



LONG-TERM EFFECTS OF FISCAL POLICIES IN PORTUGAL¹

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Abstract

Purpose - This paper estimates the long-term effects on output of different fiscal policies in Portugal.

Design/methodology/approach – Results are obtained from accumulated impulse response functions associated with unrestricted VAR models that include several public spending and taxation variables in addition to output.

Findings - Empirical results suggest that the effects of fiscal policies are within the Keynesian paradigm for public investment and direct taxation. In turn, non-Keynesian effects dominate in the case of intermediate public consumption and indirect taxation where the effects are negligible.

Practical implications - Cuts in public consumption and increases in indirect taxations seem to be the most desirable instruments for fiscal consolidation in Portugal. Also, deficit-neutral policies that offset increases in public investment with increases in indirect taxes have long-term positive effects on output. The same is true for cuts in direct taxation offset with cuts in all forms of public spending except for public investment.

Originality/value – This is one of the few papers in this literature to use disaggregated public spending and taxation data. It is also a seminal application to the Portuguese case.

JEL Codes: E62, H60

Keywords: fiscal policy, budgetary restraint, fiscal consolidation, Portugal

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1. Introduction

The need for budgetary restraint has been the central feature of the economic policy debate in Portugal in recent years. The existence and persistence of substantial public deficits has become a matter of great concern in that it limits public choices and conflicts with international commitments in the context of the Stability and Growth Programs associated with the European Monetary Union. There are two important practical corollaries of this situation which represent two central policy issues. First, finding ways to control the public deficit without jeopardizing long-term economic performance is a central concern. Second, new budgetary initiatives tend to be conceived in deficit-neutral terms. For both questions, knowledge of the expected effects of fiscal policies in Portugal is of paramount importance.

Fiscal policy has traditionally been considered as an effective instrument for generating revenue, redistributive purposes, smoothing cyclical behavior, etc. Notwithstanding, we know relatively little about the long-term macroeconomic effects of fiscal policies, and there is little consensus among economists as to the magnitude or even the sign of such effects. Conceptually, the conventional view on the effects of fiscal policies reflects the Keynesian paradigm - fiscal expansion increases output while fiscal consolidation reduces output. This is in contrast with the non-Keynesian view that output effects are likely to be small and that it may even be that, through a variety of channels, fiscal consolidation could have positive effects on output.

Empirically, the possibility that the long-term effects of fiscal policies may differ from the Keynesian paradigm was first investigated by Giavazzi and Pagano (1990, 1996). More recently, several authors [see, for example, Akay and Nargelecekenler (2007), Blanchard and Perotti (2002), Cerda et al (2006), De Castro (2003, 2006), Marcellino (2006), Mendonca (2009), Perotti (2005), and Von Hagen et al (2001)] have used vector autoregressive models (VAR) to estimate the long-term macroeconomic effects of fiscal policies in various countries [see Capet (2004), Kamps (2005), and Perotti (2004, 2005) for reviews of the literature on the macroeconomic effects of fiscal policies]. Indeed, VAR models, models routinely used to evaluate the effects of monetary policy, have now also become the instrument of choice in the debate on the long-term macroeconomic impact of fiscal policies.

Overall, while the empirical literature has identified important long-term non-Keynesian effects, the issue of the sign and magnitude of the effects of fiscal policies across different countries is very much an open question. This is true in general and much more so in the case of Portugal, for which the empirical evidence is rather scant and contradictory. With a structural macroeconomic model, the IMF finds important positive effects on output from public spending and important negative effects from taxation while the EU QUEST model finds small effects on output from public spending and no effects from taxation [see OECD (2006)]. In turn, using a structural VAR approach, IMF (2005) also finds that public spending has positive effects while taxation does not seem to have significant effects. Finally, Tondl (2004) finds that fiscal consolidation increases output if pursued through cuts in government spending but reduces output if based on increasing taxes.

The objective of this paper is to provide empirical evidence on the long-term effects of fiscal policies in Portugal in the context of a structural VAR framework with an identification process based on short-term restrictions. We use VAR models that include public spending, taxation and output. As Blanchard and Perotti (2002) point out, since both public spending and taxation affect output and the two variables

are not independent, to estimate the effects of one variable, the other must be included. However, while most of the relevant literature only considers total public spending and total taxation, in this paper we also consider expenditure and taxation at a more disaggregated level. Therefore we are able to provide more detailed answers to the two central policy questions under consideration and shed some light on the contradictory evidence available for the Portuguese case.

