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The reliability of EMU fiscal indicators: Risks and safeguards

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THE RELIABILITY OF EMU FISCAL INDICATORS: RISKS AND SAFEGUARDS

by Fabrizio Balassone*, Daniele Franco* and Stefania Zotteri*

Abstract

The reliability of EMU's fiscal indicators has been questioned by recent episodes of large upward deficit revisions. This paper discusses the causes of such revisions in order to identify ways to improve monitoring. The computation of EMU's deficit indicator involves the assessment of accrued revenue and expenditure and the identification of transactions in financial assets. Both can open margins for opportunistic accounting. However, crosschecks between deficit and changes in gross nominal debt (the other fiscal indicator used in EMU) can reduce the scope for window dressing. Simple comparison of deficit and changes in debt can readily spotlight large inconsistencies in fiscal data. Nevertheless, consistency checks must go deeper than simple comparison, since different items in the reconciliation account between deficit and change in debt can offset each other. Econometric evidence suggests that such offset may indeed have been used to reduce the visibility of deficit-specific window dressing. Attention to the quality of statistics has increased in recent years, also in the context of the reform of the Stability and Growth Pact. In this context, the paper argues that detailed analysis of the reconciliation account between deficit and change in debt is crucial to the effectiveness of monitoring.

JEL Classification: H61, H62, H87.
Keywords: EMU, fiscal rules, fiscal indicators, stock-flow adjustment.

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1. Introduction[1]

The effectiveness of any fiscal rule crucially depends on the indicators to which it is geared. The indicators should be resilient to manipulation and opportunistic exploitation.

EMU fiscal rules rely on yearly targets set in terms of traditional indicators of deficit and debt. Continued compliance with these targets is expected to ensure long-term fiscal sustainability. Arguably, reference to forward-looking indicators would have been more appropriate. However, such indicators require complex computations, often relying on strong assumptions, and do not lend themselves to be adopted for the enforcement of formal rules, especially in a multinational context where moral hazard issues gain prominence (Balassone and Franco, 2000).

Having dismissed sophisticated indicators for the sake of effective monitoring, the expectation is that EMU fiscal indicators should score high in terms of reliability. However, recent episodes of large upward deficit revisions suggest that this is not always the case.

The paper acknowledges that all fiscal indicators can be manipulated. Therefore, replacing current indicators with new ones would not solve the problem. By highlighting the weak spots of EMU fiscal indicators, the paper aims at identifying ways to improve monitoring.

The paper points out that EMU's deficit indicator is particularly fragile in two respects.[2] First, since it measures **net** borrowing, it draws a line between transactions in financial and non-financial assets, with the latter alone being considered in the computation of deficits. But the distinction between financial and non-financial transactions is not clear-cut, and the available margins of interpretation can be used opportunistically.[3] Second, EMU's deficit indicator is measured on an **accrual** basis, relying on estimates which are by their nature subject to an element of subjective evaluation.[4]

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[1] The views expressed in this paper are those of the authors and do not commit Banca d'Italia. We thank Marco Buti, Joao Nogueira Martins and Alessandro Turrini for kindly making available to us the dataset used for their 2006 paper. We thank Joao Nogueira Martins also for his valuable discussion of the paper and the participants to the European Commission workshop on "Fiscal indicators in the EU budgetary surveillance" for useful suggestions. Finally, we are grateful to Roberto Golinelli and two anonymous referees for their helpful comments.

[2] There is also an issue concerning the definition of the public sector whose deficit and debt have to be considered (see Balassone, Franco, and Zotteri, 2006).

[3] This problem is similar to the one arising in the application of the "golden rule", where the deficit measure should only take into account current transactions and exclude capital ones (see Balassone and Franco, 2001).

[4] Cash-based deficit measures are by no means exempt form the risk of manipulation. However, contrary to what happens with accrual estimates, manipulation of cash figures obtained by postponing payments and/or demanding anticipated payments find a natural limit in the voice of the interested counterparts.

Partly reflecting concerns over these fragilities, since 1994 EU member states are required to provide the European Commission with a reconciliation account between deficit figures and the corresponding change in debt, the latter being a good proxy of the **cash gross** borrowing (Balassone, Franco, and Zotteri, 2006). Moreover, when reliance on accrual accounting within the European System of Accounts (ESA) increased (with the switch from the 1979 to the 1995 version of the system), Eurostat specified that revenue computed in accrual terms should include only those items that are likely to be actually cashed in and that over the medium-term accrual and cash data should converge.[5]

However, in the implementation of the Excessive deficit procedure relatively little effort was put in the analysis of consistency between deficit and debt data, thus failing to exploit synergies arising in the joint monitoring of EMU fiscal rules. The problem is witnessed by the tolerance exerted by European institutions towards member states submitting incomplete reconciliation accounts. It is probably a consequence of the failure to give operational content to the debt rule, and the subsequent focus on the deficit rule.[6]

The paper argues that even simply comparing deficits with changes in debt can help the early detection of inconsistencies in fiscal data. Indeed, changes in general government debt were much larger than initial deficit figures in Greece, Italy and Portugal before the large upward deficit revisions experienced in recent years.

Nevertheless, the paper points out that consistency checks between deficits and changes in debt must go deeper than the overall difference between the two indicators. Since different items in the reconciliation account (henceforth, SFA for stock-flow adjustments) can offset each other, an underestimated deficit does not necessarily imply a large discrepancy between deficit and change in debt.

The paper presents a simple model of the incentives to resort to window dressing under EMU deficit and debt rules, based on the partition of SFA into two groups.[7] One group includes items that can be used to affect the Maastricht deficit but leave the change in debt unaltered (a "deficit-specific" SFA), the other includes items that can be used to reduce the change in debt

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[5] The Treaty and annexed protocols rely on the ESA for the definition of deficit. When the Treaty was signed in 1992, and until 1999, the ESA79 version of the system was in place, which allowed government accounts to be computed mostly on a cash basis. ESA95 was first implemented in 2000, in the release of fiscal data for 1999. See Eurostat (2000) and EU Regulations 2516/2000 and 995/2001.

[6] The debt rule demands that, if the debt-to-GDP ratio is above 60 percent, it must be declining at a "satisfactory" pace. However, the meaning of "satisfactory" is yet to be defined.

