Challenges in measuring fiscal effects

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Abstract
The channels through which governments affect the economy are manifold. In this article the focus is exclusively on direct fiscal effects stemming from the budget balance. The article presents and assesses the most frequently used methodologies for computing automatic stabilisers, the fiscal stance and the fiscal impulse. Alternative simpler approaches for the determination of the stance and the impulse are also proposed. This clear-cut conceptual framework is applied to Portuguese public finances in the last two decades, with a particular focus in 2020. The contribution of the fiscal stance to fiscal developments is only slightly higher than that of the automatic stabilisers in the 2000-20 period and there is no clear pattern between the two indicators. In 2020, both indicators have played a major role in explaining the deterioration in the budget balance. Moreover, calculations for the fiscal impulse show that, in their absence, GDP could have dropped by 11 per cent in 2020, instead of the observed 7.6 per cent decline.

1. Introduction

The channels through which governments affect the economy are manifold. Governments' regulations, decisions and activities may have a direct and an indirect influence on output. In general, the direct effect is reflected in the budget balance and/or the public debt. It is very much concentrated on the tax and social security systems and the provision of public goods and services. Indirect effects stem from mechanisms rooted in national or EU legislation, financial transactions, decisions with a fiscal impact lagged in time, among others. This article focuses exclusively on direct fiscal effects stemming from the budget balance.

Headline balances react automatically to changes in economic activity, notably through tax and social security revenue and unemployment benefits. As these elements contribute to smooth the economic cycle regardless of government interventions, they are called automatic stabilisers. In addition, the budget balance reflects discretionary decisions and policy interventions, as well as structural trends and non-cyclical effects outside governments' control. The fiscal stance is the economic concept that attempts to summarize in a single indicator the aggregate effects of fiscal policy actions on the

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government's budget balance. Its role in fiscal analysis is of import: it serves as a basis for policy discussions and international comparisons of policy actions. The impact of the fiscal stance in economic activity is the so-called fiscal impulse. The fiscal impulse can be broadened to encompass total fiscal effects, i.e. considering also the impact of automatic stabilisers.

The objective of this article is to present and assess the main methodologies currently used for computing automatic stabilisers, the fiscal stance and the fiscal impulse. To our knowledge, an encompassing and updated reference cannot be found in the literature. In this article, automatic stabilisers are proxied by the cyclical component of the budget balance. For the fiscal stance several methodologies are presented: the top-down approach, anchored in the change in the structural primary balance; the pure narrative approach which focuses only on inventories of fiscal measures; and mixed-approaches, like the expenditure benchmark used in the context of the Stability and Growth Pact (SGP). The top-down approach is assessed as the most comprehensive measure for the fiscal stance. It is herein proposed an alternative mixed approach that, although less encompassing, is simpler to compute and provides pertinent results in normal times. Finally, to obviate the fact that the fiscal impulse measurement is model-dependent, it is computed herein on the basis of selected fiscal multipliers drawn from the extensive literature available on the subject.

This clear-cut conceptual framework is applied to understand fiscal developments in Portugal in the last two decades. This is an interesting case from an analytical perspective, as the recent past has been particularly eventful in terms of fiscal policy. Until recently, Portuguese public finances have been essentially characterised by high deficits and a rising trend in the debt ratio. According to the statistical rules currently used, the budget balance averaged -4.5 per cent of GDP in 2000-2008 (and never stood below the -3 per cent threshold) and the debt-to-GDP ratio was on a steady increasing path since 1999, exceeding 75 per cent by end-2008 (Figure 1). By 2010, the general government deficit had widened to -11.4 per cent of GDP and public debt had reached 100.2 per cent. Unsurprisingly, as disruptions in financial markets intensified leading to the euro area sovereign debt crisis, Portugal was at the centre stage with Greece and Ireland. Portuguese authorities requested international economic and financial assistance in 2011 and a Programme was set up, jointly financed by the EU and the IMF. The country entered a sharp fiscal adjustment process under the close monitoring of the international creditors and regained market access in 2014. In this year, government debt still exceeded 130 per cent of GDP and the deficit was only slightly lower than that at the beginning of the financial assistance programme. Since then, however, the balance improved substantially and a surplus was recorded in 2019, while the public debt was following a downward path - until the pandemic hit. At the end of 2020, the budget balance stood at -5.7 per cent of GDP and the debt ratio had escalated to 133.6 per cent.

The article discusses the contributions of fiscal policy for these developments, covering both the role of automatic stabilisers and discretionary decisions. Regarding the fiscal impulse, the analysis focuses exclusively on 2020, as the first year of the pandemic provides a *quasi-natural* experiment extremely interesting and rich to analyse.

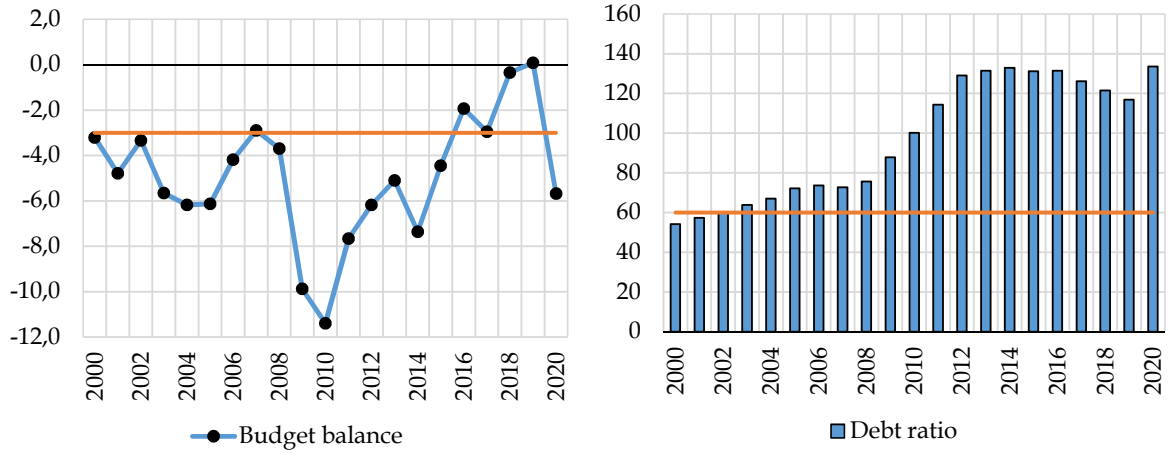

FIGURE 1: Budget balance and public debt in Portugal: 2000-2020 | Percentage of GDP
Sources: Statistics Portugal and Banco de Portugal.

The article is organised as follows. The Section 2 describes the most frequently used method for the computation of automatic stabilisers and briefly discusses other alternatives. In Section 3, the main methods for measuring the fiscal policy stance are presented and an alternative mixed approach is proposed. Both sections provide an application of the main methodologies for the analysis of Portuguese public finances in 2000-2020. The fourth section explains the concept of fiscal impulse and defines a simplified mechanical approach for its computation. Before concluding, a particular focus is placed on 2020 fiscal developments, applying the previously laid-out framework for the analysis.

2. The automatic reaction of government balances: the automatic stabilisers

Headline balances are affected by economic fluctuations. This reflects the fact that revenue from taxes and social contributions and expenditure on social transfers - notably unemployment benefits - automatically react to changes in economic activity. These elements, the so-called automatic stabilisers, contribute to smooth the economic cycle regardless of government interventions. Implicit automatic stabilisation mechanisms are also built into non-cyclical budgetary items. This reflects the fact that a large share of government expenditure does not react to changes in economic activity, thereby contributing to avoid further dampening or overheating effects.

The budgetary impact of automatic stabilisers is often gauged on the basis of estimates of the cyclical component of the budget balance. Mohl *et al.* (2019) dub this the "statistical approach". In practice, most international institutions - including the

Eurosystem - rely on aggregate methods[1] for the computation of the cyclical component, obtaining it as the product between a budgetary semi-elasticity (ε^{BB}) and the output gap (og):

$$CC_t = \varepsilon^{BB} \times og_t \tag{1}$$

where both the semi-elasticity ε^{BB} and og are unobserved and must be estimated.