The paper is organized as follows. In Section 2, we describe the data and briefly discuss some preliminary empirical results including unit root tests and VAR specification tests. In Section 3, we address the issue of identifying and measuring the effects of fiscal shocks. In Section 4 we present and discuss the empirical results - at both aggregate and disaggregated levels - and derive the relevant policy implications. Finally, in Section 5, we provide some concluding remarks.

2. Data and preliminary empirical resultsⁱ

We use annual data in real terms (millions of 2000 euros) for 1980-2005 published by Eurostat and presented in European Commission (2008). In addition to output (GDP) we consider four public spending categories covering about 88% of public spending in the last decade and two types of taxes covering about 85% of revenues. Specifically, we consider current transfers (GTRA), which represent about 12.5% of GDP in the last decade, intermediate public consumption (GICO), 5.5%, compensation of employees (GWAG), 14.0%, public investment (GINV), 3.6%, direct tax revenues (TDIR), 20.5%, and indirect tax revenues (TIND), 14.0%.

In our empirical analysis we allow for possible structural breaks in 1986 when Portugal joined the European Union and 2001 when Portugal joined the Euro zone. The possible existence of these structural breaks is fully incorporated into our unit roots, cointegration, and VAR specification tests, as well as the VAR estimation procedures. We follow the standard procedure in the literature (see, for example, Maddala and Kim, 1998), and consider the possible significance of two dummy variables for the relevant periods in every step of the analysis.

In terms of the empirical implementation, we start by determining the order of integration of the variables. The unit root results are based on Augmented Dickey-Fuller tests. The optimal number of lags is selected using the BIC test and deterministic components and dummies for the structural breaks are included when statistically significant. Test results suggest that all of the series are non-stationary in log-levels and stationary in first differences of log-levels. Since these tests, however, are known to be very sensitive to the sample size [see, for example, Dejong et al., (1992) and Phillips and Xiao (1998)] we further test for unit roots using the Dickey-Fuller Generalized Least Square test proposed by Elliot et al. (1996) and the test proposed by Ng and Perron (2001). All test results point in the direction that all series are stationary in first differences.

We now test for cointegration among the different variables – output, aggregate spending and aggregate tax revenues. Due to our relatively small sample we use the Engle-Granger procedure, which is less vulnerable than the Johansen procedure to the small sample bias toward finding cointegration when it does not exist [see, for example, Gonzalo and Lee (1998) and Gonzalo and Pitarakis (1999)]. Following the standard Engle-Granger procedure, we perform three tests each one with a different endogenous variable. This is because it is possible that one of the variables enters the cointegrating relationship with a

statistically insignificant coefficient. In this case, a test that uses such a variable as the endogenous variable would not detect cointegration. The optimal lag structure was chosen using the BIC, and deterministic components and dummies for the structural breaks were included if statistically significant. Test results uniformly suggest that at the 5% level of significance we fail to reject the null hypothesis of no-cointegration. Although no cointegration test were performed at a more disaggregated level, the fact that there is no evidence for cointegration at the aggregate level makes it rather unlikely for cointegration to exist when the spending and taxation variables are disaggregated.

Given the empirical evidence that all variables are stationary in first differences and that they are not co-integrated we proceed to estimate a VAR model in first differences of log-levels or growth rates. In order to gain greater insights into the effects of different types of fiscal policies, we consider two different models. The first is an aggregate model which includes output (GDP), government spending (G), an aggregate of the four spending categories introduced above, and tax revenues (T), an aggregate of the two revenue categories considered above. The second is a disaggregated model which in addition to output (Y) considers separately the four spending categories (GTRA, GICO, GWAG, and GINV) as well as the two sources of revenues (TDIR and TIND).

