FISCAL CONSOLIDATION IN A SMALL EURO AREA ECONOMY*

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ABSTRACT

This article focuses on the costs and benefits of a fiscal consolidation in a small euro area economy. The macroeconomic impacts and the welfare analysis are conducted in a New-Keynesian general equilibrium model with non-Ricardian agents. We define a benchmark fiscal consolidation strategy based on a permanent reduction in Government expenditure. We find that, over the long run, fiscal consolidation leads to a considerable increase in the level of output and consumption, and is welfare improving. In addition, the gains are boosted if the fiscal strategy also involves a tax reform that shifts the tax burden away from labour income towards the final goods consumption. However, important short-run costs arise, notably through output, consumption and welfare losses. Finally, we assess the effect of alternative fiscal consolidation paths in terms of its degree of front loading, speed of completion and interaction with the risk premium.

1. Introduction

The Great Recession triggered by the international financial crisis led to the implementation of massive fiscal stimulus plans in many economies. In addition, the injection of public funds in many troubled financial institutions assumed a crucial role in taming systemic risk. In this context, public debt increased substantially across developed economies, including the United States, euro area, the United Kingdom and Japan. These developments raised increasing concerns over public finances sustainability, bringing the discussion on the need of a fiscal consolidation to the center stage of the economic policy debate.

In a context of tense global financing conditions created by increased risk aversion, the uncertainty on public finances sustainability in many economies led to a reappraisal of the sovereign debt risk pricing, which translated into an uneven increase in Government bond yields, in particular across euro area economies. These developments challenged the widely-held belief that the euro was a bulletproof vest against significant risk price discrimination among participant economies, since the common monetary policy coupled with the Stability and Growth Pact rules were taken as almost ensuring perfect risk-sharing.

The international financial and economic crisis put in evidence the heterogeneity of euro area economies and discredited the perfect risk sharing assumption. Euro area economies revealing more fragilities, including larger fiscal imbalances, asset price bubbles and/or increasing difficulties of the banking system in acceding wholesale international financial markets, started to be discriminated in what respects debt pricing. More precisely, higher quality sovereign debt experienced a relative price increase

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against lower quality debt. In this context, restoring debt sustainability after the crises, evaluating the benefits of fiscal consolidation in the long-run and creating conditions for a successful consolidation process have become a major focus of the current economic literature (see Rother 2010, Mulas 2010 and Barrios 2010).

This article focuses on the short, medium and long-run impacts on economic activity, demand conditions and welfare of a fiscal consolidation based on specific fiscal policy measures, encompassing a permanent cut in government expenditure and a temporary increase in labour income taxes. Fiscal consolidation is defined herein as a permanent reduction in the public debt ratio. The impact of unbalancing the fiscal instruments towards a stronger increase in consumption taxes in exchange for a smaller increase on taxation on labour income is also analyzed, which in the context of a small-open economy integrated in a monetary union is a possible way of implementing a real exchange rate devaluation, thereby regaining competitiveness and reducing the external imbalance. This might be an important objective in the case where the fiscal deficit and the external deficit (the "twin deficits") are a major concern of domestic authorities. The impact of alternative timings to complete the fiscal consolidation is also addressed. Finally, we consider the case in which the consolidation strategy restores credibility, bringing interest rates to levels below the pre-consolidation period.

The discussion is based on *PESSOA*, a New-Keynesian model for a small euro area economy. The structure of the article is as follows. The model is presented in section 2. Section 3 addresses the impact of alternative fiscal consolidation strategies, with alternative timings, on the main macroeconomic aggregates and on welfare. Section 4 presents a scenario in which the fiscal consolidation is accompanied by a reduction in the domestic risk premium. Section 5 concludes and draws some policy implications.

2. *PESSOA*: a model for a small euro area economy

PESSOA features a small open economy integrated in a fully-fledged monetary union, the euro area.[1] Its structure mainly builds on the IMF's model, Global Integrated Monetary and Fiscal model (GIMF), presented in Kumhof and Laxton (2007). It is assumed from the outset that the rest of the monetary union is not affected by domestic shocks, implying that monetary policy decisions are orthogonal to domestic developments as in Adolfson (2007). In the small open economy setup, the domestic economy is modeled in detail, while the rest of the monetary union modeling is very parsimonious. Contrary to most general equilibrium models in the literature on small open economy, *PESSOA* has intrinsic non-Ricardian features: finitely-lived households in line with the stochastic finite lifetime framework (see Blanchard (1985), Yaari (1965), Buiter (1988) and Weil (1989)); distortionary taxation on households consumption, labour and capital income; and hand-to-mouth households (see Gali *et al.* (2007)). The fiscal block of the model is detailed enough to account for shocks over the several types of distortionary taxation, lump-sum transfers to households, and government expenditure.

Since *PESSOA* is designed for a small open economy integrated in a monetary union, the adjustment mechanism of the economy to domestic shocks is rather different from the standard general equilibrium model setup, in which monetary policy and real interest rate movements are crucial to render the model dynamically stable. In *PESSOA*, monetary policy is trivial in the sense that the domestic interest rate is orthogonal to domestic shocks and can only deviate from the rest of the union rate by a risk premium,

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1 See Almeida, V. Castro, G., Félix, R. M. and Maria, J. R. (2011) "Fiscal policy in a small euro area economy", Banco de Portugal, *Economic Bulletin* – Spring 2011.

assumed to be constant. This implies that domestic shocks affecting domestic inflation developments tend to generate powerful effects on the real interest rate, amplifying domestic economy fluctuations. The dynamic stability of the model is ensured instead by an active role of the real exchange rate in the adjustment of international trade in goods and assets. Domestic agents in *PESSOA* are assumed to trade in goods and assets/debt solely with agents in the monetary union. Therefore, real exchange rate fluctuations have sizeable impacts on competitiveness, trade and thus in the net foreign asset/debt position of the economy. Since foreign prices developments are assumed to be independent of domestic shocks, the real exchange rate pins down uniquely the domestic price level.

The model is populated by two types of households: inter-temporal optimizers that can smooth out consumption by trading in domestic and foreign bonds; and hand-to-mouth households that can only perform intra-temporal optimization, since they do not access asset markets. Both types of households derive utility from consumption and leisure, which is modeled by means of a constant relative risk aversion utility function and is subject to external habit formation.

Concerning the production block of the model, two types of firms are featured: manufacturers and distributors. All firms operate in monopolistic competition in their output markets, charging a mark-up over their marginal cost, and in perfect competition in their input markets, rewarding production factors at their marginal productivity. The model features a number of nominal and real rigidities that give rise to realistic short-run impacts and create room for stabilization policy.