The semi-elasticity provides a measure of the reaction in the balance-to-GDP ratio induced by a 1 per cent change in GDP. Typically, the semi-elasticity of the balance is obtained as the difference between the semi-elasticities of revenue and expenditure. In turn, these are derived on the basis of fiscal-to-base elasticities for individual tax and expenditure items (measuring their responses to changes in the macroeconomic bases) and base-to-output elasticities (capturing the reaction of macroeconomic bases to changes in the output gap), weighted by the share of each category in GDP.

Banco de Portugal currently uses the estimate obtained by Braz *et al.* (2019) on the basis of the ESCB method which stands at 0.54. It should be noted that it takes into account lagged responses to the output gap: the contemporaneous component is 0.49.[2] Following the latest revisions, respectively in 2015 and 2019, both the OECD and the Commission have estimated the budgetary semi-elasticity for Portugal to stand also at 0.54 (Price *et al.*, 2015 and Mourre *et al.*, 2019).

This standard approach to proxy the budgetary semi-elasticity is subject to some criticism. In particular, it provides a stylized and simplified depiction of the relationship between fiscal and macroeconomic aggregates that prevails, on average, over a long period of time. However, in practice, in each year, cyclical revenues and spending may deviate from such historic relationship, giving rise to windfalls and shortfalls that may be wrongly interpreted as structural developments. This may happen due to changes in the composition of GDP, or because some tax bases respond to fluctuations in asset prices that do not necessary follow the economic cycle (Eschenbach and Schuknecht, 2002). Moreover, "true" tax elasticities are also affected by changes in compliance and the relative size of the informal sector, which, in turn, tend to respond to cyclical swings. Finally, structural reforms or legal changes would also warrant frequently revisiting the elasticities - which is often not the case.

In addition to the semi-elasticity, computing the cyclical component of the budget balance also requires determining the output gap, a measure of the amount of slack (or lack thereof) in an economy. It is proxied as the difference between actual and potential output, and expressed as a ratio to potential output. Potential output is an intrinsically theoretical concept that may be defined as the highest production level

1. Disaggregated approaches rely on the notion that specific components of the budget balance respond to changes in specific macroeconomic variables, which may differ from the fluctuations exhibited by the output gap.

2. Braz *et al.* (2019) provide a detailed description of the ESCB cyclical adjustment method, as well as on the derivation of the budgetary semi-elasticity, with an emphasis on the estimation of fiscal-to-base and base-to-output elasticities for Portugal.

that would be achieved with full resource employment, without triggering inflationary pressures. It is an unobservable variable whose estimation is surrounded by several sources of uncertainty, mainly in terms of modelling (Banco de Portugal, 2017). Although there is no consensus in academic or policy fora on the most accurate method, widely used approaches rely on Cobb-Douglas production functions and some sort of filtering process to extract trend components of relevant series. This is the case with the estimation methods used at Banco de Portugal (Duarte *et al.*, 2020 and Braz *et al.*, 2019, the latter used for cyclical adjustment of budget balances), as well as with the commonly agreed methodology used by the European Commission (Havik *et al.*, 2014).

Estimates for potential output - and hence for the output gap - are unstable and subject to frequent and large revisions. This has implications for policy analysis and policy making as the output gap is a key variable in the European fiscal surveillance framework. There is evidence of some pro-cyclicality in potential output estimates (Deutsche Bundesbank, 2014). Revisions appear to be asymmetric over the cycle, with upward revisions in the output gap in good times tending to be larger than downward revisions in bad times (Burriel *et al.*, 2021). The uncertainty in the measurement of potential output is heightened at the current juncture. In particular, the severity of the pandemic shock makes it difficult to fit in any model and this is likely to result in significant revisions in estimates for potential output, including as regards historical figures (as it typically happens around large cyclical swings - Duarte *et al.*, 2021).

While the so-called "statistical approach" just described is the most widely used to estimate the size of automatic stabilisers, alternative methods exist. They are categorized as "microeconomic" or "macroeconomic" approaches by Mohl *et al.* (2019). Microeconomic approaches focus on the extent to which the tax and benefit systems help in cushioning the impact of changes in market (gross) income in households' disposable income (respectively income before and after taxes and social transfers). The ability of the system to absorb shocks is typically captured by the stabilisation coefficient proposed by Dolls *et al.* (2012), corresponding to the ratio between changes in disposable income and changes in gross income. Although this coefficient may be estimated directly through microeconometric regressions (see Freier *et al.*, 2021 for an example using panel regressions on EU-SILC data), it is more often computed on the basis of microsimulation techniques. These methods, however, capture a relatively narrow definition of automatic stabilisers which does not consider indirect taxation, taxes on corporations or social benefits that depend on previous contributions (such as old-age pensions). This is also a partial equilibrium approach which overlooks second order effects. As such, direct comparisons of the size of automatic stabilisers as estimated by the statistical and microeconomic approaches should be avoided. Macroeconomic approaches rely on DSGE models to gauge overall automatic stabilisation effects of fiscal policy. In particular, these models take into account behavioural and feedback effects when measuring the response of aggregate disposable income to shocks. The same effects are also implicitly taken into account in the determination of the budgetary cyclical component underlying the statistical approach. However, the actual size of automatic stabilisers as estimated using DSGEs is very much contingent on the type

of shock. Moreover, the accuracy and comprehensiveness of the estimates also depends on the richness of the fiscal block of the underlying model.

All in all, and despite its limitations, the cyclical component presents a number of advantages compared to the alternative methods for assessing the size of automatic stabilisers. It is comprehensive in scope and relatively easy to compute and replicate based on publicly available data. For these reasons, it is the approach adopted in the article.

Figure 2 highlights the contribution of automatic stabilisers to the annual change in the budget balance. Several facts are worth highlighting. First, in only around half of the years the sign of the change in the cyclical component coincides with that of the change in the budget balance. Second, in terms of magnitude, the standard deviation of the automatic stabilisers (1.1) is considerably smaller than that of the overall change in the budget balance and the remaining component. Also, in absolute terms, it averages 0.7 pp of GDP per year. Taken together, these pieces of evidence suggest that automatic stabilisers have contributed to smooth out macroeconomic fluctuations in Portugal, but have played a relatively minor role in explaining past fiscal developments.

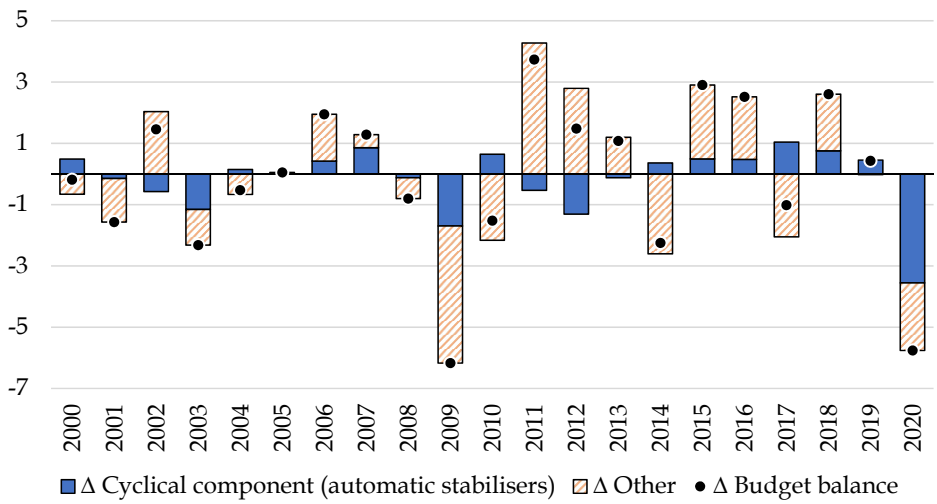

FIGURE 2: Contribution of automatic stabilisers to the change in the budget balance in Portugal: 2000-2020 | Percentage points of GDP

Sources: Own representation based on authors' calculations.
Notes: The impact of automatic stabilisers is calculated on the basis of a statistical approach which proxies it as the change in the cyclical component of the budget balance. The latter is estimated following the Eurosystem methodology described above and considering Banco de Portugal's current estimates for potential output.