[7] The model is similar in spirit to Buti, Nogueira Martins, and Turrini (2006), but differs in several significant respects.

but leave the Maastricht deficit unaffected (a "debt-specific" SFA). Econometric estimates based on such model provide evidence that deficit-specific SFA tend to increase with the underlying deficit, and debt-specific SFA tend to offset the impact of such an increase on total SFA. This suggests not only that opportunistic accounting may have taken place to ensure formal compliance with the deficit rule, but also that debt-specific SFA may have reduced the visibility of the ensuing deficit-debt discrepancy.

Attention to the quality of statistics has increased in recent years, also in the context of the reform of the Stability and Growth Pact (SGP). Based on case studies and econometric evidence, the paper welcomes this development and argues that that detailed analysis of SFA components is crucial to the full exploitation of the monitoring synergies arising from the presence of two fiscal indicators.

The remainder of the paper is organised as follows. Section 2 briefly reviews the reconciliation account between EMU's deficit and debt indicators. It discusses how the headline deficit can be kept low through increases in some SFA components and how other SFA components can partly offset the ensuing negative effects on debt dynamics. Section 3 analyzes large deficit revisions in Greece, Italy and Portugal. Section 4 develops a simple model of window dressing, which is then used in Section 5 as the basis of an econometric analysis. The empirical evidence suggests that, indeed, different SFA components have reduced both reported net borrowing and the visibility of deficit-specific window dressing. Section 6 concludes.

2. The reconciliation account (SFA)

For the purpose of EMU fiscal rules, deficit is defined as the general government **net** borrowing computed on an **accrua**l basis in accordance with ESA95, and debt is defined as general government **gross** financial liabilities at **face value**.[8] A simplified reconciliation account between the change in Maastricht debt (ΔB) and the Maastricht deficit (D^m) can therefore be written as:

$$\Delta B \equiv D^m + CA + FA_a - FA_s - VE \qquad (1)$$

Where:

a) CA is the difference between cash and accrual valuations (the latter is used to compute the Maastricht deficit D^m, the former determines the actual financing needs and therefore is reflected in changes in liabilities as measured by ΔB);
b) FA_a and FA_s are, respectively, acquisitions and sales of financial assets (which must be added to **net** borrowing measured – D^m – to obtain a measure of **gross** borrowing, consistent with the change in gross liabilities – ΔB);

[8] This is not the debt definition provided by ESA95, but the relevant financial instruments and the reference sectors are those specified within that framework.

c) *VE* (i.e. valuation effects) is a summary measure of SFA arising from changes in the face value of outstanding liabilities[9] and from differences between the face value of a bond and its issue price.[10]

Identity (1) suggests three observations concerning the scope for opportunistic accounting:

a) underestimation (overestimation) of accrued expenditure (revenue) allows reporting a lower Maastricht deficit (D^m) but leaves the change in debt (ΔB) unaffected as it is offset by an increase in cash-accrual differences (CA);
b) similarly, the adoption of loose standards in the identification of expenditure/revenue reflecting acquisition/sales of financial assets, reduces the reported D^m but leaves ΔB unaffected due to the corresponding increase/decrease in FA_a/FA_s;
c) sales of financial assets (FA_s) and debt restructuring operations (a component of VE) can be used to reduce the change in debt but have no effect of the Maastricht deficit.[11]

Therefore:

a) a large difference between ΔB and D^m should alert towards the possibility that D^m is underestimated;
b) a small difference between ΔB and D^m cannot be taken to exclude an underestimation of D^m since sales of assets and debt restructuring can be used to offset inflated cash-accrual differences and net acquisition of financial assets.

This suggests rewriting (1) in order to partition total SFA into two groups. One group includes items that can be used to affect the Maastricht deficit but leave the change in debt unaltered (a "deficit-specific" SFA, X), the other includes items that can be used to reduce the change in debt but leave the Maastricht deficit unaffected (a "debt-specific" SFA, Z):[12]

$$\Delta B \equiv D^m + X - Z \qquad (2)$$

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9 For example, those due to debt restructuring operations or to fluctuations in the exchange rate affecting the value in domestic currency of foreign currency denominated debt.

10 The face value of a bond is used to compute ΔB while its issue price measures the financing actually received by the government and therefore reflects the financing needs measured by the cash gross borrowing requirement, i.e. by $D^m + CA + FA_a - FA_s$.

11 Importantly, such operations may leave the government's net asset position unaffected or even worsen it. In this respect, one should also control the extent of one-off measures affecting directly D^m (Milesi-Ferretti, 2003). There is of course no implication here that privatizations are by definition bad policy. However, if they are undertaken with the sole purpose of reducing gross debt – regardless of the economics underlying the transaction – then the operations can be questioned.

12 See also Buti, Nogueira Martins, and Turrini (2006).

Mapping identity (1) into identity (2), however, is not a straightforward exercise. First, there are items in the reconciliation account that do not belong to either *X* or *Z* (this is the case of valuation effects arising from fluctuations in the value of foreign currency denominated debt and because of bonds issued above/below par).[13] Second, some of the individual items in (1) may be affected by attempts at reducing D^m as well as ΔB (this is the case of asset sales, FA_s, whose total can be lowered by an opportunistic classification of transactions aimed at lowering D^m, and can be increased by privatization programs undertaken to reduce ΔB).

For the purpose of this paper, we use the following definitions:

$$\begin{aligned} Z &= PRIV + VE \\ X &= CA + FA_a - OFA_s \end{aligned} \tag{3}$$

where *PRIV* indicates revenues from the sale of assets arising in the context of privatization programs and OFA_s indicates other revenue from the sale of financial assets.

The proposed treatment of *VE* and FA_s reflects data availability constraints and carries some costs. First, based on these definitions, *Z* includes all valuation effects (*VE*), irrespective of whether they can or cannot be controlled by the fiscal authorities. This is likely to introduce considerable noise in *Z* and may impede the detection of any systematic pattern in "debt-specific" stock-flows. Second, it is implicitly assumed that sales of financial assets different from privatization do not reflect debt reduction motives. This may somewhat blur the distinction between "deficit-specific" and "debt-specific" SFA components, making it more difficult to detect a systematically selective use of SFA items.