For the selection of the specifications of the VAR models, we use the BIC test. The VAR specification has several dimensions: the order of the VAR specification, the specification of the deterministic components, and the possibility of structural breaks in 1986 and 2001. Test results suggest that for both models, a first order VAR model with a linear constant and no trend is the appropriate specification. Furthermore, we found no evidence of a structural break in 1986 but did find evidence of a structural break in 2001. ⁱⁱ

3. Identifying and measuring the effects of fiscal innovations

In order to accommodate the contemporaneous correlations among shocks in the different variables we follow the standard procedure in the literature [see, for example, Kamps (2005), Fatas and Mihov (2001) and Favero (2002)] and consider the Cholesky decomposition of the variance-covariance matrix of the estimated residuals. It is well-known that the ordering of the variables has potentially great repercussion on the estimated effects of policies. Therefore, to determine our central case results we turn to economic intuition to decide on the ordering the variables. We present, however, the whole range of results for all the Cholesly decomposition strategies.

In terms of the aggregate model, to identify our central case we assume first that, as in Blanchard and Perotti (2002) and De Castro (2006), public spending is essentially exogenous. This means that, on impact, output responds to changes in public spending but public spending does not respond to changes in output. The institutional framework implies that decisions on public consumption spending are undertaken before the public sector obtains information about the actual performance of the economy. The portions of public spending, such as unemployment benefits, which seem to be more immediately responsive to changes in the economic conditions are a very small part of public spending.

Secondly, we assume that output affects tax revenues contemporaneously but the converse is not true. This means that on impact, taxation responds to changes in output. Indeed, in the very short term changes in tax revenues are due exclusively to changes in the tax base as changes in economic activity affect tax

collections. Within a year we also allow for changes in economic activity to affect tax discretionary measures. In turn, output does not respond to changes in tax revenues. This is because the political process implies substantial delays between the consideration and the implementation of changes in the tax rates which at the margin would affect output and to the fact that consumption and investment plans take some time to adapt to a policy even after enacted. This assumption is consistent with Bernanke and Mihov (1998) and with the argument in Blanchard and Perotti (2002) that taxation can be adjusted in response to unexpected changes in output within the year and therefore ours is the appropriate assumption when using annual data.

These two assumptions imply that the ordering of the variables considered in the central case is public spending, output, and tax revenues (G, GDP, T). The accumulated impulse response functions under these assumptions are presented in Fig 1 and the corresponding results are present in Table 1. Despite the fact that these are sound orthogonalization assumptions from a conceptual perspective we will also consider later their empirical plausibility.

As to the ordering of the variables in the disaggregated model we maintain the assumptions above for the aggregate model. As such, public spending variables appear first, followed by output, and by tax revenue variables. Obviously, however, we need further assumptions to identify our central case. On the revenue side, we assume that indirect tax revenues do not contemporaneously affect direct tax revenues, while the reverse is true. That is to say, we assume that changes in direct tax revenue affect disposable income, changes which lead to changes in consumption and in indirect tax revenues. On the flip side, we assume that changes in indirect tax revenue have no contemporaneous effect on direct tax revenue. As a result, the ordering of the tax variables in the central case is (TDIR, TIND).

On the expenditure side, we assume first that current spending variables - public transfers, intermediate consumption, and compensation of employees - precede public investment. This assumption reflects the standard view that the budgetary decisions on public investment are conditioned by the decisions on current spending while the reverse is not true. Second, we assume that compensation of public employees does not affect expenditure on current transfers and intermediate consumption contemporaneously. Finally, we assume that intermediate consumption does not affect public transfer contemporaneously while the reverse is true. Accordingly, the ordering of the variables for the central case results is (GTRA, GICO, GWAG, GINV, GDP, TDIR, TIND). The accumulated impulse response functions for the central case are presented in Figure 2. The disaggregated results under these assumptions are reported in Table 2 which also includes the ranges of variation of the results considering all the possible orderings within the confines of the central assumption for the aggregate model.

In measuring the effects of changes in public spending we consider the effects of a one-percentage point, one-time one standard deviation innovation in the growth rate of public spending. The accumulated impulse-response functions associated with the VAR estimates and the policy function described above as well as the corresponding error bands are presented in Figures 1 and 2. We observe, without exception, that the accumulated impulse response functions are very smooth and that most of the growth rate effects occur within the first four-five years after the initial fiscal shocks occur. The error bands surrounding the point estimates for the accumulated impulse responses convey uncertainty around estimation and are

computed via bootstrapping. We consider one standard error bands that correspond to a 68% posterior probability as suggested by Sims and Zha (1999) and now standard in the literature.