The government consumes a particular good and performs transfers across households. To finance its activities, the government levies taxes on labour income, firms' dividends and households' consumption and benefits from non-tax revenues, stemming from EU transfers. Furthermore, the government issues one-period bonds and pays an interest rate on the stock of bonds held from one period to the next, which might differ from the monetary union interest rate due to the risk-premium. To prevent a divergent debt path, a fiscal rule is imposed to ensure that the debt to GDP ratio converges to a pre-specified target value that uniquely pins down the fiscal balance.

3. Macroeconomic effects of a fiscal consolidation

This section assesses the macroeconomic effects of a fiscal consolidation in a small euro area economy. Fiscal consolidation is defined as a permanent reduction in the target public debt ratio and is implemented through a gradual fiscal tightening, followed by stabilization around the new steady-state level. Over time debt falls and so does Government interest outlays, which allows for a larger primary deficit in the new steady-state.

The analysis presented in this section is conducted by implementing a set of fiscal policy simulations using the model described in section 2, to study the costs and benefits of fiscal consolidation. We analyze the effects of two alternative fiscal consolidation scenarios: a pure fiscal consolidation and a fiscal consolidation accompanied by a tax reform. Those scenarios are based on a very specific set of policy measures, which were selected partly on the basis of their macroeconomic impacts. Therefore, before discussing those scenarios, subsection 3.1 presents four simulations in which the impact of each available fiscal policy instrument on the main macroeconomic variables is analyzed in isolation to illustrate the main transmission channels.

Subsection 3.2 studies the transitional dynamic, the steady-state and the welfare impacts of a pure fiscal consolidation program and of a fiscal consolidation program accompanied by a tax reform. The first scenario is focused on the potential benefits and costs of a fiscal consolidation, while in the second

scenario it is examined whether costs can be minimized and benefits can be enhanced by a change in the policy mix.

In subsection 3.3 the pure fiscal consolidation scenario is expanded to implement a sensitivity analysis focused on the duration of the consolidation process. More specifically, we consider two alternative scenarios. The first one evaluates the possibility of a protracted consolidation period (the "slow consolidation scenario"), which is characterized by a less aggressive policy towards reaching the target debt-to-GDP ratio. The second one considers a shorter consolidation period (the "fast consolidation scenario") with a more aggressive policy towards reaching the target debt-to-GDP ratio.

Throughout this section, the fiscal consolidation experiments are all based on a permanent reduction in the public deficit of 1 per cent of the initial steady-state GDP. Given the assumptions of the model for nominal interest rates and nominal GDP growth, around 4.5 and 4 per cent respectively, a permanent reduction in the public deficit of 1 per cent of the initial steady-state GDP corresponds to a decline in the Government debt-to-GDP ratio of around 25 p.p. in the long-run. However, given the extremely long-lived dynamics of fiscal consolidation, changes in flows take literally decades to be fully reflected in the corresponding public debt stock. Thus, in the following subsections impulse response functions are shown by lines for the first 10 years and by points representing outcomes for longer horizons.

3.1. The macroeconomic impact of alternative fiscal instruments

Chart 1 presents the results of 4 alternative fiscal consolidation instruments, with one fiscal instrument being used at a time (transfers to households, Government consumption, tax burden on wage income[2] or consumption tax) to reach a reduction on the fiscal deficit equal to 1 per cent of initial steady-state GDP. In each simulation, the remaining tax rates or spending components are held constant.

Starting with fiscal consolidation based on transfers to households, it affects macroeconomic outcomes mainly through their impact on households' wealth and on the resulting responses of labour supply and private consumption.[3] A reduction in transfers has a significant negative wealth effect, leading to a drop in consumption and leisure and thus to an increase in labour supply.[4] Rule-of-thumb households strongly cut their consumption and simultaneously increase hours worked to compensate foregone income. Consumption of asset holders is less affected, reflecting expected dividend prospects and the possibility of consumption smoothing. Moreover, the shift in labour supply leads to lower real wages and to a decrease in the firm's' marginal costs implying a drop in domestic prices and a real exchange rate depreciation.

A fiscal consolidation based on a decrease in the demand for Government consumption goods, which are labour intensive, implies a reduction in labour demand. As a consequence, real wages decline and so households' wealth and private consumption. In this simulation, unlike what happens in the case of transfers cuts, the impact in labour supply and consumption is similar for both types of households. Moreover, the Government consumption goods employ resources that would otherwise be available
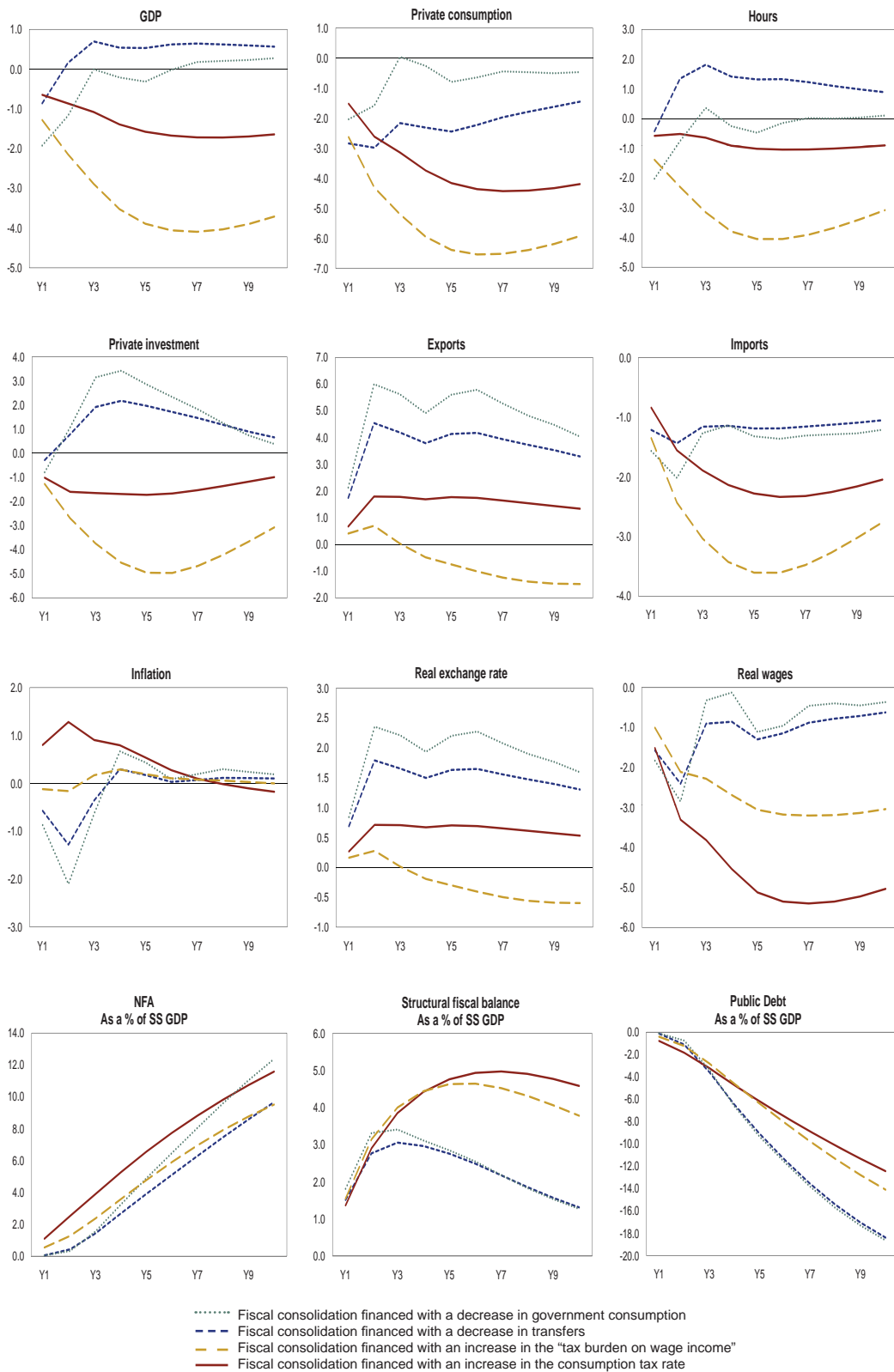
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2 "Tax burden on wage income" corresponds to the labour income tax rate paid by employees and employers' social security contributions, which are adjusted in equal magnitudes in terms of percentage point changes in their average tax rates.