Table 1 reports the average values – as a share of GDP – of total, deficit-specific, and debt-specific SFA, according to the definitions in (3) for the countries which were EU members over 1994-2004 (excluding Luxembourg). The table shows that the discrepancy between changes in debt and deficits has been by no means negligible over the period considered (the average for the EU as a whole amounts to 0.6 percent of GDP). The table also highlights a much higher value for the deficit-specific SFA component (1.0 percent of GDP), and the offsetting role of debt-specific SFA (averaging at 0.3 percent of GDP).

Table 2 reports similar information, but it is based on the original data releases by Greece, Italy, and Portugal (i.e. before the revisions which have occurred since 2002). The overall SFA averages at 0.9 percent of GDP for the EU countries considered. This is the net result of a deficit-specific component of 1.2 percent of GDP, partly offset by the debt-specific component (0.3 percent of GDP on average).

[13] Note, however, that by issuing bonds above par, a government could reduce the change in debt associated with a given deficit.

Table 1 - Total SFA and its components (% of GDP)
(average values over 1994-2004)

	deficit-specific SFA (X)	debt-specific SFA (Z)	total SFA
Belgium	-0.3	0.3	-0.6
Denmark	0.8	0.7	0.1
Germany	0.7	0.0	0.7
Greece	3.2	0.0	3.2
Spain	0.3	-0.3	0.7
France	0.5	0.0	0.5
Ireland	2.0	0.5	1.5
Italy	1.1	0.9	0.2
The Netherlands	-0.1	0.3	-0.5
Austria	1.2	0.5	0.7
Portugal	0.9	1.3	-0.3
Finland	1.4	-0.9	2.3
Sweden	1.5	1.0	0.5
United Kingdom	0.4	0.4	0.1
EU average	**1.0**	**0.3**	**0.6**

Table 2 - Total SFA and its components (% of GDP)
(average values over 1994-2004, data before revisions occured since 2002)

	deficit-specific SFA (X)	debt-specific SFA (Z)	total SFA
Belgium	-0.3	0.3	-0.6
Denmark	0.8	0.7	0.1
Germany	0.7	0.0	0.7
Greece	5.0	-0.9	5.9
Spain	0.3	-0.3	0.7
France	0.5	0.0	0.5
Ireland	2.0	0.5	1.5
Italy	1.4	0.7	0.7
The Netherlands	-0.1	0.3	-0.5
Austria	1.2	0.5	0.7
Portugal	1.5	1.3	0.1
Finland	1.4	-0.9	2.3
Sweden	1.5	1.0	0.5
United Kingdom	0.4	0.4	0.1
EU average	**1.2**	**0.3**	**0.9**

3. Deficit revisions in Italy, Portugal, and Greece

Evidence supporting the usefulness of crosschecking fiscal data is provided by three case studies of significant deficit data revisions. These revisions concerned the 2001 deficit outcome in Italy and Portugal and the 2003 deficit outturn in Greece. In all three cases, the initial deficit figure was consistent with the forecasts by international organisations. This seems to indicate that by looking at the ESA95 deficit in isolation all parties involved can get a biased view of fiscal trends.[14]

Italy: the 2001 deficit outturn

In March 2002, the Italian Statistical Office (Istat) released the first statistics concerning the 2001 net borrowing. Back then, the deficit was estimated to be 1.4 percent of GDP. The outcome was very close to the range of forecasts published by international organisations. After several revisions, the 2001 deficit is currently estimated to be 3.1 per cent of GDP.

Changes to the 2001 net borrowing figures took place between June 2002 and March 2006. In particular, in June 2002 Istat raised its estimate from 1.4 to 1.6 percent of GDP, primarily on account of higher health sector expenditure. One month later, Eurostat announced its decision on the accounting treatment for the purposes of the Excessive deficit procedure of securitisations carried out by governmental authorities. This implied an upward revision of Italy's deficit to 2.2 percent of GDP.

In February 2003, Istat again published a higher figure for the 2001 deficit: 2.6 per cent of GDP. This new estimate was due to the availability of more complete information on the different government tiers' economic accounts.

Two years later, in March 2005, Istat once more revised upwards the 2001 deficit, to 3.0 percent of GDP, because of the reclassification of capital transfers from the general government to the Ferrovie dello Stato (the state-owned railway company) from financial to real transactions. Two months later, in May 2005, the 2001 deficit was estimated to be 3.2 percent of GDP mainly because of the upward revision of transfers to firms. Finally, in March 2006, due to a GDP upward revision, the 2001 deficit was indicated to be 3.1 percent of GDP.

The overall revision can be interpreted in terms of the deficit-specific SFA component (X) considered in the previous Section: X was initially overestimated. More specifically, the deficit revision reflects a reduction of the cash-accrual adjustment by 0.6 percentage points of GDP, an increase in the sale of assets by 0.6 points (the reclassification of securitization), and a

[14] This Section is a summary and update of the analysis conducted in two earlier papers (Balassone, Franco and Zotteri, 2004 and 2006).

reduction in acquisitions of financial assets by 0.5 points (mainly, the reclassification of capital injections in the railway company).

The decline initially reported for the deficit between 2000 and 2001 (from 1.7 percent to 1.4 percent of GDP) was in sharp contrast with the dynamics of the change in debt. According to the data available in March 2002, the latter rose from 1.6 percent of GDP in 2000 to 3.5 percent in 2001. This indicator turned out to be more stable than ESA95 net borrowing: overall, it was revised upwards by 0.7 percentage points; moreover, revisions took place only up to March 2003.

