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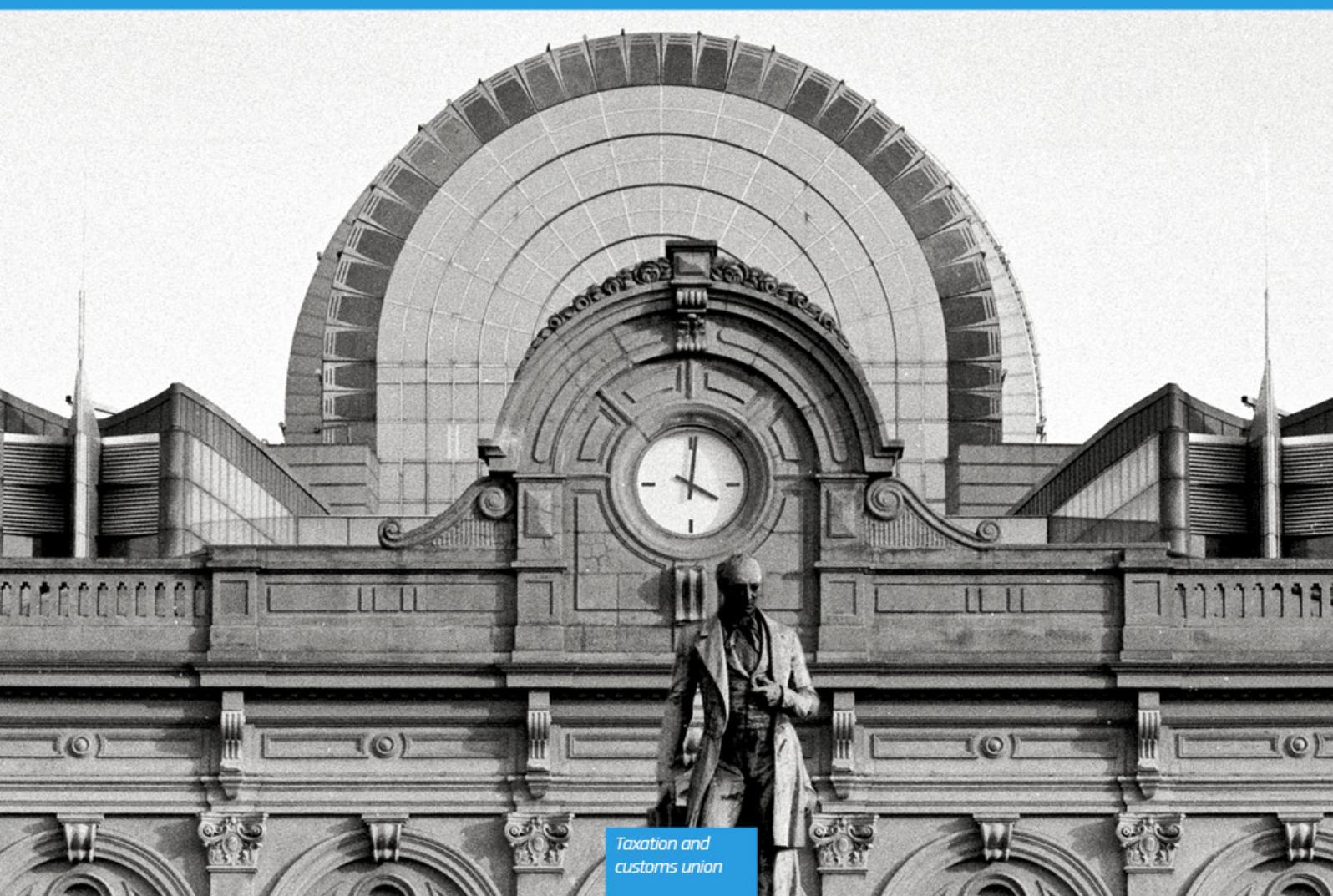
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Study on the Impacts of Fiscal Devaluation



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Study on the impacts of fiscal devaluation

Final report

TAXUD/2011/DE/338

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Preface

This draft final report presents work on the project “The impacts of fiscal devaluation”, Specific Contract no. TAXUD/2011/DE/338, implementing Framework Service Contract no. TAXUD/2010/CC/104 for the provision of economic analysis in the area of taxation.

The main research question of the project is summarized as: *What are the macroeconomic and distributional consequences of fiscal devaluation for a selection of countries and the EU as a whole?* The selected countries are France, Italy, Spain and Austria.

The project aims to perform four tasks:

1. Provide a review of the impacts of fiscal devaluations in the light of economic literature and former studies.
2. Use suitable models to analyse macroeconomic impacts of fiscal devaluation in the selected countries and do a comparative analysis of the results obtained in different countries.
3. Analyse distributional impact of fiscal devaluations with the help of models in the selected countries and link these results, if possible, to the macro-level analysis.
4. Analyse the suitability of the policy for the EU as a whole with the help of model simulations and in the light of the country-specific results.

We gratefully acknowledge the comments on the interim version received from Ruud de Mooij, Cathal O’Donoghue and European Commission staff.

Executive Summary

Before joining the Economic and Monetary Union, governments could conduct an autonomous monetary policy and an autonomous exchange rate policy. Indeed, when countries faced a lack of competitiveness and poor growth prospects, devaluing its currency was in practice a commonly used instrument to correct external imbalances, at least temporarily. As this policy option is no longer available to members of the EMU, a substitute for external devaluation has attracted new attention.

The effects of an external devaluation might be mimicked by a tax swap called internal or fiscal devaluation. Fiscal devaluation refers to a budget-neutral reduction of payroll taxes matched by changes in other taxes or in government expenditures (Calmfors, 1998). In the standard example, a reduction of employers' social security contributions (SSC) is financed by raising the VAT rate. It is easy to see how this tax reform might stimulate the economy. When nominal wages are not immediately adjusted to the reduction in the SSC rate, labour costs are reduced and net exports increase. At the same time, a higher VAT rate depresses consumption and imports, while exports remain exempted from VAT. As a consequence, output expands and the trade balance improves.

This study examines the effectiveness of fiscal devaluation by using a combination of macroeconomic and microsimulation models. Whereas the literature on fiscal devaluation focuses on short-run implications, we also discuss the long-run effects of shifting from wage to consumption taxation. We discuss in particular the following research questions for a selection of four countries: France, Italy, Spain and Austria. What are the macroeconomic consequences for a devaluing country both in the short run and the long run? What are the distributional implications for different income groups and household types in the long run? And does a country benefit more from a unilateral than from a multilateral implementation of the tax shift? The study is structured along four tasks.

Task 1: Literature overview

Wage and consumption taxation are known to be equivalent in the basic model which considers flexible wages and only labour income. The intuition is that the composition of taxation does not matter for employment and consumption as long as the real after-tax wage is not affected. The literature distinguishes two departures from the basic model that break down this neutrality result. First, shifting from direct to indirect taxation has real effects if the nominal wage is not flexible but rigid, because the real after-tax wage returns only slowly to its initial level in this case. Second, when non-labour income is considered, the tax reform amounts to shifting part of the burden from

workers to non-workers. The consumption tax is less distortive than the wage tax in this case, because the former tax is also imposed on existing wealth.

Fiscal devaluation might thus be effective in stimulating employment, GDP and net exports but the literature survey suggests that the benefits are likely to remain small. The effectiveness is sensitive to specific features of the tax-benefit system and the economic structure, in particular to the degree of indexation of social transfers and the wage elasticity of labour supply. Targeting the cut in SSC might be beneficial for both equity and efficiency.

Even when fiscal devaluation is only temporarily effective, its implementation might be attractive for accelerating the adjustment on imperfectly working labour markets. However, this tax swap should be considered as a complement and not as a substitute for structural reforms that are required to address fundamental causes of external imbalances and poor growth prospects. An additional remark concerns the efficiency gains that arise from unexpectedly taxing consumption expenditures out of existing wealth. Relying frequently on this type of tax surprises will erode the credibility of the government and the effectiveness of the reform.

Task 2: Macroeconomic effects of unilateral scenarios

We have simulated the macroeconomic effects employing two types of models. The econometric NiGEM model is more appropriate for analyzing short-run dynamics, while the general equilibrium models developed by CEPII¹ and IHS are preferred for assessing long-run effects.

Fiscal devaluation is found to have a small, short-lived expansionary effect on employment and GDP for all considered countries in the short run. In contrast to most other studies, the NiGEM model finds a (marginal) worsening of the trade balance (after 9 years). Other studies argue that the trade balance effects are dominated by the improvement in external competitiveness. However, according to NiGEM estimates, the increase in imports following the expansion of domestic demand offsets the relative price effects, which explains the reduction in net exports. While the literature considers that the improvement of the trade balance initially drives the GDP expansion, the NiGEM results point at the increase in domestic demand. Since fiscal devaluation shifts part of the tax burden from workers to non-workers (i.e. transfer recipients and capital income earners), the expansive effects of the SSC cut dominate the contractive effects of the VAT hike. Given the rigid nominal wage, it achieves a temporary reduction in real labour costs, which results in a higher employment and a lower unemployment. At the same time, consumer prices fall and real consumer wages rise, leading to a higher

¹ The CEPII model focuses on the French economy.

domestic demand. As the nominal wage is gradually increased, the expansionary effects fade away over time. Whether negative or positive, the effects on the trade balance likely remain small.

The general equilibrium models report a permanent, though small expansion of employment and GDP, while the trade balance is hardly affected in the long run. These effects are driven by two main channels in the IHS model. First, the wage cost is permanently lower because the bargaining position of workers weakens when social transfers are not indexed to the higher VAT. Second, shifting from wage to consumption taxes implies redistribution from current to future generations. Existing generations have to pay unexpectedly higher VAT, while they benefit less from the lower SSC. Future generations benefit from a less distortive taxation system. As a consequence, long-run consumption increases while the trade balance slightly worsens.

Task 3: Microeconomic effects of unilateral scenarios

The long-run distributional effects are obtained using detailed tax-benefit microsimulation models for the four countries. We first consider the distribution of equivalent disposable income. When the SSC reduction applies to all employees, we find that fiscal devaluation is in general regressive, irrespective of whether only the standard rate or all VAT rates are raised. When the SSC reduction is targeted to low income groups, the impact of the reform becomes in general progressive, except in France and Spain with uniform VAT rate. Sensitivity analysis shows that these distributive results are confirmed when the cut in SSC rates is targeted to a common share of low earners in each country. In Italy and Austria the distributive effects of fiscal devaluation are more favourable to the poorer deciles than in the two other countries. When the analysis is conducted in terms of equivalent expenditures, the distributional effects do not significantly change, becoming only slightly more progressive (except for France).

Next, we look at groups defined by the employment condition of the household head. In general, the biggest beneficiaries are households of dependent workers; these are manual workers in Italy and Spain and non-manual workers in France and Austria. In contrast, households of pensioners and self-employed workers are harmed the most. We finally discuss distributional effects on households with different compositions. In general, households of adults with or without children are the biggest beneficiaries, while the elderly are most adversely affected by the reform.

Task 4: Macroeconomic effects of multilateral scenarios

We have considered two multilateral scenarios. We increase the number of devaluing countries from 3 in the first scenario to 6 in the second scenario. We find that GDP in a

devaluing country increases more in the unilateral scenario than in the multilateral scenarios and that the gains are lower when more countries conduct the reforms simultaneously. Net exports (as %GDP) fall the least when GDP increases are the smallest, meaning that the trade balance weakens less when more countries implement the reform.

Effects on aggregate GDP of the Euro Area are ranked in an opposite order than found for the individual, devaluing economies (at least after 5 years). In case fiscal devaluation is implemented by the largest six countries, a contraction of GDP during the first years is followed by the strongest expansion during the last years.

1 Introduction

When faced with a lack of competitiveness and poor growth prospects, a country that has control over the exchange rate can resort to devalue its currency. Since this policy option is not available to (individual) members of a monetary union, these countries have to consider an alternative to correct external imbalances.³ An alternative is a tax reform that might mimic the effects of an external devaluation which is called fiscal or internal devaluation.

Fiscal devaluation can be described as a budget-neutral reduction of payroll taxes matched by changes in other taxes or in government expenditures (Calmfors, 1998). Various combinations are possible but the study focuses on the typical example consisting of a reduction of employers' social security contributions (SSC) and a rise of the VAT rate.⁴ With a rigid nominal wage, the reduction in the SSC rate lowers unit labour costs and improves competitiveness and hence increases net exports. At the same time, a higher VAT rate reduces consumption and imports without having a bearing on exports. As a consequence, output expands and the trade balance improves.

Fiscal devaluation is a topic that is not yet much analyzed in the theoretical literature but more debated in policy circles (Farhi et al., 2011). Some European countries already have experience with implementing a type of fiscal devaluation. Early examples include Denmark in 1988 and Sweden in 1993 (see Calmfors, 1998). Germany increased in 2007 the VAT rate by 3% points to finance the reduction of contributions to the unemployment insurance scheme (IMF, 2012). In 2011 fiscal devaluation was proposed in the IMF-EU adjustment programme for Portugal but this country was reluctant to raise the VAT rate. Finally, a French plan in 2012 proposed to increase the standard VAT rate by 1.6% point to co-finance a cut in employers' social contribution. However, the evidence on existing reforms is too weak to identify any causal relationship (IMF, 2011).

This study substantially contributes to the existing literature and policy discussion by applying a combination of macroeconomic and microsimulation models to analyze fiscal devaluation in countries for which simulation studies are not yet available. The study is not restricted to the short-run impact of fiscal devaluation but also considers the long-run effects of the tax swap. In particular, although distributional concerns are frequently stressed, a detailed analysis of the distributional implications of shifting from direct to indirect taxes seems to be underexposed in the literature.

³ This does not exclude that policies of the ECB or a large country can affect the exchange rate of the euro.

⁴ Another example, proposed in Portugal, consists of a shift from employers' SSC to employees' SSC.

The report is structured along the four tasks, listed in the Preface. The next section summarizes the literature on fiscal devaluation. Starting with the benchmark case in which wage and consumption taxes are equivalent, we discuss the conditions under which the tax shift becomes effective in fostering employment and GDP. Section 3 briefly describes the structure and features of the macroeconomic and microsimulation models used in this study. The following 4 sections discuss the simulated effects of fiscal devaluation unilaterally implemented in each of the considered countries. The results are subsequently discussed for France, Italy, Spain and Austria. After explaining the results obtained with the macro-models, we present the distributional analysis per country. In Section 8, we compare main results across countries and summarize general findings. The final section presents the simulation outcomes for three multilateral scenarios.

2 Literature survey

2.1 Introduction

This section summarizes the literature on fiscal devaluation. Instead of discussing in detail study by study, we organise the survey around a number of themes. The studies that are covered can be classified into three groups.

The first group consists of theoretical studies. Main studies in this group are Calmfors (1998, Section 3), EC (2008), Lipińska and von Thadden (2012), Farhi et al. (2011), Correia (2011), Franco (2011, Section 2) and IMF (2011, 2012). The second group includes simulation studies. EC (2006, 2008 and 2011) report analyses using different versions of the QUEST-model; Bank of Portugal (2011) and Boscá et al. (2012) discuss the simulation of a tax shift in Portugal and Spain, respectively. Table 2.1 lists the main features of these simulation models.⁵ The last group consists of econometric studies, which are limited to Franco (2011, Section 3), de Mooij and Keen (2012) and Boscá et al. (2012, Section 2).

Table 2.1: Main features of simulation studies

	EC (2006)	EC (2008)	EC (2011)	Bank of Portugal (2011)	Boscá et al. (2012)
Country	EU15	i. Euro area ii. Germany iii. Ireland	Unspecified small euro-member	Portugal	Spain
Tax shift	Labour → VAT	Labour → VAT	SSC → VAT	SSC → VAT	SSC → VAT
Budget closure	Ex ante by VAT	Ex ante by labour tax	Ex ante by labour tax	Ex ante by SSC	Ex ante by lump sum transfer
Indexation of social transfers	No	Yes	No	NA	NA
Nominal interest rate	Depends on inflation	Depends on (core) inflation	Fixed	Fixed	Depends on inflation and output gap
Sensitivity analysis	Indexation of transfers	i. Labour supply elasticity ii. No indexation iii. Trade elasticities	i. LR debt reduction ii. Indexation iii. Labour supply elasticity	Labour supply elasticity	i. Share of rule of thumb consumers ii. Bargaining power workers iii. Trade elasticities & openness iv. Wage rigidity

⁵ We do not include studies that are not sufficiently documented or not publicly available.

The structure of this section is as follows. In the next subsection, we first describe the benchmark case in which wage and consumption taxes are equivalent. In the following two subsections, we show two cases in which the neutrality of tax shifts breaks down. In section 2.3, non-neutrality, at least in the short run, is caused by the introduction of wage rigidities, while in section 2.4 efficiency gains result from taxing non-labour income. After having discussed the main reasons why fiscal devaluation might work, we elaborate on factors that determine the degree of its effectiveness. Section 2.5 shows that the effects of the tax shift are sensitive to whether social transfers are adjusted to increases of the VAT rate. Section 2.6 considers anticipated and transitory tax swaps. Section 2.7 discusses additional effects when the setting of the nominal interest rate reacts to changes in inflation. Section 2.8 compares the spillovers between a unilateral and a multilateral implementation of the tax reform. Section 2.9 assesses the sensitivity of the outcomes to the values of the price elasticity of imports and exports. A tax shift might have differential consequences for different firms and households, which is explained in Sections 2.10 and 2.11, respectively. Section 2.12 focuses on econometric studies that have estimated effects on government revenues and the trade balance. In a last section we summarize the general findings of the survey.

2.2 Equivalence between wage and consumption taxation

We start with a simple, static model to demonstrate under which conditions proportional wage and consumption taxation are equivalent.⁶ A single worker decides on the optimal level of consumption and labour supply. Initially only a proportional wage tax (or SSC) at rate τ is imposed on the employer.⁷ The reform consists of a budget-neutral full shift from wage to consumption taxes. Variables before and after the reform are denoted by the subscripts b and a , respectively. The budget constraint before the reform is written as:

$$W_b L_b = C_b \quad (1)$$

where W the wage (after the wage tax), L labour supply and C consumption. We assume that the abolition of the wage tax is fully shifted to the worker, meaning that $W_a = W_b(1 + \tau_b)$. After the reform the restriction becomes:

$$W_a L_a = W_b(1 + \tau_b)L_a = (1 + t_a)C_a \quad (2)$$

where t denotes the consumption tax rate.

⁶ For a more general discussion, see Auerbach (2009).

⁷ We simplify the analysis by abstracting from personal income taxation and employee's SSC.

Inspection of both budget constraints shows that the real wage $W/(1+t)$ is not affected if the tax rates meet the condition:

$$\tau_b = t_a \quad (3)$$

Labour supply does not change with a constant real after-tax wage. Since the wage cost $W(1+\tau)$ is not affected, labour demand also does not change and equilibrium on the labour market still holds. With constant real after-tax income, real consumption C does not change. Finally, it is easy to see that tax revenues are constant using condition (3):

$$\tau_b W_b L_b = \tau_b C_b = t_a C_a \quad (4)$$

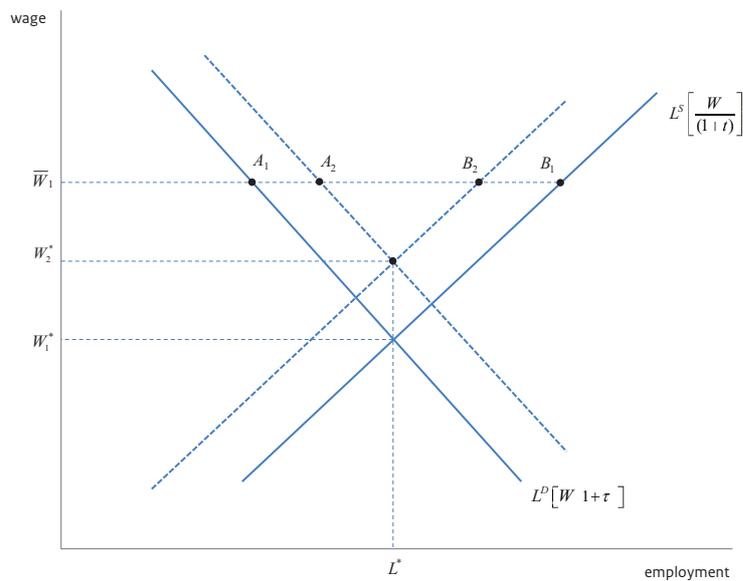
In sum, a budget-neutral shift from wage to consumption taxes does not have any effect in this model. However, the equivalence result is not robust to extensions of the basic model. For instance, the coexistence of income and consumption taxes might be optimal in the case of different losses due to tax evasion and compliance (EC, 2008).⁸ In the following subsections we will discuss two other departures from this basic model that break down the equivalence result.

2.3 Wage rigidities

The effectiveness of fiscal devaluation is explained in most of the studies by assuming downward rigid nominal wages, which initially results in disequilibrium on the labour market.⁹ This channel is illustrated in Figure 2.1. It presents labour demand in function of the wage cost $W(1+\tau)$ and labour supply in function of the real wage. With a flexible wage, the labour market clears at the wage rate W_1^* . As explained above, any tax shift that leaves the ratio $(1+\tau)/(1+t)$ unchanged will not affect real outcomes. The reduction of the wage tax τ increases labour demand while the increase in the consumption tax t decreases labour supply for a given wage. The revenue-neutral tax swap increases the nominal wage to W_2^* but employment is not affected.

⁸ In addition, taxes on consumption and production can clearly be used to correct for externalities.

⁹ Dickens et al. (2007) find a considerable degree of wage rigidity across 15 European countries and the US. They estimate that an average of 28% of workers is covered by downward nominal rigidity, ranging from 4% in Ireland to 58% in Portugal.

Figure 2.1: The effect of a tax shift on the labour market

We now assume that the nominal wage is rigid, or W is fixed. When the fixed wage \overline{W}_1 exceeds the market-clearing (or long-run) level, labour demand is smaller than supply, resulting in unemployment of A_1B_1 . With a fixed wage, fiscal devaluation increases employment and decreases unemployment (to A_2B_2). Under the assumption that the extra wage income is spent on consumption, ex post budget neutrality allows for a smaller increase of the consumption tax rate, and the figure can be extended with a rightward shift of the supply curve.

However, the beneficial effects are not permanent in this model. When the nominal wage is gradually adjusted to its market-clearing level, employment converges to its unaffected long-run level L^* . Even without having long-lasting benefits, a more attractive transition path might be attainable by fiscal devaluation. Starting from disequilibrium on the labour market, fiscal devaluation contributes to accelerate the adjustment and to minimize the costs arising from rigidities (see IMF, 2011).

Lipińska and Von Thadden (2012) analyses the tax shift in a stylised two-country model of a monetary union.¹⁰ The base case considers symmetric countries, complete asset markets (i.e. both home and foreign consumers own risky claims to home and

¹⁰ This paper extends Lipińska and Von Thadden (2009) by incorporating incomplete asset markets and wage rigidity.

foreign output), rigid prices but flexible wages. The nominal interest rate is constant and the calibrated share of non-labour income is small. The finding that the tax shift stimulates short-run employment and output is explained as follows. Under complete assets markets, the gains of lowering the tax burden on home production are shared with foreign asset owners. As a result, home consumers experience a fall in wealth. As this negative wealth effect dominates the effect of a lower real consumer wage, labour supply increases and consumption decreases. The higher labour supply depresses the nominal wage. Since only a small fraction of the producers immediately adjust output prices, the real producer wage falls and labour demand increases. Since the foreign consumers benefit from an opposite wealth effect, foreign production falls and foreign consumption expands. As a result, the home terms of trade (defined as the ratio between the import price and the domestic good price) increases.

However, these GDP effects strongly depend on the degree of financial integration. In a scenario with incomplete asset markets, only domestic consumers own risky claims to their output. In the absence of wealth leakages to foreign consumers, domestic consumers now enjoy a positive wealth effect. The combination of a positive wealth effect and higher real consumer wages dampens the increase in labour supply and thus output. Spillovers on the foreign economy are negligible and the terms of trade increase becomes small.

Finally, Lipińska et al. (2012) extend the model with sticky nominal wages. The effect of this alternative specification is easily understood by remembering the initial effect on the flexible nominal wage in the base case. When assets markets are perfectly integrated, a reduction in the short-run nominal wage is found. If such fall is precluded by sticky wages, the smaller improvement of competitiveness dampens the increase in output. In contrast, fiscal devaluation becomes more effective when the assumption of sticky wages is combined with imperfect financial integration. If wages are flexible in this case, producers have to pay higher nominal wages in the short run. Since this increase occurs more gradually with sticky wages, the terms of trade and thus production increase more in this case. Furthermore, they find long-run output gains due to a permanent increase in the endogenous terms of trade. This result stands in contrast to studies that argue that the tax shift is only effective in the short run due to sticky wages.

Franco (2011) considers wage rigidity in a version of the model of a small open economy. He claims that wage rigidity is necessary to affect competitiveness on impact. With rigid nominal wages, labour costs are initially more driven by the reduction of the SSC rate, allowing for lower output prices. In contrast to Lipińska et al. (2012), Franco (2011) simulates larger output effects in the short run than in the long run because his model does not result in permanent effects on the terms of trade.

Now that we have demonstrated how fiscal devaluation might affect output, we discuss its effectiveness in improving the *trade balance*. The tax shift affects the trade balance through two types of effects: substitution effects and income effects (see e.g. EC (2008) and Franco (2011)). First, when the domestic firms shift lower taxes on to prices, domestic products become cheaper relative to foreign products. The resulting switch of domestic and foreign consumption towards domestic goods reduces imports and expands exports, respectively. Second, imports increase following the expansion of output achieved by fiscal devaluation. Real consumption is expected to fall due to the higher VAT but the higher investment and export demand contribute to higher imports (Government consumption will increase if specified as a constant fraction of GDP).¹¹ The income effect on foreign demand can be neglected in a unilateral scenario. In principle, the total effect on imports is not determined a priori, but the substitution effect normally dominates the income effect. Notice that the same conditions hold for an external devaluation. Falling imports and rising exports contribute both to an improvement of the trade balance.

Simulation studies find that fiscal devaluation has positive but small effects on the trade balance in the short run, whereas the long-run effect is negligible. IMF (2011) overviews results obtained for a tax shift in Portugal (equal to 1% of GDP). The short-run effect on net exports ranges between 0.2% and 0.6% of GDP. EC (2011) provides another example in which a tax swap, equivalent to 1% of GDP, is analysed for an unspecified, small EMU-member. The impact effect on net exports peaks at slightly over 0.1% of GDP in the base scenario. The sensitivity of the trade balance effects is assessed in subsection 2.9.

2.4 Non-labour income

So far we neglected non-labour incomes, like capital income and private pensions. The following subsection focuses on the special features of transfers (including public pensions). After extending the model with non-labour income, we will show that the change in the tax mix will stimulate the economy due to a tax base broadening argument, even in the long run and with price flexibility.

Next to the worker, we incorporate another type of consumer who receives all the non-labour income Y . For simplicity, we specify that no taxes are imposed on Y and that Y is not affected by the reform.¹² The budget restrictions of the non-worker are:

$$Y = D_b \tag{1'}$$

$$Y = (1 + t_a)D_a \tag{2'}$$

¹¹ Keen and Syed (2006) use a similar argument to explain that an increase in corporate taxes is found to increase net exports on impact.

¹² When Y is taxed at rate τ , we are back in the base model of section 2.1.

where D denotes consumption of the non-worker. The base of the wage tax is the wage sum WL , whereas the base of the consumption tax now becomes $C+D$. Since the consumption tax base is larger, the same amount of tax revenues is obtained with a lower tax rate. With $\tau > t$, condition (3) no longer holds with equality and the real after-tax wage increases after replacing the wage tax by the consumption tax. In terms of Figure 2.1, the labour supply curve shifts to the right, resulting in a higher employment and a lower wage cost in the new equilibrium. Employment improves since the reform shifts part of the tax burden from workers to non-workers. Therefore, the consumption tax is equivalent to the combination of a wage tax and a lump sum tax on non-labour income. In other words, replacing the distortive wage tax by a less distortive consumption tax improves the efficiency of the economy but the purchasing power of the non-workers worsens in the absence of compensation.

In addition, moving toward consumption-based taxation reduces the tax bias against saving, which increases permanently GDP growth. Johansson et al. (2008) argue that consumption taxes are more growth-friendly than income taxes. However, robustness analysis by Xing (2011) and IFS et al. (2011, Chapter 11) find no strong evidence for favouring consumption taxes over income taxes. Angelopoulos et al. (2012) simulate reforms of the tax structure in the UK with a general equilibrium model with endogenous growth. They find that replacing labour taxes by consumption taxes has small positive effects on long-run growth but substantial welfare gains.

To the extent that efficiency gains are obtained by taxing by surprise income from existing wealth (including pension income), a reservation should be made on the virtues of the tax shift. The productive capacity and growth prospects of the economy will suffer from the fear of households and firms that future taxes are unexpectedly increased. Loss in government's credibility precludes conducting frequently this type of tax reforms.

Furthermore, a social contribution might affect the labour supply decision differently than a general wage tax (IMF, 2011). Social contributions are less distortionary when they are linked, in real or in perception, with benefits. A tax reform that weakens the link between contributions and benefits has adverse effects on labour supply. For example, Disney (2004) breaks the public pension contribution down into an 'actuarial' (with link to benefits) component and a tax (without link) component. In contrast to the former component, increasing the tax component is found to reduce labour supply (in particular of women). IMF (2012) therefore argues that the SSC cut in Italy should be restricted to the component for which the link with benefits is weak.

Labour taxation is more distortionary when labour supply is more elastic. The permanent stimulus of employment and output is clearly sensitive to the elasticity of

labour supply with respect to the real wage. When labour supply responds stronger to changes in the real wage, reduction of the tax burden on labour income results in larger output gains. EC (2008, Table IV.3.4) performs a sensitivity analysis for the case of a tax shift from labour taxes to VAT in Germany. Doubling the labour supply elasticity from 0.25 to 0.5 more than doubles the long-run effects on employment (from 0.22% to 0.58%) and output (from 0.20% to 0.53%). Similar results are found in EC (2011).

We finally comment on the assumption that Y is not affected by the reform. When capital income is considered to include potential revaluation effects arising from holding external assets or debt, this assumption is reasonable for internal devaluation but not for external devaluation (see Correia, 2011). Suppose a country has an external debt in foreign currency. An unexpected devaluation of the exchange rate increases the value of the debt measured in domestic currency, which corresponds to a negative wealth effect. In contrast, the (nominal) value of wealth is not affected by fiscal devaluation. Farhi et al. (2011) show in a theoretical framework that an additional instrument is required to achieve equivalence between external and internal devaluation. The negative wealth effect arising from external devaluation is reproduced by supplementing internal devaluation by a transfer from the domestic country to the foreign country, or by a partial default of the foreign country on assets held by domestic residents. An opposite transfer is required when the external devaluation creates a domestic wealth gain.¹³

2.5 Indexation of transfers

Government transfers, like unemployment benefits and public pensions, are other examples of non-labour income and hence fit in the previous discussion. However, two specific channels are distinguished in the case of transfers.

First, transfers have to be financed by government revenues. When transfers are not adjusted for increases of consumer prices, outlays in real terms fall, which would allow for an extra reduction of the labour tax rate. When the government opts for indexing transfers to avoid the adverse distributional consequences, less room is left for stimulating employment. This is illustrated by introducing fully indexed transfers in the model. We assume it is never attractive for the worker to become a non-worker. The initial budget constraint of the non-worker remains identical to (1'), but the left-hand side of the constraint after the tax shift is adapted for the indexation of the transfers:

$$(1 + t_a)Y = (1 + t_a)D_a \quad (2'')$$

¹³ Calmfors (1998, Section 3) concludes in general that internal devaluation is an imperfect substitute for external devaluation. Correia (2011) concludes, using three stylized models, that fiscal devaluations and exchange rate devaluations are equivalent under extremely strong conditions.

We specify that tax revenues equal expenditures on transfers, implying that the budget restrictions of the government are:

$$\tau_b W_b L_b = Y \quad (5)$$

$$t_a (C_a + D_a) = (1 + t_a) Y \Rightarrow t_a C_a = Y \quad (6)$$

This shows that workers pay the same amount of taxes in both cases. In other words, this model is equivalent to the base model in which the tax shift has a neutral effect on employment.

Notice this channel also operates in perfect markets and flexible prices. With an imperfect labour market, a second channel interacts with the first channel. When wages are set by (individual or collective) bargaining, the equilibrium wage depends on the outside option of the worker. When the unemployment benefit is not linked to consumer prices, an increase in the VAT rate will reduce the real value of his outside option. Worsening the worker's bargaining position will result in lower wage costs and a higher equilibrium employment. Employment gains get smaller with a larger degree of indexation of transfers.¹⁴ In the case that transfers are not fully indexed, both channels are another cause of permanent effects on the labour market.

Simulation analysis confirms that results are sensitive to the specified degree of indexation of transfers. EC (2008, Table IV.3.4) compares long-run outcomes of a tax shift in Germany. When transfers recipients are fully compensated, employment expands by 0.22% after 20 years. The effect almost doubles (to 0.43%) when no indexation is considered. Effects on GDP are similar (0.20% versus 0.47%). Similar examples can be found in EC (2006, 2011).

2.6 Timing issues

In the stylized static model, we considered permanent, unexpected policy changes. Calmfors (1998) argues that an internal devaluation is characterized by a slower decision-making process than an external devaluation. Due to implementation lags associated with major tax reforms, announcement will give extra intertemporal substitution effects. In anticipation of the higher future VAT rate, consumption and output already increase at the time of the announcement of the future tax shift. However, at the time of implementation, consumption and output fall below the path resulting from an unexpected policy change. Simulations of Lipińska et al. (2012, Section 5.3) show that announcing a tax shift four quarters ahead has sizable effects.

¹⁴ A similar argument holds in case of a binding minimum wage. When the nominal minimum wage is fixed, a shift to consumption taxes will reduce the structural unemployment.

Estimations in Carare and Danninger (2008) suggest large anticipatory effects of the VAT hike in Germany in 2007.

Instead of a delayed implementation, Franco (2011, Figure 5) considers a transitory tax shift. Production (of tradables) still expands in the short run but consumption falls in anticipation of the return of the VAT rate to a lower level. As a consequence, a much stronger improvement of the current account is achieved.

2.7 Monetary accommodation and exchange rate regime

In the case of a small economy, a constant nominal interest rate is commonly assumed. If fiscal devaluation is analysed for a large economy or a large group of countries, additional effects emerge from the reaction by monetary policy. First, we discuss an interest rate rule that targets pre-tax inflation (i.e. core inflation excluding VAT).¹⁶ If the reduction in labour costs leads to lower union-wide inflation of producer prices, the central bank reacts by reducing the nominal interest rate, which stimulates interest-elastic demand.

The interest rate setting has an additional effect via the impact on the exchange rate vis-à-vis non-eurozone countries. In the previous sections we assumed fixed nominal exchange rates. Fiscal devaluation is considered less effective with a flexible exchange rate. In most of the models the nominal exchange rate is determined by the uncovered interest parity condition (e.g. the difference between the home and the foreign short-run interest rate equals the rate of depreciation of the home currency).¹⁷ A reduction of the nominal interest rate following the tax shift will cause an appreciation of the euro, which undoes the competitiveness improvement. Fiscal devaluation will therefore be more effective if the fraction of the trade denominated in a fixed exchange rate is high. In addition, IMF (2012) argues that a unilateral devaluation will have a limited effect on the euro exchange rate when a country features a low fraction in the external trade of the euro zone. However, trade flows only have a minor, direct impact on the short-run exchange rate. More relevant is the weight of the country in the interest rate rule adopted by the ECB. Small euro members can less influence the interest and exchange rates.