We report our empirical results in the form of the elasticities of output derived from the accumulated impulse response functions. These elasticities measure the long-term accumulated percentage change on output of a 1% initial shock on the fiscal variable under consideration.ⁱⁱⁱ To have a better idea of the comparative effects of different fiscal changes we consider their cumulative multipliers. These are calculated in the conventional manner from the elasticities and the ratios of the fiscal variables to GDP. We use average ratios for the last ten years of the sample period. This allows us to interpret the cumulative multipliers as the accumulated long-term effects of policies implemented at the end of the sample period while avoiding business cycle effects.^{iv}

4. On the long-term effects of fiscal innovations

4.1 On the aggregate effects of fiscal policies

The results obtained with the aggregate model are reported in Table 1 and are based on the accumulated impulse response functions in Figure 1. The long-term elasticity of output with respect to public spending is 0.43. This estimate is somewhere between the 0.85 elasticity estimated by the IMF structural model and the 0.12 estimated by the EU QUEST model and is consistent with the IMF (2005) estimates [see OECD (2006)] but in contrast with Tondl (2004). This result is also in contrast with the international evidence in Marcellino (2006) where very limited effects are found in the cases of France, Germany, Italy, and Spain. It is, however, very much in line with the evidence for the US presented in Blanchard and Perotti (2002).

Our estimate of the elasticity of output implies that a one euro reduction in public spending reduces output in the long term by €1.21. This cumulative multiplier has two components – an effect of €1.68 on impact followed by an intertemporal accumulated effect of -€0.47. This suggests important short-term demand effects and negligible longer-term effects. Indeed, the response of output becomes insignificant after five years. Accordingly, the estimated effects of aggregate public spending are Keynesian in nature.

In turn, the long-term elasticity of output with respect to tax revenues is -0.63. This estimate is close to the -0.5 value estimated in the structural IMF model and consistent with Tondl (2004) but in contrast with the EU QUEST model and the IMF (2005) estimate of no output effects of taxes [see, again, OECD (2006)]. This result is also within the confines of the international evidence in Marcellino (2006) where strong negative effects are found for Germany, but small effects are identified for France, Italy, and Spain - and in Blanchard and Perotti (2002) where strong negative effects are found for the US.

The cumulative multiplier of taxation is -€1.83. This cumulative multiplier is based on the assumption of a zero effect on impact and therefore it reflects exclusively the intertemporal accumulated effects of changes in tax revenues, which are strongly significant throughout. Therefore, an increase in taxation is estimated to have Keynesian effects. As in Blanchard and Perotti (2002), however, we find that unlike postulated by Keynesian theory the spending multiplier is smaller than the tax multiplier.

To assess the sensitivity of our estimates to the orthogonalization strategy we ran the impulse response functions derived under all other possible alternative assumptions. We consider first the alternatives in Blanchard and Perotti (2002) where public spending and tax revenues lead output. We find that when tax revenues lead output, taxation would have a very large positive effect on output on impact

and a negligible long-term accumulated effect, a rather unreasonable result. This precludes the cases in which taxation leads output and suggests that the positive contemporaneous correlation between shocks in output and taxation is better unraveled as assuming that output leads taxation. In turn, if we allow output to lead public spending we find that output has a very strong negative effect on public spending on impact, again a rather unreasonable result. Clearly the positive contemporaneous correlation among shocks in output and public spending is more plausibly unraveled assuming that public spending leads output. Ultimately, we find that any deviations from our orthogonalization assumptions would lead to counter-intuitive contemporaneous effects.

4.2 On the disaggregated effects of fiscal policies

The results obtained with the disaggregated model are reported in Table 2 and are based on the accumulated impulse response functions presented in Figure 2. Let's consider first the results on the expenditure side. Public transfers (GTRA) have a long-term accumulated elasticity of 0.23. This translates into a cumulative multiplier of €1.81. These figures essentially reflect the effect on impact since the intertemporal accumulated effects are negligible. In fact, the effect on output becomes insignificant after four years. Therefore, the short-term demand effects are dominant and our results are within the Keynesian paradigm.