Fig. 1

Italy: Net Borrowing and Change in Debt

(Millions of euro)

Fig. 1.A – The picture taken in March 2002

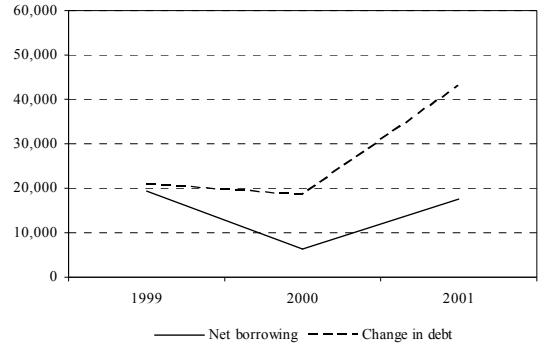


Fig. 1.B – The picture taken in March 2006

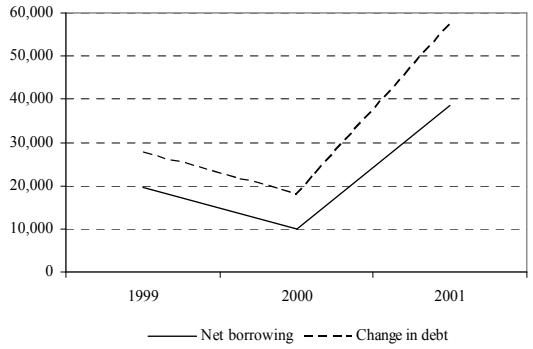


Figure 1 shows the divergence between the ESA95 deficit and the change in debt as it first appeared in March 2002 (Panel A) and as it appears now (Panel B). After the revisions, the dynamics of the ESA95 deficit is clearly closer to that of the change in debt. The joint examination of the indicators could have provided an early warning of the likely forthcoming revisions. Banca d'Italia in its Annual Report released in May 2002 in fact carried out this comparative exercise.[15]

Portugal: the 2001 deficit outturn

In March 2002 – in its first Notification about the 2001 fiscal outcomes – Portugal estimated the general government deficit to be 2.2 percent of GDP as against 1.5 percent in 2000. At that time, the most up-to-date deficit forecasts by international institution were somewhat more favourable.

[15] The Report also included an analysis of the composition of total SFA.

Eurostat stated that it was not in a position to certify the Portuguese figures due to, among other reasons, the lack of information on capital injections to public corporations – which had been treated as acquisition of shares and other equities with no effect on the government deficit. Moreover, Eurostat stressed that – as some of these capital injections might be reclassified as transfers – the notified deficit was to be considered as provisional and likely to be increased.

In the Spring of 2002 a commission headed by the Banco de Portugal and also composed of representatives of the Ministry of Finance and the National Statistical Institute was set up with the mandate of analysing and updating the government accounts. In September, the figure for the 2001 deficit was revised upwards to 4.1 percent of GDP. This revision was due to a number of factors: new data on the accounts of the local authorities; the inclusion in the budget accounts of some injections of capital into publicly-owned companies; changes to the methods used to account for expenditure carryovers and revenue connected with the EU structural funds; and the expiration of a derogation regarding the methods of recording tax and social contribution receipts accruing in the year.

Between September 2002 and September 2004 the deficit was slightly revised upwards twice, to 4.4 percent of GDP. In September 2004, Eurostat stressed that there were still ongoing discussions with the Portuguese authorities concerning the consistency between accrual and cash data for the period 2001-04. One year later, the 2001 deficit-to-GDP ratio was revised downwards to 4.2 because of an upward revision of GDP. At that time, Eurostat said that it intended to clarify reported cases of capital injections undertaken between 2001 and 2004 by various governments, including Portugal. At present, according to the European Commission 2006 Spring Forecasts, the Portuguese 2001 deficit is estimated to be 4.3 per cent of GDP. Therefore, the overall revision with respect to the original data release amounts to 2.1 percent of GDP.

The initially reported increase in the deficit between 2000 and 2001 (from 1.5 to 2.2 percent of GDP) was markedly smaller than the one observed for the change in debt. The latter rose from 2.5 percent of GDP in 2000 to 5.5 percent in 2001. Over time, the 2001 change in debt was revised only slightly and mostly because of GDP revisions. According to the most recent European Commission data – the change in debt increased from 2.4 in 2000 to 5.3 in 2001. Figure 2.A shows the initial divergence between ESA95 deficit and the change in debt. Figure 2.B shows the same variables after the revisions.

Fig. 2

Portugal: Net Borrowing and Change in Debt

(Millions of euro)

Fig. 2.A – The picture taken in March 2002

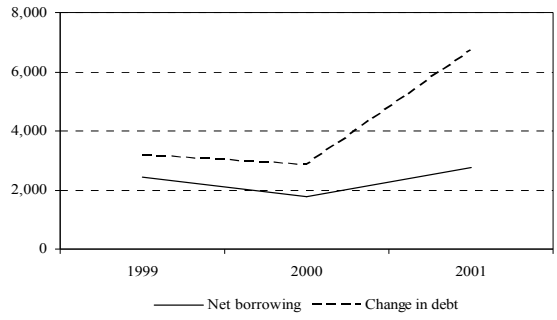
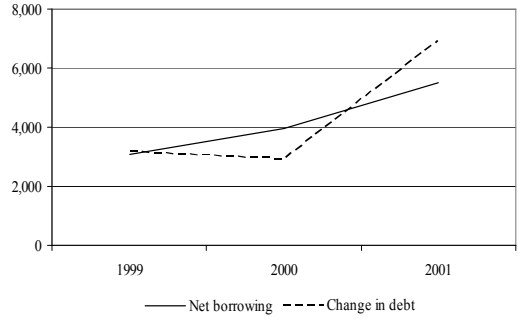


Fig. 2.B – The picture taken in April 2006



Greece: the 2003 deficit outturn

At the beginning of March 2004, in its first Notification of the 2003 fiscal outcome, Greece estimated the general government deficit at 1.7 percent of GDP, as against 1.4 percent in 2002. At that time, the most up-to-date forecasts by international institutions were broadly in line with the data notified by Greece. After several revisions, the 2003 deficit is currently estimated to be 5.8 percent of GDP.

Revisions occurred between March 2004 and March 2006. Indeed, already by the end of March 2004 Greece sent updated data to the European Commission, revising upwards the 2003 deficit to 3.0 percent of GDP. In April, in publishing the Spring Forecasts, the Commission took into account the latter Notification. It stressed that "the data for 2003 are not yet validated by Eurostat and do not therefore provide a reliable basis for assessing the budgetary situation at this stage". The Commission also noted that "[a] fact-finding mission is being prepared for the end of April in order to have more information about the budgetary situation in this country and decide on steps to be taken".

At the beginning of May, following an additional Notification, Eurostat verified that in 2003 the general government deficit was 3.2 percent of GDP. In September, the deficit and debt figures for the years 2000-03 were significantly revised. In particular, the 2003 deficit was estimated at 4.6 percent of GDP and the 2003 debt was indicated at 109.9 percent of GDP.