EC (2008) reports that the induced monetary effects are small relative to the real effects. When a revenue-neutral tax shift from labour taxes to VAT (by 1% of GDP) is simulated for the whole euro-area, inflation reduces by maximal 28 points (in the first year), the nominal interest rate is lowered by 20 points and the euro appreciates against

¹⁶ The interest rate setting depends on pre-tax inflation in the QUEST-model of EC and the NAWM-model of ECB. Coenen et al. (2012) illustrate the sensitivity of fiscal multipliers to the degree of monetary accommodation in these and other DSGE models.

¹⁷ See the QUEST model in EC (2008) and the NiGEM model in Barrell et al. (2007).

the dollar by 0.38% (in the second year). When the tax shift is only implemented in Germany, the fall in German inflation of 8 points only leads to a decrease in the interest rate of 5 points and an appreciation of 0.09%.¹⁸

Lipińska et al. (2012, Section 5.2) also study an alternative specification of the monetary policy rule in terms of the after-tax inflation (including VAT). When the inflationary pressure from the higher VAT rate induces the central bank to raise the nominal interest rate, output and consumption in the short run are lower compared to a scenario with a constant interest rate.¹⁹

2.8 Unilateral versus Multilateral fiscal devaluation

In the previous sections, we studied the effects of fiscal devaluation in a single country, neglecting policy responses in other countries. How is the effectiveness affected when the tax shift is simultaneously undertaken in many countries? The answer depends on two types of spillovers. First, competitiveness is clearly a relative concept: improving the competitiveness of one country goes at the expense of the competitiveness of another country. The effects on net exports get smaller if fiscal devaluation is applied in several countries. If these effects dominate, fiscal devaluation runs the risk of triggering international tax competition. Second, the expansionary effects of shifting to a more efficient tax structure are beneficial for other countries as well. These positive spillovers are larger when more countries participate in a coordinated fiscal devaluation.

EC (2008) provides outcomes for Germany in a unilateral and a multilateral scenario. At the current circumstances, Germany is not the best example for simulating fiscal devaluation. However, country-specific results for the multilateral scenario are only reported for Germany. The German figures are therefore only used to illustrate the relative sizes of the channels. A first scenario considers a coordinated tax shift among all EMU-members. Output in Germany increases by 0.09% in the first year and by 0.23% after 20 years.²⁰ When only Germany conducts the tax swap, the improvement of competitiveness leads on impact to a larger output expansion (0.11%). However, this gain is temporary as it is eroded by real wage adjustments, resulting in a smaller output increase in the long run relative to the multilateral scenario (0.20%).²¹

¹⁸ As expected, the interest and exchange rates are not affected if the reform is only undertaken in Ireland.

¹⁹ The tax shift is implemented in one of the two identical countries of a monetary union.

²⁰ According to EC (2008, Box IV.3.1), the finding that the GDP effect is larger in the long run than in the short run is due to the shift in taxation from wages to capital income. The resulting higher net real consumer wage leads to a permanent positive labour supply response. In combination with a constant capital-labour ratio (due to a constant user cost of capital), higher employment results in a higher GDP in the steady state.

²¹ As discussed in the previous section, gains are also smaller due to the smaller effects on the nominal interest rate and exchange rate in the unilateral scenario.

2.9 Trade elasticities

The effectiveness of fiscal devaluation depends on the size of the response of export and import demand to changes in the terms of trade. When domestic and foreign tradables are assumed better substitutes, imports fall more and exports expand more if the price of the domestic good is reduced relative to the price of the foreign good. EC (2008, Table IV.3.4) reports the sensitivity of long-run effects of a tax shift in Germany to the price elasticity of tradables (The more relevant short-run effects are not reported). In the base scenario with a trade elasticity of 2, long-run GDP increases by 0.20%. In an alternative scenario with a higher elasticity of 5, the output gain is 0.24%. The results seem rather robust to values of the trade elasticities. Output prices need to fall less when domestic and foreign goods are better substitutable. However, workers are able to quickly capture the competitiveness gain by claiming a relatively higher real wage. Bosca et al. (2012, Table 3) examine the sensitivity of the short-run effects of fiscal devaluation in Spain. They find that doubling the price elasticities of imports and exports hardly affect the GDP effect after two years (0.76% versus 0.74% in the baseline). Similarly, Lipińska et al. (2012, Table 4) discuss the introduction of home bias in consumption. This can be interpreted as a reduction of the substitution elasticity between domestic and foreign goods. They find that the home bias assumption has a dampening but negligible effect on output and consumption in the long run.

Franco (2011) considers the extreme scenario with price-taking firms. If the economy is a price taker on foreign markets, export demand is perfectly elastic and the export price is constant. As the tax shift cannot affect the value of exports, the trade balance and output are considerably less improved in the short run (see Figure 4). If, in addition, the firms also have no market power domestically, the positive income effect is not longer counteracted by the negative substitution effect on import demand and even a deterioration of the trade balance results.

2.10 Sectoral decomposition

Related to the previous section is the sensitivity to the size of the nontradable sector. The larger the nontradable sector, the more diluted are the effects on the trade balance (Franco, 2011, Figure 4). The decrease of the SSC rate reduces labour costs and producer prices of home produced nontradables and tradables, but not the producer price of foreign produced tradables. Therefore, nontradables become cheaper relative to the composite of tradables, which induces a shift of consumption to nontradables. This leaves less room for substitution between domestic and foreign tradables, leading to a smaller improvement of the trade balance.

Feldstein and Krugman (1990) add that the impact on consumption of tradables and nontradables might depend on the specific VAT design. On the one hand, tradables are

believed to be more heavily taxed than nontradables. A prominent example is the reduced VAT rate applied to nontradable labour-intensive services and the exemption of financial services. Increasing the reduced rate less than the standard rate then strengthens the substitution in favour of nontradables. On the other hand, consumption of some tradables benefit from reduced or even zero VAT rates. Food products are prime examples for many EU countries. Therefore, the impact on the trade balance depends on the specific interactions between the VAT system and sectoral features.

In this respect, labour intensity is another important feature that might cause differential effects across sectors. Whereas an external devaluation has on impact the same proportional effect on export and import prices of all commodities, internal devaluation has a larger effect on more labour-intensive commodities (IMF, 2011).²² Moreover, when labour costs fall relative to the cost of capital, substitution elasticities will determine the extent to which capital is replaced by labour in production.²³ Fiscal devaluation will not affect the capital/labour choice only if an equivalent subsidy on capital is added to the reform (Farhi et al., 2011).

2.11 Distributional considerations

Distributional effects highly depend on the specific design of the tax reform. In section 2.4 we have already pointed at the differential impact on households receiving wage income, capital income or social transfers. Increasing VAT revenues may involve changes in the zero rate, the reduced rate, the standard rate and/or exemptions. IFS et al. (2011, Chapter 9) illustrate that these measures have different distributional effects on subgroups of households.

Changes in SSC could be broad based or targeted at particular groups of workers. Restricting the SSC cuts to lower wage levels might be supported by both equity and efficiency arguments (see IMF (2011) and EC (2008)). Focusing cuts in SSC on low-paid workers offsets their loss in real income due to the higher VAT rate. In addition, when low-paid workers respond stronger to changes in net wages, a selective cut in SSC generates a larger efficiency gain.²⁴

Some models allow for a different impact on liquidity-constrained and non-liquidity-constrained households. The QUEST-model, as applied in EC (2008), assumes that liquidity-constrained households (with a population share of 40%) do not save and that they only receive labour income and indexed social transfers. In contrast, non-liquidity-

²² Labour intensity is restricted to domestic value added, excluding imported intermediate inputs.

²³ Note that labour is the only production input in the stylized models of Lipińska et al. (2012) and Franco (2011).

²⁴ De Mooij and Keen (2012, Box 1) are critical about targeting SSC cuts at new employment and at small firms.

constrained households own financial wealth and therefore receive capital income, next to labour income. Since the total income of the liquidity-constrained households benefits more from fiscal devaluation, their consumption expands more than the consumption of unconstrained households. In contrast, in the base case of EC (2011), transfers are not indexed and constrained households can consume less on impact, while consumption of unconstrained households still increases.

Decoster et al. (2010) evaluate the distributional consequences of a tax reform for 4 countries (Belgium, Hungary Ireland and the UK), using the EUROMOD micro-simulation models. The simulation considers a reduction of the SSC rate of the employees (by 25%), financed by an increase of the standard VAT rate.²⁵ Welfare is found to fall for the lower expenditure deciles, meaning that the gain from a higher disposable income is dominated by the loss from higher consumer prices.²⁶ The pattern is reversed for the higher deciles. Since social contributions are more progressive than the standard VAT, welfare effects expressed in terms of nondurable expenditures increase over the deciles.²⁷

Thomas and Picos-Sánchez (2012) simulate a reduction in SSC rates financed by an increase in VAT rates in 13 European countries, using the OECD Taxing Wages models integrated with data on the consumption patterns of different households types, obtained from Household budget surveys for each country. For various representative family types, they compute the average and marginal “combined” tax wedges before and after the fiscal devaluation. In most cases, they find a reduction in average and marginal tax wedges after the reform, with a great heterogeneity in the results for different countries. The sizes of the reductions, however, are in general not very large, since part of the SSC burden still falls on workers who must pay greater VAT rates. The authors also stress that part of the burden of the reform will be shifted to non-worker households, like the unemployed and pensioners. In France the benefit is extended also to families of high-income workers, while in Austria low-income workers do not significantly gain from the reform. Finally, in Spain the reform seems well targeted on low-income workers.

2.12 Econometric studies

The impact of individual taxes is extensively explored in the literature. Concerning the effects of VAT, we refer to the surveys in IFS et al. (2011). In particular, it discusses

²⁵ Expenditures on nondurables are affected by income changes but not by changes in relative prices. Savings, quantities of durables and labour market behaviour are assumed constant.

²⁶ The number of deciles that are confronted with welfare losses ranges from 4 in Ireland to 6 in Hungary.

²⁷ Boeters et al. (2008) simulate a harmonization of VAT rates, combined with a cut of the SSC rate with a static AGE model for Germany. Next to macroeconomic effects, they report distributional effects on the 3 terciles. The average welfare effect is positive but the lowest tercile loses.

econometric studies on the relation between VAT and trade neutrality (Chapter 7, see also de Mooij and Keen, 2012); pass-through to consumer prices (Chapter 8); growth, consumption, labour market and tax revenues (Chapter 11). Studies on SSC seem to focus on assessing its incidence on workers. OECD (1990) concludes based on aggregated data that the burden of these taxes is borne by wage earners in the long run. Micro studies find more mixed evidence on the impact on net wages (see e.g. Saez et al., 2012). This subsection focuses on econometric studies that deal explicitly with the effects of fiscal devaluation.

Franco (2011) assesses the effects of fiscal devaluation on government revenues and the trade balance for Portugal by estimating two Structural Vector Autoregression models. The first VAR model contains nominal consumption, real imports and the effective VAT rate. A positive (unexpected) shock of one standard deviation in the effective VAT rate is found to reduce nominal consumption by 2% after 2 years and by 3% after 5 years. These effects are considered to approximate the effects on the VAT base. Following the same shock, real imports fall by 6% after 2 years and 8% after 5 years. Confidence intervals are large but all effects are significantly negative. In view of the small number of quarterly observations, a separate model is estimated, containing the nominal wage bill, real exports and the effective SSC rate. A one standard deviation increase in the effective SSC rate decreases the nominal wage bill by 3% after 2 years and by 5% after 5 years. Real exports are reduced by 2% after 2 years and 3% after 5 years.

Based on these estimated elasticities, he next simulates the effects of fiscal devaluation. Ex ante budget neutrality is met when an increase of 1 standard deviation in the effective VAT rate is combined with a decrease of 1.6 standard deviation in the effective SSC rate. As the SSC base expands more than the VAT base shrinks, tax revenues increase in all quarters. The fall in imports and the rise in exports result in a substantial improvement of the trade balance. Franco (2011) concludes that the empirical analysis seems to support the efficacy and the feasibility of a fiscal devaluation in Portugal.

De Mooij and Keen (2012) provide empirical evidence that fiscal devaluation might have a quite sizable impact on the trade balance. They estimate an error correction specification on a panel of 30 OECD countries over the period 1965-2009.²⁸ They find that for euro countries reducing the employers' social contributions by 1% of GDP improves net exports by around 3% of GDP in the short run (with the government balance unchanged). This effect converges to zero in the long run. In contrast, changes

²⁸ In an earlier study, Keen and Syed (2006) consider a less rich dynamic specification. Moreover, they estimate the impact of corporate taxes and the VAT on net exports, without discussing the effect of a budget-neutral tax shift.

in VAT revenues have an insignificant effect both in the short run and in the long run. Combining these estimates suggests that a shift of 1% of GDP from SSC to VAT improves significantly net exports in the short run (by 4% of GDP), but this effect is not permanent. These results should be interpreted with care since they are not fully robust and vulnerable to endogeneity issues.

Finally, Boscá et al. (2012) find a significantly negative relationship between the current account and the ratio of social security contributions over consumption taxes in a cross-section of EU15 countries. The estimates imply that an ex ante shift of 1% of GDP improves the current account between 1.8% and 3.4% of GDP.

2.13 Conclusion

This literature survey suggests that fiscal devaluation can have positive though small effects on employment, GDP and net exports. The reform has real temporary effects if the nominal wage is not immediately adjusted to the tax shift. Permanent effects are found if consumption taxation is less distortive than wage taxation. The effectiveness is found to be sensitive to particular features of the economy, in particular the degree of indexation of social transfers and the wage elasticity of labour supply. Whether the tax system becomes less or more progressive depends on the particular design of the tax shift. Targeting the cut in social contributions at low-paid workers makes the reform less vulnerable to the trade-off between efficiency and equity. It is remarkable that studies that evaluate fiscal devaluation in Portugal seem to find rather substantial effects (Bank de Portugal (2011) and Franco (2011)).

Even when its benefits are not permanent, fiscal devaluation might be an effective instrument to accelerate adjustments to competitiveness and employment problems. However, a tax shift cannot be used as an adequate substitute for structural reforms to address fundamental problems underlying external imbalances and weak growth prospects.

3 Description of the methods

Before we discuss the simulation results in the next section, we describe the main features of the macro and micro-analyses.

3.1 Macro analysis

We use three models to conduct the macro-simulations. Its features are listed in Table 3.1.1. For studying short-run dynamics we prefer the econometric NiGEM model. The general equilibrium features of the other models make them more appropriate for analyzing long-run effects. The IHS model is available for the four countries considered, while the CEPII model focuses on the French economy.

Table 3.1.1: Main features of macro simulation models

	NiGEM	IHS	CEPII
1. Type	New-Keynesian model, estimated	AGE model, calibrated	AGE model, calibrated
2. Coverage	Multi-country	Single country	France
3. Base year	2000/2005	2009	2006
4. VAT rates	one effective consumption tax rate	one effective VAT rate	VAT rate per good
5. # goods	1	1	19
6. SSC rate	one effective labour tax rate	employer & employee effective rate (per generation & skill)	employer & employee effective rate
7. Nominal interest rate	depends on nominal GDP & inflation target	exogenous	endogenous
8. Wage determination	Error Correction Model	wage bargaining with immediate adjustment	wage bargaining with immediate adjustment
9. Elasticity labour supply	0 (exogenous)	depends on skill	0 (exogenous)
10. Budget closure	ex ante with labour tax rate	ex post with lump sum tax	ex post with lump sum tax
11. External trade	Error correction specification of import and export equations	Single homogenous good; net exports traded at fixed world price	Domestic and imported goods are imperfect substitutes; exports are function of terms of trade
12. Exchange rate	Determined by uncovered interest rate parity	Fixed at 1	Real exchange rate follows from eq. on the balance of payments
13. Expectations	Forward-looking	Perfect foresight	Static expectations

ETLA: NiGEM model²⁹

NiGEM (National Institute Global Econometric Model) is a quarterly model, which uses a ‘New-Keynesian’ framework in that agents are presumed to be forward-looking but nominal rigidities slow the process of adjustment to external events. NiGEM consists of interlinked submodels for different countries and regions, including all EU countries (except that Luxembourg, Malta and Cyprus are only implicit in a larger group). NiGEM is structured around the national income identity and is based on estimation using historical data.

Fiscal devaluation, in the form of a decrease in social security contributions and an increase in consumption taxes, affects the wage – price dynamics in the model. The wage-price block is based on the right to manage formulation where bargaining determines the real wage. Real wages, therefore, depend on the level of trend labour productivity as well as the rate of unemployment. Taxes affect real wages indirectly via these variables. Labour markets in the model embody rational expectations and wage bargainers use model consistent expectations.

NiGEM is especially useful for modelling fiscal devaluation since it captures both short-run dynamics and cross-country spillovers. As a quarterly model it captures the short-run dynamics. The dynamics of wage development depend upon the error correction term, which determines the long-run adjustment, and on the split between lagged inflation and forward inflation as well as on the impact of unemployment on the wage bargain. Consumer prices are determined by import prices, production costs, profit mark-up (that depends on capacity utilization), and consumption taxes. The dynamic adjustment to fiscal devaluation depends on the parameter values and varies between countries.³⁰ Finally, the model captures cross-country effects of fiscal devaluation. One country affects other countries via exports and imports, and where applicable also through exchange rate adjustments.

IHS: Dynamic AGE model per country³¹

This model is a single-country dynamic computable general equilibrium model with a detailed description of labour markets and the public sector. It quantifies the impact of public policy and exogenous shocks on labour supply, output, consumption and other macroeconomic variables on the transition path and in the long run. These impacts can differ within and across generations, and across skill levels.

²⁹ See the description on <http://nimodel.niesr.ac.uk/logon/nigem.php?sw=0&ftyp=1&t=3&b=1>.

³⁰ For example, the estimated error correction coefficient in the wage equation ranges from -0.09 in France, -0.15 in Italy, -0.16 in Spain to -0.33 in Austria. This implies a half-life adjustment of 7.3, 4.3, 4.0 and 1.7 years, respectively. It shows that the wage reaches its long-run level much quicker in Austria than in France.

³¹ See the detailed documentation in Berger et al. (2009).

Agents have perfect foresight and behaviour relies on micro foundations. In a static search unemployment framework, households endogenously decide on skill levels, continuous training efforts, participation in the labour market, search effort if unemployed, hours supplied and retirement, as well as the intertemporal allocation of their consumption. The model handles three skill groups and eight overlapping generations. Each household goes through 8 life-cycle stages, with age classes: 15-19, 20-24, 25-39, 40-54, 55-69, 70-79, 80-84 and 85-92 years. Starting their life (at age 15), households decide which skill level they want to achieve. Households who choose to educate only a little (low skills) work from age 15; to educate mildly (medium skills) work from age 20; to educate a lot (high skills) work from age 25. Retirement takes place when a household is in the 55-69 life-cycle stage.

Profit-maximizing firms make capital investment, hire, train and fire workers. Wages are set by bilateral bargaining between workers and firms. The bargaining power determines how the surplus is split that arises from the match between workers and firms. Wage rigidities are not included. To capture realistic components of production and better simulate dynamic responses after reforms, the model assumes capital adjustment costs and capital-skill complementarity, where low skill workers can be substituted more easily by capital than medium and high skill workers. The government raises revenues by taxing consumption, profits, labour and capital income as well as by payroll taxes and social security contributions both on the employees' and the employers' side. It provides a variety of social insurance, retirement pensions and basic firm subsidies.

In the model it is assumed that there is only one type of good (i.e. the real exchange rate is fixed at one) and that the country takes the interest rate as given. It is operational for 14 EU countries.³²

The model can be used to simulate per individual country the effects of fiscal devaluation raising value-added taxes and reducing taxation on labour (in several forms) in a revenue neutral way on various macroeconomic outcomes. Intra- and inter-generational effects can also be quantified. As the model is designed for single small open economies we can assess the effects of taxation on its trade position against the rest of the world. However, effects on bilateral trade flows between individual countries are not captured.

³²Austria, Belgium, Czech Republic, France, Germany, Italy, Denmark, Finland, The Netherlands, Poland, Spain, Sweden, Slovakia, and UK.

CEPII: macro model for France

CEPII developed a macro model focusing on the French economy.³³ This model is a dynamic computable general equilibrium (CGE) model with 19 sectors and international trade (distinguished between the Euro zone and the rest of the world).³⁴ Workers are differentiated by three skill levels. Labour supply, for each skill level, is assumed fixed and workers are assumed to be perfectly mobile across sectors implying that wages have to be identical for each sector. Wages are bargained by workers and firms implying that the unemployment rate is endogenous for each skill level. Total consumption expenditures of the representative household are a constant fraction of disposable income (i.e. this is not derived from intertemporal optimisation). The distribution of expenditures over the 19 goods and services as well as the composition into domestic and foreign goods follows from utility maximization subject to a budget constraint. In each demand component, domestic and imported goods are imperfect substitutes. The domestic price is endogenously determined in order to equilibrate the demand and supply of goods for each sector. Domestic firms export at the same price as on the domestic market, whereas import prices are exogenous. The exchange rate adjusts to guarantee the equilibrium of the balance of payments. Household saving is a constant fraction of disposable income while the government deficit and the change in net foreign assets are a fixed share of GDP. Equilibrium on the domestic capital market determines the interest rate.

3.2 Microsimulation analysis

The distributional analysis of fiscal devaluation at the micro (household) level is conducted with the use of four different tax-benefit microsimulation models, described at the beginning of the sections devoted to the results for each country.³⁵ The simulations are concerned only with the long-run effects of fiscal devaluation. In the micro-analysis, therefore, we assume that there is no change in the level of employment, that the reduction of employer SSC rates translates into an increase in wages and that the increase in VAT rates will bear entirely on consumers, therefore with a corresponding increase in prices. This last assumption, i.e. the full incidence of

³³In the offer we intended to follow a micro-macro approach based on a static CGE model and a microsimulation model, fully integrated. We developed a new, dynamic version of the macro model to make the fiscal devaluation simulations comparable to the ones of the other teams. However, solving the micro and macro model simultaneously became a too cumbersome exercise. Therefore, we had to decide to run both models completely separated which has presumably minor consequences for the results at the micro and macro level. In Appendix 1, we present the micro effects using the macro results obtained with the CEPII macro model, while the microsimulation effects presented in Section 4.2 are obtained using the macro results of the IHS model (as in the intermediate report).

³⁴ The model is described in Magnani and Carré (2012), which is available on request.

³⁵ The models have been built following different rules and use a variety of datasets. These differences may play a role in the results obtained. The simulations performed involve the analysis of both income and consumption, and it is not yet available a uniform European-wide micromodel that simulates in an integrated fashion both direct and indirect taxes.

VAT on consumers, is not very problematic (see IFS et al. (2011) for a discussion), particularly when considering the long run hypothesis and in the case of a change in all VAT rates or in VAT rates that represent a significant share of total expenditure. The assumption of full translation of reduced employer SSC into higher wages is, on the other hand, more debatable, but is consistent with the idea that in the long run the FD has not lasting effects on real variables like output or employment; if labour supply in the long run is given, then a fall in SSC produces an increase in wages. In general, the incidence should fall mostly on workers since labour supply is considered to be more rigid than labour demand. Gruber (1997), for example, finds evidence of a full shift of social security contributions on workers, and full shifting is the assumption incorporated in many studies of the distributional impact of taxes (Fullerton and Metcalf, 2002).³⁶ Also Ooghe et al. (2003) find that SSC are shifted (for more than 50%) to the employees. Other studies obtain more mixed results. More recently, many studies have emphasised the fact that SSC incidence may depend also on the institutional characteristics of the labour market, for example the degree of bargaining centralization or the strength of the link between contributions paid and benefits received by workers. Among these more mixed results, Saez et al. (2012), for example, find that workers are compensated for changes in employer contribution rates (as we assume here), but not if they are subject to increased employee rates. Our assumption of complete incidence finds some justifications both in theory and in some empirical results, but is in any case very strong, although standard in microsimulation analyses of this kind. In the short run or in specific national contexts, therefore, more mixed incidence results are possible.

In order to link the distributive analysis with the results from the macro models, the percentage change in the levels of SSC rates that has been computed in the IHS macro model (and that corresponds to 1% of GDP) is used as an input in the microsimulations.

The basic distributive results will be provided in terms of changes in disposable income or consumption by deciles of equivalent (pre-reform) income and also by deciles of equivalent (pre-reform) expenditure. There is indeed a long-standing debate about the choice of the appropriate monetary measure of the economic standard of living: income or consumption (see IFS et al., 2011, Chapter 9). This problem is particularly relevant in the case of a change in VAT rates, since the distributive impact of indirect taxation as a whole is typically regressive when measured in terms of disposable income, but turns out to be generally slightly progressive on expenditure, given the presence of multiple tax rates on different goods and services. In analyzing shifts between direct and indirect taxation, it is not clear whether one will obtain a more meaningful picture of the

³⁶ Fullerton and Metcalf (2002) state that “for the payroll tax, virtually all applied incidence studies assume that both the employee share and the employer share are borne by the employee (through a fall in the net wage by the full amount of payroll tax).”

distributional impact of the change by dividing gains and losses by income or by expenditure. For this reason, we will provide a distributional analysis not only by deciles of disposable income but also by deciles of expenditure. In addition, we present results by family types. It is a well-known fact that the distributional effects are much smaller, when the time horizon is extended from one year to the rest of the lifetime of individuals. Another point worth mentioning here is that these calculations do not consider the lump-sum wealth tax property of VAT, i.e. the fact that an increase in VAT rates is likely to reduce the value of real assets (IFS et al., 2011, section 9.4).

We have simulated three different alternative VAT reforms in order to close the public budget after a reduction of SSC corresponding to 1% of GDP:

- 1) An increase in the standard rate of VAT, together with:
 - 1.1) A general reduction in the rate of employer SSC such that the overall reform is revenue neutral. In countries where there are multiple rates of employer SSC, all are varied. We assume that the increase in VAT rates determines an increase in prices, and that the reduction in the SSC rates produces a corresponding increase in nominal wages.
 - 1.2) A reduction in the rate of employer SSC levied only on the earnings of low-paid workers such that the overall reform is still revenue neutral.

- 2) A proportional increase in all rates of VAT, together with the same two changes to employer SSC ((2.1) and 2.2)).³⁷

- 3) The abolition of all zero and reduced rates and the application of a unique VAT rate on all goods and services, together with the same two changes to employer SSC ((3.1) and 3.2)). Goods and services currently exempted from VAT keep this status.

We have tried to create a link between the macro and micro models not only taking from the macro models the % reduction in SSC revenues that represents 1% of GDP, but also using the same percentages of the macro models for the identification of the group of low-paid workers, so that in Italy 45.7% of employees are considered as low earners, in Spain 48.5%, in Austria 18.1% and in France 30%. In the microdata, employees are sorted on the basis of their gross incomes and, in the simulation that applies the SSC reduction only to low earners, we define as low earners those workers that are located below these percentages in the respective national income distribution.

³⁷ As in the other two simulations, also in this case there is a modification in relative prices due to the application of a common rate of increase to VAT rates that are of different magnitude. Since the models that we use are static, we do not consider the possible behavioural reactions to these changes in relative prices.

The changes in VAT rates necessary in each simulation to compensate at the aggregate level the reduction in SSC rates are applied to the same expenditure categories that are currently subject to VAT, without modifications in the composition of the groups that are now subject to differentiated rates. The nominal values of the monetary variables (income and expenditure in each good or service) are updated to the latest available year which is incorporated in the codes for each model.

When dealing with microdata, there is a preliminary grossing-up problem that must be dealt with. It is indeed typical for expenditure surveys to underestimate the levels of total household expenditure that are provided by national accounts. This underestimation can be very substantial, for example the grossed up total expenditure estimated from microdata could be only 60-70% of the value from national accounts. On the other hand, in the microdata the base of SSC, i.e. labour incomes, is in general less underestimated with respect to national accounts, or frequently corrected to provide representative information on direct taxes and transfers. In our 2011 TAXUD project on VAT, it was decided not to adjust the microdata with grossing-up factors (see IFS et al., 2011). We have made the same choice in the present context, but with two different application rules. In the first case, from the macro simulations, we obtain the % changes in VAT and SSC that are equivalent to 1% of GDP, and in the micro analysis we modify with the same percentages the VAT and SSC paid, even if these changes do not sum up to the aggregates of the National Accounts. In the second case, we take from the macro models only the % change in the levels of SSC rates, but search in the microdata for the changes in VAT rates that close the public budget.³⁸ This second case is more internally consistent and its results will be described in the text, while the other set of results is discussed in an appendix.

The distributional analysis is therefore carried out on data not grossed-up to national accounts, with real values expressed in the most recently available year, and incorporating the most recent legislation that is simulated by each microsimulation model.

The definition of disposable income or expenditure (denominators of the incidence analysis) includes imputed rents on owner-occupied dwellings.³⁹ In the case of Austria, the income dataset (EU-SILC) does not include imputed rents, so they are taken from the consumption dataset and added to disposable income after tax-benefit calculations have taken effect. The equivalent measures are obtained with the modified OECD equivalence scale (with weights 1 for the first adult, 0.5 for other household members

³⁸ Notice that from the macro models we get the % reduction in the rates of SSCs, not the reduction in the rates. For example, if in the macro models the SSC rate falls from 30% to 26% of gross earnings, then in the microsimulation we apply a reduction of (rates and revenue) SSC by $4\%/30\%=16.7\%$.

³⁹ We have verified that the distributive results do not significantly change with the exclusion of imputed rents on dwellings from equivalized income or expenditure.

older than 13 years, 0.3 for younger members). The unit of analysis is the household, not the individual (i.e., each decile contains 10% of households, not of individuals).

The distributional effects can be significant not only between income or expenditure levels, but also across types of households. We therefore provide the distributive impact of FD for the following two categorizations of households:

By household type:

1. 1 adult (18-64), no children (0-17), no elderly (≥ 65);
2. 1 adult, with children, no elderly;
3. >1 adult, no children, no elderly;
4. >1 adult, with children, no elderly;
5. 1 elderly, no adult, no children;
6. >1 elderly, no adult, no children;
7. at least 1 elderly (different from cases 5 and 6).

By condition of the head:

1. employee manual worker;
2. employee worker different from manual and manager (clerks, teachers, etc.);
3. manager;
4. self-employed and entrepreneur;
5. pensioner (from work or other reasons, e.g. invalidity);
6. unemployed;
7. other.

The models simulate the effects of the reduction in SSC rates taking account also of the consequent variation in the personal income tax and in the amounts of cash transfers, depending on the level of disposable income. The increase in disposable income is assumed to induce a change in current expenditure equal to the household's propensity to consume multiplied by the change in disposable income. We therefore assume that the propensity to consume (or save) out of income does not change, but we allow for different variations in total expenditure for a given income change for each household, depending on its level of the propensity to consume. If a household of the sample has total expenditure greater than disposable income, then the whole change in the latter is converted into a corresponding additional expenditure.⁴⁰

⁴⁰ The assumption of constant budget elasticity may conflict with discussion in relation to expenditure reflecting long-term consumption, particularly when we observe a negative savings rate, and particularly in the bottom part of the distribution. Expenditure being higher than income may reflect a temporary reduction in income being met by dipping into savings. Increases in income as a result of an SSC change, therefore, may not result in any change to expenditure, if existing expenditure reflects permanent income.

The basic variable that we use to assess the distributive effect of the reform is the change in disposable income, defined in the Tables and Figures that follow as the increase in monetary disposable income after the reduction in employer SSC rates (and the associated variations in personal income tax and income-related cash transfers), minus the increase in the VAT necessary to balance the public budget at the aggregate level; this change is expressed as a percentage of disposable income before the reform. We thus obtain an indicator of the variation in the living standard that takes account of the fact that indirect taxation has increased, so with a given disposable income a household is now able to purchase a lower quantity of goods and services than before. When we analyze the impact of the reform by deciles of equivalent expenditure, the key variable is “net expenditure”, defined as the increase in expenditure (that follows the increase in disposable income) minus the increase in the amount paid for the value added tax.

Before presenting the simulation results of the distributive effects of the FD in Sections 4 to 7, it may be useful to provide some data about the current distributive impact of the value added tax and of social security contributions. The two following graphs show the average burden of VAT payments on disposable income and on family expenditure, by deciles of both equivalent income and equivalent expenditure. The VAT turns out to be, as expected, regressive in terms of income but generally slightly progressive on expenditure.

As for the incidence on income, Spain and Italy show very similar patterns, with general levels of incidence lower than those found in the two other countries. In Italy and Spain, the VAT takes 8-10% of income of lower deciles and 4-6% of income for the richest ones. In France, the regressive nature of VAT is evident at the extremes of the distribution while in the middle deciles its incidence is roughly constant for most of the sample. In all countries the VAT is indeed nearly proportional in the central section of the distribution. Among the poorest households, the greatest VAT burden is suffered by households living in France and Austria, where VAT represents 12-18% of disposable income. Different levels of incidence of the VAT in different countries may arise from many factors: the various degrees of under-representation of income and consumption in the microdata with respect to the national accounts, different average propensities to save, and the application of differentiated tax rates to various groups of goods and services.

Turning to the distributive effect of VAT on expenditure, it is progressive in the four countries across the entire distribution, and also in this case the incidence among the central deciles is fairly flat (Figure 3.2.2). This effect is due to the presence of reduced and zero rates for goods and services that represent a greater share of total expenditure for households with low levels of total expenditure. For Spain the impact of VAT is actually almost proportional. Since the standard VAT rates are very similar in the

various countries, the differences in the levels of incidence depend only partially on the variability in the standard VAT rates.