3. The discretionary component of government balances: the fiscal stance

Governments influence economic activity through their decisions and policy interventions. The fiscal stance is the economic concept that designates this discretionary influence. Its measurement is not straightforward. Conventional approaches rely to a large extent in a detailed analysis of the budget balance in order to identify the

components resulting from active fiscal policy and thus proxy the stance. The most commonly used approaches are described, assessed and applied to the case of Portugal in this section.

3.1. Top-down approach: the change in the cyclically-adjusted (or structural) primary balance

The most established metric for gauging the stance of fiscal policy is based on the change in cyclically adjusted/structural balances, ie, the change in the balance that would prevail if the economy was at its potential (see Blanchard, 1990, Alesina and Perotti, 1995 or Alesina *et al.*, 1998 for some early definitions and applications)[3]. The concept of structural fiscal balance is at the core of the European surveillance framework, both in levels and in changes, being used to assess compliance with rules prevailing in the preventive and the corrective arm of the SGP. The European Commission, the European Fiscal Board (the institution mandated to assess the appropriateness of the euro area fiscal stance), the Eurosystem, the IMF and the OECD all use some formulation of the change in cyclically adjusted/structural balances to assess the fiscal stance. In the case of the Eurosystem, the stance is measured as the change in the cyclically adjusted primary balance (CAPB) excluding the impact of bank sector support measures. The focus thereon is on the most frequently used indicator, which is the change in the structural primary balance (SPB).

The calculation of the SPB relies on a top-down approach that starts from the headline balance (BB) as a ratio to nominal GDP (Y) and nets out the impact of interest payments (i) and the cyclical component of the balance (CC). Further excluding the impact of temporary measures (TM) yields the structural primary balance (SPB):

$$SPB_t = \frac{BB_t}{Y_t} - CC_t - \frac{i_t}{Y_t} - \frac{TM_t}{Y_t} \tag{2}$$

Interest payments are excluded as the outlays on government debt service primarily reflect decisions and commitments made in the past years (or decades). Temporary measures (or 'one-offs') include non-recurrent exceptional factors which typically have significant but not permanent budgetary impact in fiscal balances. These effects may be identified on the basis of more or less stringent definitions and heavily rely on expert-judgment made on a case-by-case basis. Nonetheless, these operations are generally deficit-decreasing or, if deficit-increasing, they are triggered by factors outside governments' control, such as court decisions or natural disasters.[4] Recently, in the context of the financial crisis, expenditure on banking sector support gained prominence as typical one-offs, given their significant - albeit not permanent - impact on euro area public finances. There is some debate on whether all temporary measures should

3. The structural balance corresponds to the cyclically-adjusted balance net of the impact of temporary/one-off measures.

4. European Commission (2018) presents the guiding principles followed by the Commission for identifying one-off factors. The Eurosystem definition will be used throughout this article which follows, to a large extent, the Commission guidelines.

be netted-out when trying to gauge the fiscal stance, depending on how much they influence macroeconomic developments and how exogenous are from governments' actions, but all main alternative metrics exclude, at least to some extent, the impact of temporary measures.

Difficulties in determining the "true" budgetary semi-elasticity and uncertainty around potential GDP and the output gap, result in limitations in using the change in the SPB to measure active fiscal policy. Although Duarte *et al.* (2021) document that estimates for changes in structural balance tend to be more stable since they are conditional on changes in the output gap which are less revised than its levels, volatile estimates still have implications for the assessment of the fiscal stance. Any revision, small as it may be, implies that evaluating the stance of fiscal policy based on ex-post indicators may provide a different assessment than that steering governments' discretionary decisions in real time. The above-mentioned evidence of some pro-cyclicality in potential output estimates implies that fiscal policy steered on the basis of initial estimates may turn out excessively pro-cyclical (Fatás, 2019 and Kuusi, 2018).

Figure 3 illustrates the application of the top-down approach to identify the fiscal stance in Portugal in the last two decades. It builds on Figure 2 and it further isolates the change in the (cyclically adjusted) interest payments ratio and the effect of temporary measures. According to the top-down approach, the remaining category, which is the change in the structural primary balance, shows the fiscal policy stance. A positive (negative) value corresponds to a tightening (loosening) in the stance.

The figure shows that the change in the budget balance is explained to a large extent by the impact of temporary measures, particularly after the economic and financial crisis as operations to support the banking sector became more prominent. The average absolute change in the fiscal stance (1.1 pp) is only slightly higher than that of the automatic stabilisers (0.7 pp). Moreover, the stance is also only slightly more volatile than the change in automatic stabilisers (respectively with a standard deviation of 1.6 and 1.1).

A closer look at the relationship and magnitude of the fiscal stance and automatic stabilisers allows extracting pertinent conclusions (Figure 4). In the last two decades there is no clear pattern between the two components, neither in terms of relative size, nor regarding the combination of active fiscal policy and cyclical conditions (observations are spread by the four quadrants). The stronger discretionary reactions of fiscal policy occurred in crisis years: 2003, 2009 and 2020 as far as a stimulus is concerned, and 2011 and 2012, Programme years, in case of a tightening. At times of cyclical improvement active fiscal policy was more nuanced. Quite interestingly, the stimulus in the 2009 recession was larger than that in 2020, although the deterioration in the output gap was stronger in the latter. We will come back to this point later in the article.

3.2. (Pure) Bottom-up approach: narrative measures of the fiscal stance

In light of the drawbacks of assessing the fiscal stance on the basis of changes in the SPB and, in particular, its excessive reliability on the output gap, alternative methods have

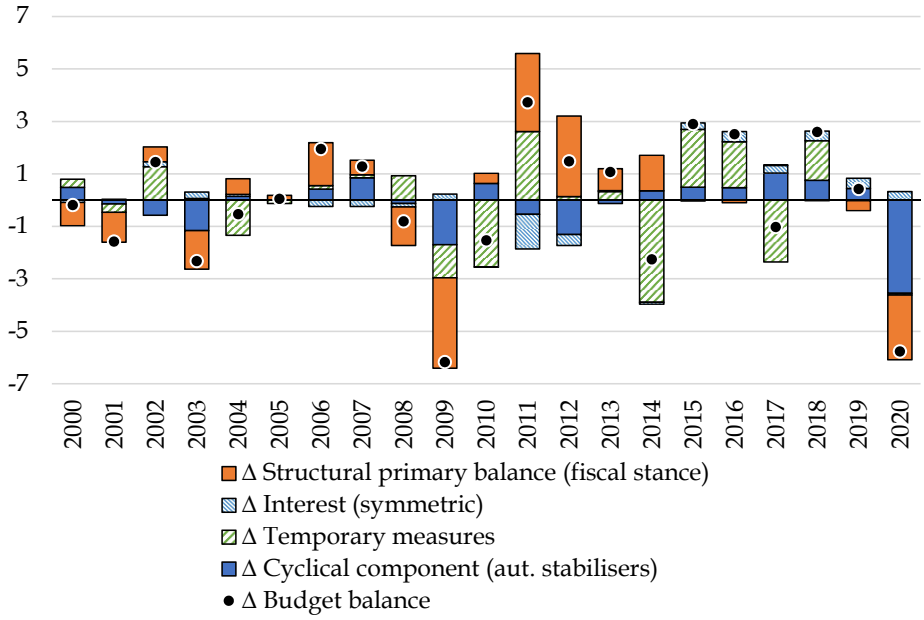

FIGURE 3: Further breakdown of the change in the budget balance in Portugal: 2000-2020 | Percentage points of GDP and potential GDP

Sources: Own representation based on authors' calculations.