3 For a detailed analysis on the impact of alternative fiscal instruments on the main macroeconomic variables and the implied transmission mechanisms see Almeida *et al.* (2010).

4 The underlying assumption behind the effect on labour supply is that all households act as labour suppliers, and therefore a cut in transfers induces a shift in labour supply. In practice, a part of the transfers are received by pensioners, who do not actively supply labour.

Chart 1

THE MACROECONOMIC IMPACT OF ALTERNATIVE FISCAL INSTRUMENTS | DEVIATION FROM INITIAL STEADY-STATE, IN PERCENTAGE

Fiscal consolidation financed with a decrease in government consumption
Fiscal consolidation financed with a decrease in transfers
Fiscal consolidation financed with an increase in the "tax burden on wage income"
Fiscal consolidation financed with an increase in the consumption tax rate

Sources: Authors' calculations using *PESSOA*.

Notes: SS: initial steady-state. Inflation, NFA and Public debt deviations are in percentage points. The remaining variables are in percentage. Higher real exchange rate implies depreciation.

to produce other types of goods and so a cut in Government consumption reduces demand side pressures and contributes to a decrease in domestic prices and thus to international competitiveness gains, through real exchange rate depreciation.

Expenditure-based fiscal consolidation policies reduce demand pressures, promote a real exchange rate depreciation and benefit the international competitiveness of domestic firms. The increase in competitiveness stimulates domestic production and factor demand and improves the external imbalance, partly offsetting the recessionary impacts of fiscal consolidation. On the other hand, the fall in expected inflation raises the real interest rate, exacerbating the decline in aggregate demand and amplifying the short-run recessive effect of fiscal consolidation.[5]

In turn, fiscal consolidation based on tax increases implies a protracted decline in output, private consumption and investment to levels below the steady-state. An increase in the labour income tax affects the economy mainly through its impact on the marginal rate of substitution between consumption and leisure. Hence, a rise in the labour income tax discourages workers, implying a decrease in labour supply. At the same time, an increase in employers' social security contributions leads to an increase in the marginal costs of firms and thus firms substitute labour for capital, reducing labour demand. Therefore, a rise in tax burden on wage income implies a decrease in hours worked and an increase in domestic prices, which implies a real exchange rate appreciation and a loss in competitiveness.

Regarding the consumption tax, it is far less distortionary of the consumption/leisure allocation than the tax burden on wage income. Changes in the consumption tax affect the economy mainly through the price transmission channel, reducing the real value of households' wealth. This induces households to supply more labour in order to cushion the impact of the negative wealth effect on consumption, explaining the smaller decline in hours worked than in the case of the tax burden on wage income.

Accordingly, the tax burden on wage income is likely to be the instrument that involves higher short and medium term losses in terms of GDP, consumption and investment when used to perform fiscal consolidation. Consolidation strategies based on transfers and Government consumption cuts are the less penalizing for real GDP, private consumption and investment. These results suggest that expenditure cuts tends to dominate tax increases in a fiscal consolidation strategy (see Corsetti *et al*. 2009), which could be particularly true in the case of some European economies where taxes are high and where the recent period has been characterized by a huge rise in public expenditures. However, expenditure cuts are also likely to imply some reforms that take time to implement and so, in the short-run, taxes may help to speed up fiscal consolidation.

Therefore, we choose a fiscal consolidation strategy mainly based on expenditure cuts (Government consumption and transfers to households), but where tax burden on wage income adjusts endogenously, increasing slightly in the short-run in order to reach the lower target level for Government deficit more quickly (henceforth the pure consolidation scenario).

3.2. Two fiscal consolidation strategies: macroeconomic impact

This subsection analyses the impact on the main macroeconomic variables of two alternative fiscal consolidation scenarios that are based on specific fiscal instruments. The exercise is conducted assuming perfect foresight and full credibility of the fiscal authority and therefore the risk premium on Govern-

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5 In models with endogenous monetary policy, the contractionary short-term impact of fiscal consolidation is partly compensated by a reduction in nominal interest rates, if the zero lower bound is not binding.

ment debt is not affected by the consolidation strategy. However, it should be highlighted that this assumption looks too strong at the current juncture and thus the results should be interpreted with caution. In fact, if an economy is facing high market pressures and a rise in the risk premium, a credible fiscal consolidation may reduce it, implying lower borrowing rates and therefore smaller short-run costs of fiscal consolidation (see section 4).

The first scenario considers a pure fiscal consolidation strategy, which corresponds to a permanent reduction in the public deficit of 1 per cent of initial steady-state GDP. The reduction in the deficit is mainly achieved through spending cuts, which are the least penalizing fiscal instruments for economic activity (see subsection 3.1). More specifically, it is considered a permanent cut in Government consumption and in transfers to households, each one contributing 0.5 per cent of initial steady-state GDP for the tightening. These measures are assumed to be gradually factored in over a period of four years. In the short-run, the adjustment to a lower deficit level implies that the tax burden on wage income increases (Chart 2). However, as Government debt falls, interest payments will decline and the resulting saving may be used to finance either new tax cuts or public spending increases. We assumed that the savings are used to reduce tax burden on wage income over the medium and the long-run, since this instrument is the most distortionary and, therefore, a cut in tax burden on wage income enhances the impact of the fiscal consolidation on economic growth and welfare (this issue will be discussed below).