Figure 3.2.1: Incidence of VAT on disposable income before the FD by deciles of equivalent disposable income

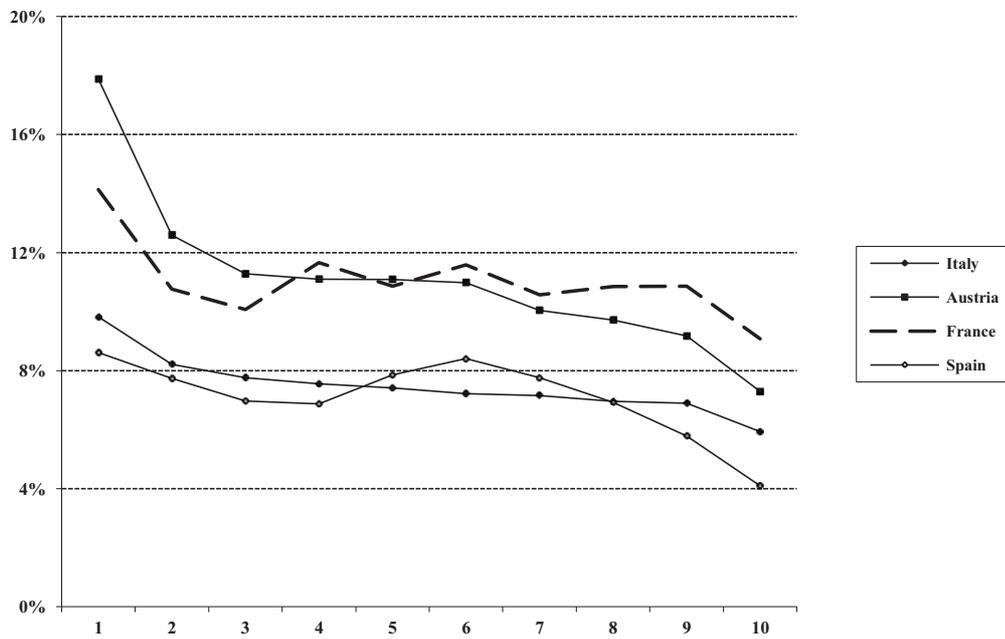


Figure 3.2.2: Incidence of VAT on expenditure before the FD by deciles of equivalent expenditure

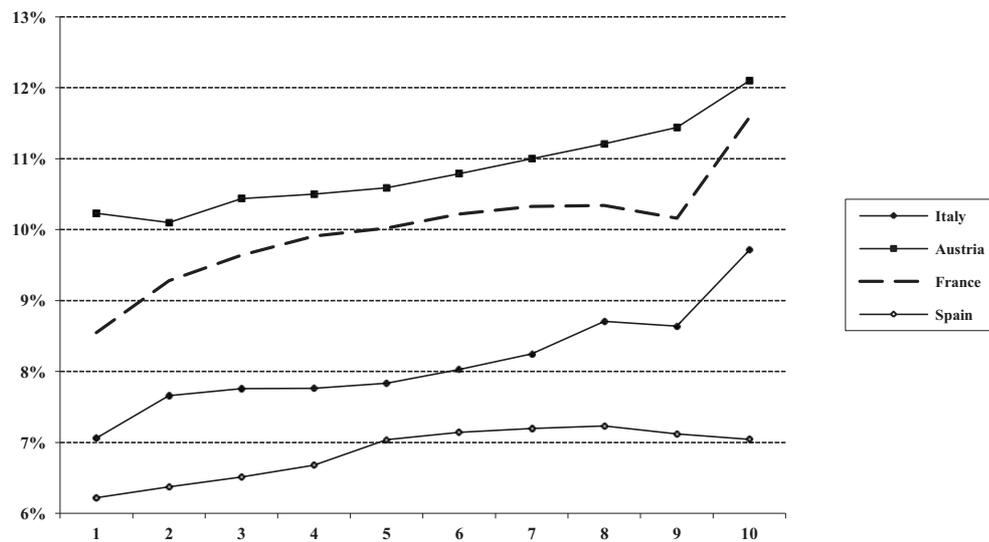


Figure 3.2.3 shows the ratio between average employer social security contributions and disposable income by deciles of equivalent disposable income. SSC are slightly progressive in Italy, Spain and Austria, while they are markedly more concentrated on higher deciles in France. The share of SSC on incomes may be very different from the incidence of SSC on GDP or on different levels of earnings, because the denominator here is household disposable income, which contains incomes from all kinds and also imputed rents on housing. The incidence of SSC depends also on the distribution of earners and of the recipients of non-labour incomes across households and deciles.

Figure 3.2.3: Incidence of employer social security contributions on income by deciles of equivalent disposable income

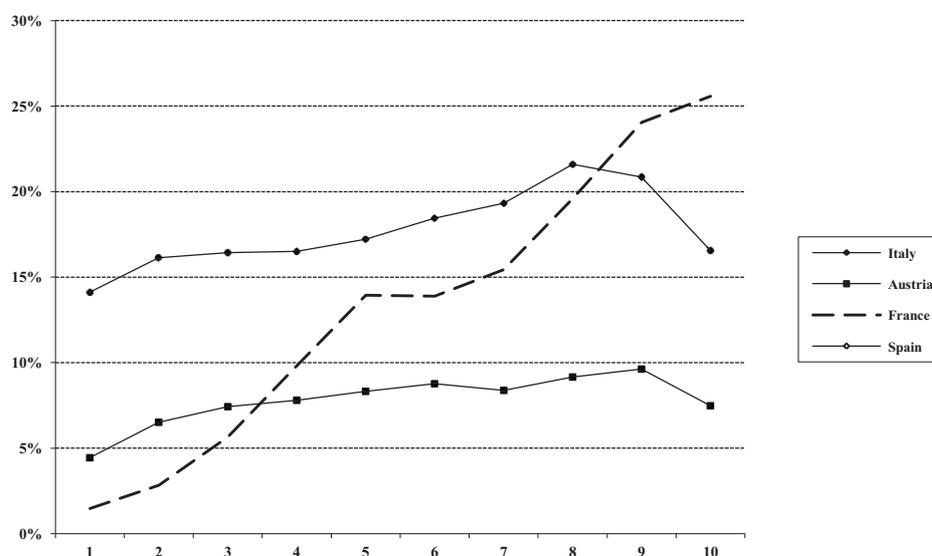
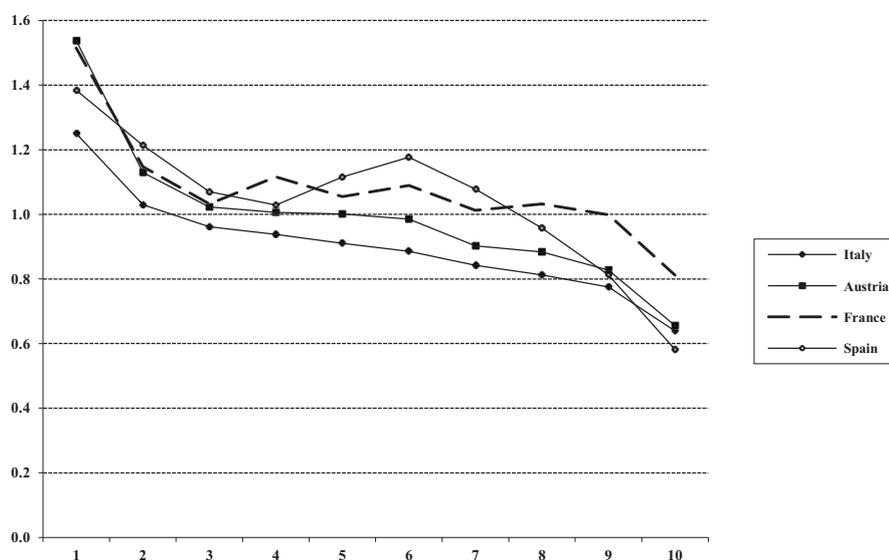


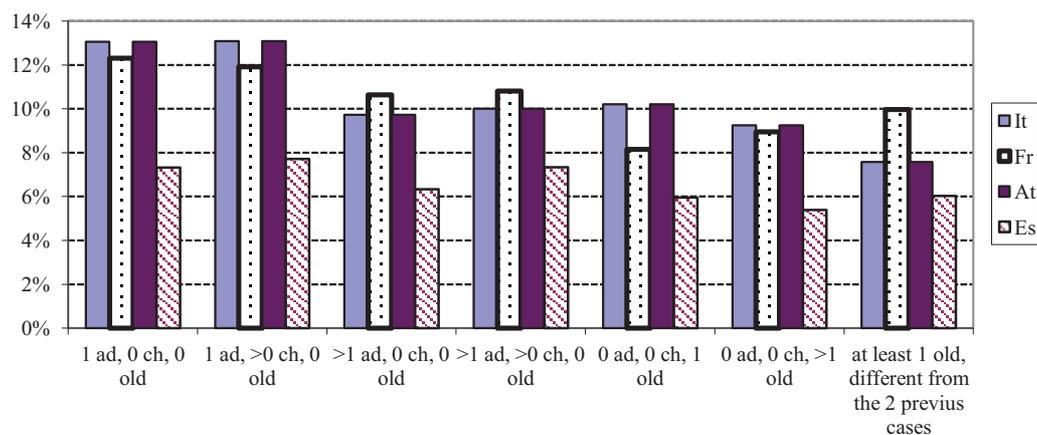
Figure 3.2.4: Average ratio of expenditure to income by deciles of equivalent disposable income



In the first decile (Figure 3.2.4) the high values of the ratio between expenditure and income depend in part on the presence of very low transitory incomes. In part, these high ratios are a consequence of the concentration in the first decile of many young households. In Italy, for example, the average age of the reference person is 56.5 years for the whole sample, but it is 51.4 in the first decile (56.9 in the second, 58.1 in the third).

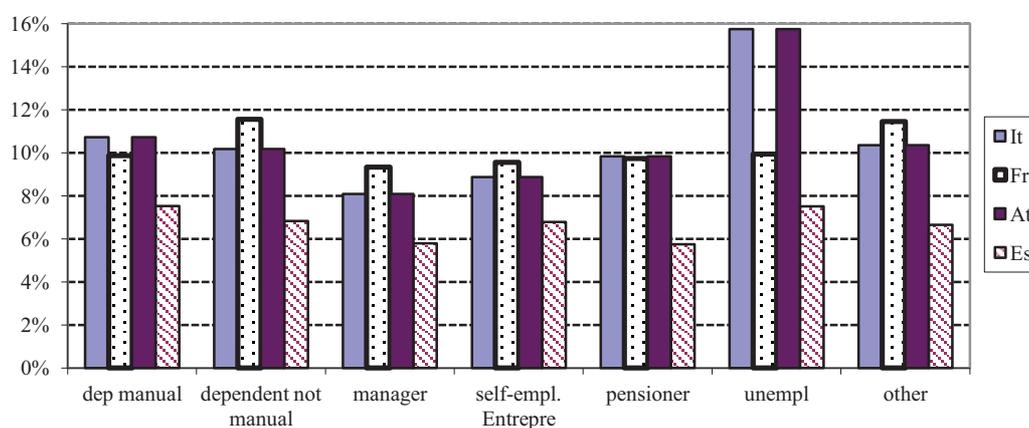
The fact that for many deciles expenditure turns out to be greater on average than income may depend in part also on the presence of very high values of current expenditure for some households. For France, for example, if we consider the median values of the ratio between expenditure and income, they are always less than 1 except in the first decile. The inclusion of durables in total household expenditure can explain a significant part of this effect. The burden of VAT is particularly high, in all countries, in households composed by a single non-elderly adult, with or without children (Figure 3.2.5). The families with elderly persons seem to be those more lightly hit by this tax. Households with children present intermediate levels of VAT incidence, between single-adult and elderly households.

Figure 3.2.5: Incidence of VAT on disposable income before FD by type of household



In almost all the countries considered in this study, the incidence of VAT is low on the incomes of households of managers, self-employed and entrepreneurs, while it is higher for dependent manual workers and particularly on households whose head is currently unemployed, i.e. those categories characterised by low saving rates (Figure 3.2.6). In Italy, for example, the average propensity to consume is 96% for households with the head employed as a dependent manual worker, 90% for other employees, 72% for the families of managers, 79% for entrepreneurs and self-employed, 92% for pensioners, 139% for the unemployed and 92% for the “other” group.

Figure 3.2.6: Incidence of VAT on disposable income before FD by condition of the household head



In the following sections, we show only the results for the case in which the increase in VAT revenue is sufficient to close the public budget after the fall in SSC, taking also into account the increase in the personal income tax and the reduction in cash transfers that are inversely correlated with after-tax income. Three alternative modifications of the VAT rates are shown in separate sub-sections, each describing the distributive results by deciles of (pre-reform) income and expenditure, by household type and by conditions of the head.

When applying the reforms that allow for a change in the VAT rates so as to balance the public budget in the microdata, we have changed the VAT tax rates as reported in Table 3.2.1. These values have been obtained by first reducing in the micro-data the revenue of SSC by a percentage that represents, in the macro models, 1% of GDP, and then by searching what is the increase in VAT rates that allows making a revenue-neutral reform.⁴¹ These VAT rates do not consider the problem of non-compliance of VAT. We must therefore allow for the possibility that non-compliance may get worse at higher VAT rates. However, the increase in VAT in these simulations changes its overall burden by a small amount, so increased non-compliance may not be a big issue.

Table 3.2.1: Overview of VAT rates (%) in micro scenarios

	France			Italy		
VAT rates before the FD reform:	2.1	5.5	19.6	4.0	10.0	21.0
1) Increase only in the standard VAT rate						
Change in SSC for all	2.1	5.5	23.0	4.0	10.0	26.0
Change in SSC for low-paid workers	2.1	5.5	20.5	4.0	10.0	25.0
2) Proportional increase in all VAT rates						
Change in SSC for all	2.1	6.0	21.4	4.6	11.6	24.3
Change in SSC for low-paid workers	2.1	5.6	20.1	4.5	11.3	23.7
3) Uniform VAT rate						
Change in SSC for all	11.4			16.3		
Change in SSC for low-paid workers	10.8			15.9		
	Spain			Austria		
VAT rates before the FD reform:	4.0	8.0	18.0	10.0	12.0	20.0
1) Increase only in the standard VAT rate						
Change in SSC for all	4.0	8.0	22.5	10.0	12.0	21.8
Change in SSC for low-paid workers	4.0	8.0	22.5	10.0	12.0	21.5
2) Proportional increase in all VAT rates						
Change in SSC for all	5.0	9.0	21.0	10.7	12.0	21.4
Change in SSC for low-paid workers	5.0	9.0	21.0	10.6	12.0	21.1
3) Uniform VAT rate						
Change in SSC for all	9.8			16.7		
Change in SSC for low-paid workers	9.8			16.5		

⁴¹ It may seem that the uniform VAT needed to make a FD revenue neutral for the budget is implausibly low in France and Spain, but we must take account that, for example, in France 50% of total expenditure is subject to the 19.6% VAT rate, 45% of total expenditure to the 5.5% rate and 5% to a 0% rate. Making a uniform tax rate from these figures is just a matter of computing a weighted average: $0.5 \times 19.6 + 0.45 \times 5.5 = 12.3\%$. Even this extremely rough exercise provides a result that is consistent with what found in the analysis.

Table 3.2.2 provides a synthesis of the employer SSC rates and of their changes that we have applied in the simulations. The rates refer to all workers or, in the case of Italy and Austria, to blue collar workers. Other details are provided in the description of the results for each country.

Table 3.2.2: Overview of employer SSC rates (%) in micro scenarios

	Current rates	Reduced rates for all employees	Reduced rates for low earners only
Austria		reduction by 8.77%	reduction by 83.65%
Health	3.7%	3.4%	0.6%
Retirement	12.6%	11.5%	2.1%
Unemployment	3.0%	2.7%	0.5%
Family fund	4.5%	4.1%	0.7%
Other	2.5%	2.2%	0.4%
Total	26.2%	23.9%	4.3%
Spain		reduction by 12.2%	reduction by 45.5%
Health, retirement, injury	23.6%	20.7%	12.9%
Unemployment	5.5%	4.8%	3.0%
Total	29.1%	25.6%	15.9%
Italy		reduction by 8.8%	reduction by 26%
Retirement	23.8%	21.7%	17.6%
Unemployment	1.9%	1.7%	1.4%
family allowances	0.7%	0.6%	0.5%
Health	2.2%	2.0%	1.6%
Other	3.6%	3.3%	2.6%
Total	32.2%	29.3%	23.8%
France		reduction by 6.6%	reduction by 39.6%
Retirement	9.9%	9.3%	6.0%
Health	12.8%	12.0%	7.7%
Family allowances	5.4%	5.0%	3.3%
Unemployment	4.0%	3.7%	2.4%
Total	32.1%	30.0%	19.4%

Indexation of benefits

Most of the microsimulation results that will be presented refer to the case in which the only fiscal parameters that are changed are the SSC and VAT rates. The amounts of the personal income tax and of the benefits received can change after the fiscal devaluation, but only because gross incomes of workers have changed. The modification of VAT rates, however, produces an increase in the inflation rate, and if there are cash benefits directed to households that are indexed to the price level, then a more realistic scenario should contemplate also an increase in their nominal values corresponding to the greater inflation rate caused by the fiscal devaluation. We have therefore simulated also

this hypothesis. The increase in the inflation rate due to the fiscal devaluation has been computed as follows:

$$\begin{aligned} \text{If } S_0 &= \text{Total expenditure before increase in VAT rates} &= P_0(1+t_0)Q_0 \text{ and} \\ S_1 &= \text{Total expenditure after increase in VAT rates} &= P_0(1+t_1)Q_1 \end{aligned}$$

$$\begin{aligned} \text{then total VAT paid before increase in VAT rates:} & \quad I_0 = t_0 P_0 Q_0 \\ \text{and total VAT paid after increase in VAT rates:} & \quad I_1 = t_1 P_0 Q_1 \end{aligned}$$

We need t_0 and t_1 :

$$t_0 = I_0 / (S_0 - I_0)$$

$$t_1 = I_1 / (S_1 - I_1).$$

The inflation rate induced by the increase in VAT rates is $(1+t_1)/(1+t_0)$. After finding this inflation rate, we have increased by the same percentage the cash benefits that are by law indexed to the inflation rate, and computed the new disposable income and the new personal income tax, if some of these benefits are taxable.

To keep the budget balanced, we have multiplied all households disposable incomes (after the increase in indexed benefits and the computation of the new personal income tax) by a coefficient lower than 1, sufficient to close the budget. In other words, we assume that the greater public expenditure for the indexation of benefits is financed with a proportional tax on disposable income. Given its proportionality, this “tax” does not change the shape of income distribution and the (relative) distributive indexes. The distributional impact of indexation of transfers depends strongly on how it is financed, and our choice is neutral on this, but can be justified if we consider that the distributional impact of many tax systems is not far from proportionality and that we cannot guess which instruments the governments will decide to use to find new revenues. This procedure has the advantage that the VAT rates do not need to be changed with respect to the previous simulations, because we only work at the level of disposable incomes. The distributive results incorporating the indexation of benefits with revenue neutrality will be presented at the end of the sections devoted to the microsimulation analysis for each country.

4 Simulations of unilateral fiscal devaluation in France

In simulating unilateral fiscal devaluation, we strive for a common base scenario in all models. Starting in year 1, the SSC is reduced by 1% of GDP while the VAT is increased by 1% of GDP. The tax shift is implemented unexpectedly and permanently. After the reform is announced, behaviour of forward-looking agents is based on adjusted expectations (except for the CEPII model that specifies static expectations). Social transfers are not indexed⁴² and the nominal interest rate is kept constant. After presenting the base scenario, we discuss the sensitivity of the results to alternative scenarios.

4.1 Macro simulations for France

We first discuss the results of the econometric NiGEM model, which focuses on short-run dynamics. In view of its assumptions and theoretical framework, the CGE models of IHS and CEPII are more appropriate for analyzing the long-run effects. To explain the full tax shift, outcomes of the two isolated tax changes are also presented.

NiGEM

Implementing the tax reform in the first year by 1% of ex ante GDP affects the public deficit but this effect is not immediately neutralized in this scenario. The government budget is closed by changing the income tax rate, starting in year 5, to ensure convergence to a constant debt ratio. Monetary policy is assumed not to react until year 4. After that the nominal interest rate depends on deviations of inflation (including VAT) and nominal GDP from the corresponding targets. Forward-looking financial markets anticipate the future change in the interest rate and the euro exchange rate immediately responds to the implementation of the reform.

When the reduction in the SSC rate is considered in isolation, the real labour costs fall on impact, which strongly increases labour intensity in production (see the red lines in Figure 4.1.1). Since labour supply is assumed constant in intensive margin, the increase in labour demand results in lower unemployment and higher output. Lower producer prices reduce domestic consumer prices, which increase purchasing power of household income. Next to the favourable price effects, the higher employment pushes up domestic demand. Since the coefficient of domestic demand is large in the import equation, import demand increases even though domestic prices are now lower than import prices. The increase in exports is limited since export prices react little to the

⁴²In the NiGEM model, transfers depend on the change in the wage bill with a coefficient of 0.25. Replacing the current wage bill indexation with price indexation would require new estimations and change the model dynamics.

lower domestic production costs and the price elasticity of exports is low.⁴³ As a result, the trade balance deteriorates. The direct loss of social contributions is insufficiently compensated by higher tax revenues resulting from the expansion of domestic activity, and the public balance weakens.

In later years, lower unemployment and higher capacity utilization raise domestic wages and prices gradually above the initial level. Real producer wages return to the initial level and production and employment gains start to fade. After the solvency condition is imposed in year 5, the income tax rate is increased, which reduces after-tax income. This contributes to a lower domestic demand and imports. This contractive effect dominates the fall in exports, as shown by the improvement of the trade balance.

A mirror image is found for the isolated increase in the VAT rate (see green lines). On impact, the nominal wage increases as a reaction to the lower real wages. The higher production costs reduce production, employment and capacity utilization. Real consumption decreases on impact due to higher consumer prices and lower employment. The loss in domestic demand cuts imports but at the same time exports fall due to the higher export prices. The first of these reactions is much larger and the trade balance improves. The higher VAT revenues improve the public balance, even though economic activity slows down. The capacity utilization and unemployment effects eventually curb the nominal wages and real producer wages fall towards the initial level. Imposing the solvency condition lowers the income tax rate after year 5, which raises after-tax incomes and stimulates domestic demand and production. Employment and unemployment converge to the initial level. The improvement of the external position fades away since imports increase more than exports.

Roughly speaking, the effect of the full tax reform equals the sum over the effects of its two components (see purple lines). The expansionary effects of the SSC cut are larger and therefore drive the direction of the total effects.⁴⁴ In sum, fiscal devaluation causes in the short run lower labour costs, a higher GDP, higher employment, lower unemployment, higher consumption and a marginally larger trade deficit.⁴⁵

⁴³The estimation of the import and export equations is explained in Barrell et al. (2007). The hypothesis of common long-run elasticities is not rejected for import demand. The estimated value of the long-run elasticity to total final expenditures equals 1.5 and the elasticity to the relative import price equals -0.2 for all countries (Table II.7). The short-run elasticity to total expenditures is country-specific but is larger than 2 for the 4 countries. The long-run price elasticity of the export volume varies over the countries. For France it equals -0.5 (Table II.9). Finally, notice that the trade balance effect includes the effect on the denominator (GDP).

⁴⁴ See also Box IV.3.1 in EC (2008).

⁴⁵ According to an uncovered interest parity condition, the increase in the nominal interest rate (after year 4) causes a depreciation of the euro (against the dollar) by 0.14% in the first year and by 0.22% in the ninth year. This depreciation contributes marginally to the improvement of competitiveness.

We want to discuss in more detail the finding that the trade balance worsens in the short run, since this opposes to results discussed in the ‘conventional’ literature. The different outcome is simply explained by the different quantification in the NiGEM model of the two opposing effects on the trade balance. On the one hand, fiscal devaluation stimulates net exports by reducing the relative price of the domestic good. On the other hand, it reduces net exports by the expansionary effects on domestic demand. The quantification of both effects in the NiGEM model is based on a careful estimation of an error correction specification of the export and import equation for each country (see Barrell et al., 2007). Estimation yields rather low price elasticities but high demand elasticities (see note 36). The values of the import elasticities to total expenditures are in particular large (exceeding 2 in the short run) when compared to parameterizations chosen in other simulation models. For example, the common specification of import demand in general equilibrium models implies a unitary elasticity.

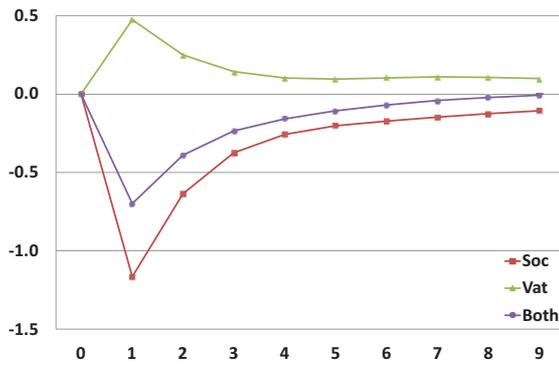
Regarding the comparisons with other studies based on model simulations, we next note that the short-run effects on the trade balance reported in the literature are positive but small (maximal 0.2% points of GDP, see Table 1 in IMF, 2012). The major exception are outcomes of the QUEST model in EC (2006, 2008), showing that shifting from labour to consumption taxation slightly weakens the short-run trade balance.⁴⁶ It is remarkable that large effects (i.e. maximal 4% points of GDP in the first 3 years) are only found in the econometric studies of Franco (2011) and de Mooij and Keen (2012).

Finally, we point at the uncertainties involved in assessing the effects. The effects on the trade balance not only measure the differences between effects *on* exports and imports, but also capture the different effects *of* increasing the VAT rate and decreasing the SSC rate. We therefore conclude that the sign of the short-run effect on the trade balance is uncertain but that its size likely is small.

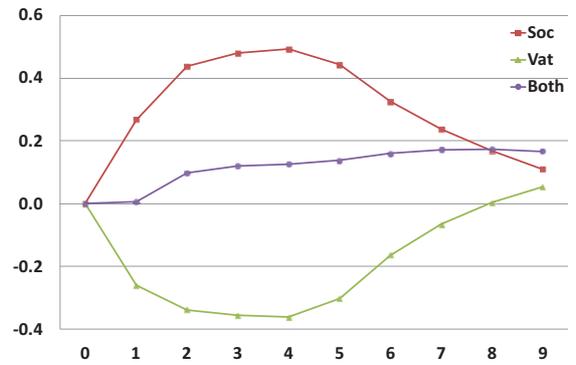
⁴⁶ EC (2008, p. 195) states “The gain in competitiveness that results from the labour tax reduction boosts exports. But the increase in domestic demand, in particular in consumption, also raises imports and the net outcome of these two opposing effects is typically a small worsening of the trade balance in the simulations”.

Figure 4.1.1: Fiscal devaluation in France – NiGEM

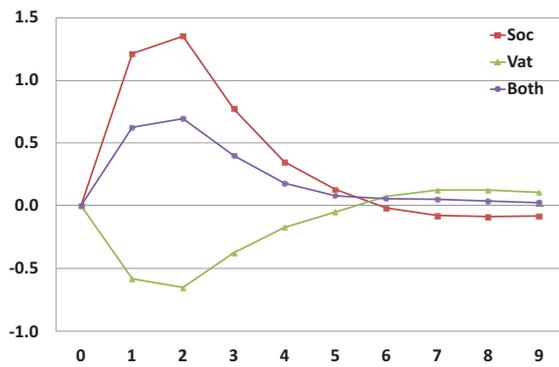
Real producer wage



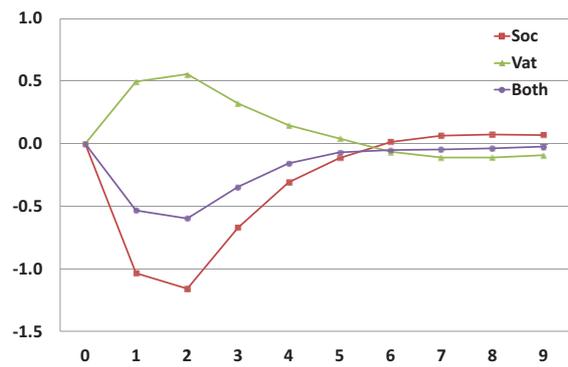
Real GDP



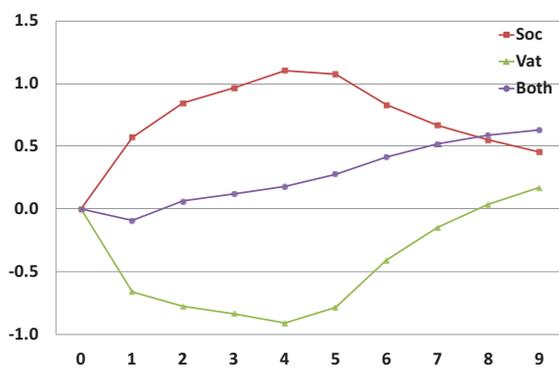
Employment



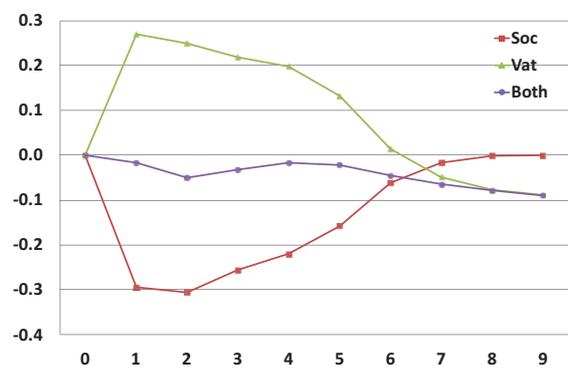
Unemployment rate



Consumption



Trade balance (%GDP)



Note: horizontal axis: years; vertical axis: % difference from the baseline, % point difference for the unemployment rate and trade balance.

IHS model

Time paths for the main variables generated by the CGE model of IHS are presented in Figure 4.1.2.⁴⁷ This model closes the government budget ex post by adjusting lump sum taxes, keeping public debt unaltered in each year. The value of public consumption is fixed, implying that its fraction in GDP varies. When comparing Figure 4.1.1 and 4.1.2, the pattern of the short-run effects is very comparable for most of the variables. However, effects are temporary in the NiGEM model, whereas the IHS model finds permanent, though small, effects.

The dynamics, and even the order of magnitude, of the real producer wage looks very similar in both models but the underlying channels are very different. In contrast to the NiGEM model, wage rigidities are not incorporated in the IHS model. Instead, the transition path of the wage in the latter model is explained by the delayed adjustment of the capital stock and labour supply. First, capital adjustment costs make large, annual changes of the capital stock unattractive. Second, labour supply effects in the IHS model capture effects on participation (entry and exit), hours supplied and search efforts by unemployed. Aggregate effects consist of age-composition and skill-composition effects. A reform that shifts the tax burden partially from workers to non-workers increases the real consumer wage. Higher wages make working more attractive and induce more job search efforts. Current older generations hardly change labour supply following the reform. As older generations are gradually replaced by young generations, aggregate labour supply reacts with a delay. On impact, the capital stock adjusts less than employment. An increase in employment then reduces the marginal product of labour, which drives down the wage cost. The opposite holds when employment falls (e.g. in the VAT scenario). As capital accumulates, the wage converges to its long-run level. Since the long-run capital cost is not affected, the capital/labour ratio returns to its initial level.

The figure also shows that fiscal devaluation has a permanent, beneficial effect on GDP, employment and unemployment. We discuss two main causes (see Section 2). First, without indexation of the social transfers, the wage cost remains below its initial level. In the case of the lower SSC rate, the wedge between the value of working and the value of non-working increases, which raises the search intensity and lowers the equilibrium unemployment. The VAT hike lowers the return on searching and increases equilibrium unemployment. The net effect of fiscal devaluation is a fall in long-run unemployment. Second, existing generations have to pay higher VAT taxes on their

⁴⁷The variables in this Figure are defined as follows. Real GDP, expressed as % deviation from the baseline, is measured in constant consumer prices (To be precise, it equals output measured in constant producer prices plus taxes on final consumption, using the pre-reform VAT rate). Changes in the ratio Consumption/GDP are expressed in % points, where real consumption is measured in producer prices (without taxes). Material balance holds after adding taxes to consumption, i.e. the sum of the changes in private consumption, public consumption, investment and net exports equals zero.

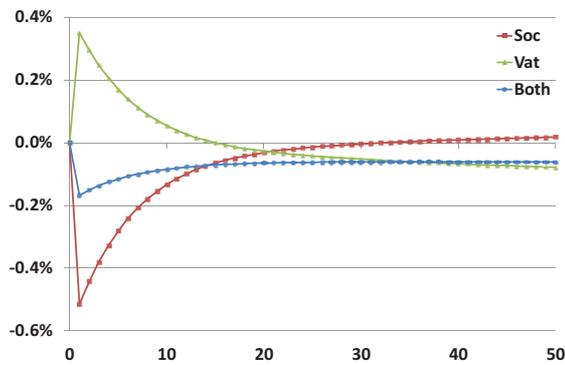
asset holdings, whereas they do not profit (or profit less) from the lower SSC rate. Future generations benefit from this windfall as they need to pay lower lump sum taxes (-10%). In contrast to the NiGEM results, consumption falls during the first (25) years. Older, current generations are harmed by the higher VAT rate, while they benefit less from the lower SSC rate. As a result, they can afford a lower level of consumption. With the growth of income, consumption finally increases above its initial level.

The IHS model has a single, tradable good with a fixed producer price. With competitiveness effects, we here mean that, at the pre-shock level of employment, fiscal devaluation reduces the real wage cost relative to the marginal productivity of labour. This induces an expansion of employment until the ratio is restored. The extra output can be exported at a constant price. Initially, the fall in consumption contributes to the increase of net exports. Over time, imports pick up with consumption and the trade balance eventually deteriorates.⁴⁸

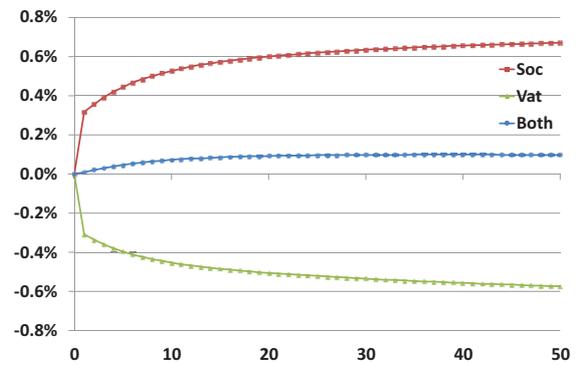
⁴⁸ Following the intertemporal budget constraint of the economy, the value of the starting stock of net foreign assets equals the sum of the present value of all trade balance surpluses and deficits. In other words, current improvements should be compensated by future deteriorations of the trade balance.

Figure 4.1.2: Fiscal devaluation in France – IHS

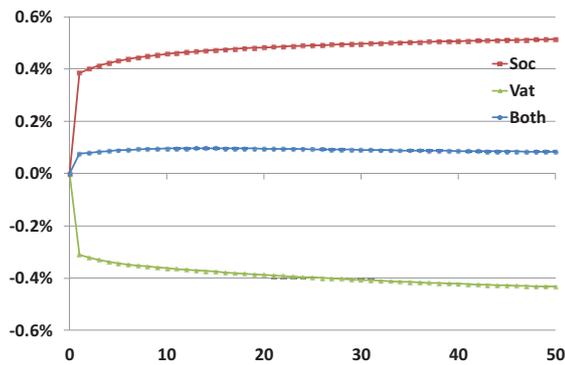
Real producer wage



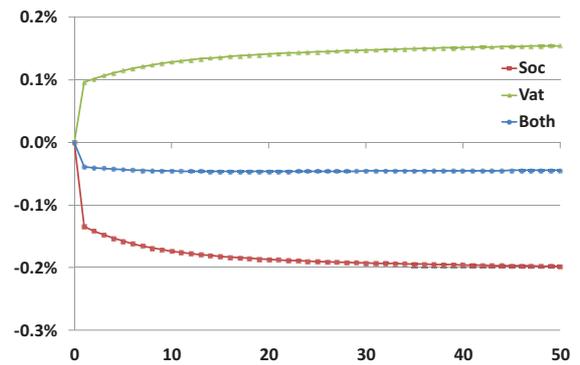
Real GDP



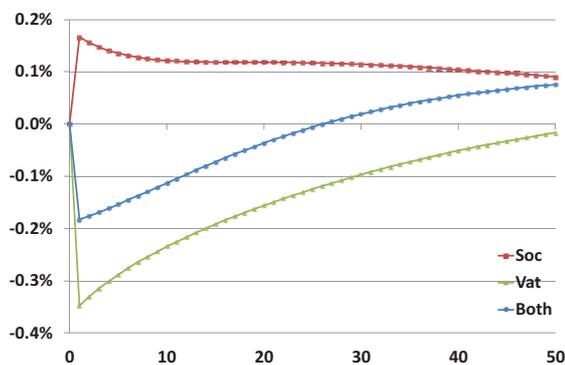
Employment



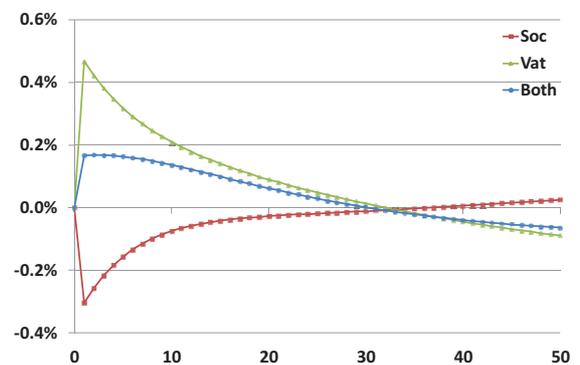
Unemployment rate



Consumption (%GDP)



Trade balance (%GDP)



Note: horizontal axis: years; vertical axis: % difference from the baseline for the first 3 figures, % point difference for the last three.