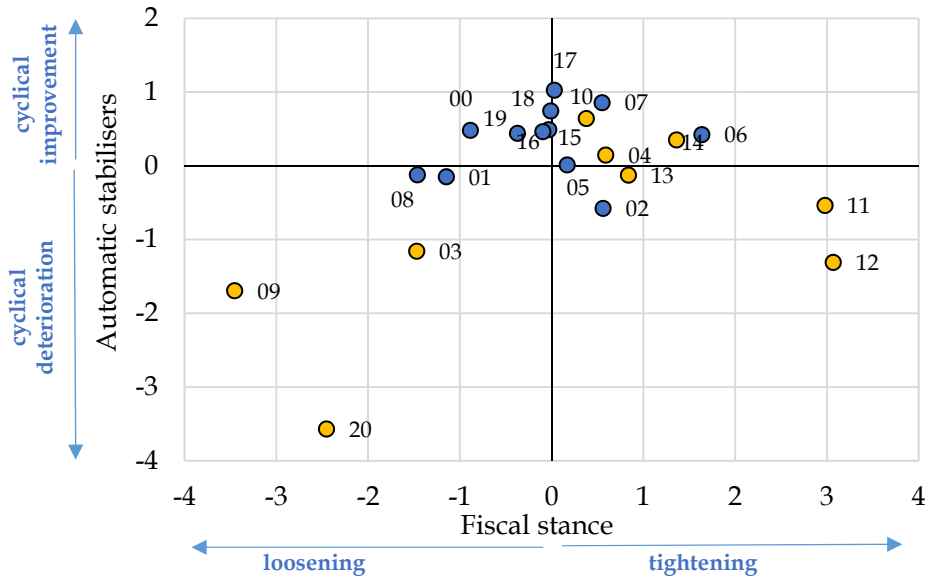

FIGURE 4: Fiscal stance and automatic stabilisers: top-down approach | Percentage points of potential GDP

Sources: Own representation based on authors' calculations.
Note: Yellow markers correspond to years with negative real GDP growth and the one immediately after.

been proposed. One of such proposals relies on "bottom-up" or "narrative" approaches, according to which active fiscal policy is evaluated on the basis of inventories of measures enacted by governments. The procedure draws heavily on official documents produced by governments, such as budgets and Stability Programmes, or

by international organisations. Other forms of government communications, including speeches and interventions in the media, are also often used. Typically, the yield of measures corresponds to estimates done at the time of their adoption and are not reassessed afterwards.

Originally, the narrative analyses have emerged as a tool to eliminate confounding factors such as endogenous interactions between fiscal policy and output in trying to estimate the macroeconomic effects of tax measures. In particular, Romer and Romer (2010) were the first to apply the narrative approach to disentangle the effects of discretionary tax changes from those induced by macroeconomic developments or prospects. They used the inventory of measures to estimate the macroeconomic impact of those changes in the United States. Similar subsequent studies employing narrative analyses include Cloyne (2013) for the United Kingdom, Hayo and Uhl (2014) for Germany, Pereira and Wemans (2015) for Portugal and Gil *et al.* (2019) for Spain. Finally, Devries *et al.* (2011) compiled a narrative dataset of measures announced in OECD countries in 1978-2009. In this case, the dataset also covers expenditure measures and it is used to exogenously identify fiscal consolidation episodes.

The pure narrative approach has some relevant limitations, that are even more detrimental in the case of cross-country analyses. Building an accurate repository of fiscal measures that is thorough enough to be useful is extremely time-consuming and demanding in terms of expertise. The sole identification and quantification of policy actions that should be included may prove challenging. The assumptions underlying the quantification of measures are rarely disclosed and may be influenced by political considerations. Also they are usually *ex-ante* estimates, not subject to *ex-post* revision.[5] Empirical analyses in Hernández de Cos and Moral-Benito (2016) and Jordà and Taylor (2016) suggest that the narrative approach may, after all, fail to adequately eliminate the endogeneity between discretionary fiscal policy and the economic cycle. Finally, it should be stressed that the identification of measures is especially complex when it comes to the expenditure side. This may explain the fact that most narrative datasets focus only on tax measures, for which the absence of decisions can arguably be seen as neutral stance and a no-policy change scenario is easier to conjecture. In turn, pinning down discretionary effects on the expenditure side requires the definition of a (counter-factual) neutral evolution that would prevail in the absence of governments' action - a limitation that semi-narrative/mixed approaches presented below try to overcome.

Figure 5 presents the impact of measures affecting revenue from taxes and social contributions in Portugal in the period 2000-2010, excluding those that have a temporary nature (such as tax amnesties). The largest increases took place in 2002/2003 (mainly concentrated on VAT and tax on oil products) and during the economic and financial assistance programme. These increases were partly reversed in the following years, widespread across different taxes and social contributions. When compared to the change in the structural tax burden underlying the top-down approach, there are

5. In this respect, Barrios *et al.* (2021) propose a novel approach for the assessment of tax reforms accounting for second-round effects, combining the use of a macroeconometric model with a microsimulation model.

important differences in several years. This means that there are further developments in tax revenues that go beyond the impact of discretionary measures. They comprise composition effects, resulting from deviations between the evolution of the macro bases and that implied by the elasticities with respect to the output gap, and other effects such as unanticipated revenue windfalls and shortfalls (see Braz *et al.*, 2019 for more details).

The difference vis-à-vis the top-down stance indicator is even more striking as the contribution of non-tax revenue and primary expenditure is not taken into consideration. While this would not be crucial for the recent years after the end of the Programme and until 2019, it would be very relevant for a year like 2020, where expenditure measures adopted in the context of the Covid pandemic were significant and quantifiable (2.3 per cent of GDP of a total budgetary impact of 3.1 per cent of GDP).

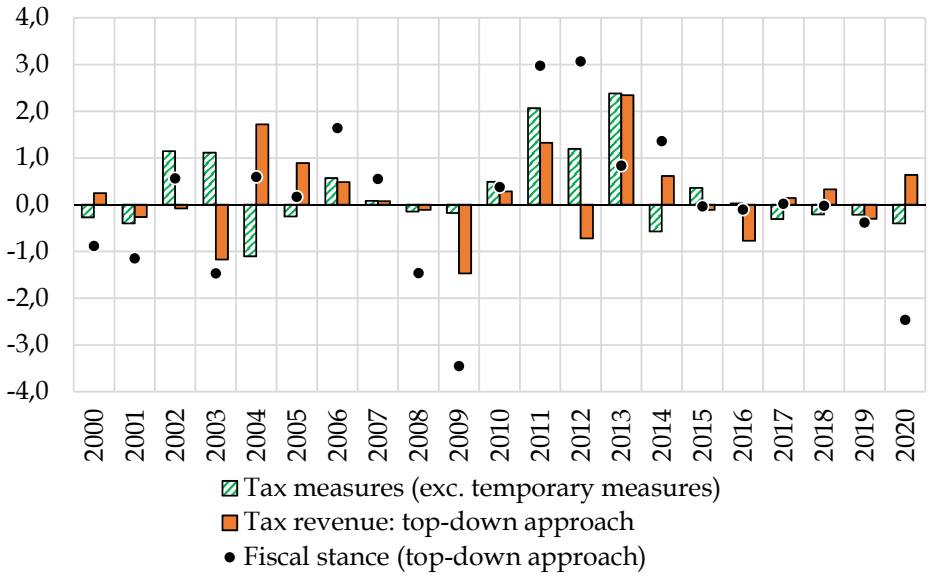

FIGURE 5: Tax measures and comparison with top-down approach | Percentage points of GDP and potential GDP

Sources: Own representation based on authors' calculations.

3.3. *Mixed approaches to compute the fiscal stance*

3.3.1. *The expenditure benchmark*

In 2011, the European Commission introduced the Expenditure Benchmark (EB) in the context of the "Six-Pack" reform of the SGP (European Commission, 2013b). It was presented as a complementary pillar to the structural balance in assessing progress towards the MTOs in the preventive arm of the Pact: it sets a limit for the annual growth of expenditure that is compatible with adequate progress. It was not therefore intended to be an alternative indicator for the stance of fiscal policy but provides an interesting lens through which it may be looked at, as suggested in European Fiscal Board (2020).