Both in the March 2005 Notification and in the September 2005 one, Greece revised the 2003 deficit upwards by more than half a percentage point of GDP (to 5.2 and 5.7, respectively). In March 2006 the 2003 deficit was estimated to be 5.8 per cent of GDP.

Fig. 3

Greece: Net Borrowing and Change in Debt

(Millions of euro)

Fig. 3.A – The picture taken in March 2004

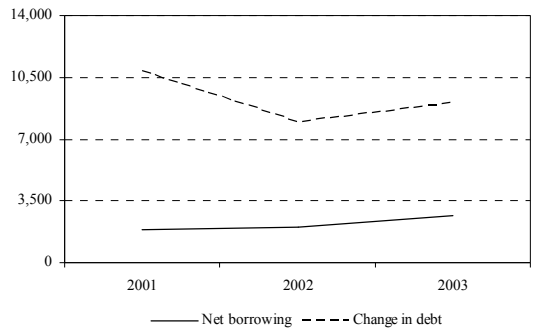
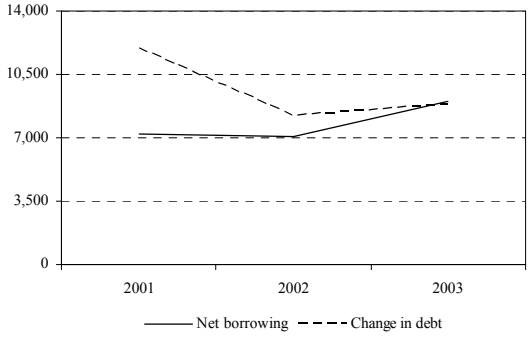


Fig. 3.B – The picture taken in April 2006



As to the deficit, the overall revisions were essentially due to: lower tax revenue (mainly VAT); lower payments received from EU institutions in the context of structural funds programmes; the reclassification, as a financial transaction, of a payment from the Saving Postal Bank to government; upward revisions of military expenditure and of interest payments; lower than expected surpluses of social security funds; and incorrect recording of hospitals' expenditure.

With reference to the debt, the revisions were due to the previous underestimation of bonds with capitalised interests and to the overestimation of consolidating assets of social security.

The initially reported increase in deficit between 2002 and 2003 (from 1.4 percent to 1.7 percent of GDP) was in line with that observed for the change in debt, the latter rising from 5.6 percent of GDP in 2002 to 5.9 percent in 2003. However, the level of the two indicators was markedly different (Figure 3.A). Figure 3.B shows how revisions have completely cancelled the 2003 discrepancy and significantly reduced those for previous years.

4. Fiscal rules and window dressing: a simple model

An econometric analysis of SFA in EU member countries was first provided by von Hagen and Wolff (2004). The paper refers to the theoretical framework developed in von Hagen and Harden (1995, 1996) and Milesi-Ferretti (2003), where governments have an incentive to circumvent fiscal rules by hiding the budgetary implications of fiscal policies in less visible accounting items (that is, in the SFA). The likelihood of this type of window dressing decreases with the costs associated with detection. The authors argue that binding deficit rules were introduced only with the start up of the European Economic Monetary Union (EMU) – i.e. the SGP – and therefore focus their analysis on differences in the correlation between reported deficits and SFA before and after EMU. They find no such correlation before 1998,

but a negative one (large and significant) thereafter, suggesting that SFA were in fact substituting for other transactions which would have had an impact on deficits.

Buti, Nogueira Martins, and Turrini (2006) develop a model where total SFA is split into two components (one that can be used to reduce reported deficits and the other to impact debt figures). In this way they can separately analyze the interaction between each of the Maastricht fiscal rules and window dressing. They assume that governments minimize a quadratic loss function whose arguments are the deviation of output from its optimal level (influenced by the "true" deficit), deviations of reported deficit and debt from the respective fiscal rule, and the size of window dressing. The model suggests that both the deficit-specific and the debt-specific components of SFA are positively related to the "true deficit", and that only the debt-specific component also depends on the debt level (though the sign of the relation is ambiguous *ex ante*). The empirical results are partly in line with the theoretical predictions of the model.[16] Notably, the authors find that the introduction of the SGP had an (increasing) impact on the deficit-specific component of the SFA, but none on the debt-specific component.

In this section, following Buti *et al.* (2006) we provide separate econometric analysis of deficit-specific and debt-specific SFA components. However, we refer to a different model as the basis for our estimating equations. We assume that government *i* at time *t* derives utility (U_{it}) from running a primary deficit (P_{it}): $U_{it}=U(P_{it})$. This can be justified either by assuming that governments are short sighted and only care about the short-term output gains that can be attained through higher deficits, or by reference to the political gain directly attainable by increasing transfers targeted to specific groups. In either case, the assumption is consistent with the rationale for having a fiscal rule specifying a maximum threshold for the deficit, suggesting the need to counteract an asymmetric deficit bias.[17] In what follows, lower-case letters are used to indicate that variables are considered as ratios to GDP.

Governments' utility maximization is constrained by compliance with Maastricht's debt and deficit rules. The debt rule mandates that the debt-to-GDP ratio (b_{it}) must be lower than 60 percent and, if higher than such threshold to begin with, it must be declining towards 60 percent at a satisfactory pace. As we have noted earlier, the "satisfactory pace" has never been defined, therefore we model this rule as requiring:

$$(4) \qquad \Delta b_{it} = p_{it} + r_{it}b_{it-1} - y_{it}b_{it-1} - z_{it} \leq W_{it} \quad \text{where } W_{it}=0 \text{ if } b_{it-1}>60,\ W_{it}=60-b_{it-1} \text{ if } b_{it-1}<60$$

[16] The authors find no statistically significant relationship between the two components of SFA and "true deficits". They find evidence of a positive relationship between reported deficits and deficit-specific SFA and of a negative relationship between reported deficits and debt-specific SFA. Only debt-specific SFA are found to be affected (negatively) by the debt level.