Intermediate public consumption (GICO) affects output with a long-term accumulated elasticity of 0.03. This implies a cumulative multiplier of €0.62, which can be decomposed into an effect on impact of €0.27 and an intertemporal accumulated effect of €0.35. These effects, however, are very small and not significantly different from zero. This is consistent with the widespread notion that a lot of intermediate public consumption is actually wasteful. At any rate, our results are at best only marginally within the Keynesian paradigm.

The story is different, however, when we consider public wages (GWAG). The long-term accumulated output elasticity is -0.37 which corresponds to a cumulative multiplier of -€2.68. The cumulative multiplier reflects a positive effect on impact of €0.33 and a strong negative accumulated intertemporal effect of -€3.01. This means that although, on impact, demand effects dominate and therefore the effects are Keynesian in nature, such effects are completely obscured by the strong long-term non-Keynesian effects. This is a pattern consistent with the findings in Alesina et al (2002). Increases in public sector wages, a heavily unionized sector, spill over to private sector wages which over time reduces profit margins and private investment and, ultimately, output. In this case, cuts in public wages are expansionary. It should be noted, however, that zero is inside the region between the two one-standard deviation band both on impact and for the subsequent accumulated effects. Accordingly, this result has to be taken with caution.

Finally, public investment (GINV) affects output with a long-term accumulated elasticity of 0.15 which corresponds to a cumulative multiplier of €4.69. This cumulative multiplier results from a €2.44 change on impact reflecting demand-side effects as well as an intertemporal accumulated effect of €2.25 which reflects longer-term supply-side effects. These results for public investment – positive elasticities and large cumulative multipliers – are in line with the findings in Pereira and Andraz (2005) on the importance of public investment in transportation infrastructure in Portugal and Pereira and Pinho (2008) on the effects of general public investment in Portugal.

Consider now the tax revenue side. Our estimation results suggest that changes in direct tax revenues (TDIR) have substantial effects. The accumulated long-term elasticity is -0.57. This implies a cumulative multiplier of -€2.78 which, by construction, reflects essentially intertemporal accumulated effects. This result is consistent with the Keynesian paradigm and is also consistent with other empirical evidence for the Portuguese case as in Pereira (1998) and Pereira and Andraz (2009) where increases in social contributions are shown to have a strong negative effect.

Finally, the effects of indirect tax revenues (TIND) on output are negligible. The long-term accumulated elasticity is -0.03 and the corresponding cumulative multiplier is -€0.18. This result is at odds with the Keynesian paradigm but is consistent with the long-term neutrality of value added taxes in Portugal identified by Pereira and Rodrigues (2004) in the context of a dynamic general equilibrium model. The fact that indirect taxes are essentially neutral is not shocking. In Portugal, indirect taxes are mostly consumption taxes, which with relatively inelastic consumption patterns and habits do not have significant demand effects.

In terms of the sensitivity analysis of the results with respect to the orthogonalization assumptions, we should first note that, consistent with the assumptions and evidence at the aggregate level, the ranges of variation reported on Table 2 correspond to cases in which all public spending variables are ordered first followed by output and by the tax revenue variables. Now, a striking feature is that the range of variation for the effects of the public spending variables is very narrow and therefore our central results are very robust. The same is true for our central results for direct taxation. In the case of the effects of indirect taxation, however, reversing the order vis-à-vis the central case, i.e., letting indirect taxation lead direct taxation would lead to substantially negative effects on impact and an overall negative effect of -€1.44. This result, however, is conceptually implausible since it would require the private sector to consider their indirect tax burden, which affects their consumption decisions, before their direct tax burden, which affects their income decisions.

4.3 On the effects of fiscal consolidation

The first policy question we are attempting to answer has to do with the potential long-term effects of budgetary consolidation. What will be the long-term output effects of spending cuts or tax increases? Our aggregate results suggest that consistent with the Keynesian paradigm budgetary consolidation would lead to negative long-term effects regardless of whether it would be based on cuts in public spending or based on raising taxes, although our results are more robust with respect to taxation.