The expenditure aggregate relevant to assess compliance with the EB results from various adjustments. It excludes interest outlays (i), expenditure that is matched by

EU funds (E^{EU}) and a share of spending on unemployment benefits that is driven by cyclical developments (unb^{CYC}).[6] It is also corrected for the impact of temporary or one-off measures (TM^E). Moreover, it takes into account a four-year average of government investment (encompassing the expenditure incurred in the current and the previous three years, $\overline{INV_4}$). The impact of non-temporary revenue discretionary measures and of revenue increases mandated by law (R^{DISC}) is also deducted:

$$E_t^{EB} = E_t - i_t - E_t^{EU} - unb_t^{CYC} - TM_t^E - INV_t + \overline{INV_4} - R_t^{DISC} \tag{3}$$

This net expenditure aggregate is adjusted using an average of the figures for the GDP deflator in year t as per the Commission's Spring $t-1$ and Autumn t forecasts. Finally, the real growth rate is compared to a medium-term potential growth rate, averaged over a 10 year period and thus smoother and less likely to be revised than annual estimates.

In computing the fiscal stance, the EB offers a number of advantages compared to the structural balance. The theoretical concept of net expenditure is easier to communicate to policymakers and the general public. The assessment based on the EB is much less prone to revisions in the cyclical position, as the NAWRU plays only a minor role in the definition of net expenditure and the benchmark against which its growth is measured relies on a smoother definition for potential growth. Moreover, by also smoothing-out investment outlays, it downplays incentives for sharp cuts that may entail long-term costs, while avoiding penalising large-scale projects. However, it also presents drawbacks. Albeit to a lesser extent, the EB still relies on unobservable variables - both the NAWRU and potential output. The computation of the net expenditure aggregate requires information on outlays financed by EU funds, which are not always publicly available. The EB fails to capture the impact of some budgetary components, such as the composition of growth and the unexplained component (residuals) in tax revenues and other developments in non-tax revenue beyond the impact of discretionary measures and EU funds. Finally, the assessment of discretionary revenue measures shares the limitations highlighted above for the narrative approach. For a review of details underlying the calculation of the EB, refer to Marinheiro (2020).

3.3.2. Other methodologies and an alternative approach

In 2013, the European Commission introduced a complementary measure for the fiscal stance, the so-called Discretionary Fiscal Effort (DFE) indicator (European Commission, 2013a; Carnot and de Castro, 2015). It is a mixed approach in the sense that it entails a "bottom-up" or narrative approach on the revenue side, while on the expenditure side it is "top-down". In particular, the DFE is defined as

6. Cyclical unemployment expenditure is computed as $unb_t^{CYC} = unb_t \times \frac{unRate_t - NAWRU_t}{unRate_t}$. It depends on the overall expenditure on unemployment benefits (unb) and on an estimate for the labour market slack as implied by the relationship between the actual unemployment rate ($unRate$) and the estimated non-accelerating wage rate of unemployment ($NAWRU$, a measure of structural unemployment).

$$DFE_t = \frac{R_t^{DISC}}{Y_t} - \frac{(\Delta E_t^{'} - y^* \times E_{t-1}^{'})}{Y_t} \tag{4}$$

where R^{DISC} is the overall impact in year t of non-temporary revenue measures, based on a narrative approach, and Y_t corresponds to nominal GDP. The Commission avoids overly depending on governments' estimates for the yield of measures in R^{DISC} by relying on a dedicated database of discretionary fiscal measures internally built and updated, for which governments' figures are scrutinized and expert judgement can be employed. However, data is only available from 2010 onwards. $E_t^{'}$ corresponds to total expenditure excluding interest outlays, non-discretionary unemployment benefits and one-off or temporary expenditure measures. Variable y^* represents the medium-term potential growth rate relevant in the context of the EB.

Similar, albeit simpler, semi-narrative measures of the fiscal stance have been proposed in recent years. Morris *et al.* (2015) relies, on the revenue side, on a dataset of tax legislation changes covering essentially the first decade of the 2000s and a set of 8 EU countries. This draws on information collected by fiscal experts in the context of the ESCB Working Group on Public Finance. On the expenditure side, they present results based on three different benchmarks for "neutral" spending - nominal trend GDP, the GDP deflator, and the Consumer Price Index - and show that they all broadly lead to similar conclusions.

Braz and Carnot (2019) identify discretionary fiscal changes on the basis of an extended version of the ESCB dataset used by Morris *et al.* (2015) covering all euro area countries. As a robustness check, they also compare their results with those implied by the Commission's dataset of discretionary measures and assess differences to be negligible in most overlapping years. They capture the discretionary component of fiscal changes on the expenditure side by benchmarking against annual nominal potential growth. A sensitiveness analysis focusing on alternative benchmarks (namely real potential growth or the GDP deflator) shows that the magnitude of the discretionary effects varies considerably, and although results remain qualitatively unchanged in most years, in some cases the conclusions are contradictory.

Inspired by these analytical frameworks, this article proposes an alternative, simple mixed approach (AMA) based on the impact of discretionary measures on taxes and social contributions and taking annual nominal potential GDP growth as the benchmark for primary expenditure net of non-tax revenue. In the case of Portugal this netting out is particularly relevant as it allows eliminating the impact of EU funds expenditure financing. Indeed, although expenditure financed via EU funds may have an impact on economic activity, it should be disregarded when measuring the fiscal stance as it is not under the direct control of national governments. Temporary measures are also excluded, upfront, and so is the change in the cyclical component of unemployment benefits, computed in accordance with the Eurosystem methodology. The latter adjustment has, overall, a minor impact on results. In terms of formula, AMA is defined as

$$AMA_t = \frac{R_t^{DISC}}{Y_t} - \frac{(\Delta E_t^{''} - y_t^* \times E_{t-1}^{''})}{Y_t} - \Delta CC_t^{unb} \tag{5}$$

where R^{DISC} is the overall impact in year t of (non-temporary) discretionary revenue measures; $E_t^{''}$ corresponds to total expenditure excluding interest outlays and non-tax revenues, adjusted also for the impact of one-off or temporary measures; y_t^* represents the annual nominal potential GDP growth rate; and CC_t^{unb} is the change in the cyclical component of unemployment benefits (derived as a ratio to GDP).

Figure 6 compares the fiscal stance in Portugal as obtained with the top-down approach and the mixed framework proposed in this article. In most years results are qualitatively similar and broadly convey the same message in terms of the stance of fiscal policy, even if the magnitudes involved might somewhat differ. The major exceptions occur in years 2003 to 2005 and 2014. Differences between the two approaches are also significant, but without changing the qualitative stance assessment, in 2009, 2012 and 2020. The difference between the two approaches stems almost exclusively from developments in the tax burden captured as composition effects and residuals, which go beyond the direct impact of discretionary measures, and affect the change in the SPB (Figure 7). This is aligned with insight provided in European Commission (2013a), according to which the SPB provides an overly favourable view on the stance of fiscal policy in good times (when revenue windfalls are larger), while in bad times (when shortfalls emerge) it tends to underestimate consolidation efforts.[7]

To sum up, the mixed approach herein suggested is a simpler alternative for computing the fiscal stance, as it requires essentially an assumption on potential GDP growth (rather than in levels as is the case of the top-down approach) and the identification of discretionary revenue measures. It provides robust results when tax revenues evolve as expected, i.e., in line with historical elasticities and the impact of legislative changes. In theory, its accuracy could even be superior to that of the top-down approach when tax residuals and composition effects are significant and have essentially a cyclical nature. In the case of residuals, while some amounts may correspond to specific events (e.g, related to refunds behaviour), in practice it is extremely difficult to assess its cyclical/structural nature. Similarly, since the behaviour of macroeconomic bases does not necessarily follow the real business cycle and may reflect governments' decisions, assessing the structural nature of composition effects is also not straightforward.[8]

Figure 6 also depicts the stance as measured on the basis of the expenditure benchmark for the available period, i.e., after 2010. Results somewhat differ from the

7. This insight stems from a comparison between the DFE and the SPB-based fiscal stance in 2004-2013 in EU countries presented in European Commission (2013a). It is shown that the difference between the two indicators is pro-cyclical due to the cyclicality of effects captured as revenue shortfalls or windfalls.