The second scenario considers a fiscal consolidation with a tax reform. Labour taxes or consumption taxes affect differently savings and labour supply decisions. It is often claimed that shifts towards increasing taxes on consumption and decreasing taxes on labour stimulate private saving and competitiveness, enhance economic growth and promote job creation, and improve the current account balance. This way, substituting labour income taxes by consumption taxes (as for e.g. VAT and special consumption taxes), is a competitiveness-enhancing tool and can be used to achieve a real exchange depreciation.

In this context, the scenario of fiscal consolidation with tax reform preserves the fiscal consolidation path, but adds a shift in the tax burden away from wage income towards consumption tax. In this scenario, it is assumed that the average consumption tax rate increases by 4 p.p.. The tax burden on wage income adjusts endogenously as in the previous exercise, but given the additional revenue generated by the consumption tax it increases by less in the short run and falls more substantially in the long run. Hence, in the case of the simulation without tax reform the tax burden on wage income remains above the baseline level during the first 10 years and then starts to decline, whereas in the case with tax reform it only remains above the baseline level during the first 3 years (Chart 2).

Chart 3 shows the short and long term impact on the main macroeconomic variables of the two fiscal consolidation scenarios. Regarding the short-tem, the pure consolidation scenario points to a fall in GDP, which reaches a trough in the second year (around 2.1 per cent below the steady state) and to a gradual recovery thereafter. This scenario leads to a protracted period of below-steady-state real GDP. Private consumption strongly decreases in the first years, due not only to the direct impact of fiscal measures on wealth, but also to its impact on the real interest rate, which increases the return on savings, measured in terms of future consumption, and implies a further disincentive to present consumption. The negative impact on consumption and investment is slightly reduced in the short-run by the anticipation of more favorable future wealth prospects due to expected lower distortionary taxes. On the other hand, the decrease in the price level leads to a gain in international competitiveness, which implies an increase in the exports market share and a decline in the import content of national production. Thus, in the short-run, fiscal consolidation leads to an improvement in the trade balance-to-GDP ratio.

Chart 2

FISCAL CONSOLIDATION SCENARIOS – EVOLUTION OF TAX RATES | DEVIATION FROM INITIAL STEADY-STATE, IN PERCENTAGE POINTS

Sources: Authors' calculations using *PESSOA*.

In the case of a fiscal consolidation accompanied by a tax reform, it is assumed a permanent increase in the consumption tax, allowing a higher reduction of the tax burden on wage income in the new steady-state, which in a rational expectations framework is fully anticipated by households. Hence, the tax reform reduces distortions in the economy, promoting a higher labour utilization and an increase in international competitiveness, and therefore has a positive impact on GDP. Output decline is smaller in the short-run than in the pure fiscal consolidation scenario, reaching a trough in the first year (around 1.6 per cent below the steady state) and starting to recover thereafter. The period of below-steady-state real GDP is substantially shortened, from 10 years in the pure consolidation scenario to 6 years in the scenario with tax reform.

Overall, it can be concluded that a fiscal consolidation has unavoidable contractionary short-run effects on economic activity, in particular on consumption and investment. At the same time, an expansion in net exports usually occurs, partly offsetting the negative impact of domestic demand on GDP. Moreover, it can be concluded that short-run costs can be limited by changing the policy mix towards less distortionary taxation.

Regarding the long-run effects, chart 3 also sheds some light on the following question: Does fiscal consolidation generate long-term benefits?

Lower public debt reduces the burden of Government interest payments over the longer time horizon, which in the simulations illustrated in chart 3 is used to reduce the tax burden on wage income. In the case of a fiscal consolidation without tax reform, the tax burden on wage income declines 3.3 p.p. in the new steady-state. Hence, households' after-tax real wage increases, raising the opportunity cost of leisure and therefore leading to an increase in labour supply. At the same time, labour costs of firms fall and labour demand increases, leading to a rise in the marginal product of capital and fostering capital accumulation. The increase in households' wealth, due to the increase in wage income and capital accumulation, boosts consumption and investment and therefore real GDP. In the long-run, real GDP is 2.5 per cent above the initial steady state.

Chart 3

THE MACROECONOMIC IMPACT OF FISCAL CONSOLIDATION SCENARIOS WITH AND WITHOUT TAX REFORM | DEVIATIONS FROM INITIAL STEADY-STATE, IN PERCENTAGE
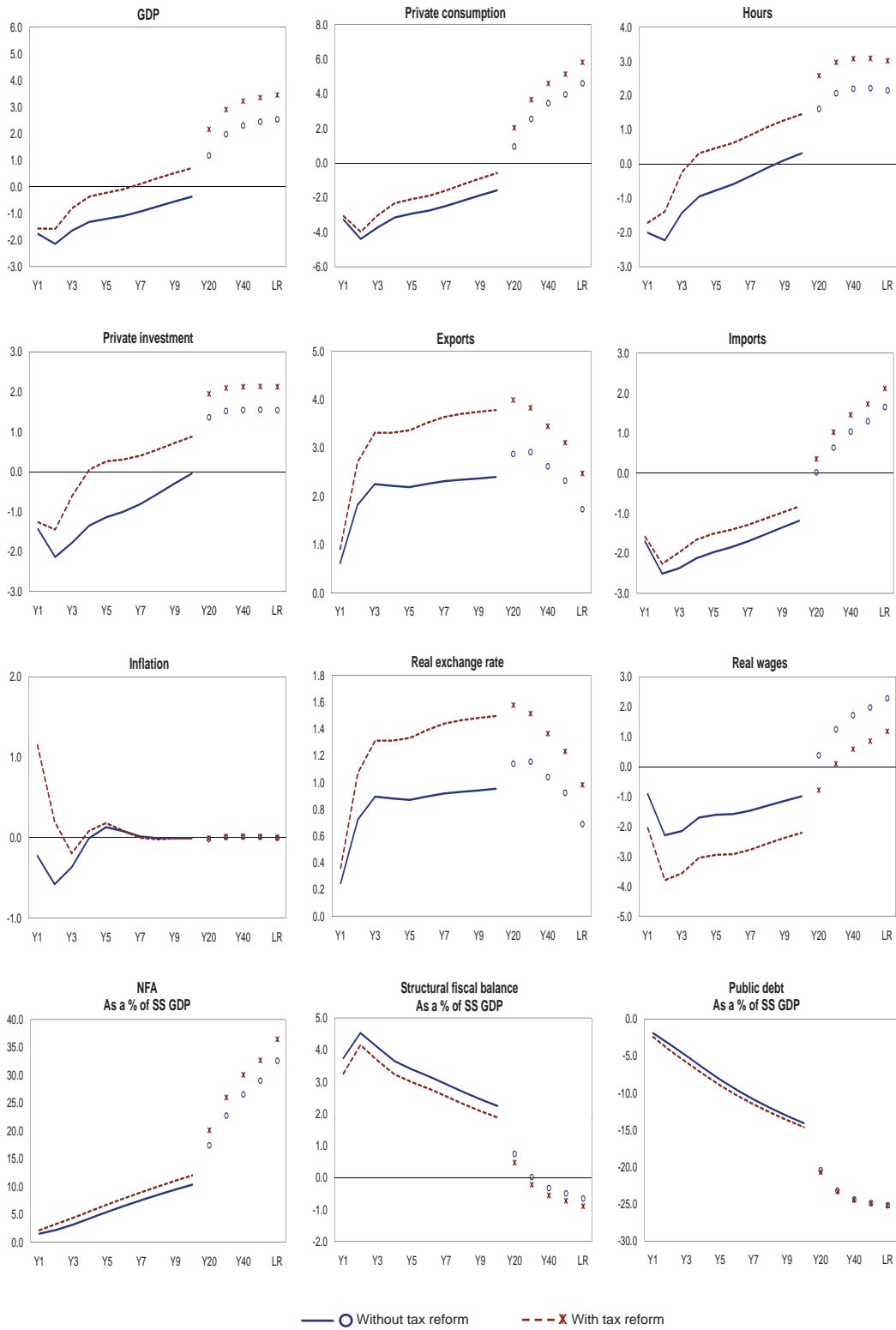
Without tax reform