Disaggregate results, however, show a more complex picture. On the expenditure side, fiscal consolidation through cuts in public investment and possibly in public transfers would indeed lead to negative long-term effects on output while cut in intermediate public consumption would be essentially neutral. Cuts in public wages, however, could possibly in fact be expansionary in nature. On the revenue side, fiscal consolidation through increases in direct taxation would have negative long-term effects on output but through increases in indirect taxation would be neutral in the long-term. This means that likely the best instruments for fiscal consolidation are cuts in public wages and intermediate public consumption and increases in indirect taxes.

4.4 On the effects of deficit-neutral fiscal policies

The second policy question we are attempting to answer in this paper has to do with the potential effects of pursuing deficit-neutral policies. What will be the long-term effects of policies in which increases in public spending are offset by increases in tax revenues? The cumulative multiplier figures for the different expenditure and revenue variables allow us to answer this question. Our aggregate results suggest that budget-neutral public spending initiatives have negative long-term output effects an idea reinforced by the robustness of the taxation results.

Again, the disaggregate results paint a much richer picture. Clearly, the effects on output of deficit-neutral policies depend on the combination of expenditure and taxation instruments considered. Our results suggest that deficit-neutral increases in public investment and possibly in public transfers would have a positive long-term effect on output when financed through indirect taxes. However, if financed through direct taxation only deficit-neutral increases in public investment would have positive long-term effects. The flip side of the coin is that cuts in direct taxes offset by cuts in public transfers, public consumption, or public wages would likely have positive long-term effects on output.

5. Conclusions

In this paper we estimate the long-term output effects of different fiscal policies in Portugal based on unrestricted VAR models that include several public expenditure and tax revenue instruments. Empirical results suggest that the effects of fiscal policies are within the Keynesian paradigm for both aggregate expenditure and taxation. The disaggregation of the public variables, however, shows much richer patterns not always in tune with the Keynesian paradigm. On the expenditure side, while the results for public investment are Keynesian in nature, the effects for intermediate consumption are negligible. On the revenue side, the effects of direct taxation are within the Keynesian paradigm while the effects of indirect taxes are negligible.

Our results have clear policy implications. If the government wants to control the public budget while minimizing the costs to the economy, the most promising strategy would likely be cuts in public wages and in intermediate consumption. Reductions in public investment and possibly in public transfers would be much more problematic. On the flip side, increases in direct taxes would be rather undesirable while increases in indirect taxes would be less problematic. In turn, when considering deficit-neutral policies, our results imply that significant positive effects on output would be generated by increases in public investment offset by either direct or indirect taxes. The same would likely be true for reductions in any tax revenues compensated by reductions in public wages as well as offsetting reductions in direct taxation and any form of public spending except for public investment.

Despite and maybe because of the practical relevance of our results it is prudent to conclude with several cautionary notes. First, in this paper we consider only the effects of non-systematic fiscal policies, i.e., policy shocks. The effects of systematic policies could be rather different. Second, we are considering exclusively the effects on output. It would be important to consider the effects on inflation and interest rates for example. Third, we are making the implicit methodological assumption that shocks in fiscal policy do not have effects before they are implemented. Fourth, we are making the implicit methodological assumption that non-linear effects of fiscal policies are not relevant. This would be problematic in the context of credibility or solvency issues. Finally, there is the question of whether or not

the enhanced fiscal discipline associated with the Stability and Growth Pact and the existence of a single currency in the EMU area in more recent years could significantly change the fiscal effects identified using data for a period that mostly pre-dates these changes.

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Figure 1 – Accumulated responses of GDP at the aggregate level

(accumulated response to one S.D. innovation and one S.E. bands on the two sides of the response)