CEPII model

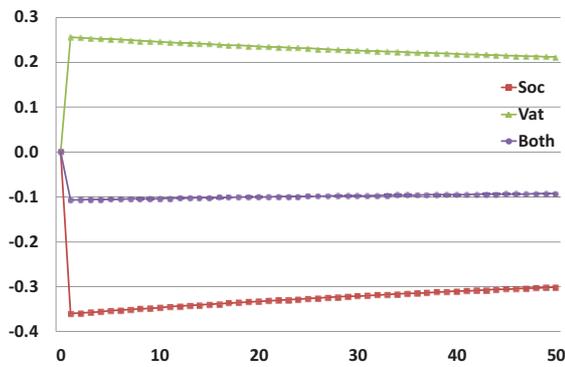
In the CGE model of CEPII lump sum transfers are adjusted to keep the fiscal deficit (as % of GDP) unchanged in each year (as in the IHS model). Figure 4.1.3 shows the simulation outcomes of the CEPII model. The effects of the reforms on output and labour markets are very similar to the findings of the IHS model. Following the estimated wage setting equation, fiscal devaluation reduces permanently real labour costs. The resulting increase in labour demand contributes to the expansion of GDP. With a fixed labour supply, the increase in employment comes about by a reduction in unemployment.

The consequences for consumption and the trade balance differ between both models. The IHS model found an increase of consumption by 0.1% point of GDP in the long run, which was mirrored by an equal reduction of net exports. These GDP shares are hardly affected in the CEPII simulations: consumption ultimately falls by only 0.01% while the trade balance slightly improves by 0.03%. These differences in outcomes can be explained by differences in model features. First, the IHS model considers overlapping generations (with finite lives), allowing for dynamics driven by intergenerational heterogeneity. The CEPII model specifies one representative household, meaning that higher ex post tax revenues are distributed as lump sum transfers to the same household. Second, households in the IHS model feature forward-looking optimising behaviour (including labour supply). In the CEPII model consumption spending is a constant fraction of disposable income and labour supply is fixed. Third, the IHS model considers a fixed interest rate and a fixed commodity price. The CEPII model includes an endogenous interest rate and endogenous terms of trade.

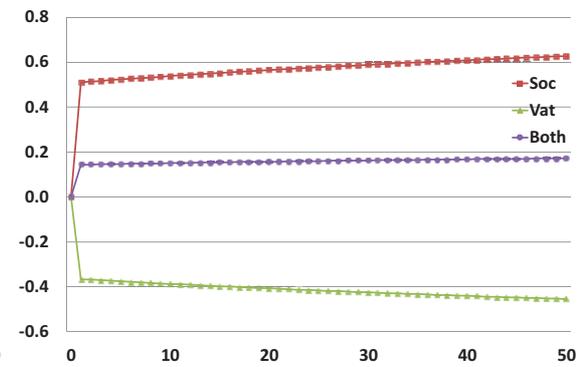
In the remainder of this section, we discuss some sensitivity analysis.

Figure 4.1.3: Fiscal devaluation in France – CEPII

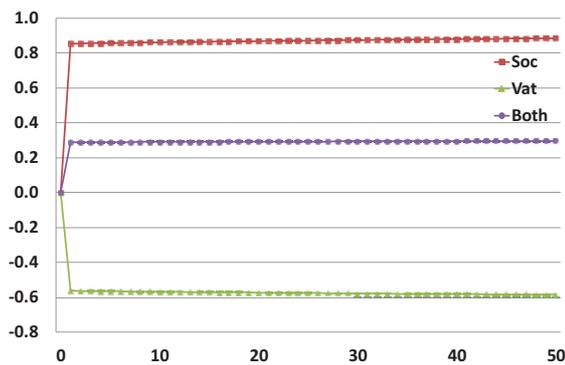
Real producer wage



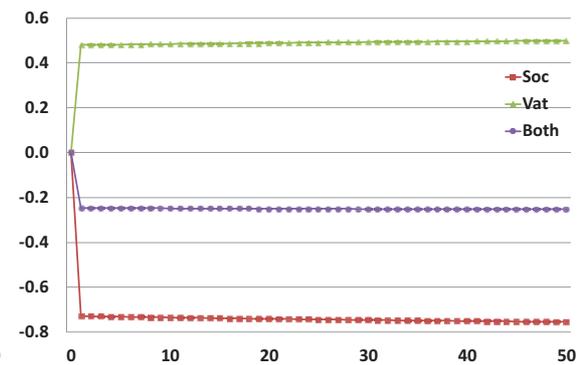
Real GDP



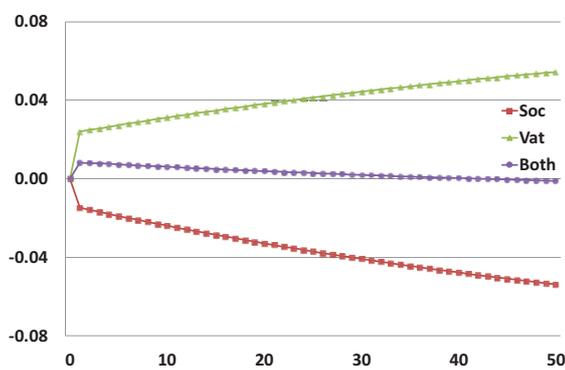
Employment



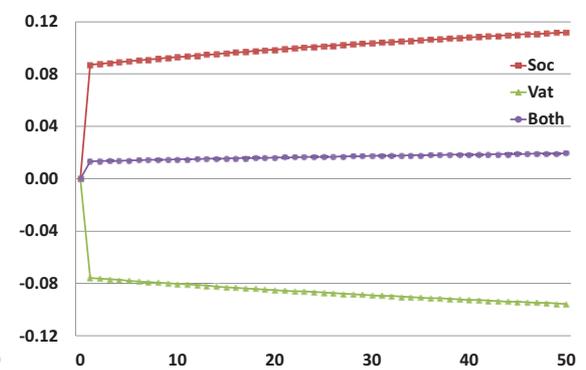
Unemployment rate



Consumption (%GDP)



Trade balance (%GDP)

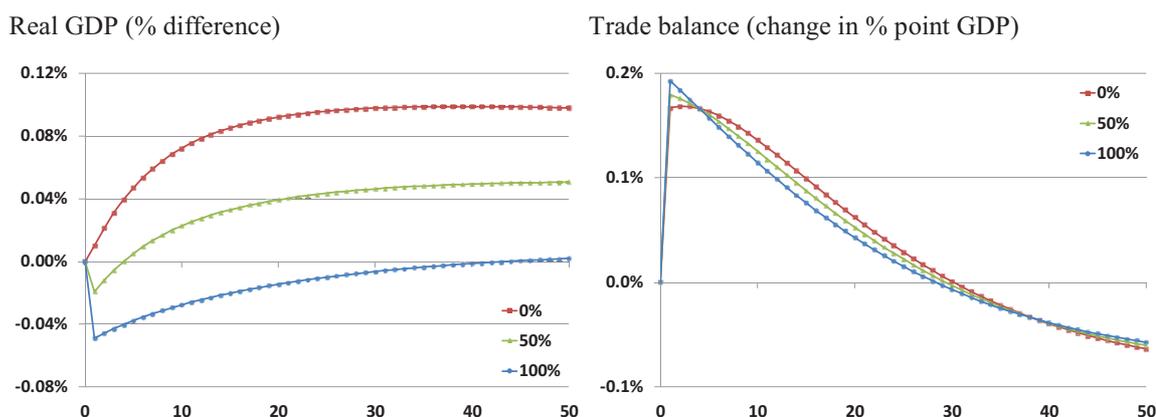


Note: horizontal axis: years; vertical axis: % difference from the baseline for the first 3 figures, % point difference for the last three.

Sensitivity to price indexation of social transfers

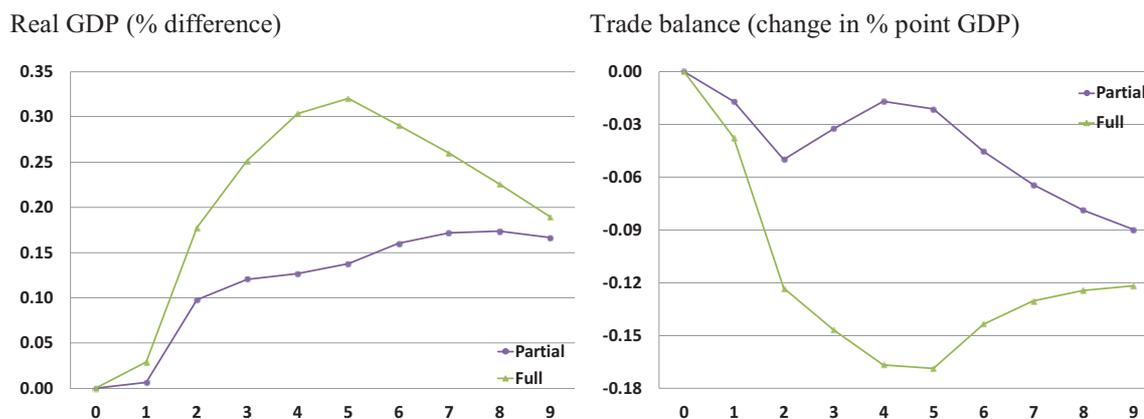
Next to the baseline without price indexation, we simulate with the IHS model 50% and 100% indexation of social transfers. Figure 4.1.4 confirms that the effects on GDP are very sensitive to the degree of price indexation. When social transfers are partially or fully linked to the consumer price, the reservation wage of the workers will be higher. Furthermore, the increase in outlays on social transfers is financed by a higher lump sum tax. In contrast to the baseline, full indexation leads to higher labour costs and lower employment in each year. As a consequence, GDP is hardly stimulated in the long run (as already indicated by the discussion in Section 2.5). In the case with indexation, the fall in exports, due to the higher production costs, is offset by the fall in imports, following the reduction of consumption (relative to the base case without indexation). Therefore, net exports are not much affected by the indexation rule (as a fraction of GDP).

Figure 4.1.4: Sensitivity to the degree of price indexation in France – IHS



The indexation rules of transfers in the NiGEM model affect the results through a completely different channel. In this model, transfers are indexed to changes in the wage bill but receiving transfers is not conditional on not being employed. In the base case, transfers are partially linked to wage bill changes (coefficient equals 0.25). In an alternative scenario, we consider full indexation by increasing the coefficient to 1. Figure 4.1.5 shows that the higher transfer outlays in the alternative scenario, initially financed by a larger government deficit, have a large expansionary effect on GDP. The extra output gains are more driven by demand than by supply factors in this case. After the increase in the wage bill slows down and consolidation starts by increasing the income tax rate, the difference with the baseline quickly falls. The development of the trade balance is opposed to the GDP effects: the larger the expansion of GDP the more the trade balance weakens (as %GDP).

Figure 4.1.5: Sensitivity to indexing transfers to wages in France – NiGEM

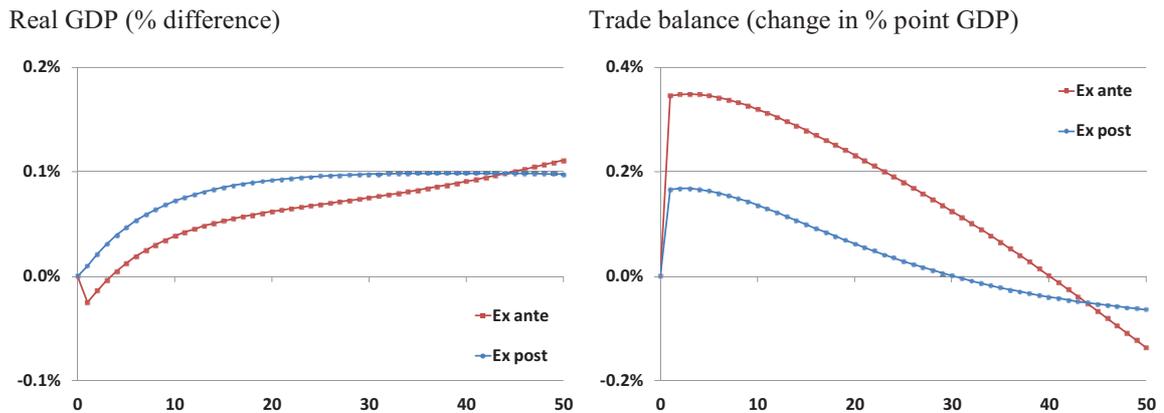


Sensitivity to alternative budget closure

In the baseline of IHS the budget is closed ex post by changing lump sum taxes. The following ex-ante closure scenario is applied:

- For the first 40 years, lump sum taxes are kept constant and the fiscal balance and thus public debt are allowed to vary unrestricted.
- Between years 41 and 80, the lump sum tax is changed so that there is a linear change in public debt.
- From year 81, the public debt is kept constant at its initial level by adjusting lump sum taxes.

Notice that the long-run outcomes are identical in both scenarios, because public debt becomes ultimately the same. To understand differences in the transition path, remember that fiscal devaluation leads to an expansion of the economy. In the ex-post scenario, this allows an immediate reduction of lump sum taxes, or raise in lump sum transfers, while this is postponed till year 41 in the ex-ante scenario. As a consequence, generations living during the first 40 years benefit less, or even do not benefit, from lower lump sum taxes. These generations have to reduce consumption and leisure. The marginal increase in aggregate labour supply leads to a slightly large output at producer prices. GDP measured at consumer prices is lower than in the ex-post scenario, due to the lower consumption tax revenues (see Figure 4.1.6). After the deferred adjustment of lump sum taxes, consumption and GDP pick up and exceed the benchmark level till the long run. The change in the consumption path is reflected in the deviations of the trade balance. Larger relative increases in net exports during the first years make room for larger decreases during later years.

Figure 4.1.6: Sensitivity to budget closure in France – IHS**Sensitivity to targeted reduction of SSC**

The IHS model considers three types of workers with different skill levels. This allows analyzing a scenario in which the SSC reduction is targeted at the low-skilled workers (A reduction by 1% of ex ante GDP is obtained by decreasing the firm's rate from 32% to 19% for 30% of the workers). The effects on production and wages crucially hinge on the specification of the substitution possibilities between the different labour types in production. This model assumes capital-skill complementarity, meaning that low-skilled workers can be substituted more easily by capital than medium and high-skilled workers. Wages per skill level are bargained between workers and firms.

The results show a channel that is not covered in the literature survey. The targeted reduction indeed achieves an expansion of the employment of low-skilled workers, but this is going at the expense of employment of the other workers (see the lines with markers in the right panel of Figure 4.1.8).⁴⁹ Medium and high-skilled workers reduce labour supply since they only suffer from the reform (the VAT increase). Replacing high productive workers by low productive workers reduces the average productivity, which is reflected by an ultimate fall of GDP (see Figure 4.1.7). The larger initial expansion of GDP is combined with more beneficial effects on the trade balance but these switches into more adverse effects in later years.

⁴⁹ The expansion of low-skilled employment by 2.6% on impact might be unrealistic, showing that the short-run effects are less relevant in this model.

Figure 4.1.7: Sensitivity to targeted reduction of SSC in France – IHS

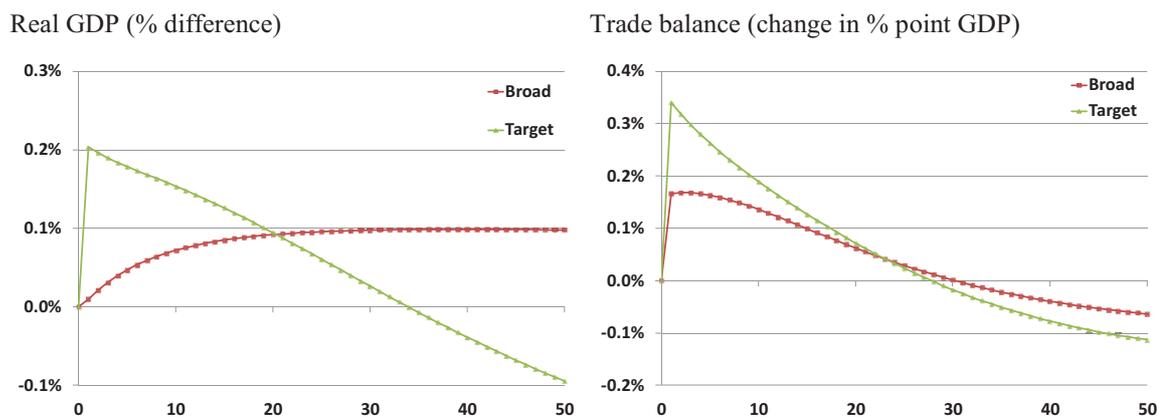
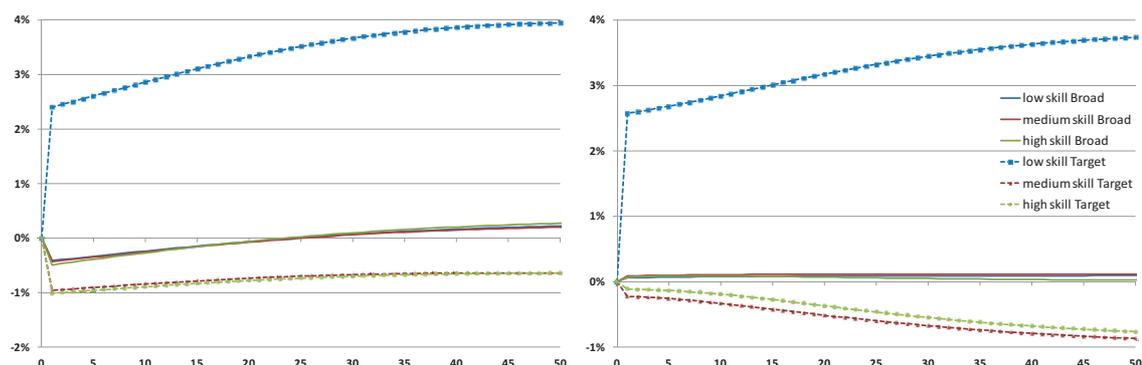


Figure 4.1.8: Sensitivity of consumption (left) and employment (right) of different skill levels to targeted reduction of SSC in France – IHS



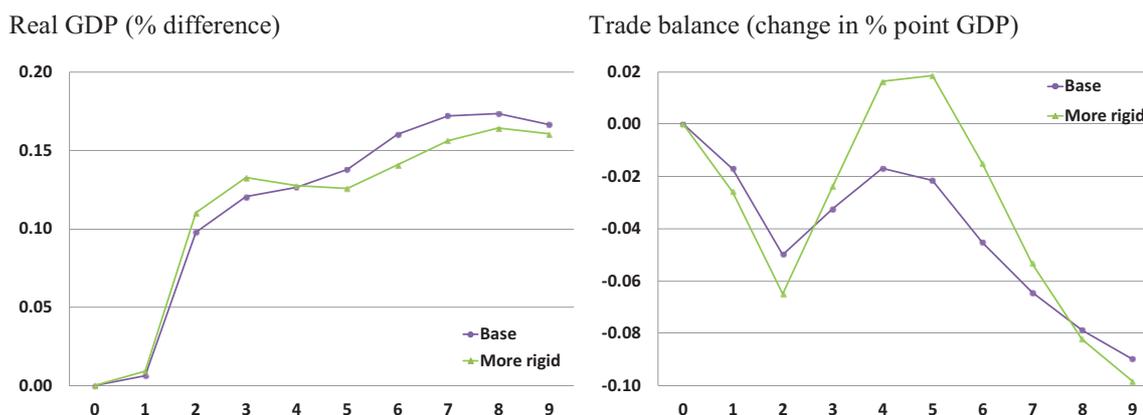
We use this scenario to discuss the distributional consequences of the reform on the three skill levels. Figure 4.1.8 illustrates the distributional effects by way of annual changes in average consumption. The overlapping full lines refer to the base scenario in which the cut in the SSC rate applies to all workers. It shows that consumption of the three types of workers is almost identically affected. Small differences can be attributed to the feature that the SSC rate and the labour tax rate increase with income, while the VAT rate is flat. In contrast, the dotted lines reveal that distributional effects differ widely if the reform focuses on low-skilled workers. Average consumption strongly increases for low-skilled workers whereas it decreases for the other workers.⁵¹ A more detailed distributional analysis using a microsimulation model will be described below.

⁵¹ Welfare effects correct for changes in leisure.

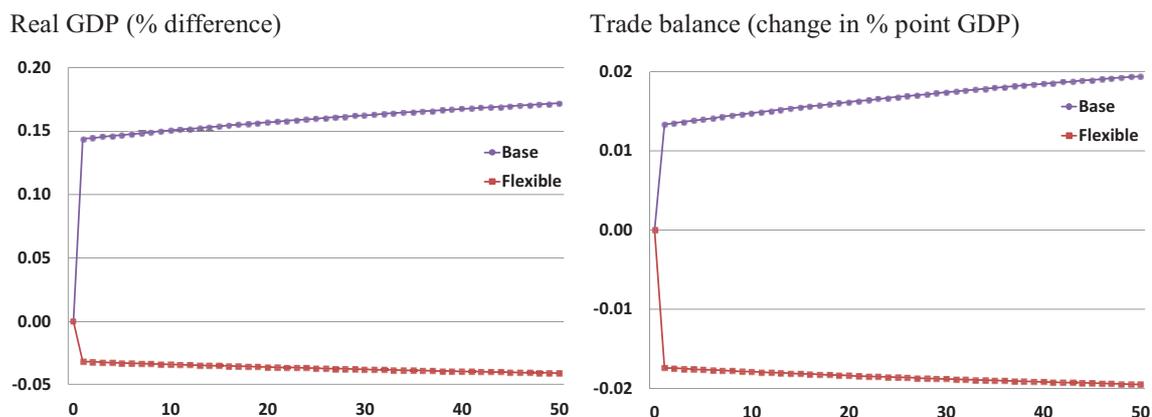
Sensitivity to wage rigidity

We first use simulations with the NiGEM model to illustrate the sensitivity to the wage formation. In the base case, wages strongly depend on the unemployment rate lagged one quarter. We increase the lag to 4 quarters in an alternative scenario, i.e. the wages start to react to unemployment only after one year. If the reduction in SSC rate and hike in VAT rate is studied separately, it turns out that the longer lag has opposite effects on nominal wages, employment and GDP. The rigidity of wages keeps the nominal wage rate low longer in case of SSC reduction, and correspondingly, it supports the higher wages in case of VAT hike. As a net outcome, GDP initially expands marginally more and the trade balance marginally worsens (see Figure 4.1.9). In later years, the real producer wage converges faster to its initial level, which leads to a smaller GDP increase and a larger trade balance improvement in comparison to the baseline.

Figure 4.1.9: Sensitivity to wage rigidity in France – NiGEM



With the CEPII model, we compare a scenario with a perfectly competitive labour market to the base scenario. The wage rate in the baseline is determined by negotiations between labour unions and employers, leading to equilibrium unemployment. In an alternative scenario we model a perfectly competitive labour market with flexible wages (the unemployment rate is kept constant at the level in the base year). Since the reduction of the SSC rate is uniform for all workers in all sectors, it has no real effects with perfectly flexible wages and fixed labour supply. In contrast, increasing sector-specific VAT rates by the same percentage changes the relative output prices. As a consequence, the effect on aggregate GDP depends on the reallocation of production factors over the sectors. Figure 4.1.10 shows that GDP is slightly reduced when wages are perfectly flexible. It clearly illustrates that fiscal devaluation is only effective in the presence of labour market distortions. Real consumption falls but less than GDP. The fall in exports and the rise of imports now leads to a small deterioration of the trade balance (in %GDP).

Figure 4.1.10: Sensitivity to flexibility of wages in France – CEP11**Sensitivity to trade elasticities**

From the literature survey we concluded that simulation results are rather insensitive to the values of the trade elasticities (section 2.9). We simulate the same tax reform with the NiGEM model after doubling the price elasticity in the export demand equation. As expected, exports now benefit more from the fall in its relative price, which contributes to an improvement of the trade balance and GDP during the first years when compared to the base case (see Figure 4.1.11). As the gain in competitiveness is only temporary, both GDP and the trade balance are lowered in later years (relative to base case). The small differences confirm that outcomes are robust to the price elasticity of exports, in particular the finding that fiscal devaluation has unfavourable effects on the trade balance position.

The sensitivity in the longer run is illustrated with outcomes of the CEP11 model. The sector-specific price elasticity of export demand (or the Armington substitution elasticity) ranges from 1.1 to 5.1 in the baseline (in absolute value). In the alternative scenario we halve these elasticity values. When exports respond less elastic to a lower price, GDP is less stimulated by the tax reform (see Figure 4.1.12). The smaller increase of exports is compensated by a larger fall of imports, implying a larger improvement of the trade balance (relative to the base case). We again find that the outcomes hardly differ between both sets of export elasticities.⁵²

⁵²Notice that this sensitivity analysis cannot be performed with the IHS model since it considers one homogenous good (in other words, domestic and foreign goods are assumed perfect substitutes).

Figure 4.1.11: Sensitivity to doubling the price elasticity of exports in France – NiGEM

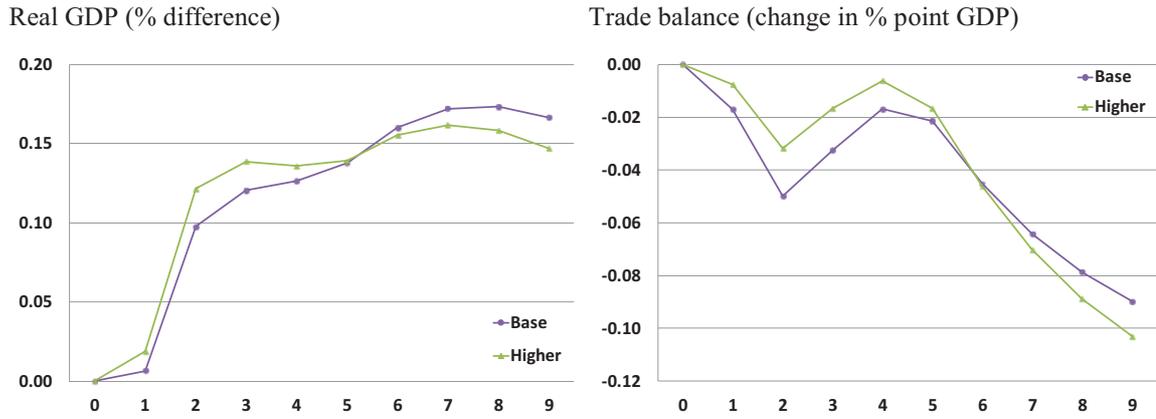
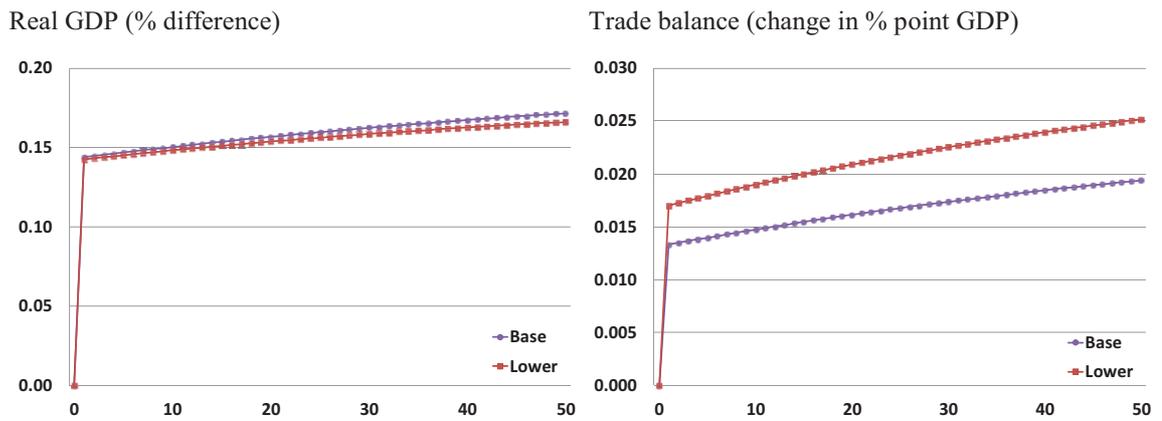


Figure 4.1.12: Sensitivity to halving the price elasticity of exports in France – CEPII



Summary

Fiscal devaluation in France has a favourable impact on output and labour market outcomes in the short run according to the NiGEM model. Since fiscal devaluation implies a shift in taxation from workers to non-workers (i.e. transfer recipients and capital income earners), the expansive effects of the SSC cut dominate the contractive effects of the VAT hike. Given the rigid nominal wage, it achieves a temporary reduction in real labour costs, which results in a higher employment and a lower unemployment (with a constant labour supply). At the same time, consumer prices fall (i.e. producer prices fall more than VAT increases) and real consumer wages rise, leading to a higher consumption. In contrast to other studies, NiGEM finds a (slight) worsening of the trade balance in every year. According to the NiGEM estimates, the favourable effects arising from the improvement in the competitive position are offset by the increase in imports following the expansion of domestic demand. As the nominal wage is gradually increased, the expansionary effects fade away over time.

Long-run effects are illustrated using the CGE models of IHS and CEPII. Both models find a permanent, though small, positive effect on employment and GDP. We identify two main channels in the IHS model. First, the bargained wage is permanently lowered because the outside option of the workers deteriorates when social transfers are not indexed to the higher consumer prices. Second, the IHS model incorporates that the incidence differs over the generations. Shifting from wage to consumption taxes implies a redistribution from current to future generations. Existing generations have to pay unexpectedly higher VAT taxes, while they benefit less from the lower SSC rate. This is mirrored by lower tax payments over the lifetime of future generations. As a consequence, long-run consumption increases while the trade balance worsens. The CEPII model finds similar effects as the IHS model, except for small differences for the consumption and trade balance effects.

The sensitivity analysis for France is summarized in Table 4.1.2. In line with the literature, we find that the GDP effects are very sensitive to the degree of price indexation of social transfers (IHS). GDP outcomes are in particular sensitive to targeting the SSC reduction to low-skilled workers, due to a channel that is underexposed in the literature (IHS). The expansion of the employment of low-skilled workers is achieved at the expense of employment of the other workers. Replacing high productive workers by low productive workers leads ultimately to a fall of GDP. Next, effects are only marginally affected by increasing the degree of wage rigidity (NiGEM), but fiscal devaluation is not effective in a perfectly competitive labour market (CEPII). Finally, results are robust to values of the trade elasticities (NiGEM, CEPII).

Table 4.1.1: Summary of fiscal devaluation in France

	SR max. ** (NiGEM)	LR (IHS)	LR (CEPII)
Real producer wage	-0.70%	-0.07%	-0.08%
Real GDP	0.17%	0.09%	0.20%
Employment	0.70%	0.08%	0.30%
Unemployment rate*	-0.60%	-0.04%	-0.26%
Consumption (LR*)	0.31%	0.09%	-0.01%
Trade balance (%GDP)*	-0.09%	-0.09%	0.03%

* % point difference; ** maximum effect (in absolute value) during first 9 years

Table 4.1.2: Sensitivity analysis for France

	GDP		TB (%GDP)	
	<i>Iy</i>	<i>9y</i>	<i>Iy</i>	<i>9y</i>
<i>NiGEM</i>				
Basecase	0.01%	0.17%	-0.02%	-0.09%
Indexation	0.03%	0.19%	-0.04%	-0.12%
Wage rigidity	0.01%	0.16%	-0.03%	-0.10%
Export elasticity	0.02%	0.15%	-0.01%	-0.10%
<i>IHS</i>	<i>SR</i>	<i>LR</i>	<i>SR</i>	<i>LR</i>
Basecase	0.01%	0.09%	0.17%	-0.09%
Indexation	-0.05%	0.01%	0.19%	-0.07%
Ex ante budget closure	-0.03%	0.09%	0.35%	-0.09%
Targeted SSC	0.20%	-0.24%	0.34%	-0.08%
<i>CEPII</i>	<i>SR</i>	<i>LR</i>	<i>SR</i>	<i>LR</i>
Basecase	0.14%	0.20%	0.01%	0.03%
Wage rigidity	-0.03%	-0.05%	-0.02%	-0.02%
Export elasticity	0.14%	0.19%	0.02%	0.03%

4.2 Micro simulations for France

The microsimulations of the distributive impact of FD have been performed using the SYSIFF 2006 tax-benefit model (developed by Microsimula – UIB). It uses 2006 household budget data for France (*Budget des Familles*, BDF 2006), with 10229 households. Though the main objective of this survey is the study of the consumption patterns of households, there is extensive information on family characteristics and job conditions of the individuals, as well as very detailed income information. This allows SYSIFF 2006 to model extensively most part of social contributions (for employers, employee and self employed), special contributions, income tax (including most tax credits and deductions), local taxes (for each municipality) and social benefits (including minimum income, housing benefit, children and family allowances, schooling benefits, and so on). The data base is very rich and no matching is necessary in order to perform the simulations. The fiscal year used in the simulation is 2006. Although 2008, and partially 2009, are available, the updating for these fiscal years is completely different from what proposed by this project. Hence, to avoid inconsistencies, the choice has been to simulate using 2006 data and then update everything according to the criteria of this project. The update was performed directly from within the microsimulation model using the last available official INSEE figure for the GDP and CPI. The last official common year is 2010.

In France, in 2006, there were three VAT tax rates. The ordinary rate is 19.6% and includes clothing, furniture, equipment, housing products, communication, recreation, leisure, meals out of home, beauty and other goods (as aggregated in SYSIFF2006). The percentage of total expenditure taxed at 19.6% amounts to 50.1% of total expenditure. The reduced rate is 5.5%, and includes food, beverages, energy, transports, books (including newspapers, weekly publications, etc), cinema and museums. The percentage of total expenditure taxed at 5.5% amounts to 45.0%. There is a specially reduced rate of 2.1% for some very special goods categories (such as newspapers, TV licence fee, pharmaceuticals) that we do not model. These expenditures amount to 4.9% of the total expenditure. The latter tax rate is not changed in the scenario in which a uniform tax rate is introduced. In France social security contributions have a very important role in collecting resources for public finances, accounting for 16.4% of GDP. The contributive scheme is very complex and several contributions are collected with different aims (e.g. health, unemployment, widowhood, retirement, etc.). Employer social contributions are also used to finance family benefits, housing benefits, work injuries, in-work formation, etc. Several non-linearities arise from the system. The main source is the upper limit applied to many contributions, both for the employee and for the employer. Similar conditions apply to several different contributions. Progressivity in social contributions is introduced through the complementary pension payment, which is one of the largest forms of contribution. A reduced rate and a full rate exist, with the latter being almost three times higher. Also for this contribution an

upper limit exists. A special mention is due to two special contributions, CSG and CRDS. They are proportional contributions without upper limits and are paid at the same rate (with some exceptions, of course) for all sources of incomes (including income from capital and benefits). Differently from the other contributions, only a small part of their payment can be deducted from taxable income.

For the sake of the reform scenarios, we applied a proportional reduction to all (employer) contributions in order to make the VAT reform revenue neutral, without differences among the various rates. Two scenarios were developed. In the first one the reduction applied to all workers, and therefore is rather modest. In the second one the reduction is applied only to low income workers and hence it is more substantial.