With tax reform

Sources: Authors' calculations using *PESSOA*.

Notes: SS: initial steady-state. Inflation, NFA and Public debt deviations are in percentage points. The remaining variables are in percentage. Higher real exchange rate implies depreciation.

In the case of a fiscal consolidation with tax reform the qualitative effects are quite similar, but the magnitudes are amplified. The tax burden on wage income declines 5.8 p.p. in the new steady-state and real GDP is 3.5 per cent above the initial steady-state, which is significantly higher than the impact of a pure fiscal consolidation scenario.

The decrease in public debt implies a decline in the net foreign liabilities-to-GDP ratio of the small-open economy. Hence, the temporary trade balance improvement mentioned in the short-run analysis, mainly due to the real exchange rate depreciation, declines gradually, resulting in a lasting trade deficit financed by a lower burden of interest payments on foreign debt in order to ensure that the net foreign liabilities stabilize at a lower level.

Finally, the effects of a fiscal consolidation can also be assessed by analyzing the impact on households' welfare. We consider a discrete time counterpart of the suggestion of Calvo (1988), which has also been used in Ganelli (2005) and Kumhof *et al.* (2008). Welfare analysis can be seen as a benchmark metric for the impact of a particular policy experiment, as measured through the aggregate lifetime utility, which is a function of the goods valued by households (consumption and leisure in the case at hand).[6] Hence, welfare corresponds to a weighted average of the utility of individuals alive in current and future periods, where a weighting factor reflects the importance of future generations in the welfare from the viewpoint of the policymaker. The welfare impact is synthesized in the standard compensated variation of consumption measure proposed in Lucas (1987), which transforms utility into corresponding units of consumption good in the initial steady-state. Table 1 presents the impact on households' welfare measured by the compensated consumption variation from a fiscal consolidation with and without tax reform, according to four different average planning horizons. As the planning horizon increases the gains from consolidation in terms of households' welfare also increase. In the pure consolidation scenario households' welfare, in aggregate terms, varies from -8.9 per cent, if the planning horizon is very short, to 7.9 per cent, in a long term planning horizon. In scenario with tax reform, the welfare losses are smaller in the short-run and the gains are higher in the long-run.

As mentioned before, we have assumed that the fiscal room created by lower interest rate payments on outstanding Government debt is used to lower the tax burden on wage income. This assumption was selected on the basis of its macroeconomic impact, as illustrated in table 2. This table compares the long run impacts of a pure fiscal consolidation if savings on the burden of interest payments are used to cut consumption tax or to raise one of the spending components (Government consumption or transfers to households) instead of using them to cut the tax burden on wage income.

Table 1

IMPACT ON WELFARE OF FISCAL CONSOLIDATION SCENARIOS	COMPENSATING VARIATION IN CONSUMPTION, IN PERCENTAGE				
Discount rate		**2.8%**	**6.3%**	**30%**
Average planing horizon of agents (years)	*Long run*	*36*	*16*	*3*
Fiscal consolidation without tax reform	7.9	1.5	-3.4	-8.9
Fiscal consolidation with tax reform	10.4	3.5	-1.9	-8.2

Sources: Authors' calculations using *PESSOA*.

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6 In *PESSOA*, it is assumed that public consumption is not valued by households in the utility function. In reality, public consumption expenses are used in the provision of public goods and services, which are valued by households. In this context, the reduction in public consumption considered in this article should always be seen as an increase of government efficiency in broad sense, achieved through both an increase in the efficiency in the provision of goods and services actually valued by households, and an elimination of the spending associated with goods and services who are only negligibly valued by households.

Table 2

THE MACROECONOMIC AND WELFARE IMPACTS FROM THE BUDGETARY CLEARANCE OBTAINED WITH THE LOWER INTEREST RATE BURDEN | IN PERCENTAGE				
	Lower interest burden used to:			
	Reduce labour income tax	**Reduce consump-tion tax**	**Raise government consumption**	**Raise transfers to households**
GDP	2.5	1.4	0.5	-0.4
Private consumption	4.6	3.1	-0.2	0.8
Private investment	1.5	0.7	0.6	-0.3
Exports	1.7	0.7	-0.5	-0.7
Imports	1.7	1.1	0.4	0.2
Hours	2.1	1.0	0.4	-0.6
Real wage rate	2.3	4.1	0.2	0.2
Real exchange rate	0.7	0.3	-0.2	-0.3
Compensating variation in consumption (in SS)	12.1	8.8	-1.6	3.7

Sources: Authors' calculations using *PESSOA*.

Note: All variables are measured as percentage deviations from the initial steady state.

The results points to positive long-run impacts on economic activity from fiscal consolidation, regardless of the strategy chosen, except in the case that the fiscal authority uses the improvement in the fiscal position to raise transfers.[7] The positive effects on output vary from around 0.5 per cent (increase in Government consumption) to 2.5 per cent (cut in tax burden on wage income). When the fiscal authority uses public savings on interest payments to cut the consumption tax, real GDP increases around 1.4 per cent. Thus, stronger positive impacts on GDP and in all private expenditure came from using savings to cut tax burden on wage income, which is in line with the standard view of relative distortionary features of the different fiscal instruments. Reducing this tax burden also seems the preferred option if we consider welfare analysis (see last row of table 2).

