	1.2	6.0
	Positive	35	218.5	632.3	25.7	6.1	1.0	6.0
Economic growth	No	40	72.2	165.8	22.9	5.9	1.3	6.0
	Yes	68	118.6	447.1	27.6	6.0	1.1	6.0
Euro area	No	44	61.9	150.0	31.8	6.1	1.5	6.0
	Yes	64	128.5	461.8	26.4	5.8	0.8	6.0
Surplus GA (No/Yes)	Deficit	88	91.1	346.9	23.3	5.9	1.2	6.0
	Surplus	20	146.8	458.9	36.5	6.1	0.9	6.0
Convergence criteria accomplishment	No	69	30.9	50.9	18.7	6.0	1.2	6.0
	Yes	39	226.1	593.7	57.8	5.8	1.0	6.0
Deficit/surplus accomplishment	No	59	23.7	24.1	18.7	6.1	1.3	6.0
	Yes	49	194.9	534.3	38.5	5.8	1.0	6.0

Total obs: 108 except for accounting basis (Cyprus is not available).

Source: Authors' findings

In the period under analysis, cases of economic growth prevail. On average, materiality, as well as dispersion, is much higher in countries and years of economic growth than otherwise. No relevant differences are found regarding diversity.

Most countries belong to the Euro area. While materiality of GA-NA differences is higher among these countries (despite high dispersion levels), diversity tend to be slightly higher in non-Euro countries.

In the period 2007 to 2010, deficits in GA balance prevail. However, concerning materiality, mean values are higher in countries and years where the GA balance is positive (surplus). Diversity also tends to be slightly higher in situations of surplus.

Concerning the Maastricht Treaty convergence criteria, most countries do not meet either of them. The same occurs when considering the deficit criteria alone. On average, materiality is much higher in countries and years where the Maastricht Treaty requirements are achieved, although much more dispersed than otherwise. The opposite is found regarding diversity, but only a slight difference is observed.

Median values confirm the analysis made using mean values, only for the sign of the NA balance (technical-accounting variable), the sign of the GA balance, economic growth, convergence criteria accomplishment and deficit/surplus accomplishment (economic policy variables).

Table 7: Pearson correlation between Materiality and Diversity and quantitative independent variables

Independent variables	Materiality	Diversity
Population	-0.080	-0.325 ***
GDP per capita (million euros)	0.188 *	-0.137
GDP % change from previous period	0.074	-0.002

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Total obs: 108.

Source: Authors' findings

Correlation coefficients show that, in the period 2007-2010, population (as a proxy for each country's size) does not seem to be relevant in differentiating the materiality of GA-NA budgetary balance adjustments, although it is significantly and negatively correlated with diversity (1% significance level), as smaller countries tend to make and report more adjustments.

GDP per capita is not significantly correlated with adjustments' diversity between 2007 and 2010, but it is positively correlated with materiality (10% significance level), meaning that materiality increases slightly for countries and years with higher GDP per capita. The % of change in GDP is correlated with neither adjustments' materiality nor with their diversity.

The above description is complemented by multivariate regression analysis (Tables 8 and 9), intended to offer further enlightenment on the possible determinants of adjustments' materiality and diversity.

Table 8: Determinants of GA-NA adjustments' Materiality

	Independent variables	Coefficient	Std. Error	Standardized Coefficient	t-Statistic
	Constant	-772.547	517.218		-1.494
X1	Surplus NA (1-Yes/0-No)	202.891	113.823	0.210	1.783 *
X2	Accrual (1-Yes/0-No)	180.143	170.786	0.129	1.055
X3	Cash (1-Yes/0-No)	274.373	118.229	0.322	2.321 **
X4	GDP % change from previous period	0.608	9.653	0.008	0.063
X5	Economic growth (1-Yes/0-No)	-18.639	96.809	-0.024	-0.193
X6	Euro area (1-Yes/0-No)	56.925	83.954	0.075	0.678
X7	Surplus GA (1-Yes/0-No)	30.057	98.082	0.032	0.306
X8	Sign of GA-NA difference (1-Positive/0-Negative)	209.043	82.532	0.258	2.533 **
X9	Convergence criteria accomplishment (1-Yes/0-No)	192.445	148.631	0.247	1.295
X10	Deficit/surplus accomplishment (1-Yes/0-No)	-42.951	132.433	-0.057	-0.324
X11	Ln(Population)	22.083	30.381	0.082	0.727
X12	GDP per capita (million euros)	5415.111	3268.444	0.223	1.657
	Adjusted R-squared	0.139			
	F statistic (df:12;91)	2.382 **			
	Std. Error of regression	348.213			