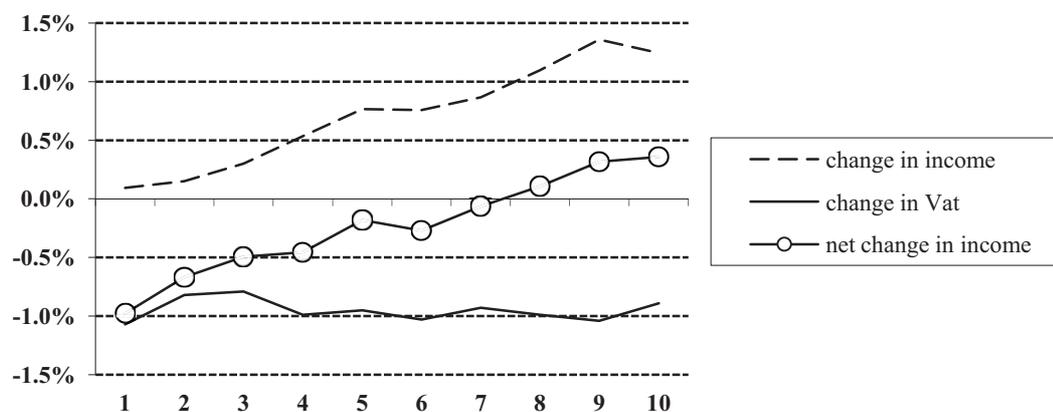
1 Increase only in the standard VAT rate

In this first subsection we show the distributive impact of a fiscal devaluation financed by an increase only in the standard rate of VAT, which in France is set at 19.6%. There are two sub-cases. In the first one, the SSC rates on all workers are reduced by 6.6%⁵³. Then the standard VAT rate is increased by 17.1% of its amount, i.e. from 19.6% to 23%, in order to close the budget. In the second case, we decrease SSC rates only for low earners by 39.6% (still corresponding, from the macro model, to 1% of GDP), compute the total cost of this reform after the changes in the other schemes of the tax-benefit system, and increase the standard VAT rate by the necessary amount to balance the budget.

The FD produces an increase in disposable income through the reduction in SSC rates, but also a greater VAT burden. Figure 4.2.1 shows these different effects for the case in which all rates of SSC are reduced by the same percentage, taken from the macro model. In this and all other similar graphs, the burden of VAT change on income or expenditure is represented with negative numbers, so as to clearly distinguish this change (a reduction in actual disposable income) from the increase in income arising from the reduction in SSC. The VAT burden rises for all deciles more or less by the same amount, around 1% of disposable income, but the increase in average disposable income of the poorest decile is negligible, while the richest ones get a substantial benefit. The result (the line with white dots) is a regressive effect, whereby “net” disposable income (disposable income minus the increase in the amount paid in VAT) rises for the three richest deciles and falls for the first six deciles. Consequently, the Gini index of the disposable equivalent income distribution rises from 0.29014 (the baseline value) to 0.29208, i.e. by 0.67%.

⁵³ This is equivalent to saying, as already stressed, that the total revenue from social security contributions falls by 6.6%.

Figure 4.2.1: Change in disposable income and VAT (as a percent of disposable income) after the FD in France – decrease in all SSC rates



When only the SSC for low-paid workers are cut (Figure 4.2.2), then the increase in disposable income before VAT is higher in the bottom half of the population, while the burden of the higher VAT is spread uniformly in relative terms. Notice that the increase in the burden of VAT is much lower than in the previous case. The main reason for this difference lays in the strong reduction in public expenditure for cash benefits after the increase in the incomes of poor workers. Also, the revenue of the personal income tax rises, in part because of the effect of the mechanism of the family quotient. So, budget neutrality can be obtained with a small increase in the VAT rate (from 19.6% to 20.1%). The presence of a complex set of tax-benefit instruments, affecting the structure of the budget constraint in particular for low incomes, may also explain why the percentage increase in income has a non linear pattern across deciles. For example, for very low incomes the gain following the reduction in SSC is almost completely offset by the reduction in some benefits that have a very high withdrawal rate. For earnings around 1000 euros per month, a greater income is followed by an increase in the *Prime pour l'emploi*, so net income could increase by more than the reduction in contributions. For higher incomes, a greater income is followed by a reduction in this benefit and therefore by a possibly marginal increase in net income. To understand all these changes in detail, therefore, it would be necessary to analyse the whole structure of the French tax-benefit system⁵⁴. The net result is a very slightly progressive change in “net” disposable income across deciles, with the poorest two and the middle three deciles gaining a bit from the reform, and the richest two slightly losing. Notice that also the richest deciles are partly beneficiaries of an increase in income: the deciles are defined on households and on household incomes, not on individuals, and there are

⁵⁴ To partially correct for the presence of strong poverty traps, the *Revenu minimum d'insertion*, which had a withdrawal rate of 100%, has been replaced in 2009 by the *Revenu de solidarité active*, with much smaller withdrawal rates.

some low earners who live in affluent families. The moderate progressivity of this case is confirmed by the change in the Gini index, which falls from its baseline value of 0.29014 to 0.2891, i.e. a reduction by -0.36%. The two curves with the final change in disposable income are repeated in Figure 4.2.3, so as to highlight the differences between the two cases.

Figure 4.2.2: Change in disposable income and VAT (as a percent of disposable income) after the FD in France – decrease in SSC rates only for low incomes

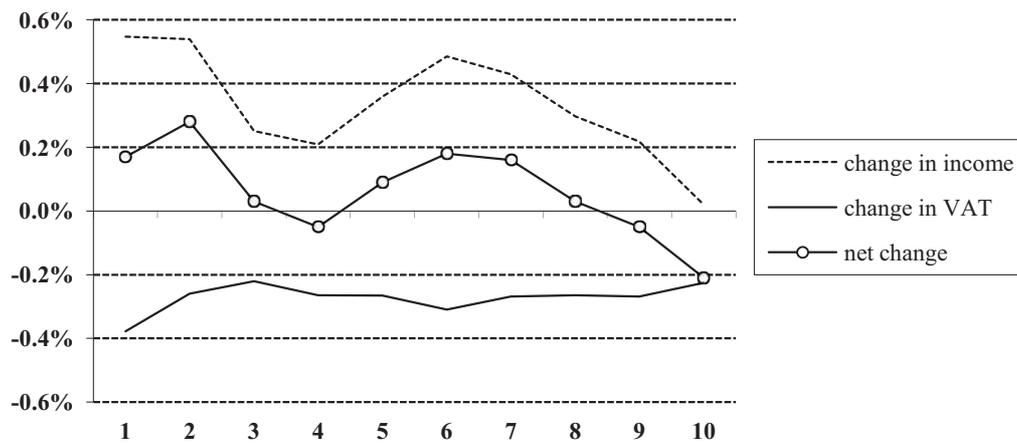
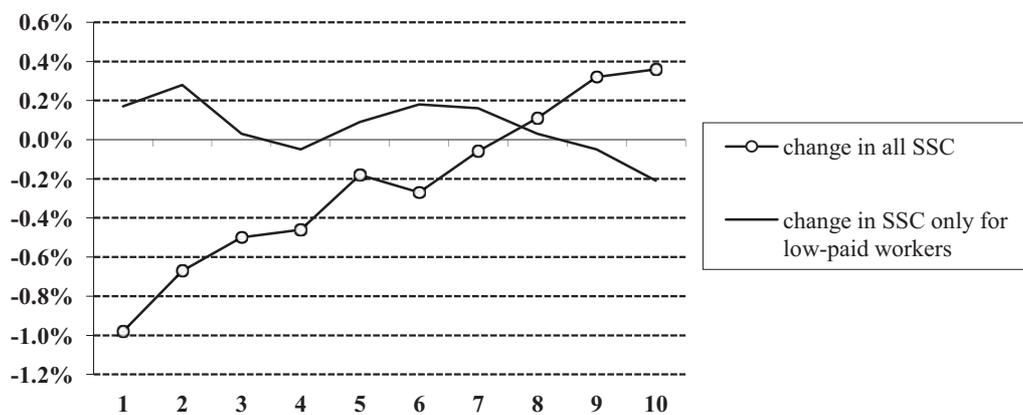
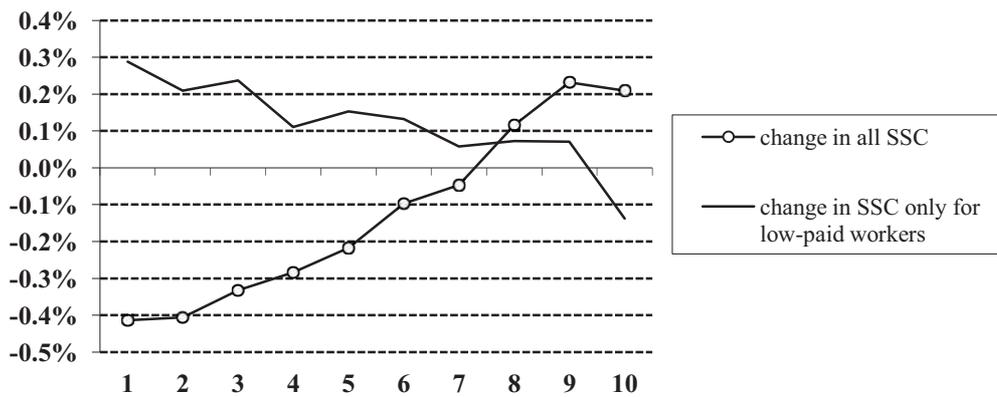


Figure 4.2.3: Change in disposable income after FD in France by deciles of equivalent disposable income



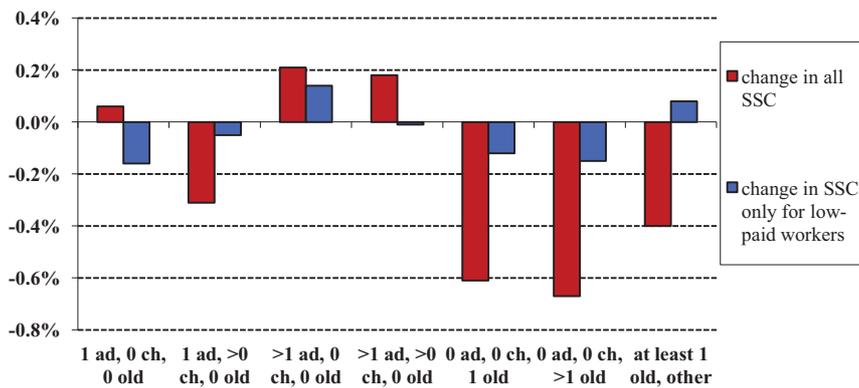
If we evaluate the distributive impact of the FD not on the income deciles but across equivalent expenditure deciles, the results of Figure 4.2.3 are confirmed (Figure 4.2.4): the FD is regressive if it is extended to all employees (the Gini index in this case rises from 0.38372 to 0.38456 (+0.22%)), it is slightly progressive if it is concentrated only on low incomes, with a corresponding reduction of the Gini index to 0.38284 (-0.23%).

Figure 4.2.4: Change in disposable expenditure after FD in France by deciles of equivalent disposable expenditure



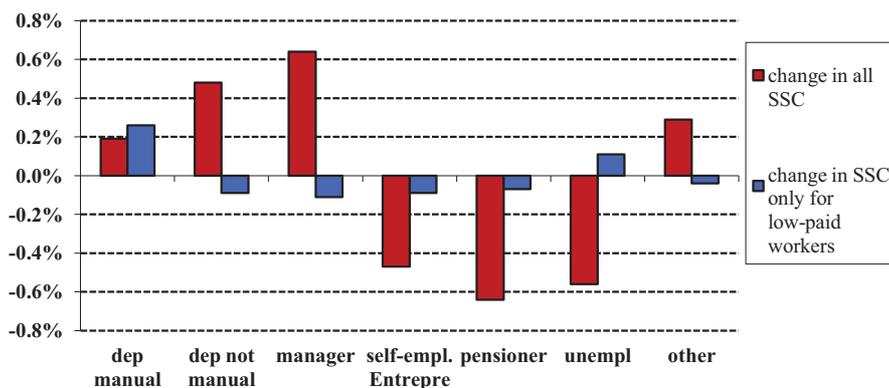
The results by family type (Figure 4.2.5) show that if the reduction of SSC is extended to all workers the greatest beneficiaries are households with children, even if the average gain is very low, while the greatest burden is on the elderly. If we change only SSC on low-paid workers, the effect is much more neutral across family types, since the reduction in various transfers reduces the net gain in many incomes, and the required increase in VAT rates to close the budget is low.

Figure 4.2.5: Change in disposable income after FD in France by family type



The analysis by condition of the head (Figure 4.2.6) confirms this distributional pattern: with SSC reduction extended to all employees, the biggest gainers are households of non manual workers and managers, and the biggest losers are the pensioners and the unemployed, as well as the independent workers. When the SSC reduction is targeted to low incomes, then only the families of manual workers and of the unemployed seem to gain a bit, while for the other groups the change is barely significant.

Figure 4.2.6: Change in disposable income after FD in France by condition of the household head



2 Proportional increase in all VAT rates

In this case all VAT rates are increased by the same proportion so as to close the public budget. The new VAT rates are set at 6% and 21.4% (increasing by 9%) if the SSC reduction is extended to all employees, and at 5.6% and 20.1% (increasing by 2.4%) if it is targeted to low earners only. The distributional effects of FD by deciles of income or expenditure are very similar to those of the previous case: clearly regressive with general reduction in SSC, with an increase in the Gini index to 0.29255, i.e. by 0.73%, very slightly progressive with SSC reduction concentrated on low incomes, with a reduction in the Gini index by -0.22%, to 0.28928. We therefore do not make new comments on them. The reduction of SSC only on low incomes seems able, as in the case before, both to improve the conditions of low-income households with children and to preserve the elderly from a significant loss of income.

Figure 4.2.7: Change in disposable income after FD in France by deciles of equivalent disposable income

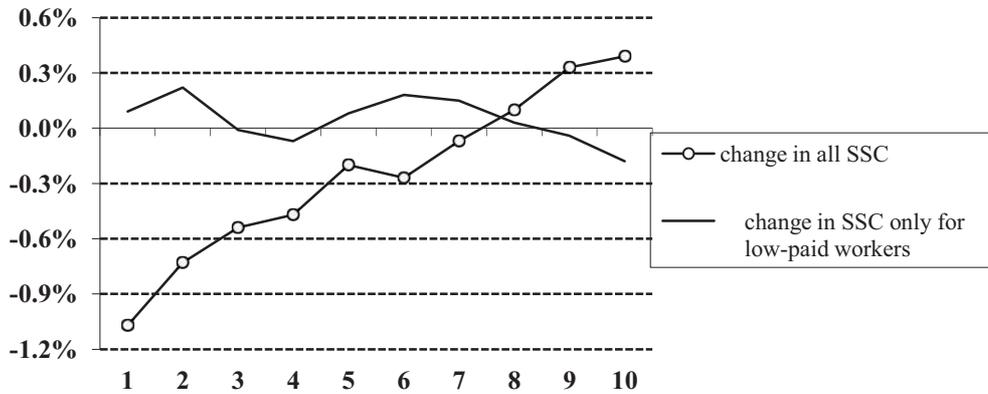


Figure 4.2.8: Change in disposable expenditure after FD in France by deciles of equivalent disposable expenditure

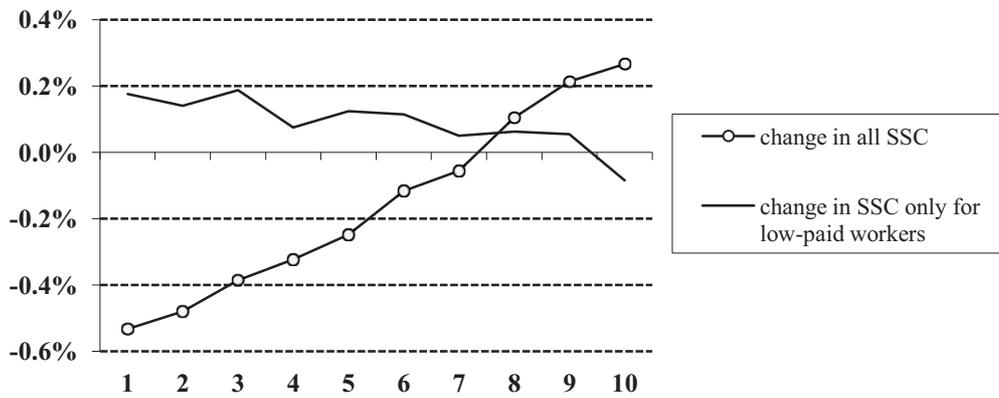
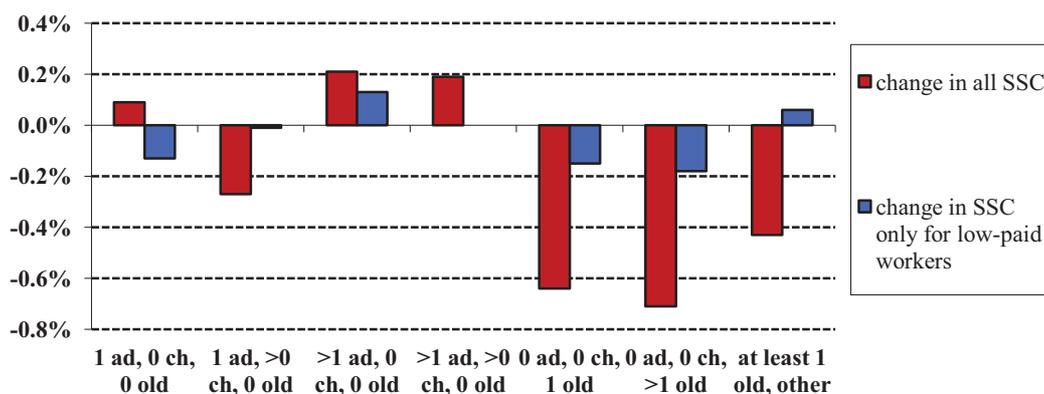
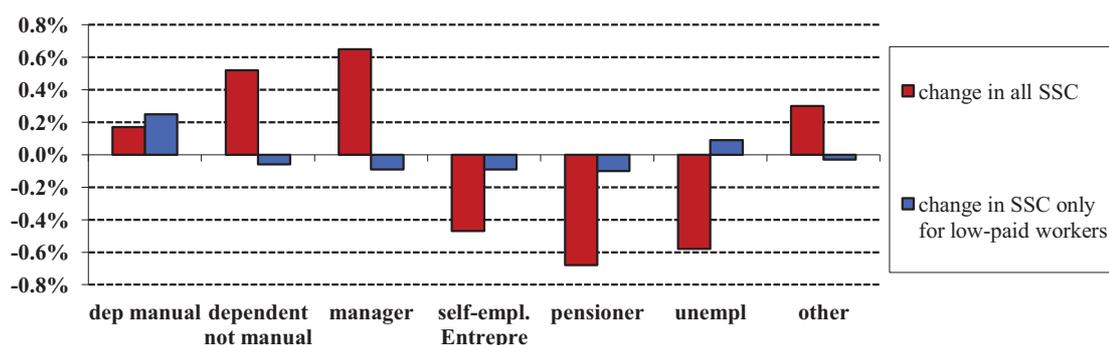


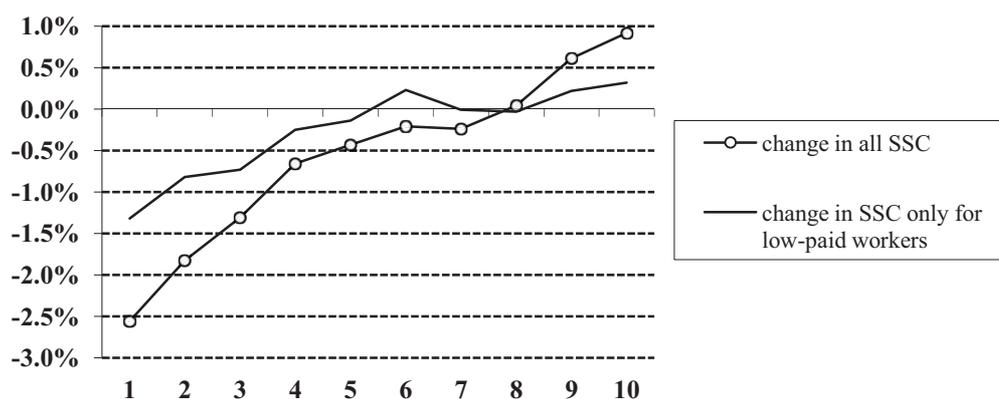
Figure 4.2.9: Change in disposable income after FD in France by family type**Figure 4.2.10: Change in disposable income after FD in France by condition of the household head**

3 Uniform VAT rate

If the public balance is closed with a uniform VAT rate on all goods and services (keeping current exemptions), then the FD is regressive even if the reduction in SSC is concentrated on low earnings, and also if the incidence is measured on (yearly) consumption. With general SSC reduction (new uniform VAT rate at 11.4%), the increase in disposable income is negligible for the lowest deciles, while it is significant for the richest ones. On the other hand, the new VAT would increase its burden on the lowest two deciles by more than 1.7%, but only by 0.4% on the richest one, so that the net effect of both changes is markedly regressive. Indeed, the Gini index of the equivalent income distribution rises by 2.03%, i.e. from 0.29014 to 0.2960. In the equivalent expenditure distribution, the Gini rises by 1.38%.

However, the effect would remain regressive also in the case of a SSC reduction concentrated on low incomes (new uniform VAT rate at 10.8%), because the VAT change would remain strongly regressive, while the SSC change would have a modestly progressive impact.

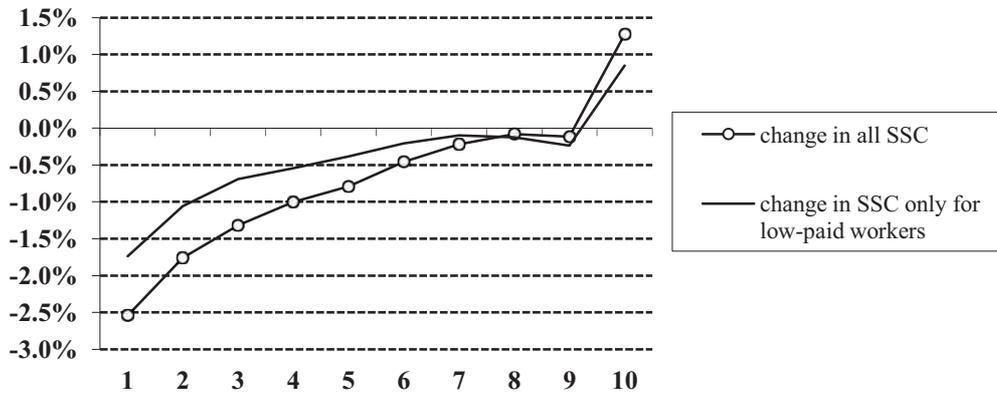
Figure 4.2.11: Change in disposable income after FD in France by deciles of equivalent disposable income



The regressive picture is confirmed across the equivalent expenditure deciles (Figure 4.2.12): with general SSC reduction, the increase in expenditure is nearly zero for the lowest deciles but significant for the richest section of the distribution, while the new uniform VAT rate has a clearly regressive impact. As in the previous graph, the reduction of SSC only on low incomes manages only to attenuate a bit the regressivity of this reform.

That a move towards a uniform VAT rate can have a regressive impact is not an unexpected result (IFS et al., 2011). This effect, however, does not mean that a FD cannot be financed with a uniform VAT rate. A government concerned about the increase in inequality could, for instance, set the new uniform VAT rate at a higher level than that necessary to close the budget, and use the extra-revenue to finance a cash transfer targeted to poor households.

Figure 4.2.12: Change in disposable expenditure after FD in France by deciles of equivalent disposable expenditure



The reform would particularly hurt the households of pensioners, in both versions, while the effect on families with children would be modest. The lower additional burden would be on families that consume goods and services already taxed at the standard rate, i.e. non manual workers and managers.

Figure 4.2.13: Change in disposable income after FD in France by family type

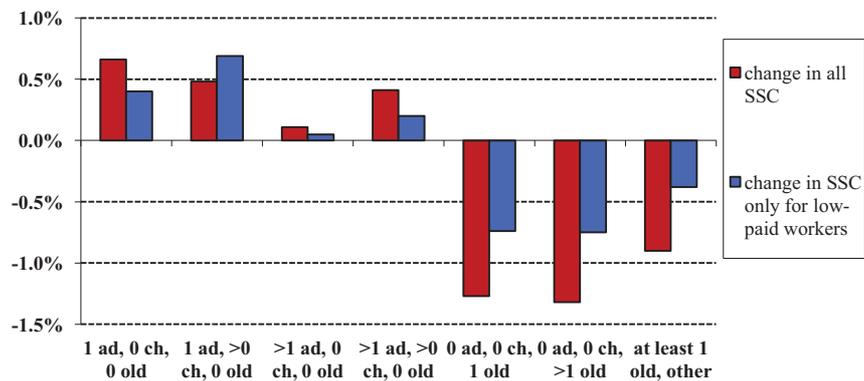
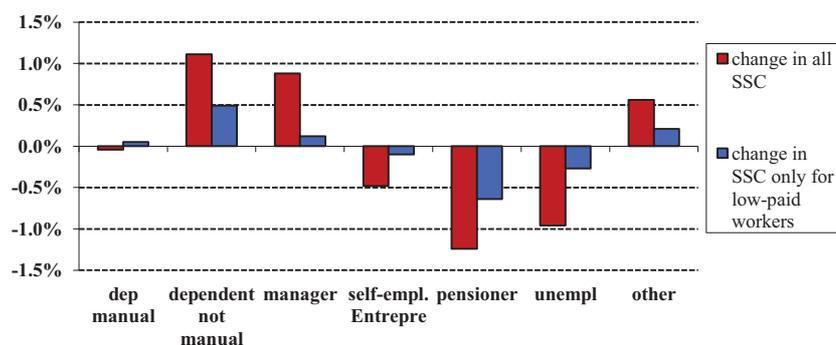


Figure 4.2.14: Change in disposable income after FD in France by condition of the household head



Indexation of benefits in France

We next compare the distributive effects of the FD in France with and without the indexation of cash benefits (by 0.5%-0.85% according to the various hypotheses concerning the changes in VAT rates). In France all major monetary benefits are indexed to the price level. The curves associated to the no-indexation case are the same already presented above. All three alternative cases of modifications of the VAT rates show a similar pattern: the indexation of benefits has a detectable effect for the poorest deciles, always reducing, as expected, their loss, or increasing their benefit. This effect is particularly clear in the case of a uniform VAT rate, where the negative net incidence for the first decile is reduced from -2.6% to -1.8% of disposable income. In this third case, the targeted reduction of SSC actually turns the FD from regressive to slightly progressive.

Figure 4.2.15: France: change in disposable income with reduction in SSC and increase in standard VAT rate, by deciles of equivalent disposable income, with and without indexation of benefits

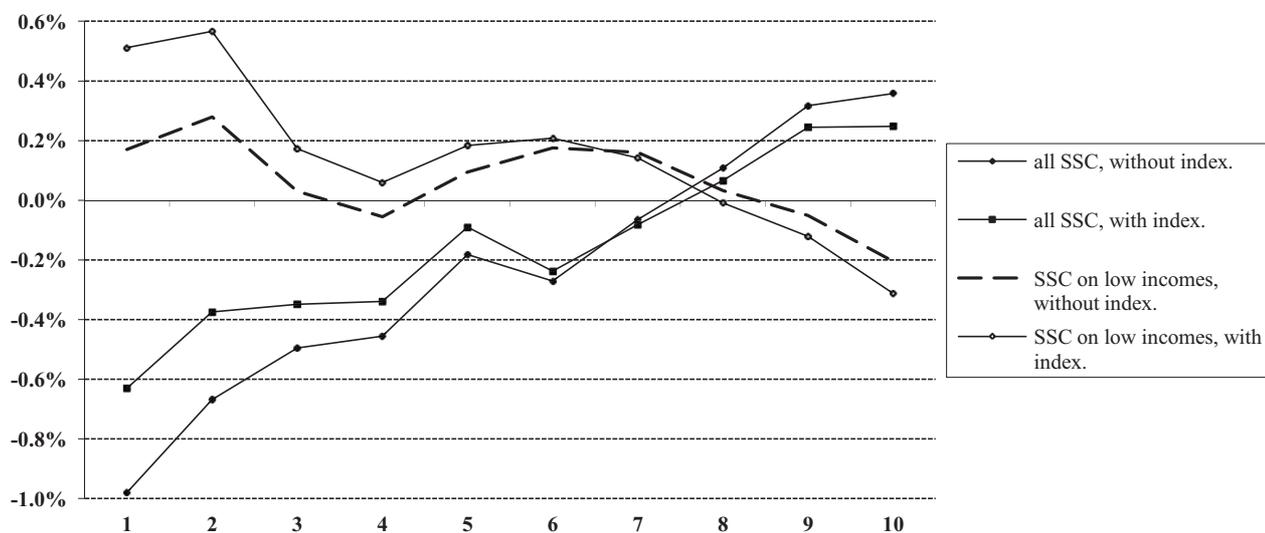


Figure 4.2.16: France: change in disposable income with reduction in SSC and increase in all VAT rates, by deciles of equivalent disposable income, with and without indexation of benefits

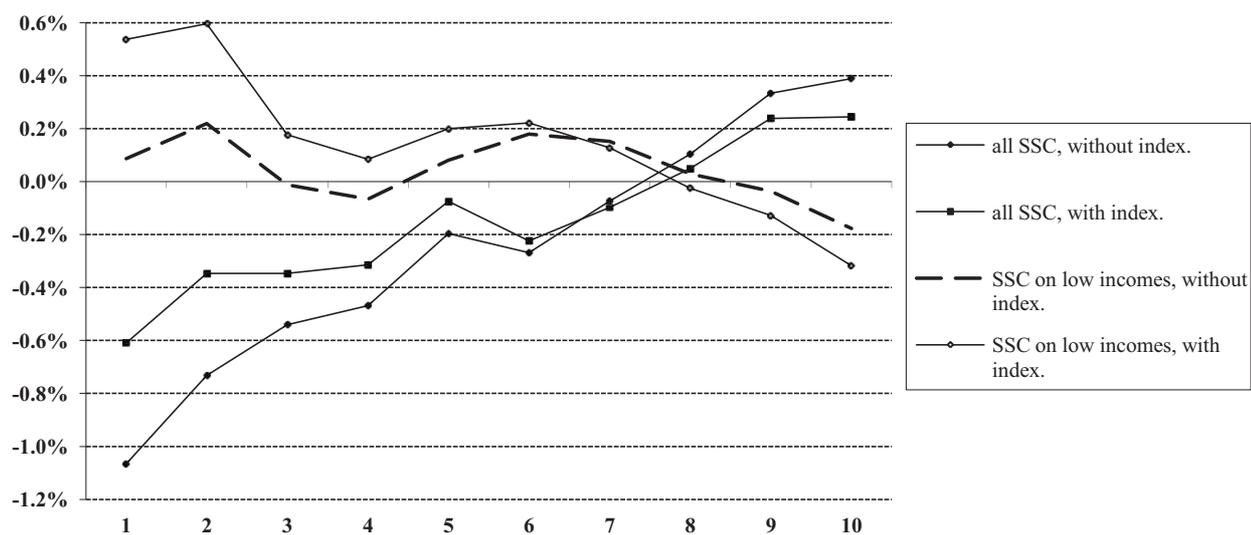


Figure 4.2.17: France: change in disposable income with reduction in SSC and uniform VAT rate, by deciles of equivalent disposable income, with and without indexation of benefits

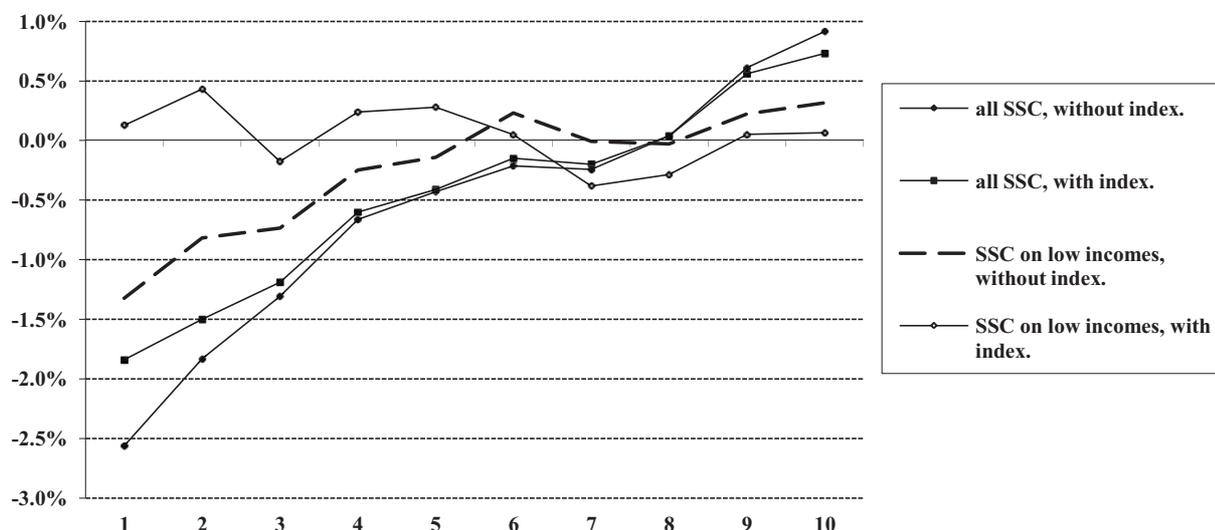


Table 4.2.1 compares the percentage changes in the Gini index for disposable equivalent income after the FD. All these numbers refer to the variation in the Gini index from the baseline income distribution before the fiscal devaluation. In nearly all the cases, the indexation of benefits reduces the increase in the Gini index, when the FD has a regressive impact, and produces a more significant fall in the inequality index when the effect of FD is progressive. The only case where there is a change in the sign of the distributive effect refers to the application of a uniform VAT rate accompanied by a reduction only on the SSC rates for low income workers: without indexation the impact is regressive, with indexation it becomes slightly progressive. We can therefore conclude that benefit indexation has a significant effect in reducing the negative distributive impact of the reform, even if it manages to turn its effect, from a regressive to a progressive one, in one case only. Benefit indexation has the effect of improving the conditions of the poorest deciles.

Table 4.2.1: France: percentage variation in the Gini index for equivalent disposable income after the FD, with and without indexation of cash benefits

	Without benefit indexation	With benefit indexation
1 Increase in ordinary VAT rate		
1.1 change in all SSC rates	+0.67%	+0.49%
1.2 change in SSC rates on low incomes	-0.36%	-0.53%
2 Increase in all VAT rates		
2.1 change in all SSC rates	+0.73%	+0.49%
2.2 change in SSC rates on low incomes	-0.30%	-0.52%
3 Uniform VAT rate		
3.1 change in all SSC rates	+2.03%	+0.70%
3.2 change in SSC rates on low incomes	+0.99%	-0.29%

Note: percentage changes of the Gini index with respect to the baseline case of the distribution of disposable income before the fiscal devaluation.

The three figures that follow show that the indexation of benefits is, in some cases, able to change the pattern of the distributive results with respect to the no-indexation case. In particular, indexation seems to be particularly helpful, as expected, for households of pensioners and unemployed persons.