It can be concluded that despite the short-run costs of fiscal consolidation, in the long-run a lower Government debt-to-GDP ratio has positive impacts on economic activity, enhancing private consumption and investment and exports, and increasing households' welfare. Moreover, the change in the fiscal structure, in particular reducing the tax burden on wage income and increasing the consumption tax, is beneficial not only to reduce the short-run costs of fiscal consolidation but also to boost the long-run benefits. In short, a reduction of fiscal distortions has a sizeable expansionary effect on the economy and positive effects on aggregate welfare.

Finally, it is worth recalling that the analysis presented in this section does not take into account the probability that reduced Government debt affects the foreign risk premium on euro area interest rates (this possibility is explored in section 4).

3.3. Alternative timings for fiscal consolidation

In this subsection we illustrate the impact of alternative timings to complete the fiscal consolidation. The scenarios differ in the time horizon in which the new target for the debt-to-GDP ratio is reached: the benchmark scenario (which corresponds to the one illustrated in chart 2 without tax reform), the "slow consolidation scenario" and the "fast consolidation scenario". The time by which half of the reduction in the target debt ratio is reached is 8 years, 19 years and 4 years, respectively. It is worth

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7 This result is conditioned by the assumption that all households act as labour suppliers and therefore a cut in transfers induces an increase in labour supply.

mentioning that, similar to previous simulations, our analysis is conducted under the assumption of perfect foresight, full credibility of the fiscal authority and unchanged sovereign risk premium. The results are summarized in chart 4.

A front-loading fiscal consolidation – the "fast consolidation scenario" – implies a deep recession, with significant losses in output, consumption, investment and hours worked in the short term. On the other hand, a slow fiscal consolidation, with a longer duration of the consolidation period, implies smaller output, consumption and investment losses and a smaller reduction in hours worked in the short and medium term, but a more protracted period of below steady-state GDP. Moreover, improvements in the competitiveness of domestic firms', which takes place in all scenarios, are more limited in the case of a slow consolidation strategy.

Table 3 presents the welfare costs and benefits for the 3 scenarios. Results show that for short-term horizons the slow consolidation scenario implies lower welfare losses, and therefore current generations may prefer this fiscal policy strategy. As the planning horizon increases, the difference between the alternative fiscal consolidation strategies in terms of costs and benefits narrows and therefore a slow consolidation may no longer be the optimal strategy for future generations.

The above results suggest that in general a credible and slow fiscal adjustment implies in the short-run lower output and welfare costs.[8] However, it should be emphasized that results are conditioned by the assumption of an unchanged risk premium. In the current juncture, characterized by high risk premium on sovereign debt of some euro area economies and a low risk tolerance among investors, this assumption does not seem very realistic. In this context, section 4 offers some evidence regarding the importance of considering the likely impact of risk premium changes.

Table 3

WELFARE ASSESSMENT – COMPENSATING VARIATION IN CONSUMPTION	IN PERCENTAGE				
Discount rate			2.8%	6.3%	30%
Average planing horizon of agents (years)	*Long run*	*36*	*16*	*3*
Alternative timings for fiscal consolidation					
Slow consolidation scenario	7.2	1.4	-2.1	-3.9
Benchmark scenario	7.9	1.5	-3.4	-8.9
Fast consolidation scenario	7.9	0.7	-5.6	-14.8

Sources: Authors' calculations using *PESSOA*.

## 4. Fiscal consolidation with a decrease in the risk premium

In the scenarios presented in section 3 it is assumed that the risk premium on Government debt is not affected by the level of the debt-to-GDP ratio. However, in the current juncture, characterized by high risk premium on sovereign debt of some euro area economies and a low risk tolerance among investors, the assumption of an unchanged risk premium does not seem very realistic.

This section presents a simple exercise to illustrate the importance of considering the role of the risk premium in the analysis of the costs and benefits of fiscal consolidation. The discussion of the impact of fiscal consolidation in a context of a small open economy that faces a high risk premium is particularly relevant in the current juncture. However, in *PESSOA* the risk premium is orthogonal to macroeconomic

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8 For a similar result see Coenen (2008).

Chart 4

THE MACROECONOMIC IMPACT OF FISCAL CONSOLIDATION SCENARIOS WITH ALTERNATIVE TIMINGS |
DEVIATIONS FROM INITIAL STEADY-STATE, IN PERCENTAGE
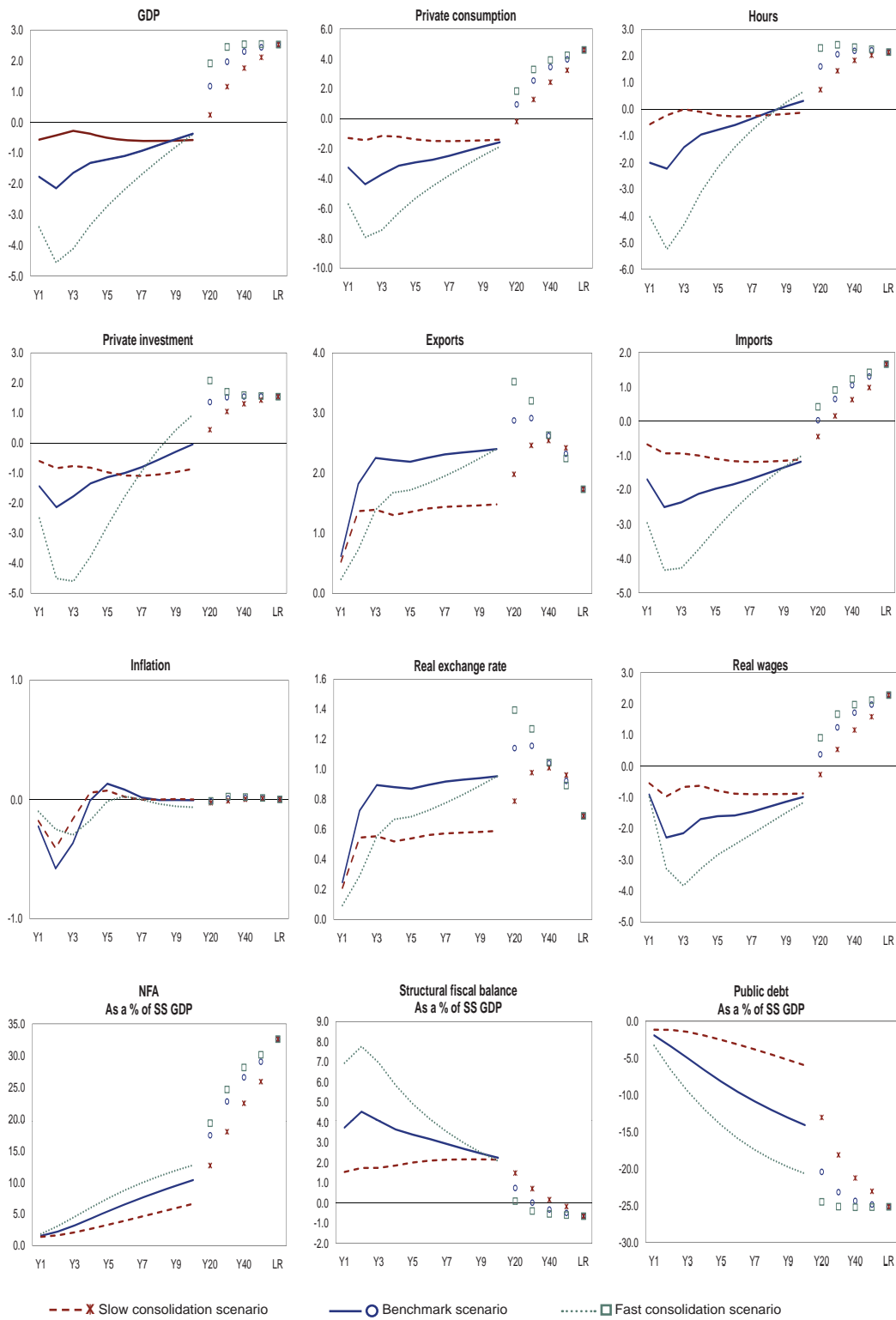
Sources: Authors' calculations using *PESSOA*.