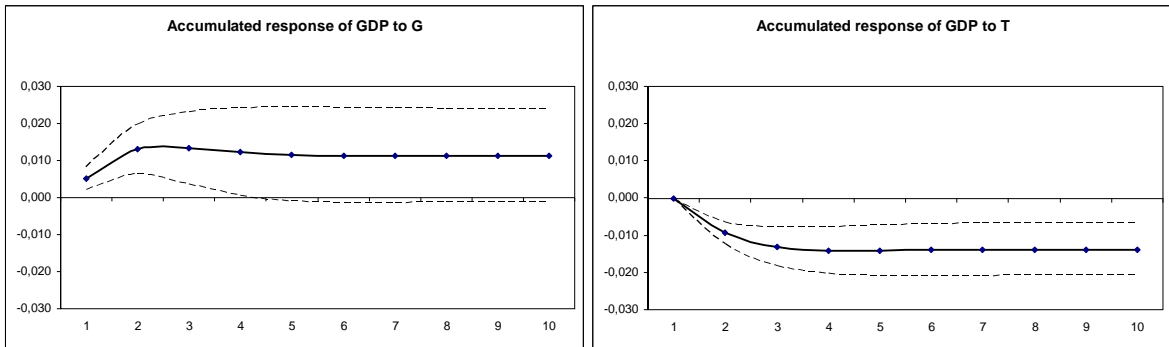


Figure 2 - Accumulated responses of GDP at the disaggregated level

(accumulated response to one S.D. innovation and one S.E. bands on the two sides of the response)