Figure 4.2.18: France: change in disposable income with reduction in SSC and increase in standard VAT rate, by condition of the head, with and without indexation of benefits

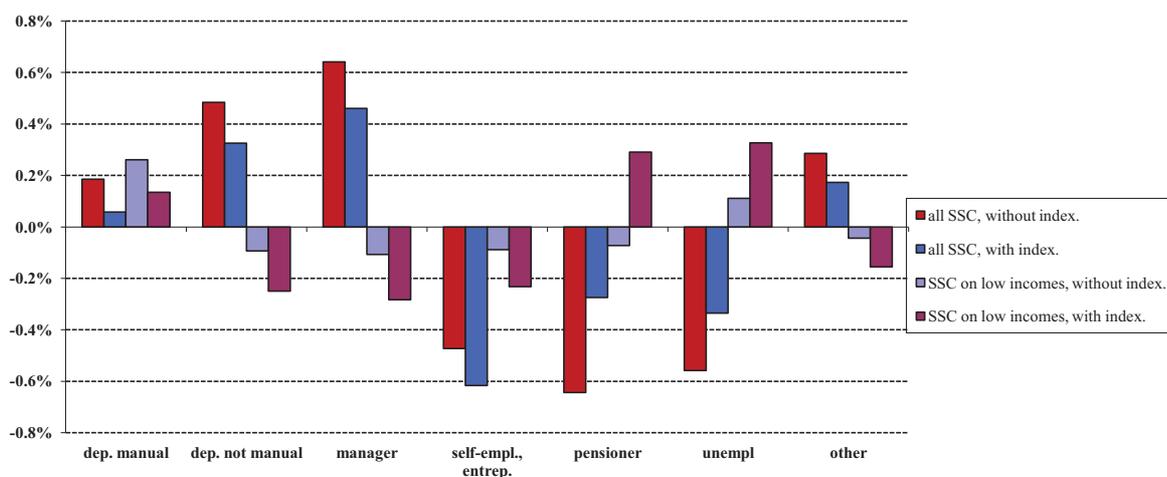


Figure 4.2.19: France: change in disposable income with reduction in SSC and increase in all VAT rates, by condition of the head, with and without indexation of benefits

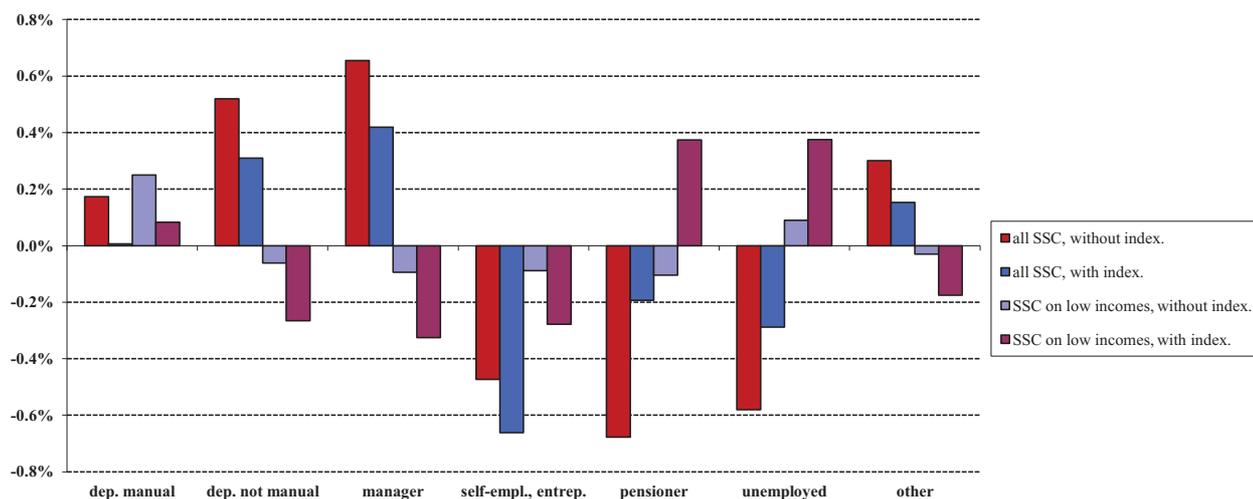
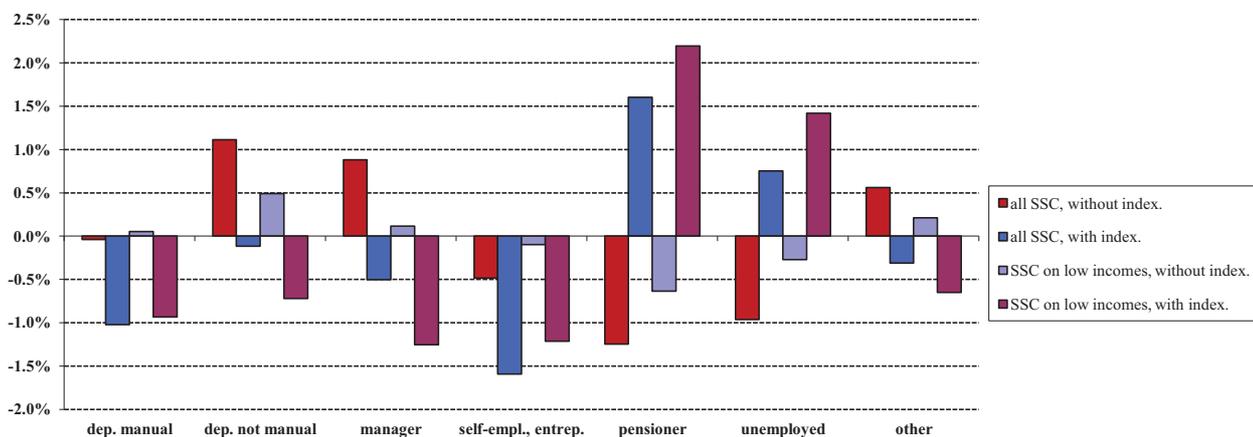


Figure 4.2.20: France: change in disposable income with reduction in SSC and uniform VAT rate, by condition of the head, with and without indexation of benefits



5 Simulations of unilateral fiscal devaluation in Italy

5.1 Macro simulations for Italy

The effects of the base case reforms in Italy simulated by the NiGEM model are presented in Figure 5.1.1.⁵⁵ When compared to the results obtained for France (Figure 4.1.1), we observe similar developments but the labour market outcomes (i.e. real producer wage, employment and unemployment) are found to stabilise much earlier. This reflects that the nominal wage is estimated to adjust more rapidly in Italy than in France. Its half-life adjustment is 4.3 years in Italy, compared to 7.3 years in France. After 9 years, fiscal devaluation stimulates GDP and private consumption twice as much in Italy as in France. In view of the larger estimated value of the long-run price elasticity of exports (1.0 versus 0.5 for France), the trade balance improves in the first three years. However, the fast convergence of production costs and the expansion of consumption contribute to an ultimate worsening of the trade balance by 0.4% of GDP.⁵⁶

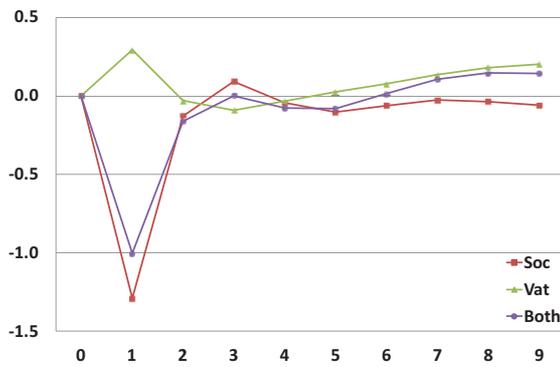
Comparison of the CGE simulations by the IHS model between Italy (Figure 5.1.2) and France (Figure 4.1.2) shows that both pattern and size of the effects are very similar. In the long run, employment in persons increase by 0.11% in Italy (0.08% in France) and GDP expands by 0.10% in Italy (0.09% in France). The small differences can be explained by a combination of skill composition effects and the progressivity of the SSC system. SSC are very progressive in France but proportional in Italy. The reduction of the SSC rate stimulates labour supply of all workers in Italy but it mostly affects labour supply of the high-skilled workers in France. The number of persons employed increases more in Italy, but after correcting for productivity, the effect on employment and hence on GDP is similar in both countries.

⁵⁵ When in the following sections results are similar to the ones found for France, we will not repeat the full explanations. We refer to Section 4.1 for the detailed discussion of the basic channels in each model. In the discussion of the findings for the remaining countries, we focus on the interpretation of main differences.

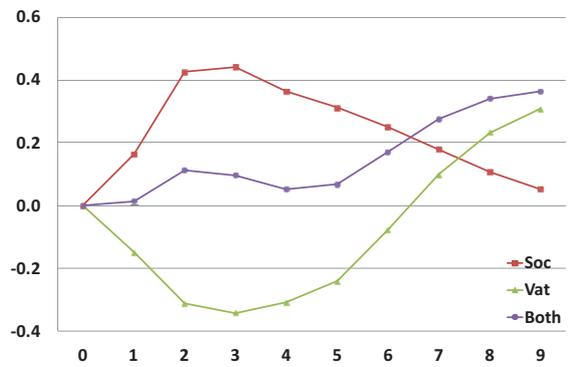
⁵⁶ The rate of depreciation of the euro ranges from 0.12% in the first year to 0.26% in the ninth year in this case.

Figure 5.1.1: Fiscal devaluation in Italy – NiGEM

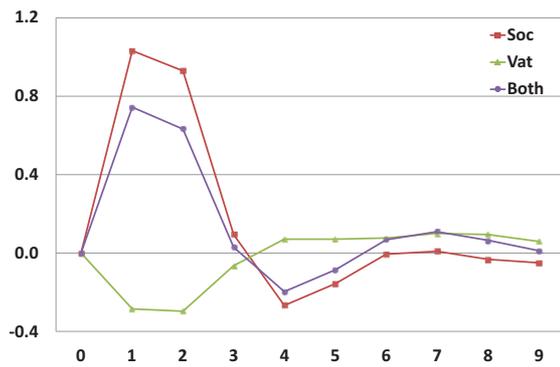
Real producer wage



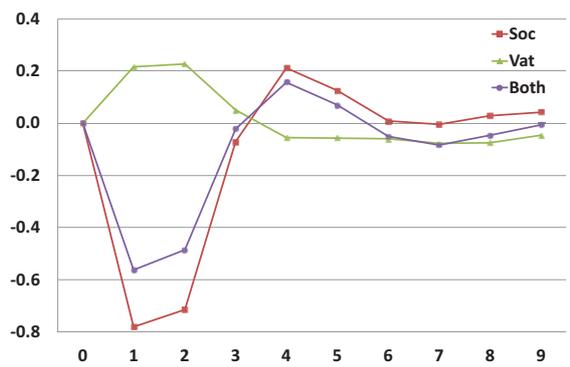
Real GDP



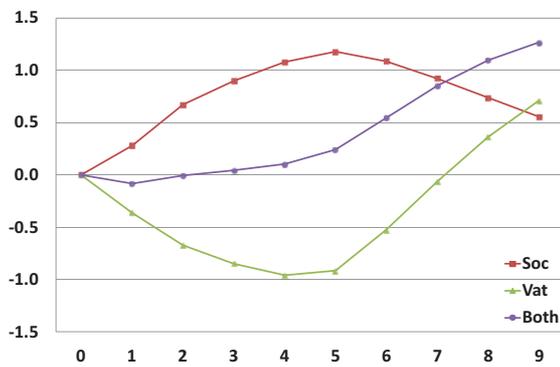
Employment



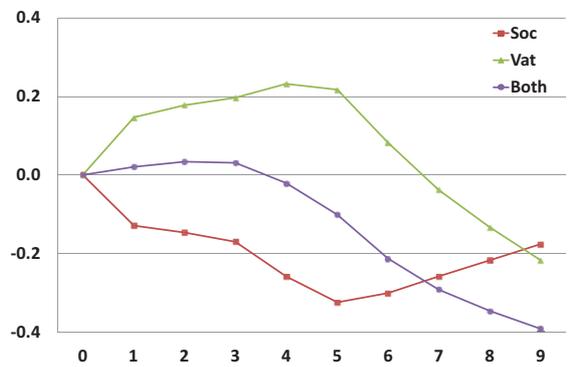
Unemployment rate



Consumption



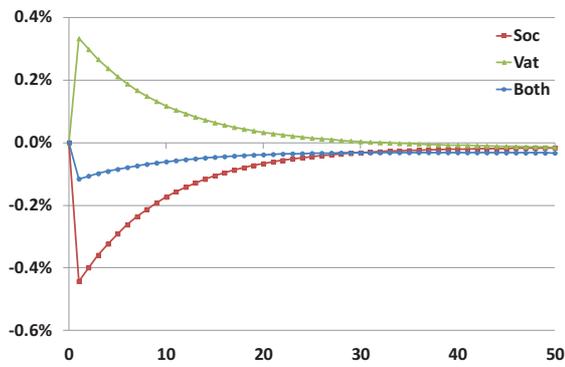
Trade balance (%GDP)



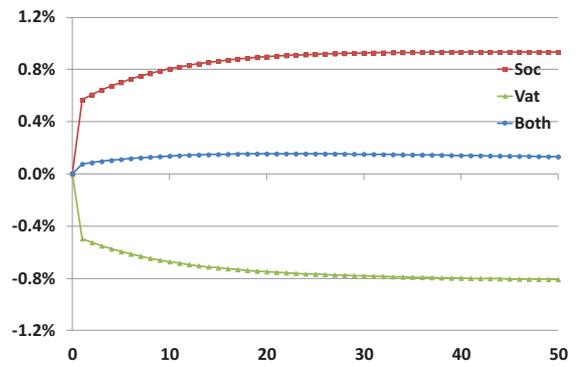
Note: horizontal axis: years; vertical axis: % difference from the baseline, % point difference for the unemployment rate and trade balance.

Figure 5.1.2: Fiscal devaluation in Italy – IHS

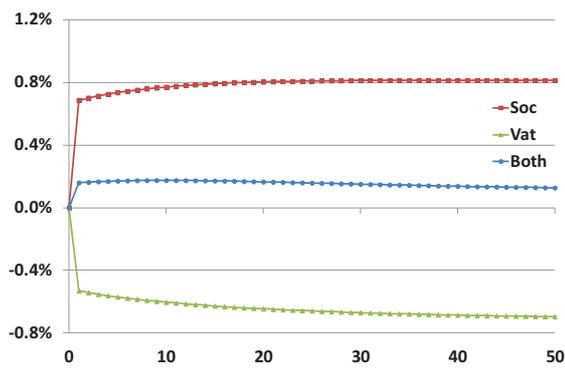
Real producer wage



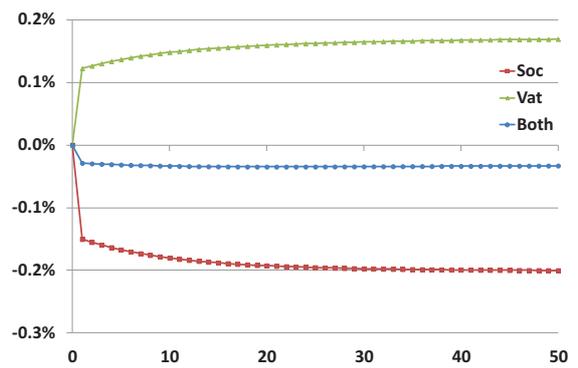
Real GDP



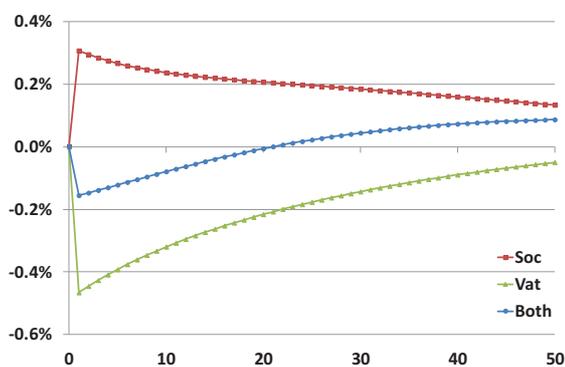
Employment



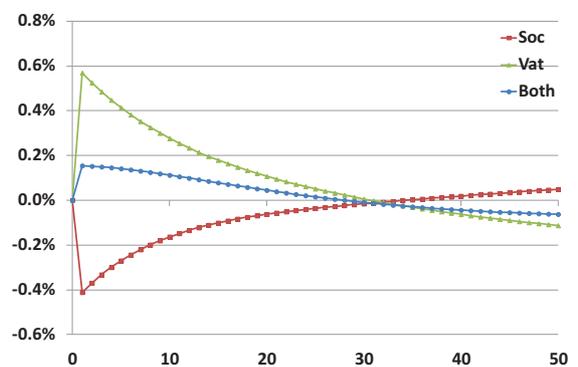
Unemployment rate



Consumption (%GDP)



Trade balance (%GDP)



Note: horizontal axis: years; vertical axis: % difference from the baseline for the first 3 figures, % point difference for the last three.

Sensitivity

The sensitivity analysis is summarized in Table 5.1.1. The upper part of the table shows that the outcomes of the NiGEM model are not sensitive to full indexation of transfers, at least in the first and last year after the policy change.⁵⁷ Outcomes in every year are robust to doubling the value of the price elasticity of exports.⁵⁸ The lower part confirms that for the IHS model long-run GDP is sensitive to indexing social transfers and to targeted SSC reduction whereas the effect on the trade balance ratio remains rather robust. It is interesting to note that long-run GDP in Italy is less sensitive to the degree of indexation compared to France. The reason is that social security insurance is less generous in Italy; for instance, the replacement rate for unemployment benefits is roughly half the replacement rate in France. The degree of indexation matters less when social transfers are low relative to wages.

Table 5.1.1: Sensitivity analysis for Italy

	GDP		TB (%GDP)	
	<i>1y</i>	<i>9y</i>	<i>1y</i>	<i>9y</i>
<i>NiGEM</i>				
Basecase	0.01%	0.36%	0.02%	-0.39%
Indexation	0.02%	0.39%	0.01%	-0.50%
Export elasticity	0.02%	0.35%	0.02%	-0.40%
<i>IHS</i>	<i>SR</i>	<i>LR</i>	<i>SR</i>	<i>LR</i>
Basecase	0.08%	0.10%	0.15%	-0.05%
Indexation	0.04%	0.02%	0.12%	-0.02%
Ex ante budget closure	0.04%	0.10%	0.33%	-0.05%
Targeted SSC	0.22%	-0.35%	0.29%	-0.09%

Summary

The NiGEM and IHS results for Italy are similar to the ones discussed for France (Table 5.1.2). The fall of the real producer wage in the NiGEM model has favourable effects on GDP and labour market outcomes. Due to a rapid adjustment of the nominal wage, labour market outcomes already stabilize after a couple of years. The trade balance improves slightly during the first years following the better competitive position but worsens in later years after the expansion of domestic demand.

The IHS model finds again a small increase in long-run employment and GDP, while the trade balance is slightly weakened. The main channels are the depressing effect of lower non-indexed social transfers on wage costs and the implied redistribution in favour of future generations. The NiGEM results are not sensitive to the value of the

⁵⁷ Remember that changes in transfers do not (directly) affect the outside option of workers in the NiGEM model.

⁵⁸ Sensitivity analysis with respect to the wage setting is not reported because this scenario did not converge for Italy.

price elasticity of exports, while the GDP effects of IHS are sensitive to the indexation of social transfers and to targeted SSC reduction (Table 5.1.1).

Table 5.1.2: Summary of fiscal devaluation in Italy

	SR max.** (NiGEM)	LR (IHS)
Real producer wage	-1.00%	-0.04%
Real GDP	0.36%	0.10%
Employment	0.74%	0.11%
Unemployment rate*	-0.56%	-0.03%
Consumption (LR*)	1.27%	0.07%
Trade balance (%GDP)*	-0.39%	-0.05%

* % point difference; ** maximum effect (in absolute value) during first 9 years

5.2 Micro simulations for Italy

The analysis of the distributive impact of FD has been performed with a tax-benefit microsimulation model (Mapp, Model for the Analysis of Public Policies) for Italy, maintained at the Department of Economics of the University of Modena and Reggio Emilia⁵⁹. The source of household micro-data is a hybrid dataset which uses information from both the 2008 EU-SILC survey for Italy (which has a sample size of 20982 households and contains information on incomes perceived during 2007) and the 2007 household budget survey (*Indagine sui Consumi delle Famiglie, ICF*), which has a sample size of 24400 households. The EU-SILC dataset provides the core data used to simulate direct taxes and income transfers, whilst the ICF provides a detailed breakdown of expenditure by category that allows highly accurate modelling of the VAT treatment of different goods and services. We have computed for each household the amount of VAT paid on 248 different categories of goods and services. Since the SILC survey does not contain spending data, we have imputed expenditures from the ISTAT ICF consumption survey of 2007 (which lacks information on income). In order to obtain a consistent relationship between total income and total expenditure, we have estimated this relationship using the Bank of Italy Survey on Household Income and Wealth for 2008, the only dataset in Italy containing data on both household disposable income and total consumption.⁶⁰ The coefficients of this regression are then used to impute a total consumption value to the SILC households. The SILC households are then classified in deciles of total imputed consumption, and households belonging to each decile of imputed consumption are then matched⁶¹ with the households that belong

⁵⁹ See, for recent applications, Baldini and Pacifico (2009) and Baldini and Poggio (2012).

⁶⁰ <http://www.bancaditalia.it/statistiche/indcamp/bilfait>.

⁶¹ Using the Stata command `psmatch2`. Notice that in three out of four countries involved in this study it has been necessary to use data obtained after a matching of two different data sets. Since these matching processes have been independently performed by the various teams, the use of different matching procedures could make the comparative analysis more uncertain.

to the corresponding consumption decile in the ICF survey. This matching procedure is separately repeated for each of the 10 deciles. In the SILC survey, we have now a vector of 248 expenditures associated with each household, and also a reliable relationship between their sum and disposable income. The average consumption propensity in SILC is greater than that in the Bank of Italy survey since average expenditure in the ISTAT consumption survey is greater. Expenditures are updated by the growth in nominal spending between 2007 and 2011 according to National Accounts, separately for nine categories of goods and services. Incomes are updated using the growth in nominal GDP (per household) between 2007 and 2011. Employer social security contributions for each worker are not simulated but are taken from the SILC survey. Since the tax base (gross wages) does not change in our simulations, changing the SSC rates is equivalent to a change in the SSC revenue for each earner. Only employer SSC are involved in this simulation, not the contributions paid by the self-employed. The rules governing the social security contributions in Italy are very complex with many differentiations depending on the sector of activity, the type of occupation and the dimension of the firm. As an illustration, for a manual worker in the industrial sector working in a firm with more than 50 employees the contributory rate is 33% of gross wage for pensions, 1.91% for unemployment insurance, 0.68% for family allowances, 3.1% for a wage guarantee fund in case of temporary suspension of the activity of the firm, 2.22% for sickness insurance, 0.46% for maternity insurance. The total rate reaches 41.57%, of which 9.49 percentage points are formally paid by the employee, the rest by the employer.

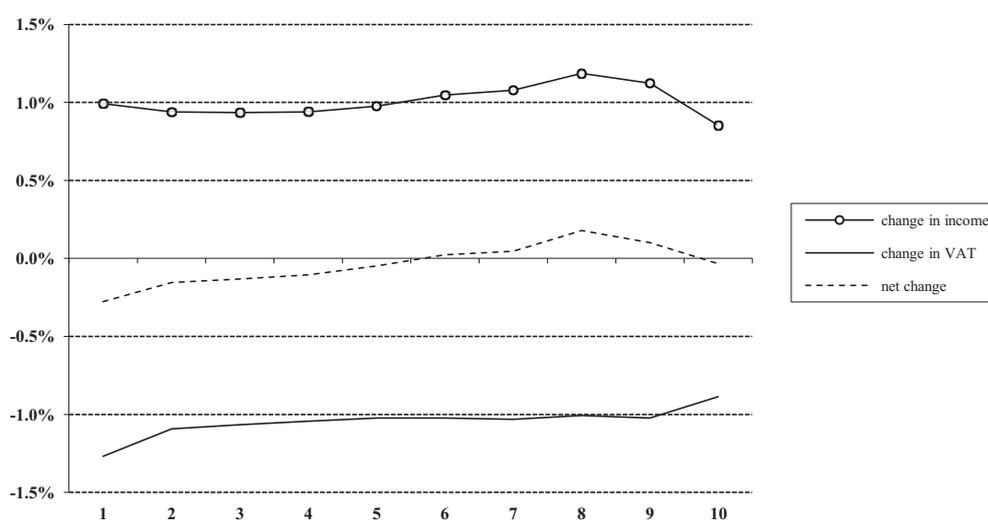
In the matched data, goods and services corresponding to 18% of total taxable expenditure are subject to the 4% VAT rate, 41.5% to the 10% rate and 58.5% to the standard rate of 21%. For households of the first equivalent income decile the goods and services taxed at 4% represent 26% of total expenditure, a share that gradually falls to 13.4% for the richest decile. Goods and services subject to the intermediate 10% rate represent 47% of total expenditure for the first decile and 37% for the tenth, and finally the standard 21% rate applies to 53% of total expenditure of the first decile and to 63% of it for the richest decile. The baseline Gini indexes are 0.29146 for the equivalent income distribution, and 0.29504 for the equivalent expenditure one.

1 Increase only in the standard VAT rate

In this first case, when the employer SSC rates are reduced on all employees, they fall by 8.8% (this is the percentage reduction in the amount of employers SSC that corresponds to 1% of GDP from the macro model), while if the reduction is targeted to low incomes (defined, from the macro model, as the lowest 45.7% of the distribution of gross incomes), then the SSC rates on these workers fall by 26%. Correspondingly, the new VAT rate increases from 21% to 26% in the first case, and to 25% in the second. The two other rates remain fixed at 4% and 10%.

Figure 5.2.1 shows, by deciles of equivalent income computed before the reform, by how much disposable income and VAT payments increase after the FD. The change in VAT is moderately regressive, while the increase in disposable income is slightly more favourable for the richest section of the distribution. As a result, the net effect is very mildly regressive. Indeed, the Gini index of the income distribution increases from 0.29147 to 0.2920, i.e. by only 0.2%.

Figure 5.2.1: Change in disposable income and VAT (as a percent of disposable income) after the FD in Italy – decrease in all SSC rates



On the contrary, if only low incomes benefit from SSC reduction then the net effect is clearly progressive (Figure 5.2.2), since the mildly regressive impact of VAT change is much more than compensated by the increase in disposable incomes for the first deciles. The Gini index falls from 0.29147 to 0.2892, i.e. by -0.77%. Figure 5.2.3 summarizes these findings showing only the net effects of these two reforms, to see more clearly the difference between the two cases.

Figure 5.2.2: Change in disposable income and VAT (as a percent of disposable income) after the FD in Italy– decrease in SSC rates only for low incomes

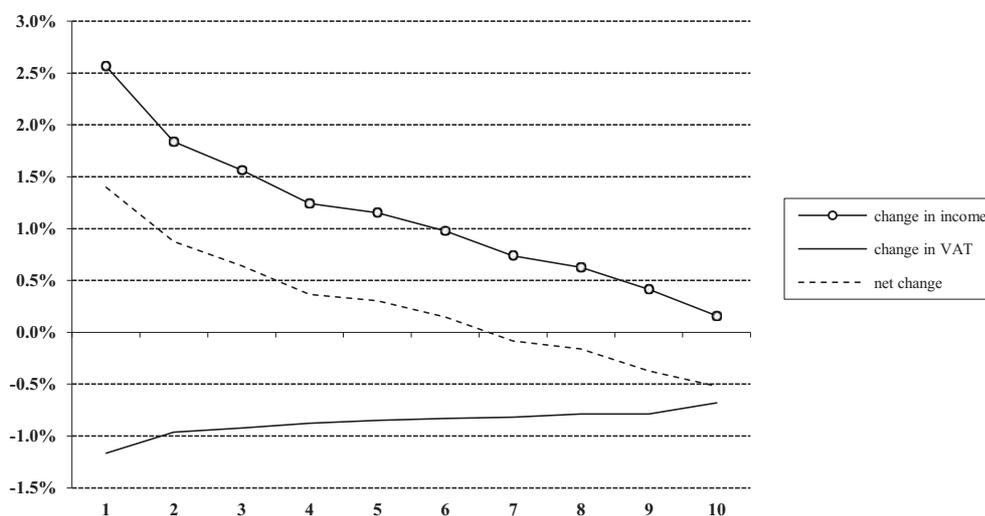
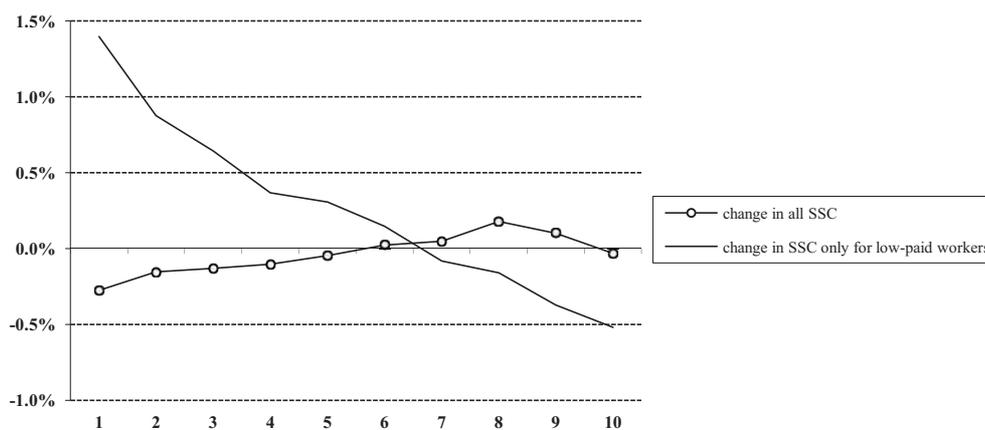
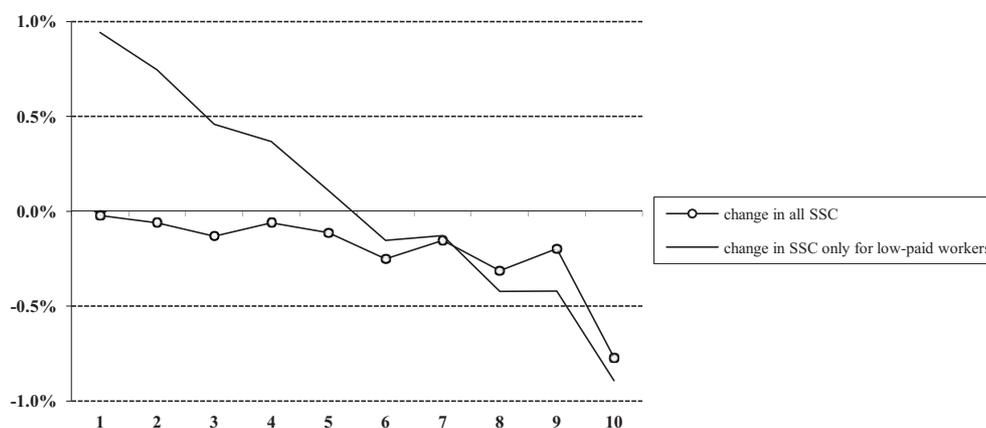


Figure 5.2.3: Change in disposable income after FD in Italy by deciles of equivalent disposable income

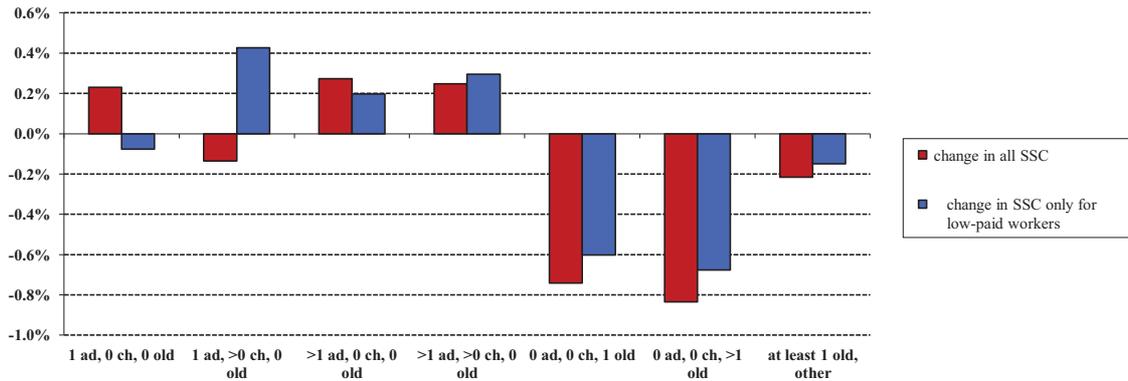
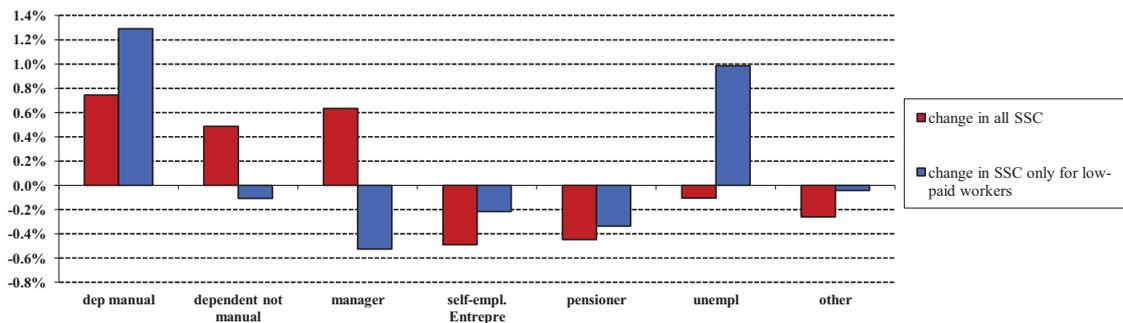


If the reform is evaluated on the deciles of equivalent expenditure (Figure 5.2.4), in both cases it penalizes more the richest deciles, but only with the targeted change in SSC rates it manages to increase the incomes of the poorest deciles. In both cases the Gini index of the distribution of equivalent expenditure decreases, by -0.33% in the first case and by -0.86% if the FD is targeted to low incomes.

Figure 5.2.4: Change in disposable expenditure after FD in Italy by deciles of equivalent disposable expenditure



As in the French simulation, but with more evident changes, households of dependent manual workers are the biggest gainers from the reform, while the other employees benefit only if they participate to the reduction of SSC. Families of pensioners in general lose from the reform, since they suffer only from the increase in the standard VAT rate. Families with children are better off in any case. The progressive effect of targeting the SSC reduction to low-paid workers for the households in which the head is unemployed is due to the household composition and therefore to a redistribution within households. Indeed, in Italy the low-income workers, as defined in this research, are present in 23% of all households. The share of households with an unemployed head that have at least one low earner among their members is much higher than the average, at 42%, while only 5 households of pensioners out of 100 contain at least one low earner. In a shift from SSC to VAT, groups at the margins of the labour market (pensioners, unemployed) are normally penalized as they cannot benefit from a cut in SSC. For this reason many studies (the Mirrlees Review, for example) suggest to increase income support measures (mostly for those not in the labour market) in order to compensate for the increase in VAT. In Italy households with an unemployed head seem to benefit from a fiscal devaluation concentrated on low earners, but since the share of households whose head is unemployed is much lower than that of households headed by a retired person (in Italy, 3% against 38%), and since this latter group lose from this reform, then the net effect of a FD is still to penalize the families who are not in the labour force. The suggestion of the Mirrlees Review is therefore substantiated by our analysis.