8. Indeed, at least in the case of Portugal, there is no evidence of cyclicality in composition effects: the correlation coefficient between composition effects and the change in the cyclical component is small and negative.

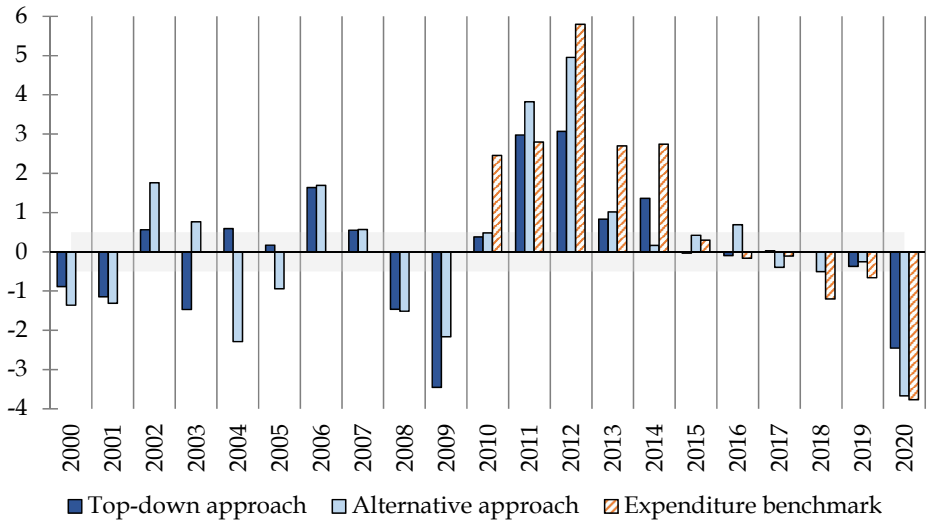

FIGURE 6: Alternative measures of the fiscal stance in Portugal | Percentage points of GDP and potential GDP

Sources: Own representation based on authors' calculations.

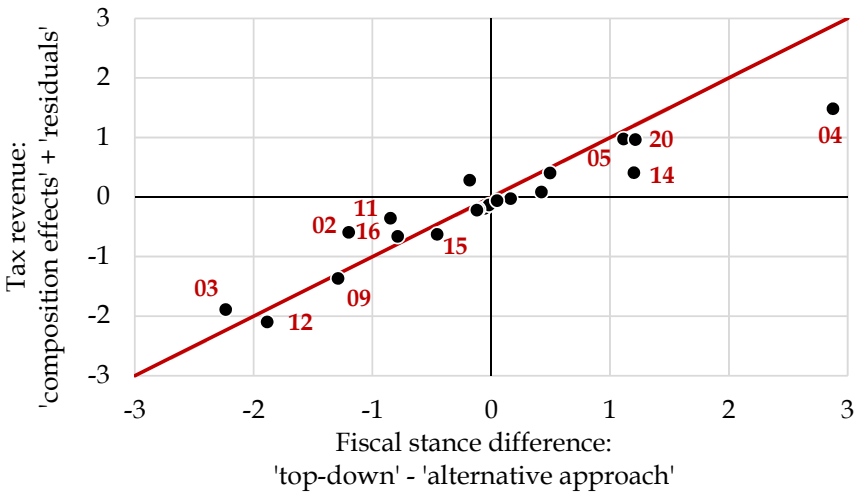

FIGURE 7: Difference in indicators of the fiscal stance and revenue developments | Percentage points of GDP and potential GDP

Sources: Own representation based on authors' calculations.

other two approaches, particularly up to 2014. The identification of the underlying causes is difficult given the complexity of the computation formula. In particular, the flattening of the investment expenditure not co-financed by EU funds is a motive for deviations, especially in periods of higher spending volatility. The rationale for a fiscal stance indicator based on a net-expenditure aggregate is not so different from that underlying other mixed approaches, in particular that proposed in this article. However, the current degree of complexity in the calculation of the expenditure benchmark eliminates, in our view, any advantages it might have over the other two approaches as an indicator of the fiscal policy stance.

4. The impact of the government balance on GDP: the fiscal impulse

The definition of fiscal impulse is not consensual among academics nor practitioners. For some authors (e.g. Alesina and Perotti, 1995) the fiscal impulse corresponds to the previously defined fiscal stance concept. In this article, the fiscal stance corresponds to the discretionary component of the budget balance, while the fiscal impulse measures the impact of fiscal policy on economic activity. Along the lines developed in Braz and Carnot (2019), this article also explores a broader definition of this impact, encompassing also the effect of automatic stabilisers on aggregate demand.

While the fiscal stance can be measured without resort to a macroeconomic model, as shown in the previous section, the same does not happen with the determination of the fiscal impulse. The latter is usually measured on the basis of statistical models (such as VARs) or structural macroeconomic models, with shocks capturing the effects of fiscal policy in economic activity. As these models necessarily entail working assumptions and subjective judgement about the structure of the economy, the measurement of the fiscal impulse is model-dependent.

The ratio between the impact on economic activity and the size of the fiscal policy shock is the so-called fiscal multiplier. The literature on fiscal multipliers is very extensive and gained traction in the aftermath of the Great Financial Crisis. In comprehensive surveys, Castelnuovo and Lim (2019) and Ramey (2019) highlight that estimates vary considerably depending on the computation method (e.g. tax multipliers are found to be larger when based on narrative methods instead of DSGE models), relevant time horizon (short versus medium-to-long term), or the persistence of the shock and whether it was expected or unanticipated. Moreover, the size of fiscal multipliers is a function of country-specific characteristics (such as the exchange rate regime or the degree of openness) and the type of fiscal instruments at play. It is also very much state-contingent: there is some evidence, albeit somewhat fragile, that spending multipliers are larger in periods of slack, while it is consensual that frictions and non-linearities - prominently when interest rates are at the Zero Lower Bound - are associated with higher spending multipliers. In general, the latter exceed multipliers derived from tax cuts, which are found to be procyclical in the sense that they tend to be larger in expansions.

Despite the relevance of composition of fiscal shocks, aggregate fiscal multipliers are often used in practice. These indicate the short term impact on real GDP growth stemming from a 1 per cent of GDP 'balanced' fiscal shock. For example, the European Commission, in its public debt sustainability analysis (DSA), assumes a fixed short-term fiscal multiplier of 0.75, in line with past estimates (Carnot and de Castro, 2015).The Eurosystem DSA considers a 0.55 fiscal multiplier, in line with simulation results obtained with the ECB's New Area Wide Model for a balanced-composition of fiscal consolidation packages.

This article focuses on the short-term impulse of fiscal policy on economic activity. This is proxied on the basis of multipliers specific to key fiscal instruments, as per Table 1. In particular, for each instrument, the relevant multiplier was derived as the average in a sample of empirical studies underlying Gechert (2015)'s meta-analysis. The resulting

figures are very much aligned with Gechert (2015)'s multipliers referring to broader categories of fiscal instruments.

Direct taxes on households	0.31
Direct taxes on corporations	0.12
Social security contributions	0.34
Indirect taxes	0.44
Government consumption	0.98
Government investment	1.07
Social transfers	0.54
Subsidies	0.62
Other net expenditure	0.12

TABLE 1. Fiscal multipliers by instrument: short term impact on real GDP

Source: Authors' calculations based on Gechert (2015) and references therein.
Note: Figures represent the short term impact on real GDP growth of a 1 per cent of GDP shock in each fiscal variable.

After having set the fiscal multipliers, the short-term impulse on GDP growth stemming from the discretionary action of governments is given by the sum, over all instruments, of the product between the multiplier and the respective fiscal shock, as follows:

$$\Delta y_t = \sum_{i=1}^{n} m_i s_{i,t} \tag{6}$$

where y_t is real GDP growth in year t, i is the fiscal instrument, m_i stands for the fiscal multiplier referring to instrument i and $s_{i,t}$ represents the shock on instrument i in period t.