Notes: Dependent variable is the **materiality** of the GA-NA budgetary balances adjustments (abs and %).
Total obs: 104 (Cyprus not present).
*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' findings

While explaining materiality, the variables show a relatively weak explanatory power (in the regression, adjusted R-squared equals 0.139). Only three out of the twelve variables in the analysis (including control variables) are statistically significant.

The sign of the NA budgetary balance and the sign of the GA-NA difference (total of adjustments) are statistically significant, at 10% and 5% level respectively. Therefore, countries having a surplus in NA as well as a positive sign in total adjustments (positive impact) tend to have considerably more materiality than those having a deficit or a negative sign in GA-NA difference (on average 203% more and 209% more respectively).

Table 9: Determinants of GA-NA adjustments' Diversity

	Independent variables	Coefficient	Std. Error	Standardized Coefficient	t-Statistic
	Constant	5.950	1.343		4.429 ***
X1	Surplus NA (1-Yes/0-No)	-0.153	0.296	-0.051	-0.519
X2	Accrual (1-Yes/0-No)	-2.405	0.444	-0.556	-5.422 ***
X3	Cash (1-Yes/0-No)	0.550	0.307	0.209	1.792 *
X4	GDP % change from previous period	0.001	0.025	0.005	0.042
X5	Economic growth (1-Yes/0-No)	0.195	0.251	0.082	0.775
X6	Euro area (1-Yes/0-No)	-0.308	0.218	-0.132	-1.410
X7	Surplus GA (1-Yes/0-No)	-0.179	0.255	-0.061	-0.702
X8	Sign of GA-NA difference (1-Positive/0-Negative)	-0.041	0.214	-0.016	-0.190
X9	Convergence criteria accomplishment (1-Yes/0-No)	0.124	0.386	0.051	0.321
X10	Deficit/surplus accomplishment (1-Yes/0-No)	-0.448	0.344	-0.194	-1.303
X11	Ln(Population)	-0.006	0.079	-0.008	-0.080
X12	GDP per capita (million euros)	8.497	8.489	0.113	1.001
	Adjusted R-squared	0.389			
	F statistic (df:12;91)	6.472 ***			
	Std. Error of regression	0.904			

Notes: Dependent variable is the **diversity** (number of adjustments).
Total obs: 104 (Cyprus not present).
*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' findings

The use of cash basis in GA is also significant (at 5% level) to explain adjustments' materiality. Consequently, countries using a cash accounting basis tend to have, on average, 274% more materiality than those using a mixed accounting basis. Since accrual basis was not found to be significant, this seems to indicate that adjustments' materiality in countries/years using a mixed accounting basis is not significantly different from that in countries/years using an accrual basis in GA.

The model considered to explain GA-NA adjustments' diversity presents considerable explanatory power, as adjusted R-squared equals 0.389. Nevertheless, only two out of the twelve variables considered are statistically significant. These two variables relate to the accounting basis: the use of cash basis (compared to a mixed accounting basis) increases the adjustments' diversity at 10% significance level (on average, 0.5 more adjustments), while the use of accrual basis (also in relation to a mixed accounting basis) decreases the adjustments' diversity at 1% significance level (on average, 2.4 fewer adjustments). As mentioned, most GA-NA conceptual differences are associated with recognition criteria, in which accounting basis adjustments are the critical issue. So it is expected and confirmed that countries already reporting in an accrual basis in GA make, on average, fewer adjustments into NA than those reporting in cash or mixed GA bases.

6. Conclusions and recommendations

This paper is essentially an exploratory study about the potential factors explaining materiality and diversity of GA-NA budgetary balance adjustments, among EU member States. In particular, it had two main objectives.