[17] The quadratic loss function adopted in Buti *et al.* (2006) is symmetric in deviations from the optimal real output growth where real output growth depends linearly on the "true deficit".

i.e. the change in the ratio of debt to GDP (Δb_{it}) – as determined by the "true deficit" ($d_{it}=p_{it}+r_{it}b_{it-1}$ where r_{it} is the average interest rate on government debt and $r_{it}b_{it-1}$ indicates the corresponding interest payments), the reducing effect of output growth ($y_{it}b_{it-1}$, where y_{it} is the growth rate of output), and the debt-specific SFA (z_{it}) – must be negative if b_{it-1} is above 60 percent to start with.[18] The change in the debt ratio can be positive if $b_{it-1}<60$ to start with, but it cannot bring b_{it} above 60 percent.[19]

The deficit rule requires that reported deficits (d_{it}^{m}) be lower than 3 percent of GDP. Similarly to what happens for the debt ratio, if the reported deficit ratio is above 3 percent to start with, a gradual reduction is expected. Without loss of generality, and by analogy with the debt rule, we assume that in this case the reported deficit, as a minimum, must not increase further. The deficit rule is therefore modelled as:

(5) $d_{it}^{m} = d_{it} - x_{it} = p_{it} + r_{it}b_{it-1} - x_{it} \leq H_{it}$ where $H_{it}=3$ if $d_{it-1}^{m}<3$, $H_{it}=d_{it}^{m}$ if $d_{it-1}^{m}>3$

where x_{it} denotes the deficit-specific SFA component.[20]

We assume that x_{it} and z_{it} only arise because of opportunistic accounting aimed at ensuring formal compliance with the rules. Therefore, we also impose two non-negativity conditions on x_{it} and z_{it} ($x_{it}\geq 0$ and $z_{it}\geq 0$).

Finally, we assume that running a primary deficit and using deficit and debt-specific SFA carry a cost $C_{it}=C(p_{it}, x_{it}, z_{it})$. Following Buti *et al.* (2006) the costs can be thought of as deriving from suboptimal allocation of resources (higher p_{it}, x_{it} and z_{it} make suboptimality more likely) and from the risk of being caught (higher x_{it} and z_{it} are more visible).

---

[18] With respect to the analysis in Section 2, scaling the variables by GDP requires the consideration of the reducing effect exerted by output growth on the debt ratio. In discrete-time models equation (4) is an approximation: the exact specification would have both $y_{it}b_{it-1}$ and $r_{it}b_{it-1}$ divided by $(1+y_{it})$.

[19] In this way we explicitly model the constraint also for countries where $b_{it-1}<60$ (Buti *et al.*, 2006, assume $z_{it}=0$ for $b_{it-1}<60$).

[20] This formulation allows differentiating the constraints applying to countries with reported deficits above and below 3 percent of GDP, rather than use dummy variables at the estimation stage.

In sum, the maximization problem facing fiscal authorities can be described as follows:[21]

$$
\begin{aligned}
(6)\quad & \underset{p,x,z}{\text{Max}} \quad U(p_{it}) - C(p_{it}, x_{it}, z_{it}) \\
& \text{s.t.} \quad p_{it} + r_{it}b_{it-1} - y_{it}b_{it-1} - z_{it} \le W_{it} \qquad \text{where } W_{it}=0 \text{ if } b_{it-1}>60,\ W_{it}=60-b_{it-1} \text{ if } b_{it-1}<60 \\
& \qquad\quad p_{it} + r_{it}b_{it-1} - x_{it} \le H_{it} \qquad \text{where } H_{it}=3 \text{ if } d_{it-1}^{m}<3,\ H_{it}=d_{it}^{m} \text{ if } d_{it-1}^{m}>3 \\
& \qquad\quad -x_{it} \le 0 \\
& \qquad\quad -z_{it} \le 0
\end{aligned}
$$

whose Lagrangean is:

$$(7)\quad U(.) - C(.) - \lambda_1[p_{it} + r_{it}b_{it-1} - y_{it}b_{it-1} - z_{it} - W_{it}] - \lambda_2[p_{it} + r_{it}b_{it-1} - x_{it} - H_{it}] - \lambda_3[-x_{it}] - \lambda_4[-z_{it}]$$

With first order conditions:

$$
\begin{aligned}
&(8a)\quad U' - C_p - \lambda_1 - \lambda_2 = 0 \\
&(8b)\quad -C_x + \lambda_2 + \lambda_3 = 0 \\
&(8c)\quad -C_z + \lambda_1 + \lambda_4 = 0
\end{aligned}
$$

(8d)	$\lambda_1 \ge 0$	$p_{it}+r_{it}b_{it-1}-y_{it}b_{it-1}-z_{it}-W_{it}\le 0$	$\lambda_1[p_{it}+r_{it}b_{it-1}-y_{it}b_{it-1}-z_{it}-W_{it}]=0$
(8e)	$\lambda_2 \ge 0$	$p_{it}+r_{it}b_{it-1}-x_{it}-H_{it} \le 0$	$\lambda_2[p_{it}+r_{it}b_{it-1}-x_{it}-H_{it}] = 0$
(8f)	$\lambda_3 \ge 0$	$-x_{it} \le 0$	$\lambda_3[x_{it}]=0$
(8g)	$\lambda_4 \ge 0$	$-z_{it} \le 0$	$\lambda_4[z_{it}]=0$

When Maastricht's debt and deficit rules are not binding (i.e. $\lambda_1, \lambda_2 = 0$), from (8b) and (8c) it follows that $\lambda_3, \lambda_4 > 0$ (since $C_x, C_z > 0$) and therefore, from (8f) and (8g), we have that x_{it} and z_{it} are equal to zero. When fiscal rules are binding instead (i.e. $\lambda_1, \lambda_2 > 0$), from (8d) and (8e) it follows that:[22]

$$
\begin{aligned}
&(9)\quad z_{it} = p_{it} + r_{it}b_{it-1} - y_{it}b_{it-1} - W_{it} \\
&(10)\quad x_{it} = p_{it} + r_{it}b_{it-1} - H_{it}
\end{aligned}
$$

In this simple model x and z represent pure window dressing variables. However, in the real world stock-flow adjustment (SFA) arise for entirely legitimate reasons and its components (i.e. x_{it} and z_{it}) can also be negative (e.g. cash-accrual differences can be negative as well as positive; negative valuation effects can outweigh privatisation receipts). Therefore, we can only use equations (9) and (10) to help selecting the drivers of opportunistic accounting and check empirically whether they explain the observed behaviour of actual stock-flow components.