For the identification of the fiscal shocks it is necessary to breakdown the stance by instrument. Out of the three approaches used to derive the fiscal stance in Portugal in the last couple of decades, only two of them allow for this splitting: the top-down approach and the alternative mixed approach proposed in this article. The fact that such breakdown is not possible when measuring the stance with the expenditure benchmark adds to the disadvantages highlighted before. In the case of the top-down approach, the splitting by instrument follows the Disaggregated Framework developed in the context of the Eurosystem for the detailed analysis of fiscal developments (Bouabdallah *et al.*, 2019 and Morris and Reiss, 2020; for an illustration for the Portuguese case, refer to Braz *et al.*, 2019). For the alternative mixed approach the breakdown by instrument follows directly.

The definition of fiscal shock can be broadened to encompass also the impact of automatic stabilisers. However, as discretionary policy action and automatic stabilisers are not independent, an adjustment is required to avoid double accounting. Braz and Carnot (2019) show that this adjustment corresponds to subtracting the product of the output effect of discretionary fiscal policy by the semi-elasticity of the budget balance and the (overall) tax multiplier.

Several obvious caveats apply to the measurement of the fiscal impulse using this approach. Firstly, it is a mechanical partial equilibrium analysis that does not take into account each years' specificities. Secondly, it only allows the assessment of the impact on GDP growth and not on other relevant economic variables. As such, it does not provide a complete counterfactual scenario. Thirdly, it is highly dependent on the choice of multipliers and it cannot grasp the exact specifications of the measures and the prevailing circumstances. Fourthly, it is not capturing possible lags between the materialisation of public revenue or expenditure and the respective macroeconomic impact, like for example those resulting from agents' reactions to government announcements. Lastly, it provides only a short-term/one year assessment, while the dynamics in the following years are also of utmost importance. However, some merits can also be pointed out. The measurement of the fiscal shocks is well founded, increasing the robustness of results. Multipliers were chosen on the basis of averages and a meta study which, given the huge diversity of estimates, is in itself a major advantage. Finally, without having the ambition of providing a counterfactual scenario, which would be in any case impossible to accurately design, the approach renders a rough approximation for the impact on GDP of active fiscal policy in a given year.

5. The 2020 case-study

As highlighted before, and similarly to what happened in almost all countries across the world, the budgetary situation in Portugal deteriorated significantly in 2020 as a result of the Covid-19 pandemic. The deficit reached 5.7 per cent of GDP, deteriorating 5.8 pp relative to the previous year. This resulted from both the working of automatic stabilisers, currently estimated at 3.6 pp, and the adoption of fiscal policy measures to address the emergency health situation and support firms and households. The exact quantification of this expansionary stance hinges on the approaches considered.

Figure 8 quantifies the 2020 fiscal stance broken down by instrument and computed in accordance with the top-down, the mixed alternative and the pure narrative approaches. The use of the latter approach is only made possible due to the atypical nature of 2020 which allows the derivation of the fiscal stance on the basis of a quantification of Covid-related measures on both the revenue and expenditure sides of the budget balance. The categorisation by budgetary instrument is compatible with the multipliers listed in Table 1.[9]

Results shown in Figure 8 place the pure narrative fiscal stance measure (3.1 per cent of GDP) in between the top-down (2.5 per cent) and alternative approach (3.7 per cent) estimates. For the main categories contributing to the stance - subsidies, other net expenditure and public consumption - results are very much aligned. Although pinpointing subsidies is not common in the literature, it was deemed necessary

9. The *proxy* for public consumption encompasses compensation of employees, intermediate consumption, social transfers in kind, all netted out of the proceeds from the sale of goods and services. The residual item net expenditure refers to other current and capital expenditure net of other current and capital receipts.

for 2020 as several firms' support measures are captured in this item in national accounts (including furlough schemes like '*layoff simplificado*'). Net expenditure captures essentially loans granted to air transport companies (*TAP* and *SATA*) and reclassified as capital transfers. The smaller contribution of this category in the purely narrative approach stems from the fact that it is not affected by other transitory transactions (such as the conversion of DTAs, which is not Covid-related), as opposed to the top-down and alternative approaches. Public consumption is capturing the bulk of additional health expenditure related to the pandemic. The slightly higher magnitude of this category in the top-down and alternative approaches is explained by the deduction of sales. The latter declined significantly during the pandemic due to lower demand and restrictions in the access of public services. Since this decline did not stem from the enactment of discretionary measures, it is not captured in the narrative approach. It is also noticeable that developments in other components of social transfers in cash are offsetting the impact of Covid-related measures, while for investment the evolution goes beyond the measures. Finally, regarding taxes and social contributions, the top-down approach captures, in addition to a small impact of measures, composition effects. These were particularly significant in direct taxes paid by households and social contributions. Indeed, in 2020 the wage bill has evolved more favourably than would result from historical elasticities vis-à-vis GDP, reflecting measures that mitigated the impact of the pandemic on the labour market.[10] As such, in the specific case of 2020, the top-down approach may provide a more accurate quantification of active fiscal policy in Portugal.

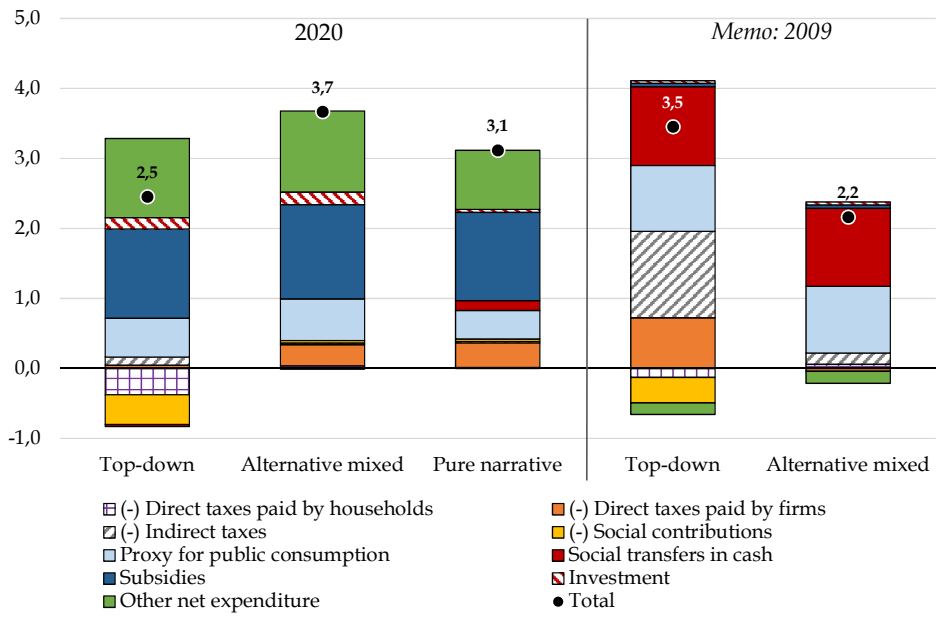

FIGURE 8: Breakdown of the fiscal stance by instrument in 2020 | Percentage of GDP

Sources: Own representation based on authors' calculations.

10. For further details, refer to Box 3 in Banco de Portugal May 2021 Economic Bulletin.

The computation of the fiscal stance with the alternative approach and the breakdown by instrument facilitates a better understanding of the differences between government active fiscal policies in 2020 and in the 2009 crisis. As referred to above, the 2020 fiscal stimulus calculated in accordance to the top-down approach was smaller than that in 2009, which is at odds with the perception that the fiscal packages adopted in response to the Covid pandemic were unprecedented. However, this does not hold when the alternative approach is used (Figure 8). Indeed, the 2009 fiscal outturn was marked by a behaviour of tax revenue much worse than anticipated by average elasticities and the evolution of the macroeconomic bases, particularly as regards direct taxes paid by firms and indirect taxes. These shortfalls are only captured in the top-down approach and may partly have a cyclical nature. In this case, as opposed to 2020, considering these shortfalls as part of active fiscal policy is less accurate. The alternative approach also highlights the different instruments used for the stimulus: although public consumption played a significant role in both cases, the other main explanatory item in 2009 is social transfers in cash, which have an almost nil contribution in 2020.