Regarding objective 1 (to analyze whether both materiality and diversity of GA-NA budgetary balance adjustments reflect the conceptual differences between the two systems), two research questions were considered:

a. Do the magnitude and diversity of the GA-NA balance differences (adjustments) reflect the conceptual differences between the two systems?
b. Which category of adjustments accounts more for the magnitude of GA-NA budgetary balance adjustments?

As for question a) the study confirms that conceptual differences identified in the literature are reflected in the adjustments EU member states make when translating GA data into NA. This happens particularly concerning differences related to recognition criteria, since most GA-NA adjustments arise due to these differences. Nevertheless, in answer to question b), the study also proved empirically that only three main adjustment categories are statistically significant in explaining their materiality: financial transactions included in the 'working balance', accounting basis adjustments, and balance (net borrowing or net lending) of other CG entities. While the first two are associated with recognition criteria, the third is linked to both definition and scope of the reporting entity under GA and NA, and preparation and disclosure of consolidated financial statements.

Concerning objective 2 (identifying potential factors that might explain the adjustments' materiality and diversity or GA-NA budgetary balance differences), the research questions were:

a. Are there issues of economic policy (e.g. economic growth, GA budgetary balance sign, inclusion in the Euro-Zone and accomplishment of the Maastricht Treaty criteria) that might explain the materiality and diversity of GA-NA budgetary balance adjustments?
b. Are there technical-accounting issues (e.g. GA budgetary balance accounting basis, sign of NA budgetary balance, and sign of the total adjustments) that might explain the magnitude and diversity of GA-NA budgetary balance adjustments?

As for question a), none of the variables taken as economic policy proxies were found to be statistically relevant in explaining either adjustments' diversity or their materiality. Regarding question b) all technical-accounting variables considered were found to be relevant in explaining materiality, although only the GA balance accounting basis was important in explaining diversity. Therefore, the results show that only technical-accounting issues are relevant in explaining GA-NA adjustments.

These results offer some implications for policy making, namely regarding EU budgetary discipline, where transparency and quality/reliability of GFS are critical. If technical-accounting issues affect the materiality of GA-NA budgetary balance adjustments, special attention should be given to the definition of rules and policies for both GA and NA systems, as well as to how their data should relate. Bearing in mind the main ideas underlining the earnings management approach, EU policy-makers should reduce the possibilities for countries to use some creativity by means of accounting discretion in managing their reported deficits, when managing GA-NA

budgetary balance adjustments. Consequently, a major recommendation to the standard-setting bodies in the EU can be derived from this paper, which is to impose in all EU member states the adoption of accrual accounting in both budgetary and financial accounting systems. Furthermore, while presently embarking on a GA European harmonization process, special attention should be given to the adoption of standards such as IPSASs, since they allow a great degree of estimations and judgments, again creating room for accounting discretion. So while a harmonized accounting system in GA is urgently required, using an IPSASs or EPSASs approach, this should allow very few options regarding recognition and measurement criteria, in this way avoiding GA-NA adjustments and consequently increasing the quality of the information reported in both reporting systems. Some possible actions may also include strengthening auditing and control over GA reporting, enhancing the role of Supreme Auditing Institutions and/or external private firms in certifying public sector accounts.

In NA, policy-makers must consider the possibility of assessing the convergence criteria in reporting for EDP purposes on the basis of data in final status, already including all GA-NA adjustments to be made.

All in all, this paper represents an original contribution to understanding which factors may affect the differences between GA and NA budgetary balances, as well as to policy making – it is important to underline that keeping adjustments' materiality (amount) and diversity as low as possible is relevant to assure the reliability of aggregates for EU convergence assessment. Another central contribution is its originality in terms of the methodological perspective, since this research is the first to consider a quantitative approach to the topic of GA-NA adjustments.

Nevertheless, some limitations can be pointed out. The main limitation is the use of independent explanatory variables never tested before and without literature support, since as far as we are aware, no research has been developed on this subject. If this is indeed a limitation, it is also an opportunity to make some contribution to theory, and to continue exploring potential determinants of GA-NA adjustments' materiality and diversity.

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