---

[21] The standard assumptions on U(.) and C(.) ensure that the maximisation problem is well defined.

[22] Obviously, possible solutions include cases where only one of the two fiscal rules is binding ($x_{it} = 0$, $z_{it}>0$ and $x_{it}> 0$, $z_{it}=0$).

5. The empirical analysis

We use panel data for the fifteen countries which were EU members over 1994-2004. Deficit-specific SFA are obtained from the Buti *et al.* (2006) dataset as the sum of cash-accrual differences and of net acquisitions of financial assets, excluding privatization, following the discussion in Section 2. The "true deficit" is obtained by summing the deficit-specific SFA to deficit data used in the context of the Excessive deficit procedure (EDP) as reported in the AMECO database. The "growth effect" is computed using data from the AMECO database. Finally, and again in line with the discussion in Section 2, debt-specific SFA are obtained residually by subtracting from total SFA the deficit-specific SFA component and the growth effect.

As a first step, in order to test the restrictions implicit in equation (9) and (10) (i.e. that the growth effect only matters for the debt-specific SFA and that H_{it} and W_{it} only affect one component of SFA, respectively x and z), we estimate the following two regressions:

$$(11) \quad z_{it} = \alpha_0 + \alpha_1 d_{it} + \alpha_2 y_{it} b_{it-1} + \alpha_3 W_{it} + \alpha_4 H_{it} + \Sigma_t \alpha_t DU_t + \varepsilon_{it}$$
$$(12) \quad x_{it} = \beta_0 + \beta_1 d_{it} + \beta_2 y_{it} b_{it-1} + \beta_3 W_{it} + \beta_4 H_{it} + \Sigma_t \beta_t DU_t + \nu_{it}$$

Where DU_t are time-dummy variables included to account for time-specific common shocks.

Since x_{it}, z_{it}, and p_{it} (and therefore d_{it}) are simultaneously determined, we report results obtained using two stage least squares with country fixed effects (we instrument d and H with their lagged values). We run the test on two datasets: one including the most recent data releases, the other one based on the values first reported by Greece, Italy, and Portugal over the period 1998-2004 (that is data published before the statistical revisions discussed in Section 3).

For both samples the model restrictions are accepted (Table 3 and Table 4, Columns 1 and 3). None of the time dummies is significant in equation (11). All of them are significant in equation (12), but dropping them does not affect sign and significance of the other relevant parameters (Columns 5 in Tables 3 and 4).[23]

Therefore, we estimate the following equations:

$$(13) \quad z_{it} = \alpha_0 + \alpha_1 d_{it} + \alpha_2 y_{it} b_{it-1} + \alpha_3 W_{it} + \varepsilon_{it}$$
$$(14) \quad x_{it} = \beta_0 + \beta_1 d_{it} + \beta_4 H_{it} + \Sigma_t \beta_t DU_t + \nu_{it}$$

[23] In the Tables only results of the joint-significance test are reported.

From the signs in (9) and (10), we expect:

(a) $\alpha_1 > 0$; α_2 , $\alpha_3 < 0$
(b) $\beta_1 > 0$; $\beta_4 < 0$

We expect both types of SFA to be positively related to the level of the "true deficit" (α_1, $\beta_1 > 0$): the higher the "true deficit", the higher the *x* and *z* values required for formal compliance with the rules (see also Buti *et al.*, 2006).

The debt level plays no direct role, and it only affects the debt-specific SFA through the "growth effect" (i.e. the reduction of the debt ratio determined by GDP growth, which is larger the larger the debt). The use of *z* to keep debt dynamics under control becomes less necessary when the growth impact is higher, hence the negative sign expected for α_2.

The constraints determined by the deficit and debt fiscal rules enter directly the corresponding estimating equations. We expect the levels of *z* and *x* to be negatively correlated with, respectively, the maximum allowed change in debt and the maximum allowed deficit (α_3, $\beta_4 < 0$). In other words, the more binding the fiscal rule the higher the incentives to resort to window dressing.

The estimation results are in line with expectations from the model (Columns 2 and 4 of Tables 3 and 4). All coefficients are correctly signed, statistically significant and exerting quantitatively large effects on the dependent variables. Using the original data releases for Greece, Italy, and Portugal induces an improvement in the regression fit for the deficit-specific equation, but not for the debt-specific one, possibly reflecting the limited extent of revisions to changes in debt compared to revisions in deficits (Columns 2 and 4 of Tables 3 and 4). Estimates are robust to sample selection: results are not affected by the exclusion of Italy, Greece and Portugal nor is there a significant difference between results for the EU15 and those for the euro area.

The deficit-specific SFA is positively correlated with the "true deficit". For each one percent of GDP increase in the true deficit there is an estimated 0.6 percent of GDP increase in deficit-specific SFA. The deficit-specific SFA is also negatively correlated with the maximum allowed deficit (*H*). The increase in deficit-specific SFA associated with a one percent of GDP decrease in the allowed maximum deficit is estimated at 0.25 percent of GDP, using the data set which includes recent revisions to data for Greece, Italy, and Portugal, and to 0.5 percent, excluding such revisions.

Table 3 - Determinants of deficit and debt SFA: latest releases (1)

Dependent Variable	**Debt SFA (z)**		**Deficit SFA (x)**		
	with time dummies	no time dummies	with time dummies		no time dummies
Constant	**0.436**	**1.983** **	**-2.389** *	**-1.898** *	**2.155** **
	0.700	*0.000*	*0.018*	*0.028*	*0.000*
"True Deficit"	**0.436** **	**0.300** **	**0.586** **	**0.569** **	**0.427** **
	0.000	*0.000*	*0.000*	*0.000*	*0.000*
Growth Effect	**-0.270** *	**-0.379** **	**0.037**		
	0.056	*0.001*	*0.771*		
Debt rule (W)	**-0.200** **	**-0.189** **	**0.054**		
	0.000	*0.000*	*0.097*		
Deficit rule (H)	**-0.129**		**-0.251** *	**-0.243** *	**-0.597** **
	0.365		*0.049*	*0.047*	*0.000*
Time dummies (2)	0.085		0.000	0.000	
R2: within	0.512	0.376	0.571	0.558	0.308
between	0.457	0.436	0.376	0.312	0.183
overall	0.251	0.204	0.458	0.416	0.255

(1) 2SLS, fixed effects. P-values in italics. *, ** indicate coefficient significance at the 95% and 99% level, respectively. Data as in the latest releases available.
(2) P-values for the joint-significance test.