Figure 5.2.5: Change in disposable income after FD in Italy by family type**Figure 5.2.6: Change in disposable income after FD in Italy by condition of the household head**

2 Proportional increase in all VAT rates

If all VAT rates are increased in the same proportion so as to close the public budget, they must increase by 15% in the first case of general SSC reduction (the three new rates are 4.6%, 11.6% and 24.3%), and by 12.5% in the case of targeted SSC change (new rates 4.5%, 11.3%, 23.7%). The distributional effects of this reform are, as in the French case, very similar to those shown for the increase in the standard rate only, so it would be redundant to illustrate them in detail. As in the previous case, indeed, the Gini index for income slightly rises (by 0.28% to 0.2923) if all SSC rates are cut, while it decreases (by -0.70% to 0.2894) in the case of a targeted SSC cut. The Gini of equivalent expenditure, on the other hand, falls in both cases (by -0.20% to 0.2945 in the first case, by -0.75% to 0.2928 in the other one).

Figure 5.2.7: Change in disposable income after FD in Italy by deciles of equivalent disposable income

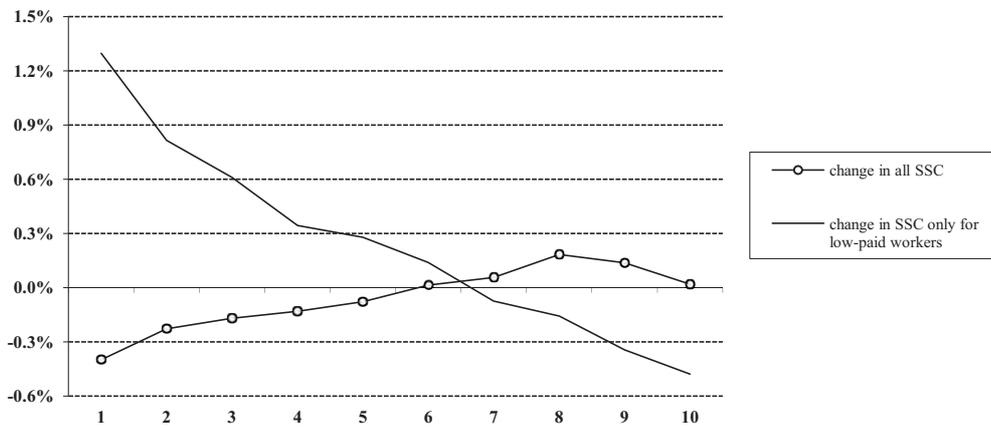


Figure 5.2.8: Change in disposable expenditure after FD in Italy by deciles of equivalent disposable expenditure

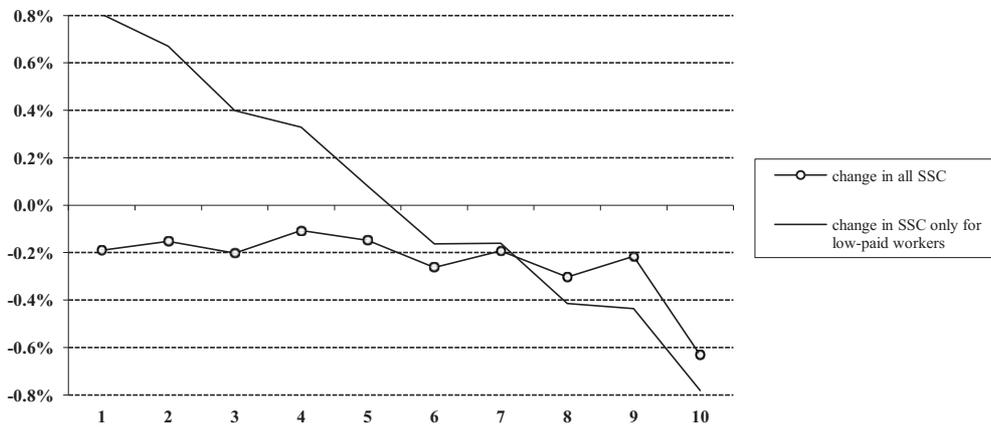
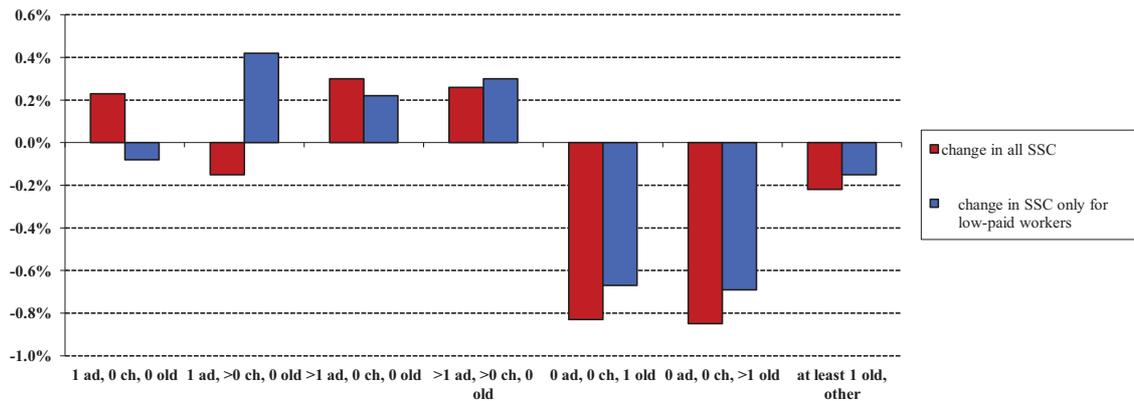
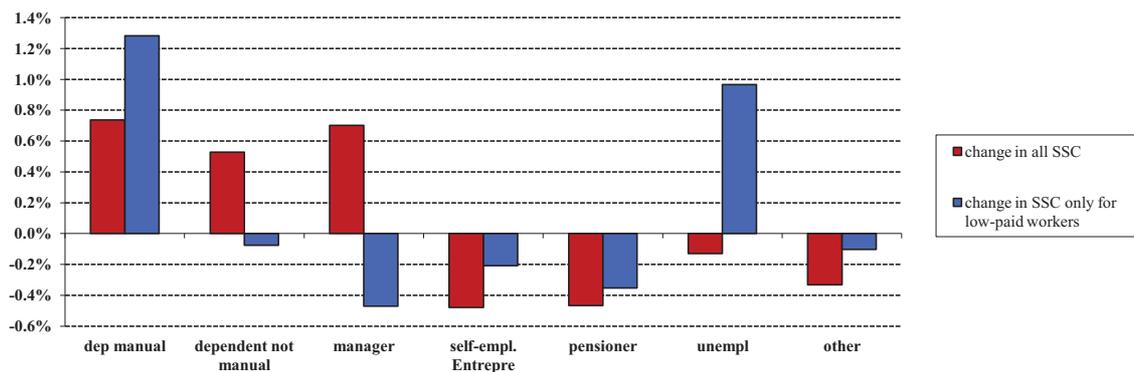


Figure 5.2.9: Change in disposable income after FD in Italy by family type**Figure 5.2.10: Change in disposable income after FD in Italy by condition of the household head**

3 Uniform VAT rate

The new uniform VAT rate that closes the budget is set at 16.3% with a general reduction of SSC, and at 15.9% with a selective reduction. The increase in the two reduced rates, together with the reduction of the standard rate, has a strongly regressive impact: the VAT burden on disposable income increases by 2.3% for the poorest decile and by 1.7% for the second, while this increase is 0.8% for the ninth decile and 0.5% for the richest one. On the other hand, the effect of SSC reduction on disposable incomes is proportional, about 1% for all deciles. The net effect is a clearly regressive impact (Figure 5.2.11). The Gini index of disposable income rises from 0.29147 to 0.2941, i.e. by 0.90%. On the other hand, with a targeted change in SSC the net impact becomes slightly progressive, since the increase in disposable incomes for the lowest deciles more than compensates the rise in the VAT burden for them, while the richest deciles do not benefit from the reduction of SSC, but pay a slightly increased VAT.

Indeed, the Gini index now turns out to be very slightly reduced from the baseline case (from 0.29147 to 0.2912, -0.09%).

Figure 5.2.11: Change in disposable income after FD in Italy by deciles of equivalent disposable income

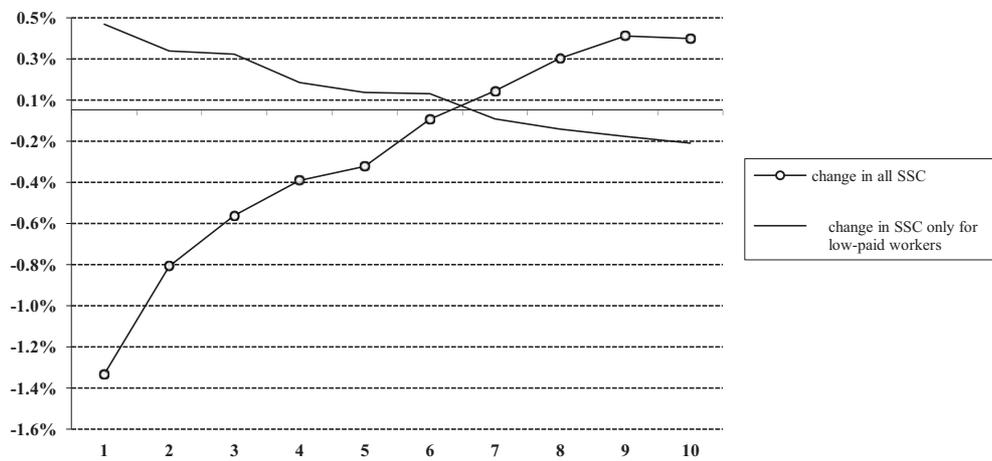
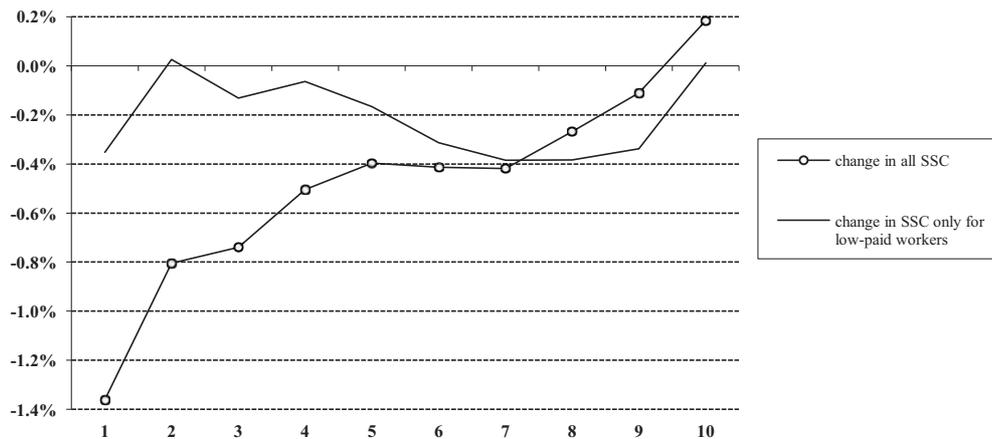


Figure 5.2.12: Change in disposable expenditure after FD in Italy by deciles of equivalent disposable expenditure



When evaluated in terms of equivalent expenditure, this reform is still markedly regressive when there is a general cut in SSC (Figure 5.2.12), with a rise in the Gini index by 0.73%, but becomes substantially neutral if the reduction in SSC is concentrated on low incomes (the Gini actually rises as well, but only by 0.16%). In this second case, the VAT increase is still very regressive, but it is compensated by the increase in low incomes induced by the SSC change.

The groups particularly hit by this reform are those who cannot benefit from the SSC reduction but must pay more VAT, i.e. in particular the pensioners. Households with children seem to gain when there is more than one income earner in the family, or in any case if the SSC reduction is targeted on low-paid workers (Figure 5.2.13, Figure 5.2.14). This kind of fiscal devaluation produces therefore a significant redistribution of the tax burden across generations.

Figure 5.2.13: Change in disposable income after FD in Italy by family type

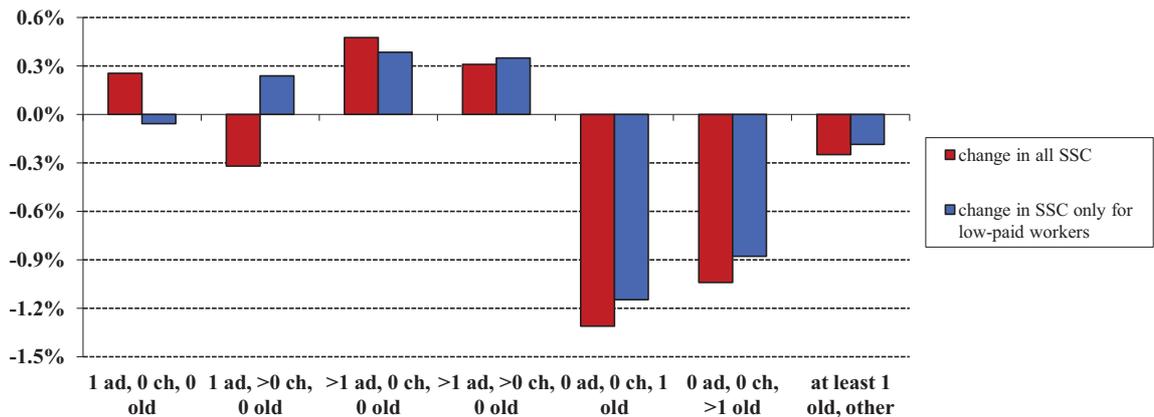
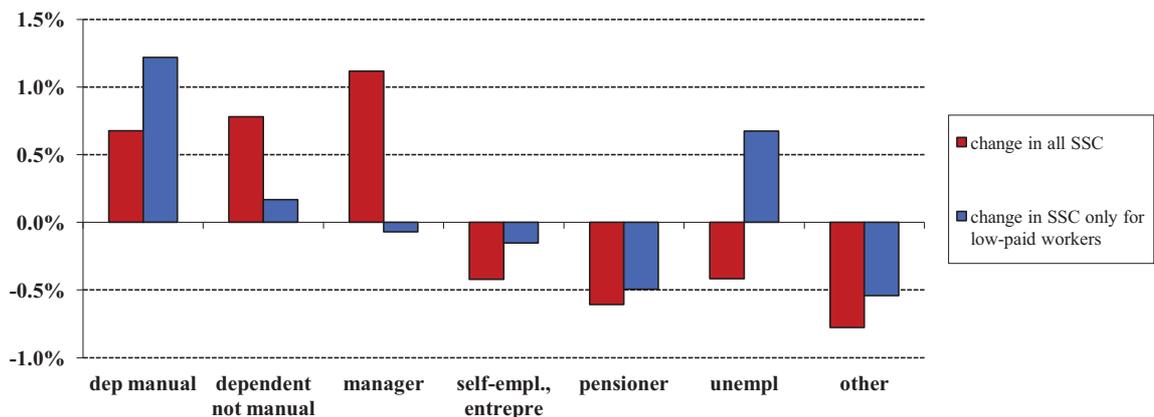


Figure 5.2.14: Change in disposable income after FD in Italy by condition of the household head



Indexation of benefits in Italy

In Italy the impact of the indexation of benefits (pensions, invalidity and unemployment benefits, and cash allowances for families with children rise by around 1.25 percentage points; the “proportional tax” needed to balance again the budget is around 0.3% of average household disposable income) is lower than that found for France; this measure changes only marginally the distributive effect of FD by deciles. The dominant form of cash transfer in Italy is represented by pensions, and households of pensioners are spread in a fairly uniform way across the income distribution. In particular, when the reduction of SSC rates is universal there is, with indexation, an improvement in net disposable income for the poorest deciles and a slight fall for the richest 20% of the distribution, but the changes are always very small and do not modify the general patterns. In the case of targeted reductions of SSC rates only for low incomes, the effect of benefit indexation can be observed only from a small reduction of the average incomes of the richest deciles.

Figure 5.2.15: Italy: change in disposable income with reduction in SSC and increase in standard VAT rate, by deciles of equivalent disposable income, with and without indexation of benefits

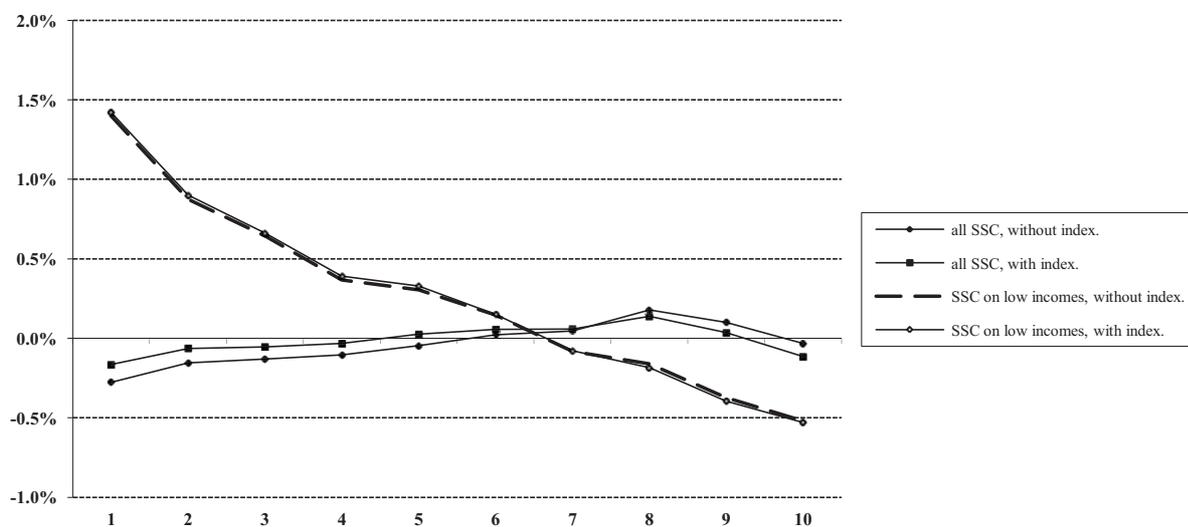


Figure 5.2.16: Italy: change in disposable income with reduction in SSC and increase in all VAT rates, by deciles of equivalent disposable income, with and without indexation of benefits

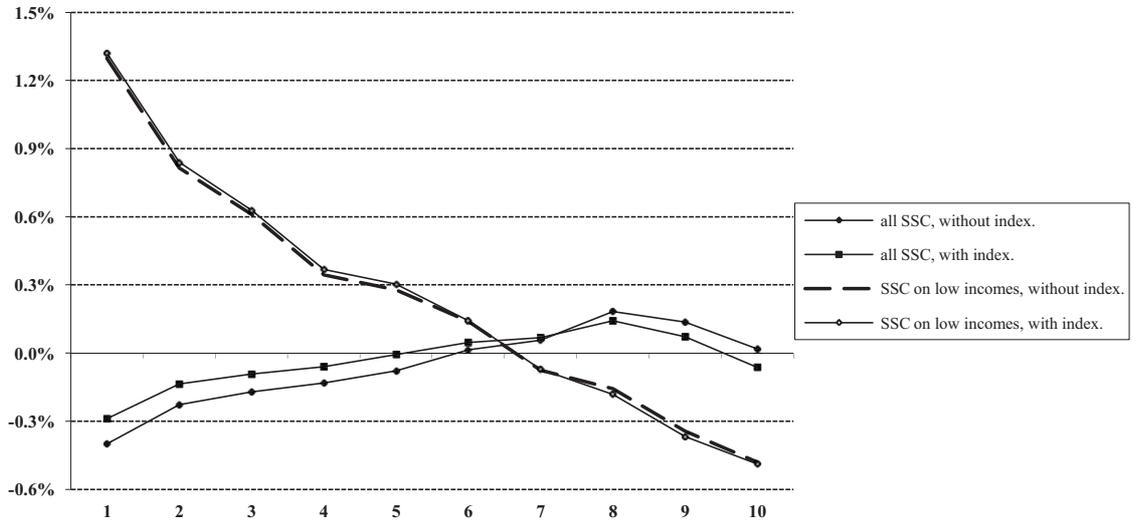
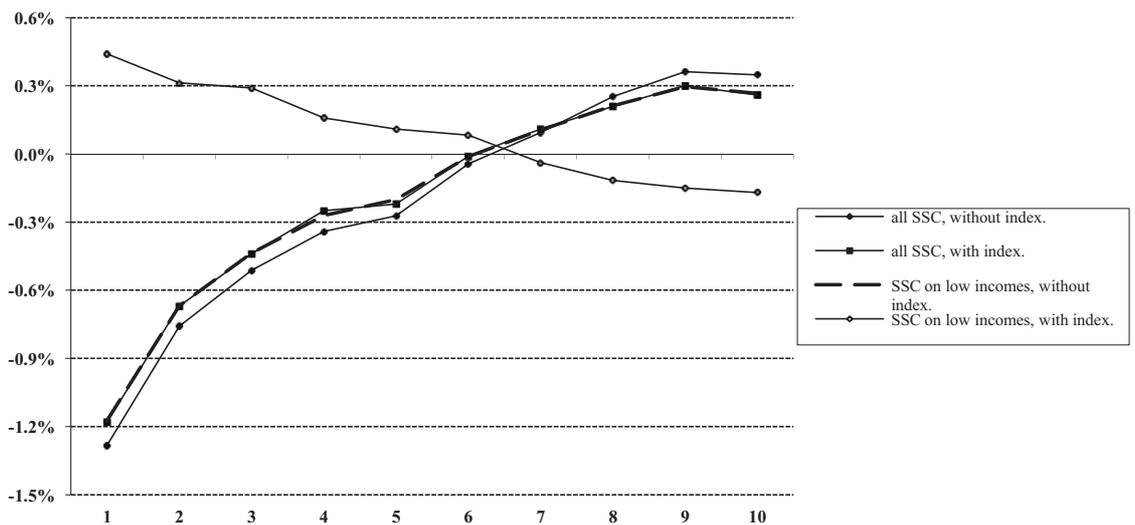


Figure 5.2.17: Italy: change in disposable income with reduction in SSC and uniform VAT rate, by deciles of equivalent disposable income, with and without indexation of benefits



In Italy the indexation of benefits is never enough to change the distributive signs of the various cases of FD simulated in this work. This indexation always mitigates the regressive impact of FD, when it is already regressive, and produces a more significant reduction of the Gini index when the FD is progressive. In all cases, however, the changes in the Gini index (from the baseline case, i.e. before the FD) with indexation are particularly close to the changes in the Gini without it, so the distributive results of FD are always confirmed.

Table 5.2.1: Italy: Percentage variation in the Gini index for equivalent disposable income after the FD, with and without indexation of cash benefits

	Without benefit indexation	With benefit indexation
1 Increase in ordinary VAT rate		
1.1 change in all SSC rates	+0.19%	+0.03%
1.2 change in SSC rates on low incomes	-0.77%	-0.82%
2 Increase in all VAT rates		
2.1 change in all SSC rates	+0.28%	+0.12%
2.2 change in SSC rates on low incomes	-0.70%	-0.75%
3 Uniform VAT rate		
3.1 change in all SSC rates	+0.90%	+0.74%
3.2 change in SSC rates on low incomes	-0.09%	-0.15%

Note: percentage changes of the Gini index with respect to the baseline case of the distribution of disposable income before the fiscal devaluation.

Benefit indexation seems to favour in particular the households of pensioners and those falling in the residual category with head's condition classified as "other", i.e. housekeepers or disabled persons. This is a consequence of the predominance of pensions in the Italian cash benefit system, while monetary transfers to younger households are of secondary importance. The households of unemployed persons lose from the indexation despite the fact that unemployment benefits are indexed to prices because in many households with head unemployed there are other members who are working, therefore making this type of household not very different from those with employed heads. These distributive patterns are common to all the three hypotheses of changes in the VAT rates.

Figure 5.2.18: Italy: change in disposable income with reduction in SSC and increase in standard VAT rate, by condition of the head, with and without indexation of benefits

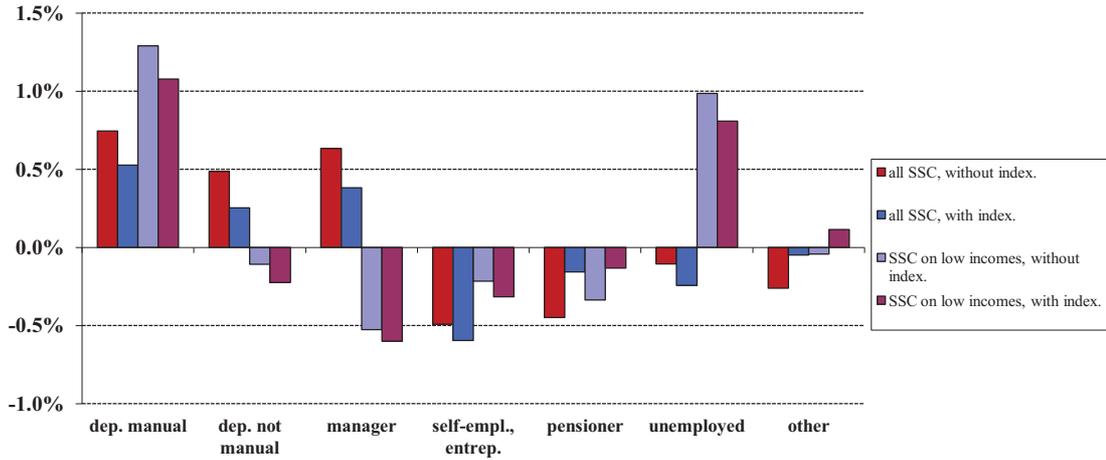


Figure 5.2.19: Italy: change in disposable income with reduction in SSC and increase in all VAT rates, by condition of the head, with and without indexation of benefits

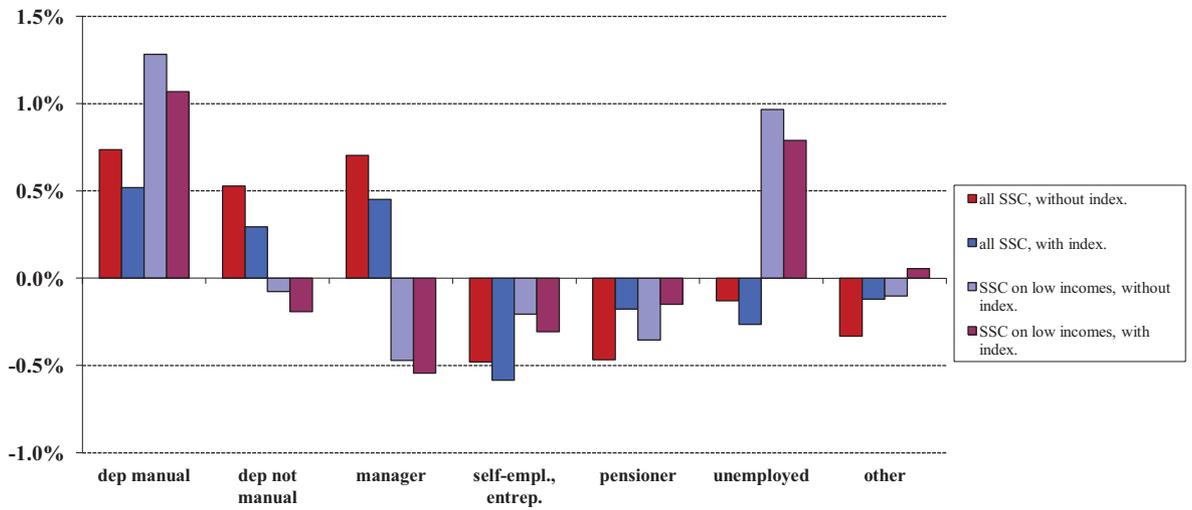
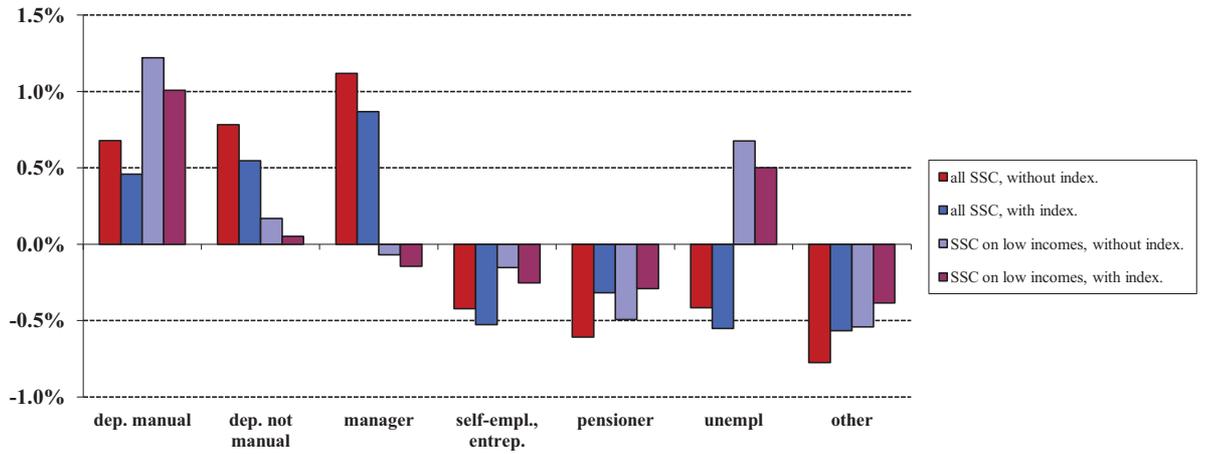


Figure 5.2.20: Italy: change in disposable income with reduction in SSC and uniform VAT rate, by condition of the head, with and without indexation of benefits



6 Simulations of unilateral fiscal devaluation in Spain

6.1 Macro simulations for Spain

As for the other countries, we simulate a reduction of the SSC financed by an increase in VAT, equivalent to 1% of ex ante GDP. The effects in the NiGEM model for Spain in Figure 6.1.1 are comparable to the effects for Italy. With an adjustment speed of nominal wages comparable to the Italian estimate, employment and unemployment already stabilize after 4 years. However, the real labour cost adjusts more smoothly than in Italy. Real GDP and consumption respond similarly as in Italy. The larger price elasticity of export (1.2) and the slower recovery of production costs lead to a larger and longer improvement of the trade balance, but this cannot avoid a deterioration at the end.⁶²

The IHS model finds the largest effects (in absolute value) on labour market outcomes and GDP for Spain in the long run (Figure 6.1.2). The main reason is that the tax reform in Spain enables the largest decrease in the wedge (by 0.9%), which is approximated by the sum of the reduction of the SSC rate and the raise in the VAT rate.⁶³ In addition, the SSC system in Spain is flat, as in Italy, while it is very progressive in France. Since the SSC reduction is spread more equally over all workers, labour supply in persons expands more in Spain. In contrast to Italy, the fraction of high-skilled workers in Spain (30%) and France (28%) is comparable, which implies that skill composition effects hardly alter the increase in productivity-corrected labour supply. As a result, GDP in Spain increases more than in France.

Sensitivity

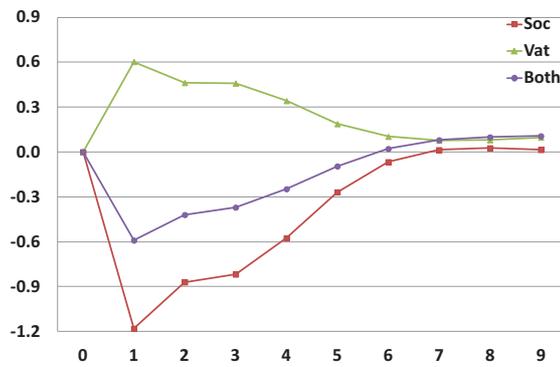
Table 6.1.1 shows that the sensitivity of the results is qualitatively similar as discussed for France and Italy. In particular, the indexation option in the IHS model depresses employment and GDP slightly relative to the basecase due to the low replacement rates of social transfers. GDP is rather sensitive to targeting the SSC reduction to low-skilled workers in view of their large population share (48%).

⁶² The Spanish reform has a small effect on the euro exchange rate: 0.06% in year 1 and 0.14% in year 9.

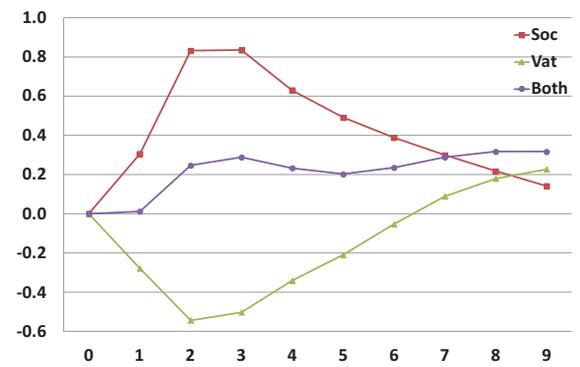
⁶³ The real wedge is defined as $1 - (1 - \tau)/(1 + t)$ where τ denotes the labour tax rate and t the consumption tax rate. This wedge is approximated by $\tau + t$. Its change is given by the sum of the change in the SSC rate and the change in the VAT rate, because the other tax rates are kept constant.

Figure 6.1.1: Fiscal devaluation in Spain – NiGEM

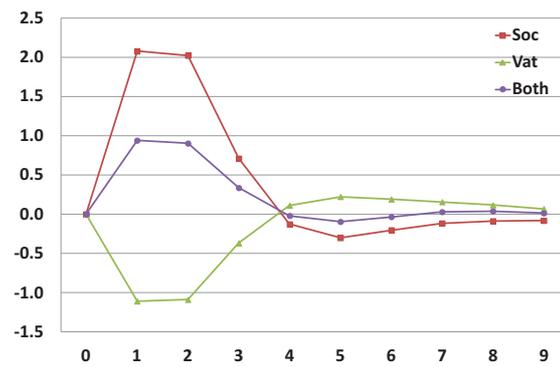
Real producer wage



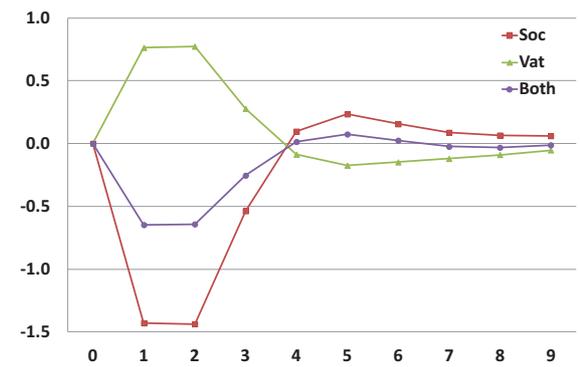
Real GDP



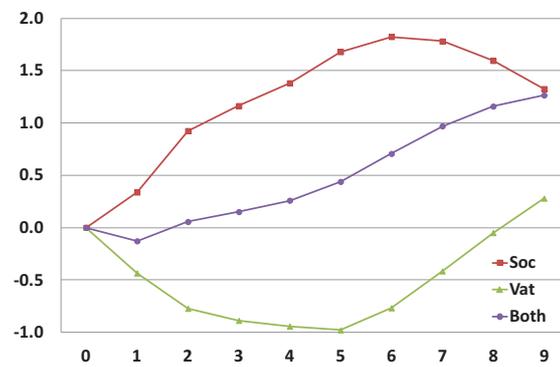
Employment



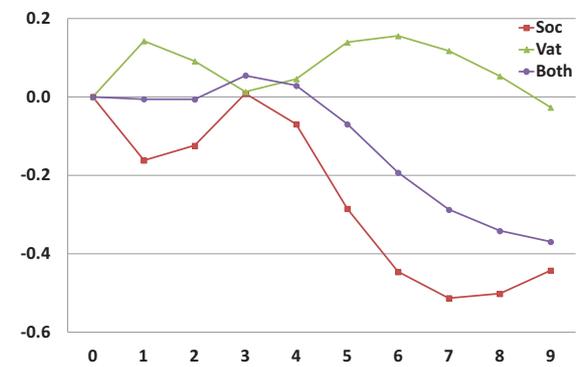
Unemployment rate



Consumption



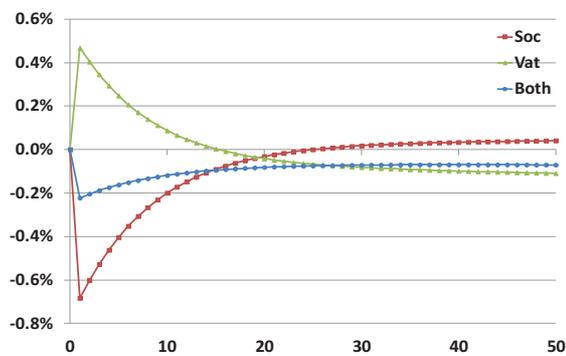
Trade balance (%GDP)



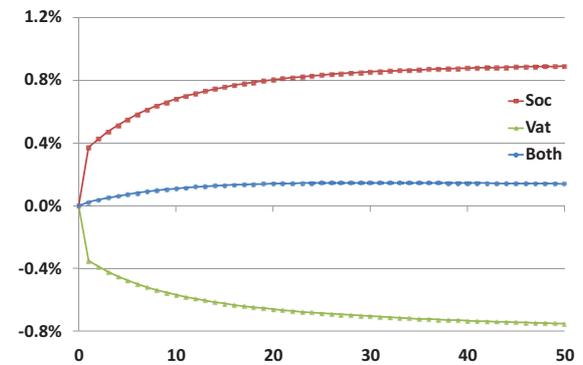
Note: horizontal axis: years; vertical axis: % difference from the baseline, % point difference for the unemployment rate and trade balance.