Notes: SS: initial steady-state. Inflation, NFA and Public debt deviations are in percentage points. The remaining variables are in percentage. Higher real exchange rate implies depreciation. The Benchmark scenario corresponds to the one illustrated in chart 3 without tax reform.

developments and does not reflect probabilities of default. In this context, an ad-hoc exercise was implemented to illustrate the impact of a reduction in the risk premium as a credible fiscal consolidation is implemented. The initial steady state of the pure fiscal consolidation scenario was changed in order to include a risk premium of 100 basis points in the small open economy. As the observed debt-to-GDP ratio converges to a lower target level, the risk premium decreases and reaches zero in the final steady-state. The risk premium $\left(\Psi_t\right)$ is modeled as a shock that follows a first-order auto-regressive process:

$$\ln \Psi_t = \left(1 - \rho^\Psi\right)\ln \Psi + \rho^\Psi \ln \Psi_{t-1} + \varepsilon_t^\Psi$$

Where ρ^Ψ is the persistence parameter, Ψ is the steady-state risk premium and ε_t^Ψ stands for time t independent and identically distributed zero mean innovation. chart 5 presents 3 alternative trajectories for the risk premium, which differ on the calibration of parameter ρ^Ψ.

Chart 6 shows the results of the pure fiscal consolidation scenario accompanied by a reduction in the risk premium, considering the three above-mentioned trajectories. The results point to a significant impact of a decrease in the risk premium on domestic demand and economic activity. The evolution of the risk premium directly affects households and firms decisions, stimulating both private consumption and private investment. The decrease in the risk premium implies, on the one hand, a lower discount rate on future income, which increases net wealth and has a positive effect on households' consumption. On the other hand, the decrease in the domestic interest rate and the higher demand prospects implies a higher desired capital stock level and thus has a positive impact on private investment. Additionally, the decrease in Government interest outlays implies a lower increase of the tax burden on wage income in the short-run and a more substantial fall in the long run, which leads to positive effects on households' wealth enhancing the impact on economic growth.

The gains of fiscal consolidation in terms of households' welfare are enhanced and the short-term costs are reduced if the consolidation is accompanied by a decrease in the risk premium (see Table 4). In the

Chart 5

FISCAL CONSOLIDATION SCENARIO – EVOLUTION OF THE RISK PREMIUM | DEVIATIONS FROM THE INITIAL STEADY-STATE, IN PERCENTAGE POINTS
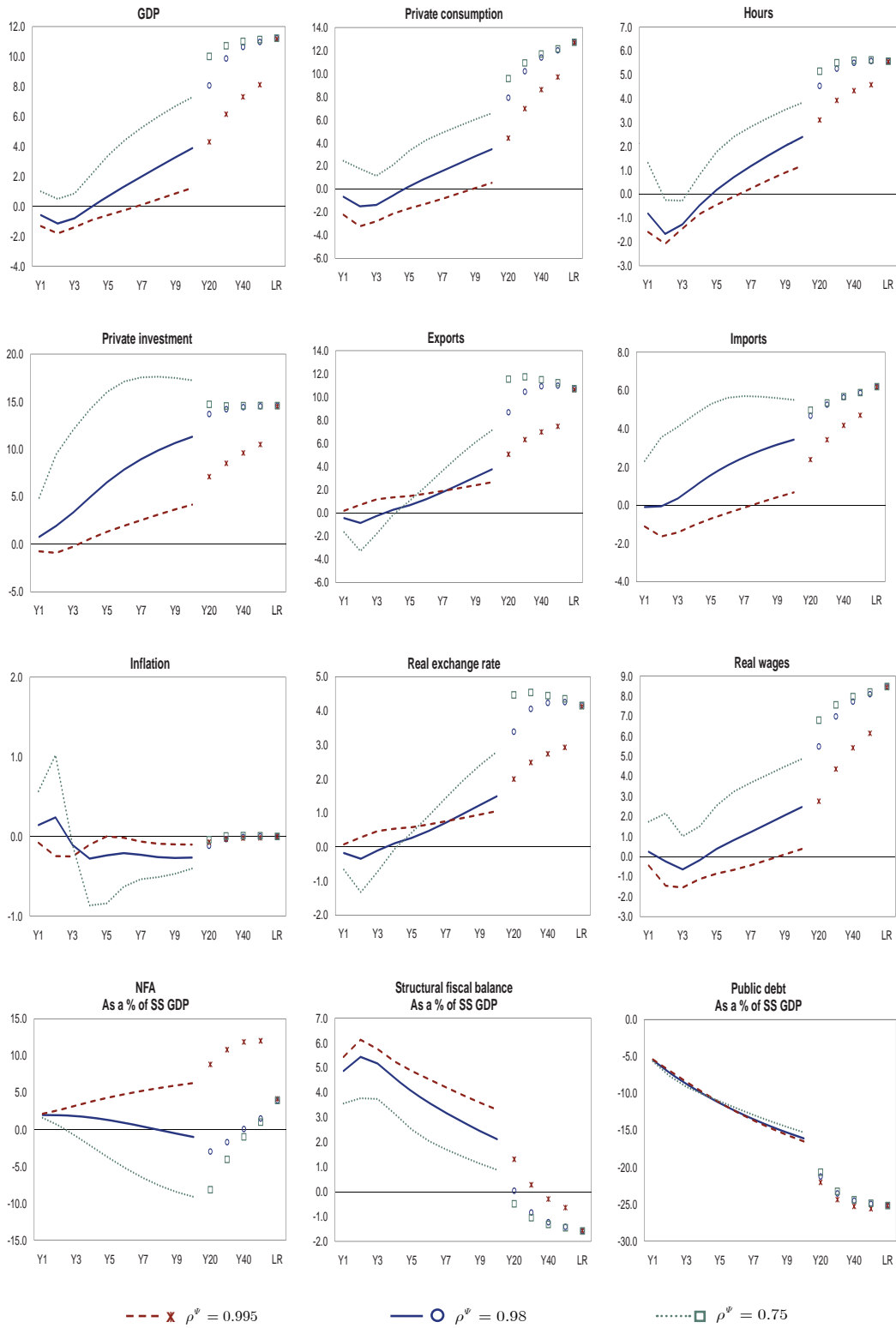