Table 4 - Determinants of deficit and debt SFA: initial releases (1)

Dependent Variable	**Debt SFA (z)**		**Deficit SFA (x)**		
	with time dummies	no time dummies	with time dummies		no time dummies
Constant	**-0.856**	**1.564** **	**-0.605**	**-0.570**	**3.172** **
	0.500	*0.010*	*0.557*	*0.513*	*0.000*
"True Deficit"	**0.385** **	**0.300** **	**0.613** **	**0.601** **	**0.472** **
	0.000	*0.000*	*0.000*	*0.000*	*0.000*
Growth Effect	**-0.202**	**-0.302** *	**-0.048**		
	0.202	*0.017*	*0.708*		
Debt rule (W)	**-0.192** **	**-0.176** **	**0.029**		
	0.000	*0.000*	*0.405*		
Deficit rule (H)	**0.072**		**-0.486** **	**-0.502** **	**-0.836** **
	0.650		*0.000*	*0.000*	*0.000*
Time dummies (2)	0.088		0.000	0.000	
R2: within	0.441	0.327	0.628	0.623	0.388
between	0.319	0.351	0.422	0.426	0.219
overall	0.173	0.164	0.537	0.538	0.317

(1) 2SLS, fixed effects. P-values in italics. *, ** indicate coefficient significance at the 95% and 99% level, respectively. 1998-2004 data for Greece, Italy, and Portugal are those from first official releases.
(2) P-values for the joint-significance test.

The debt-specific SFA is positively correlated with the "true deficit". For each one percent of GDP increase in the true deficit, there is an increase by about 0.3 percent of GDP in debt-specific SFA, offsetting half of the corresponding estimated increase in deficit-specific SFA. The debt-specific SFA is negatively correlated with the "growth effect". For each one percent of GDP increase in the growth effect, there is a 0.30-0.38 percent of GDP decrease in debt-specific SFA. Finally, the debt SFA is also negatively correlated with the maximum allowed change in debt (*W*). For each one percent of GDP increase in the allowed maximum change in debt, there is an estimated 0.2 percent of GDP decrease in debt-specific SFA.

6. Conclusions

The reliability of EMU's fiscal indicators has been questioned by recent episodes of large upward deficit revisions. This paper points out that EMU's deficit indicator is particularly fragile in two respects: the identification of transactions in financial assets and the assessment of accrued revenue and expenditure. It argues that margins for window dressing mainly arise from these two weak spots.

Even the simple comparison between deficit and change in debt can help early detection of inconsistencies in fiscal data. Evidence from three case studies of significant deficit data revision suggests the usefulness of crosschecks between deficit and changes in gross debt to reduce the scope for window dressing.

Changes in general government debt were much larger than initial deficit figures in Greece, Italy, and Portugal, before the large upward deficit revisions experienced in recent years. In Italy, the revision process was gradual and lasted four years. Although the initial discrepancy between the change in debt and the deficit was more than 2 percent of GDP, the highest annual revision amounted to only 0.8 points. In Greece, a large discrepancy between the two indicators was present for several years before the process of statistical revisions abruptly started in 2004.

Nevertheless, since different items in the reconciliation account between deficit and change in debt can offset each other, consistency checks must go deeper than the overall difference between the two indicators. Italy provides an interesting example. In 2001 total SFA amounted to 4.3 percent of GDP, as against "only" 1.2 percent in 2000. However, deficit-specific SFA were higher in 2000 than in 2001 (3.4 vs. 3.0 percent of GDP), and the increase in total SFA in 2001 reflected the decline in the offsetting debt-specific SFA.

Econometric estimates discussed in Section 5 provide evidence that deficit-specific SFA tend to increase with the underlying deficit and debt-specific SFA tend to offset the impact on total SFA of such an increase. This suggests not only that window dressing may have helped

ensuring formal compliance with the deficit rule, but also that debt-specific SFA may have made the ensuing deficit-debt discrepancy less visible.

Attention to the quality of statistics has increased in recent years also in the context of the reform of the SGP. Since 2004, Notifications include more detailed information, which now refer to the various sub-sectors of the general government. In addition, some steps have recently been taken to improve statistical governance at the EU and national level.

The Regulation concerning the statistics used for the Excessive deficit procedure has been amended. The role of Eurostat as the statistical authority in the context of the Excessive deficit procedure has been reinforced by introducing formal requirements of completeness and internal consistency of fiscal data reported to the Commission and by disciplining Eurostat's interaction with member states through "dialogue" and "methodological" visits. In order to improve transparency and accountability of national statistical authorities, the Regulation mandates the public availability of data reported by member states as well as of inventories describing the methods, procedures and sources used by member states, and requires the publication by Eurostat of regular reports on the quality of data.

To bolster the operational capacity of the Commission, Eurostat has conducted an internal redeployment of staff in order to reinforce the activities linked to the validation of economic and fiscal accounts and created a dedicated unit.

Finally, the directors of national statistical institute and Eurostat adopted a European Statistics Code of Practice, defining standards for the independence of the national and community statistical authorities. The Code lists a set of indicators to be used to review the implementation of the Code itself. The Commission is setting up a reporting system to monitor adherence to the Code of Practice by the national statistical authorities and Eurostat.

The analysis of SFA along the breakdown suggested in the paper may enhance the effectiveness of these reform efforts. To this end, the reconciliation account between deficit and change in debt reported in the Notifications should identify all financial assets and therefore there should be no residual item labelled as "other assets". Moreover, national authorities should routinely provide justification for cash-accrual differences in annual data for individual accounting items. In due time member states should also be requested to provide a full set of government accounts covering both deficit formation and its financing. Such set of accounts should include both cash and accrual figures.

Given the unavoidable information asymmetry between the community and member states, ensuring the independence of the national statistical institutions is crucial. This is not just an issue of enforcement of fiscal rules; it is an issue of accountability to the public and of good management of public resources.

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