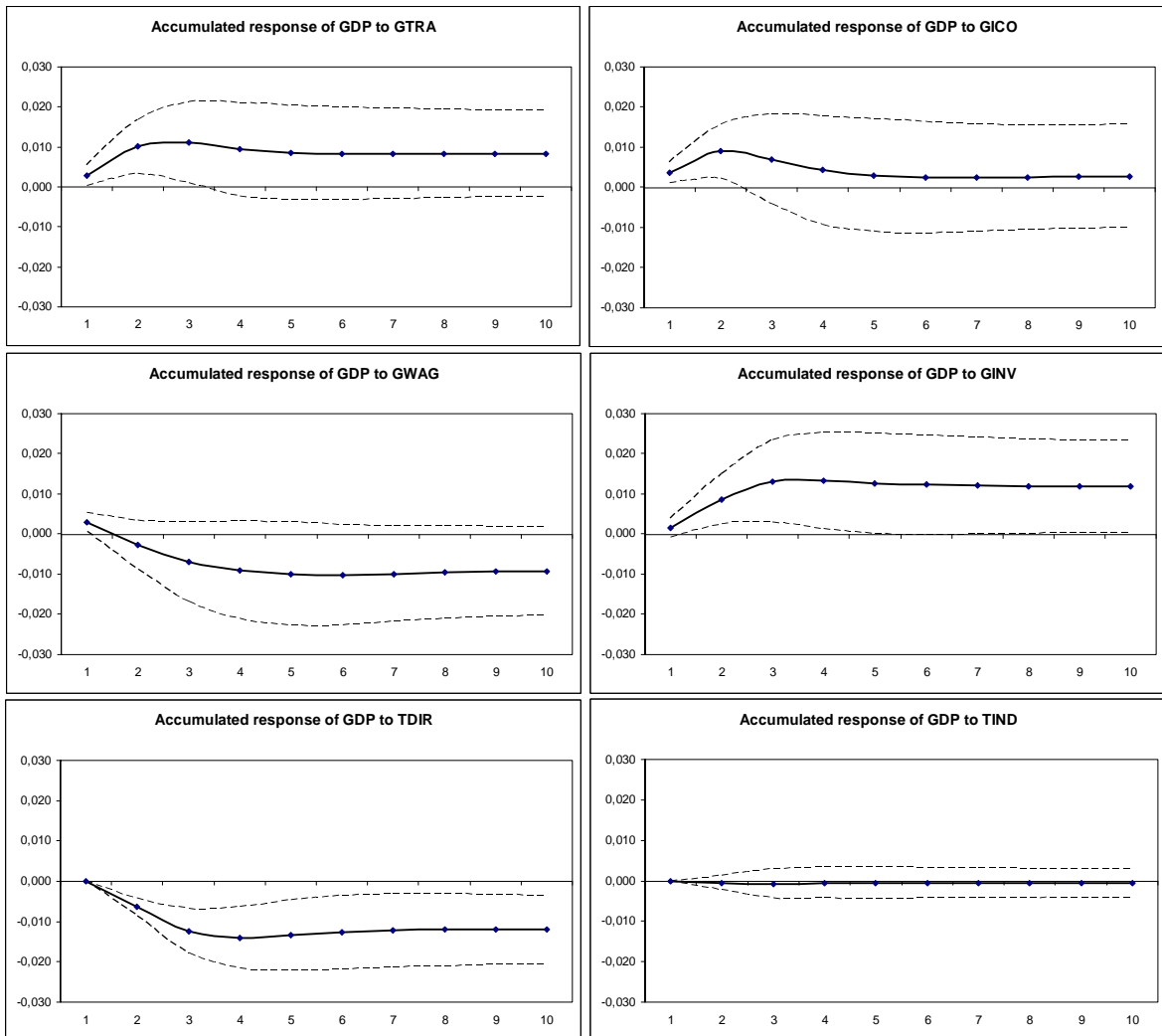


Table I - Aggregate Effects of Fiscal Policies

	(G, GDP, T)	
Elasticities	G	T
Central Case	0.43	-0.63*
Intertemporal effects	-0.17	-0.63
Contemporaneous effects	0.60	0.00
Cumulative multipliers		
Central Case	1.21	-1.83*
Intertemporal effects	-0.47	-1.83
Contemporaneous effects	1.68	0.00

* An asterisk indicates that in the long-term 0 is outside the region between the two one-standard error bands.

NB - The intertemporal effects are obtained by assuming no contemporaneous effects while the contemporaneous effects are obtained assuming the central Cholesky decomposition assumption.

Table II – Disaggregated Effects of Fiscal Policies

	GTRA	GICO	GWAG	GINV	TDIR	TIND
Elasticities						
Central Case (Range of Variation)	0.23 (0.21 / 0.25)	0.03 (0.03 / 0.05)	-0.37 (-0.35 / -0.45)	0.15* (0.12 / 0.15)	-0.57* (-0.56 / -0.57)	-0.03 (-0.03 / -0.24)
Intertemporal effects	-0.01	0.02	-0.42	0.08	-0.55	-0.02
Contemporaneous effects	0.24	0.01	0.05	0.07	-0.02	-0.01
Cumulative multipliers						
Central Case (Range of Variation)	1.81 (1.66 / 1.97)	0.62 (0.62 / 1.03)	-2.68 (-2.54 / -3.26)	4.69* (3.37 / 4.69)	-2.78* (-2.73 / -2.78)	-0.18 (-0.18 / -1.44)
Intertemporal effects	-0.07	0.35	-3.01	2.25	-2.68	-0.12
Contemporaneous effects	1.88	0.27	0.33	2.44	-0.10	-0.06

* An asterisk indicates that in the long-term 0 is outside the region between the two one-standard error bands.

NB - The intertemporal effects are obtained by assuming no contemporaneous effects while the contemporaneous effects are obtained assuming the central Cholesky decomposition assumption. The range of results considers all the relevant Cholesky decomposition strategies.

Notes

ⁱ Details of all of the empirical test results discussed in this section are available from the authors upon request.

ⁱⁱ It should be mentioned that that despite the relatively small sample size, the impulse response function results are rather stable across different VAR specifications and robust to the omission of data points early or late in the sample. Therefore, and since the focus of the paper is on long- term simulations results and not on parameter or structural analysis, any possible instability of parameter estimates is of little consequence since it does not translate into instability of the long terms impulse response function results. Finally, it should be mentioned that, such samples sizes are not uncommon in general and more specifically in the related literature with a Portuguese focus [see, for example, Pereira and Andr az (2005) and Pereira and Pinho (2008).“

ⁱⁱⁱ Please note that the values of the elasticities reported in Tables I and II cannot be read directly from Figures 1 and 2. This is because while Figures 1 and 2 report the accumulated response of GDP to one standard deviation innovations in the fiscal variables, the elasticities are normalized to a 1% initial shock in the fiscal variables.

^{iv} “To measure the long-term effects of different fiscal policies we use, as commonly done in the literature, the long-term fiscal multipliers. These indicators are obtained from the accumulated impulse response functions. Therefore, they capture the accumulated effects in the long term of the initial fiscal shocks as filtered through the short-term identifying assumptions and the dynamic VAR feedbacks. Although the VAR structure itself is a relatively short-term structure the fact that it is specified in growth rates implies that fiscal policies have long-term level effects, and this is what the long-term multipliers are designed to capture.”