$\rho^\Psi = 0.995$ $\rho^\Psi = 0.98$ $\rho^\Psi = 0.75$
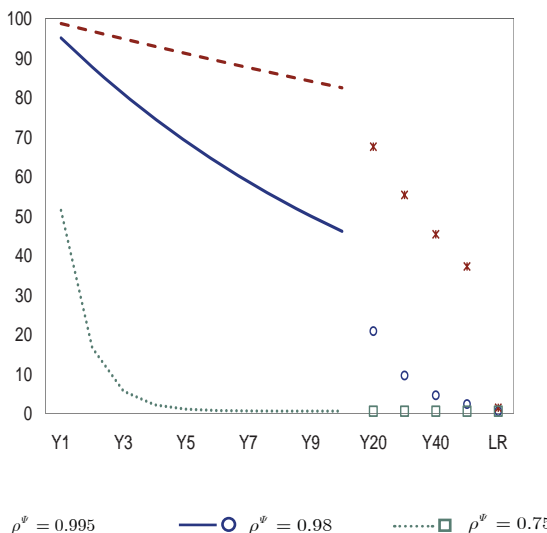
Sources: Authors' calculations using *PESSOA*.
Note: The three considered trajectories differ in the convergence velocity of the risk premium to the final steady state value.

Chart 6

THE MACROECONOMIC IMPACT OF A FISCAL CONSOLIDATION SCENARIO WITH A DECREASE IN THE RISK PREMIUM | DEVIATION FROM THE INITIAL STEADY-STATE, IN PERCENTAGE

Sources: Authors' calculations using *PESSOA*.

Notes: SS: initial steady-state. Inflation, NFA and Public debt deviations are in percentage points. The remaining variables are in percentage. Higher real exchange rate implies depreciation.

Table 4

WELFARE ASSESSMENT – COMPENSATING VARIATION IN CONSUMPTION	IN PERCENTAGE			
Discount rate		**2.8%**	**6.3%**	**30%**
Average planing horizon of agents (years)	*Long run*	*36*	*16*	*3*
Fiscal consolidation with decrease in the risk premium				
$\rho^* = 0.995$	24.5	11.9	3.4	-5.6
$\rho^* = 0.98$	29.8	19.1	10.5	-0.8
$\rho^* = 0.75$	31.7	23.9	17.2	6.9

Sources: Authors' calculations using *PESSOA*.

case of a sharp decrease in the risk premium $\left(\rho^{\Psi} = 0.75\right)$, fiscal consolidation leads to gains in current generations' welfare even for very short planning horizons. This is largely explained by the behavior of consumption, which increases relative to the initial steady state, even in the short-run, while hours worked show a decreasing path over the first three years.

Although the reduction in the risk premium is ad-hoc, it clearly shows the importance of taking risk premium effects into account in the discussion of the gains and costs of fiscal consolidation. The results point to lower short-term costs and higher long-term benefits if the reduction in public debt is accompanied by a reduction in the risk premium, implying that short-term costs of fiscal consolidation are smaller in economies that face higher market pressures. Moreover, in a scenario of a sizeable immediate decrease in the risk premium, the impact of the fiscal consolidation may even be positive in the short-run, both in terms of GDP growth and households' welfare. This result is in line with the literature that highlights that fiscal contractions can have expansionary effects in some situations, namely if confidence in a country's public finance is low and the fiscal consolidation is pursued in a credible and consistent manner, fostering the sustainability of public finances in the long term.

The above results suggest that the appropriate fiscal consolidation strategy may not be identical for all economies. Sharp corrections are probably needed in countries that already face high and increasing foreign risk premium. Mild corrections are nevertheless more desirable if the risk premium is in a more comfortable situation and is not very sensible to fiscal developments.

5. Conclusions

In the present juncture, a credible fiscal consolidation strategy seems necessary in many euro area countries to bring the public debt ratio to a sustainable path. Moreover, some economies have been facing a surge in sovereign debt spreads and are being forced to take immediate and rapid measures to ensure the access of the public sector to the sovereign debt markets. However, debt reduction is painful for slow-growing economies, since it may imply a reduction of economic activity and welfare losses in the short-run. At the same time, lowering debt and thus reducing interest rate payments on outstanding government debt will bring long run benefits. In this context, evaluating the costs and benefits of fiscal consolidation and creating the conditions for a successful consolidation process have become an important policy issue.

This article analyses the impact on the macroeconomic scenario and on households' welfare of alternative fiscal consolidation strategies, using a dynamic general equilibrium model with non-Ricardian features (*PESSOA*). Simulations show that a fiscal consolidation, in general, implies a trade-off between the short-run costs and the long-run benefits. We also conclude that consolidation strategies based

on transfers to households and Government consumption cuts are the less penalizing for real GDP, private consumption, investment and welfare in the short-run. At the same time, long-term gains of fiscal consolidation are enhanced if the fiscal room created by lower Government interest outlays on outstanding debt is used to cut distortionary taxes, in particular, on labour. Therefore, well-designed consolidation strategies could minimize the short-term costs and enhance the long-run benefits. Additionally, we show that gains can be boosted if the fiscal consolidation strategy involves a tax reform that shifts the tax burden away from labour services towards the households' consumption expenditures, in a deficit-neutral way, encouraging savings and labour supply and enhancing competitiveness by a real exchange rate depreciation.

The results also suggest that a front-loading fiscal consolidation implies a deeper recession, with significant short-term losses in output, consumption, investment, hours worked and welfare, when compared with a more gradual consolidation strategy. Thus, if possible, a credible slow fiscal adjustment is in general more beneficial for the economy, a result that is in line with the literature pointing to the optimality of tax smoothing. However, those results are conditioned by the assumption of an unchanged risk premium and, therefore, do not take into account the likelihood that domestic interest rates could be correlated with the debt level. In this case, the balance of short-run costs and long-run benefits might be quite different. The results show that if a fiscal consolidation strategy is pursued in a credible and consistent manner and implies a significant decrease in the risk premium on domestic interest rates, the short-term costs are reduced and, in extreme cases, the short-run impact may be expansionary. Therefore, the appropriate fiscal consolidation strategy may not be identical across economies.

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