The fiscal impulse in 2020 can be computed on the basis of the framework described in the previous section. The impact of discretionary fiscal policy on the 2020 GDP growth is calculated as the product of the identified fiscal shocks, according to the three approaches, by the fiscal multipliers. The overall impact on GDP growth reaches 1.4 pp in the top-down approach, 1.5 pp in the pure narrative and 1.8 pp in the alternative approach (Figure 9). The corresponding average multipliers are 0.58, 0.47 and 0.49, respectively, close to the aforementioned 0.55 estimate used in the context of the Eurosystem DSA methodology. The results imply that, in the absence of active fiscal policy, the drop in GDP in 2020 could have reached around 9 per cent (or slightly worse), instead of the observed 7.6 per cent decline.

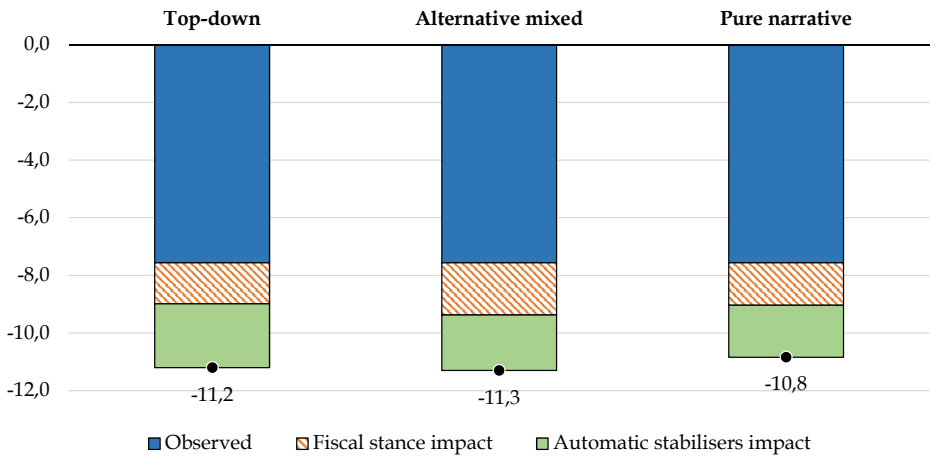

FIGURE 9: Real GDP growth rates: observed and excluding fiscal effects | Percentage
Sources: Own representation based on authors' calculations.

As explained in the previous section, the impact of automatic stabilisers on GDP growth can also be included. The adjustment to eliminate the double accounting between discretionary policy action and automatic stabilisers transforms the 3.6 pp of

GDP estimate for the change in the cyclical component of the deficit in 2020 to around 4 pp.[11] The joint consideration of the two effects, discretionary plus adjusted automatic stabilisers, shows that in their absence GDP would have fallen by around 11 per cent in 2020. Results are also illustrated in Figure 9.[12] Taking into account that the effect of other measures without a direct budgetary impact, like the granting of government guarantees on loans, is not considered, the obtained overall impact may well represent a lower bound for the fiscal impulse.

6. Concluding remarks

The assessment of the magnitude of active government policies - the so-called fiscal stance - is important for the analysis of public finances, providing a base for policy recommendations. In this article, it is argued that the top-down approach, i.e. the change in the structural primary balance ratio to (potential) GDP, is the most comprehensive measure for the fiscal stance. Although structural balances have been subject to heightened criticism in the recent years, due to their unobservable nature and the frequent revisions, this occurs in the context of the multilateral fiscal surveillance framework at the EU level. Outside this scope, structural balances remain a very relevant analytical tool.

There are other approaches for measuring the fiscal stance. On the other extreme of the spectrum, one can find the pure narrative approach which has the advantage of not requiring any estimate of potential output. However, it can also become unstable as the quantification of adopted measures, particularly on the expenditure side, proves extremely difficult. Mixed approaches, like the expenditure benchmark used in the context of the SGP, may provide an alternative. However, in this specific case, the data requirements and the complexity of its computation outweigh the benefits, the latter much reliant on the utilisation of a ten-year average of potential GDP growth. As a result, an alternative mixed approach is proposed in the article, inspired by the work developed by other authors.

In normal times, the computation of the fiscal stance on the basis of the proposed alternative approach is very reliable. First, it builds on a narrative approach for taxes and social contributions. In the presence of significant composition effects or unexplained developments (residuals) in the tax burden, the use of the top-down approach may be, otherwise, commendable. Second, it requires an estimate for potential GDP growth as a benchmark for the non-discretionary evolution of net expenditure. This estimate is easier to obtain in normal times. Lastly, it should be adjusted by the cyclical component of unemployment benefits, which, with the exception of years with pronounced macroeconomic developments, is usually negligible. Under these

11. For the adjustment it was assumed a 0.49 budgetary semi-elasticity, in line with the contemporaneous estimate obtained for Portugal in the context of the Eurosystem methodology. Regarding the overall tax multiplier, the weighted average (taking 2019 weights) of the considered multipliers (0.36) was used.

12. The same exercise applied to 2009 would generate an average overall impact on GDP growth of 3.25 pp, to be compared with 3.5pp in 2020.

conditions, the calculation of the fiscal stance is quite straightforward. It requires, essentially, estimates for changes in tax legislation and temporary measures (in the last years in Portugal, very much concentrated in fiscal support to the banking sector), which are usually publicly available, and for potential output growth, without the need for having estimates in levels.

A comparison between the automatic reaction of public finances - the so-called automatic stabilisers - and the fiscal stance shows no clear pattern in Portugal in the last two decades. In the 2000-2020 period, the average absolute change and the volatility of the fiscal stance is only slightly higher than that of the automatic stabilisers. This holds both in terms of relative size and regarding the combination of active fiscal policy and cyclical conditions. The stronger discretionary reactions of fiscal policy occurred in crisis years: 2003, 2009 and 2020 as far as a stimulus is concerned, and 2011 and 2012, Programme years, in case of a tightening. At times of cyclical improvement, active fiscal policy was more nuanced. In most years results obtained with the alternative approach are qualitatively similar, even if the magnitudes involved might differ somewhat.

The fiscal stance can be used as an input to measure the impact of discretionary policies on economic activity, i.e. the fiscal impulse. As the measurement of the fiscal impulse is model-dependent, in this article its computation relies on a selection from the literature of short-term fiscal multipliers by instrument. These, multiplied by the fiscal shocks obtained from the breakdown of the stance by instrument, allow to compute the short-term impulse on economic activity. The fiscal shocks can be broadened to encompass in addition the effect of automatic stabilisers. Many caveats obviously underlie this very stylised and simplified framework.

The atypical nature of the year 2020 provides an excellent case study for the framework described in this article. In a first step, the 2020 fiscal stance is quantified and disentangled on the basis of three approaches: top-down, alternative mixed and pure narrative. The latter corresponds to the actual magnitude of the measures adopted in response to the Covid-19 pandemic. Results show the pure narrative fiscal stance measure (3.1 per cent of GDP) in between the top-down (2.5 per cent of GDP) and alternative approach (3.7 per cent of GDP) estimates. For the main categories contributing to the stance - subsidies, other net expenditure and public consumption - results are very much aligned. In a second step, the short-term impulse on economic activity is computed. It shows that in the absence of active fiscal policy and the working of automatic stabilisers, GDP drop in 2020 could have reached around 11 per cent, instead of the observed 7.6 per cent decline.

The pandemic crisis and the ensuing strong response by governments created a natural experiment for the application of fiscal analysis tools. Moving forward, the measurement of the fiscal stance and fiscal impulse will most likely be adapted to circumstances and evolve, as it has been the case over the last decades. In the EU countries, interest in these measures will probably not subside in the coming years as, among others, a good understanding of the Next Generation EU fiscal effects and its impact on economic activity will be of utmost importance.

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