Figure 6.1.2: Fiscal devaluation in Spain – IHS

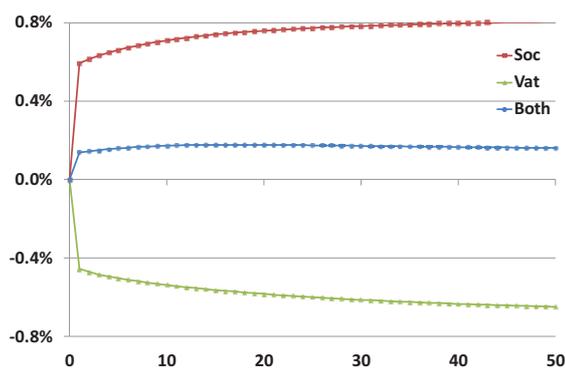
Real producer wage



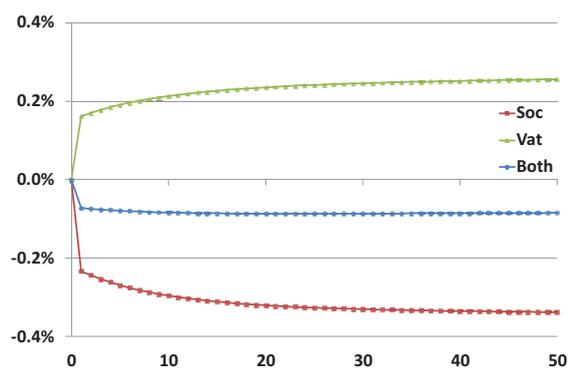
Real GDP



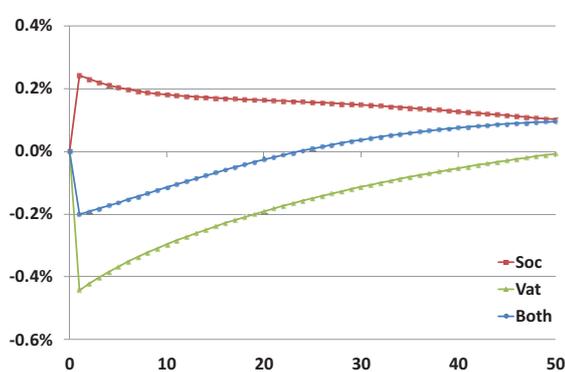
Employment



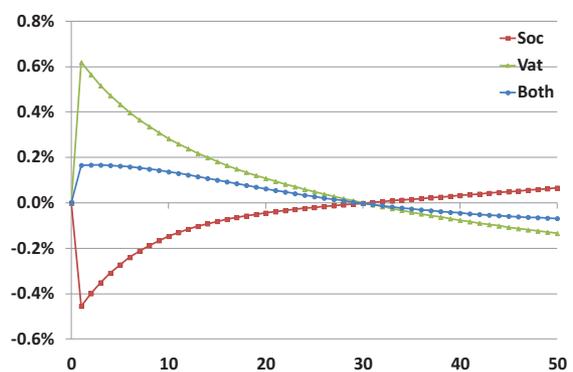
Unemployment rate



Consumption (%GDP)



Trade balance (%GDP)



Note: horizontal axis: years; vertical axis: % difference from the baseline for the first 3 figures, % point difference for the last three.

Table 6.1.1: Sensitivity analysis for Spain

	GDP		TB (%GDP)		
	<i>Iy</i>	<i>9y</i>	<i>Iy</i>	<i>9y</i>	
<i>NiGEM</i>					
Basecase	0.01%	0.32%	-0.01%	-0.37%	
Indexation	0.01%	0.30%	-0.00%	-0.34%	
Wage rigidity	0.00%	0.38%	0.00%	-0.36%	
Export elasticity	0.03%	0.30%	0.03%	-0.38%	
<i>IHS</i>	<i>SR</i>	<i>LR</i>	<i>SR</i>	<i>LR</i>	
Basecase	0.02%	0.12%	0.17%	-0.06%	
Indexation	0.01%	0.09%	0.16%	-0.04%	
Ex ante budget closure	0.00%	0.12%	0.29%	-0.06%	
Targeted SSC	0.20%	-0.47%	0.37%	-0.09%	

Summary

Table 6.1.2 provides an overview of the macro-results for Spain. The NiGEM results show that shifting from wage to consumption taxation is successful in reducing temporarily real labour costs, leading to a higher employment and GDP. The fall in the relative price of domestic goods leads to an initial increase in net exports. In later years, the stimulus to consumption is reflected by the deterioration of the trade balance. Among the four countries considered, the IHS model finds the largest long-run effects on the real producer wage, (un)employment and GDP in Spain. The expansion of consumption is small, mirrored by a small fall in net exports. Two main channels explain the long-run results. First, when social transfers are not adjusted for the higher VAT rate, workers will moderate their wage claims. Second, the unexpected VAT hike imposes an extra tax burden on existing generations who consume out of accumulated wealth, whereas future generations benefit from less distortive taxation. Sensitivity analysis gives similar results as discussed for the other countries.

Table 6.1.2: Summary of fiscal devaluation in Spain

	SR max.** (NiGEM)	LR (IHS)
Real producer wage	-0.59%	-0.08%
Real GDP	0.32%	0.12%
Employment	0.94%	0.15%
Unemployment rate*	-0.65%	-0.08%
Consumption (LR*)	1.27%	0.09%
Trade balance (%GDP)*	-0.37%	-0.06%

* % point difference; ** maximum effect (in absolute value) during first 9 years

6.2 Micro simulations for Spain

The microsimulation model used for the Spanish case has been developed by the Spanish Institute of Fiscal Studies (IEF, Instituto de Estudios Fiscales). We count on a simulator for indirect taxation which includes VAT and excise tax, and a tax benefit simulator (integrated in EUROMOD) which permits to simulate changes in personal income tax, social security contributions (SSC) and the whole system of transfers. Our first idea was to use EUROMOD, but finally we programmed the changes in SSC to use the latest data from the Survey of Living Conditions (not included in EUROMOD at the moment).

The VAT simulator uses the Household Budget Survey for 2009, and includes the information about households' consumption. The Survey of Living Conditions refers also to 2009 data and includes information about household income. Since there is not a common survey including income and consumption, it was necessary to match information of the households. We generated different clusters according to demographic characteristics of the household. The same groups were generated in the Survey of Living Conditions and in the Household Budget Survey. The number of clusters to be matched had to be adjusted considering these two conditions:

- A number of groups sufficiently high to insure variability
- A number of groups not so big to produce many empty groups in the original surveys for income or consumption.

The VAT rates for year 2011 are three: super reduced: 4%; reduced: 8%; ordinary: 18%. The proportion of revenue obtained from each rate is 4% from the super-reduced, 22% from the reduced, and 74% from the ordinary rate. The main goods taxed with non ordinary or zero rates are: food, household rental, public services, health, public transport, culture, education, restaurants and hotels.

Social security contributions for dependent workers are shared between employers and employees. They include contributions to health, retirement, and accident insurance (common rate) and unemployment (different rate). The rates are common while the bases depend on the category and occupation of the employee. There are minimum and maximum bases for different occupations and categories of workers. The following table summarizes the rates valid in 2012 as applied in the simulations.

Table 6.2.1: Overview of SSC rates in Spain.

	Employer	Employee	Total
Health, retirement, and injuries	23,60%	4,70%	28,30%
Unemployment	5,50%	1,55%	7,05%
Total	29,10%	6,25%	35,35%

The unemployment rates also depend on the kind of contract (full time or part time). Different rates apply for self-employed (distinguishing farmers and others), domestic workers and retirees. There are also bonuses (on the bases but not on the rates) for workers depending on their age (for workers aged 60 and more).

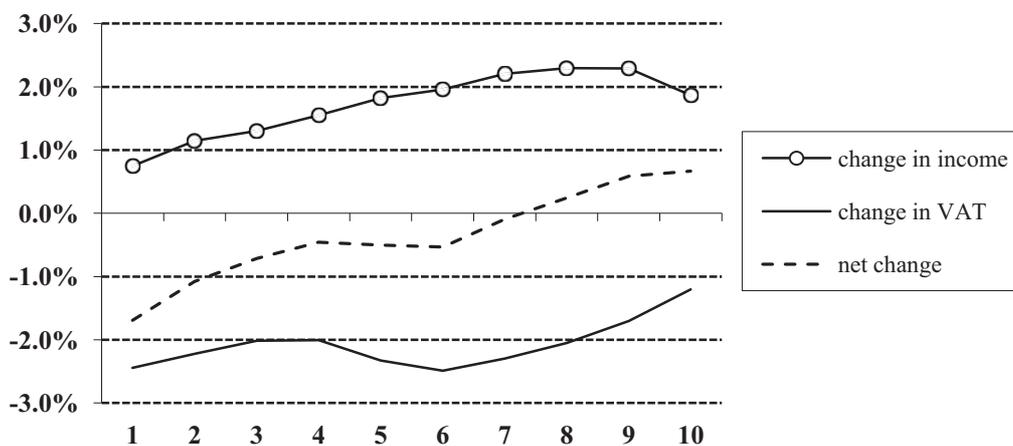
The rates used for uprating the nominal values of variables expressed in monetary terms (incomes and expenditures) have been obtained from the Spanish National Institute of Statistics. The factor for uprating (between 2009 and 2011) income is 5.3%, and for uprating consumption is 6.3%.

The simulations for Spain have been conducted following a route which is partly different from that followed in the other cases, but substantially similar and with results that are comparable: instead of setting a given % change in SSC rates taken from the macro models, the simulations have started considering a VAT increase providing 1% of GDP, and then looking for the corresponding reduction of employer SSC that guarantees ex post budget balance. The baseline values of the Gini index are 0.2592 for the distribution of equivalent disposable income and 0.2075 for equivalent expenditure.

1 Increase only in the standard VAT rate

An increase in revenues from the standard VAT equal to 1% of GDP means a total amount of 10.700 millions of €. The final standard rate in VAT should be increased to the rate of 22.5%. To be neutral in revenue, we should decrease the employer rate of SSC. As we do not have information about the *rates*, but the total contribution of the employer, we calculate the percentage reduction allowed by the increase in VAT. This means a reduction of 13.2% when we consider the whole population, and a reduction of 45.5% in SSC when only the low earners rates are reduced. The change in income following the reduction in all SSC rates favours the richest deciles, while the increase in VAT is more or less proportional, with the exception of the top 10%. As a result, the reform is regressive (Figure 6.2.1), producing gains only for the richest 30%. The pattern of the changes in disposable income is very similar to that found in the French case, even if here the lower deciles lose more. The Gini index of income rises to 0.2649, i.e. by 2.2%.

Figure 6.2.1: Change in disposable income and VAT (as a percent of disposable income) after the FD in Spain – decrease in all SSC rates



If, however, only SSC rates for low-paid employees are cut, the reform turns out to be slightly progressive despite the clear regressivity of the VAT change (Figure 6.2.2). The Gini index falls by -0.46% to 0.258. Figure 6.2.3 summarizes these findings and shows how variable are the distributional results depending on the different alternatives on the reduction of SSC. Figure 6.2.4 describes the distributive effect of FD in terms of changes in “net” expenditure by deciles of equivalent household expenditure. It shows that the reform would be regressive, with a curve very similar to the French one, if the reduction in SSC rates would be universal (Gini up from 0.19677 to 0.1987), while it will have a more differentiated effect with a reduction only in SSC rates for low-income households: it would be progressive from the fourth decile onwards, regressive for the poorest section of the distribution. The net effect on the Gini index signals a regressive impact: the Gini rises from 0.19677 to 0.19873.

Figure 6.2.2: Change in disposable income and VAT (as a percent of disposable income) after the FD in Spain – decrease in SSC rates for low-paid workers

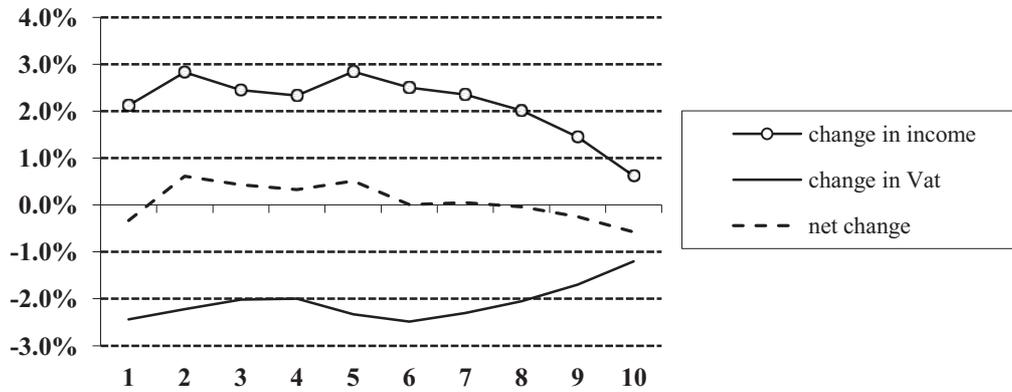


Figure 6.2.3: Change in disposable income after FD in Spain by deciles of equivalent disposable income

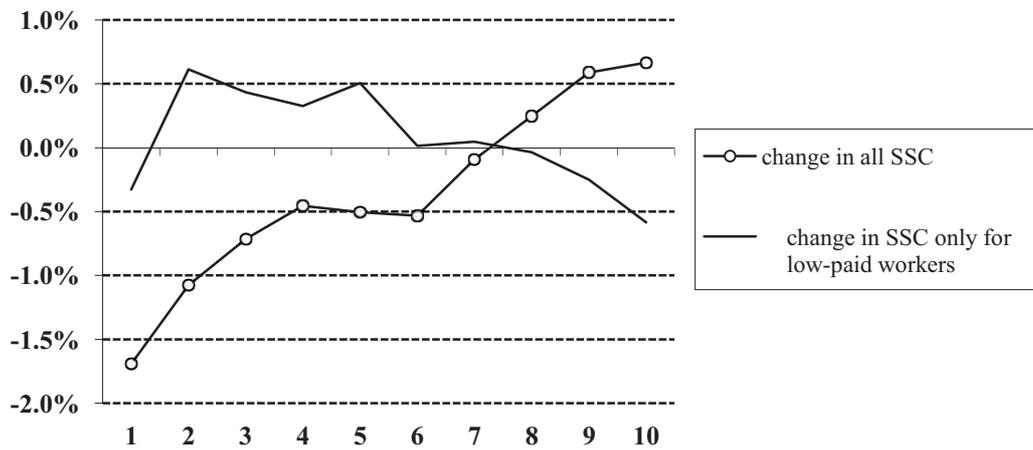
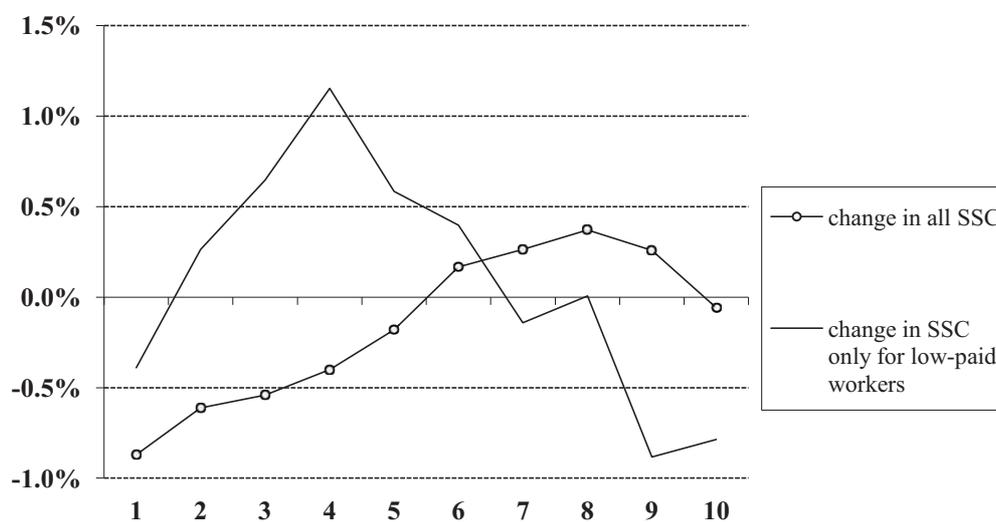


Figure 6.2.4: Change in disposable expenditure after FD in Spain by deciles of equivalent disposable expenditure



As in other countries, this reform would worsen the conditions of the elderly and their households (Figure 6.2.5), while improving those of employees as manual workers and, with a general reduction in SSC, also of the other employees (Figure 6.2.6). As in the Italian case, households of the unemployed gain with a fiscal devaluation because some low earners live in households with heads who are unemployed, particularly in South European countries where children typically leave late the parents' house.

Figure 6.2.5: Change in disposable income after FD in Spain by family type

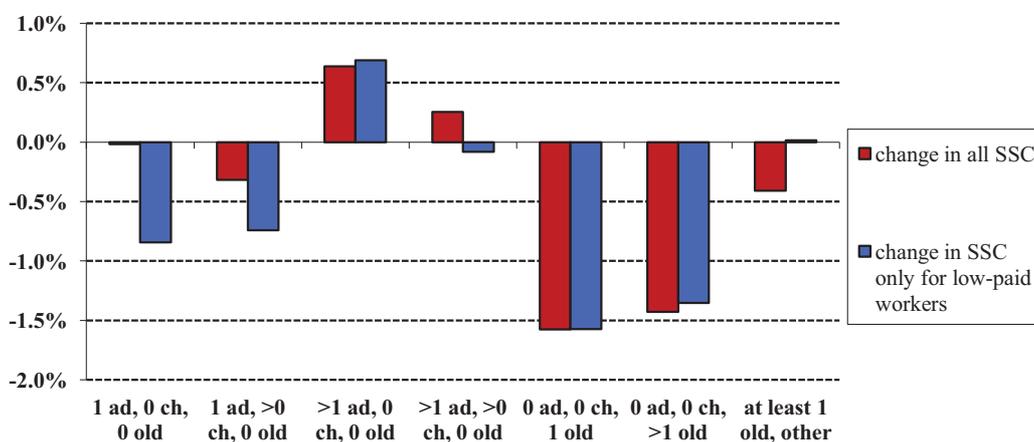
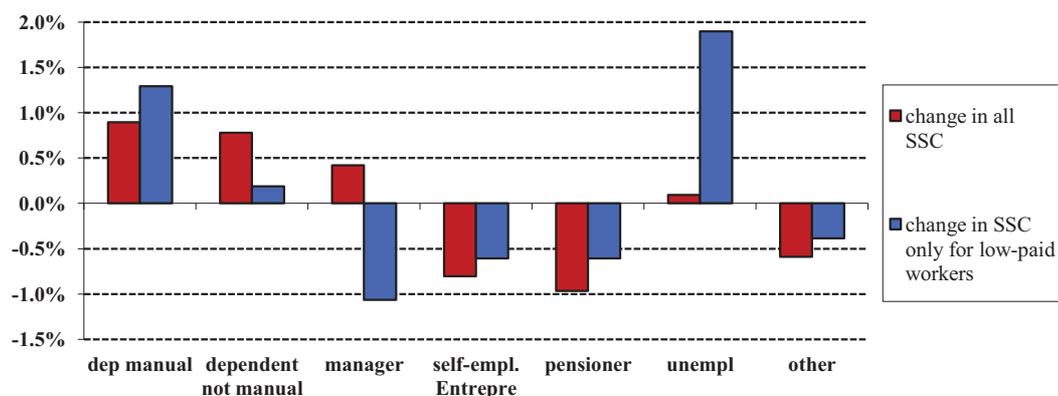


Figure 6.2.6: Change in disposable income after FD in Spain by condition of the household head



2 Proportional increase in all VAT rates

An increase in all the rates according to the revenue shares but generating the same increase of 10.700 millions of € should raise the rates to the levels: 5%, 9% and 21%. The changes in SSC are the same we presented in Reform 1. Figure 6.2.7 is very similar to Figure 6.2.3, so there is no need to repeat the analysis and to comment the relative graphs. Also the effects on the distribution of equivalent expenditure are very close to those already illustrated in Figure 6.2.4.

Figure 6.2.7: Change in disposable income after FD in Spain by deciles of equivalent disposable income

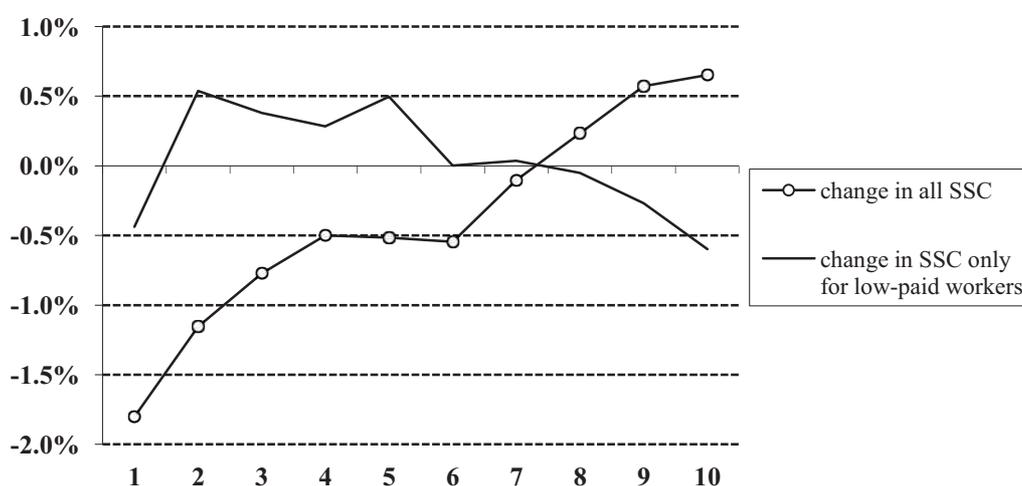


Figure 6.2.8: Change in disposable expenditure after FD in Spain by deciles of equivalent disposable expenditure

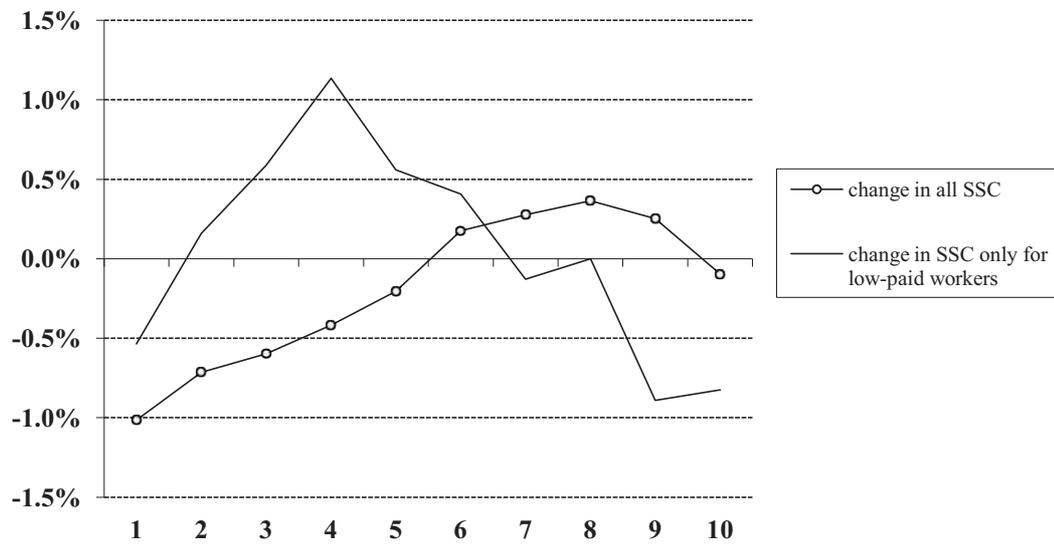


Figure 6.2.9: Change in disposable income after FD in Spain by family type

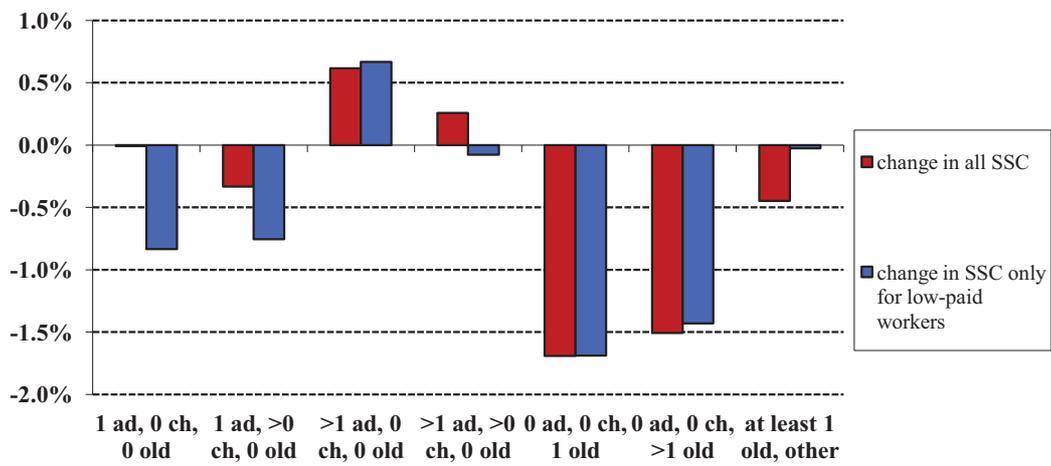
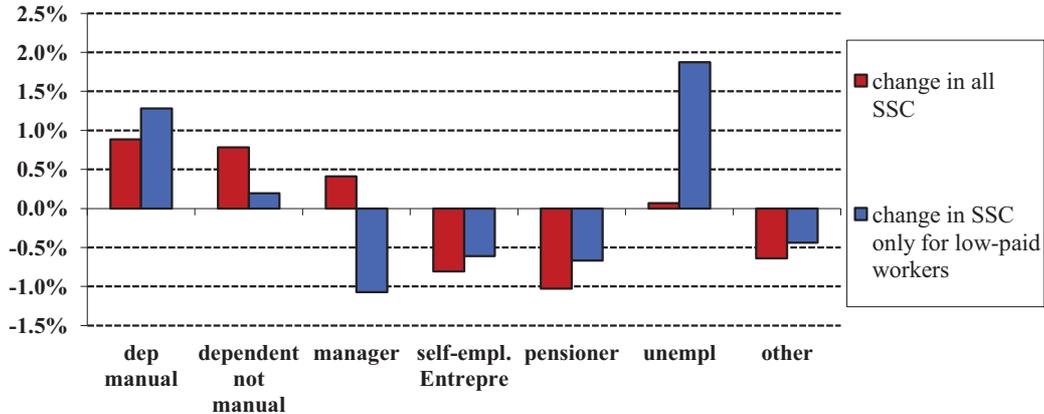


Figure 6.2.10: Change in disposable income after FD in Spain by condition of the household head



3 Uniform VAT rate

The adoption of a uniform rate worsens the distributive effects of the fiscal devaluation. The Gini index, for the case of a universal reduction in SSC rates, increases by 2.76% to 0.2664. Now the reform appears to be regressive even in the case of a targeted reduction in SSC rates, even if now the Gini index barely moves, to 0.2595 (+0.11%). The negative effect for the poor of the income distribution is greater than in the French and Austrian cases, and of course also than in the Italian case, which shows the lowest burden on the first decile. A targeted change of SSC on low earners only is not enough to guarantee a significantly progressive impact of the reform, but it still benefits much more the households with children and with manual workers than the households of pensioners (Figure 6.2.14). Inequality increases according to the Gini index also if we consider the distribution of equivalent expenditure.

Figure 6.2.11: Change in disposable income after FD in Spain by deciles of equivalent disposable income

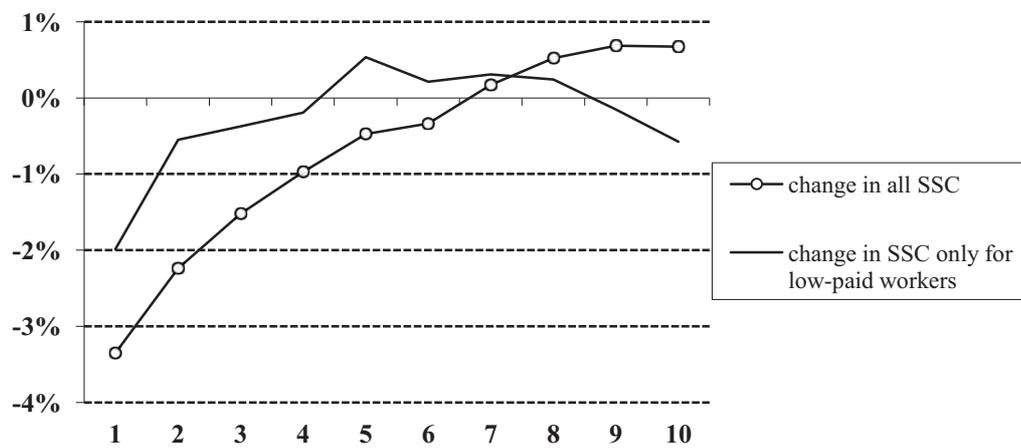


Figure 6.2.12: Change in disposable expenditure after FD in Spain by deciles of equivalent disposable expenditure

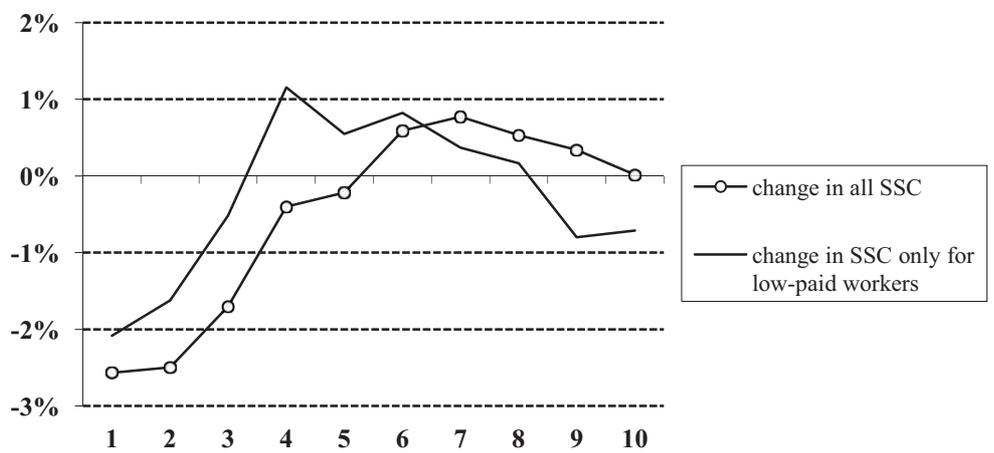


Figure 6.2.13: Change in disposable income after FD by in Spain by family type

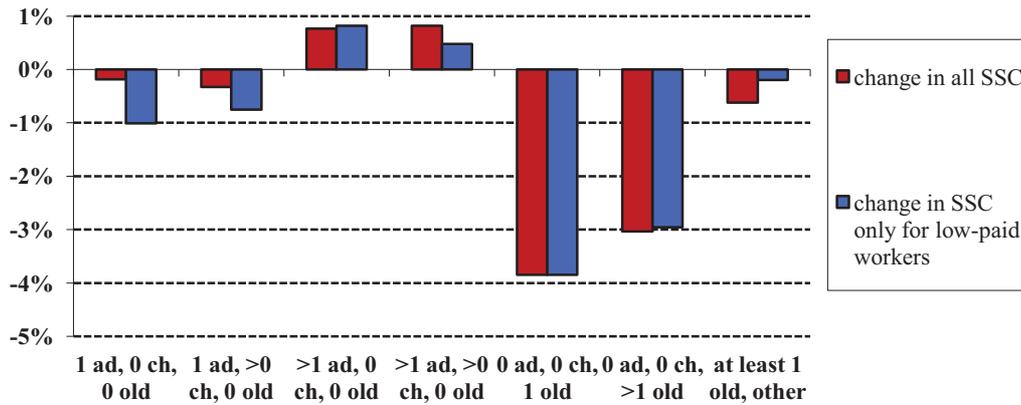
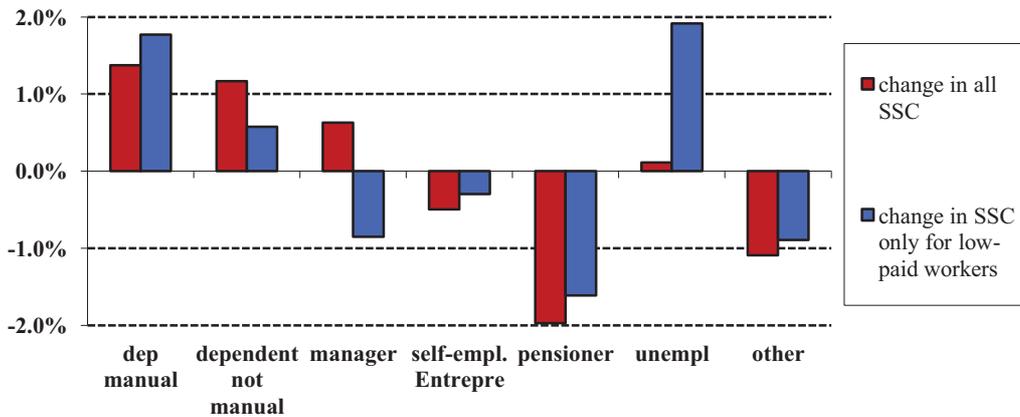


Figure 6.2.14: Change in disposable income after FD in Spain by condition of the household head



Indexation of benefits in Spain

In Spain the “proportional tax” that must be imposed so as to keep the public budget close after the indexation of cash transfers (which are increased in the various cases by percentages around 2%-2.1%) is on average 0.4% of disposable household income. The impact of the indexation of benefits is more significant than in Italy: even if the distributive effects of the fiscal devaluation are similar to those of the no-indexation scenario, the positive impact of the indexation is now clearly apparent for the lowest deciles.

Figure 6.2.15: Spain: change in disposable income with reduction in SSC and increase in standard VAT rate, by deciles of equivalent disposable income, with and without indexation of benefits

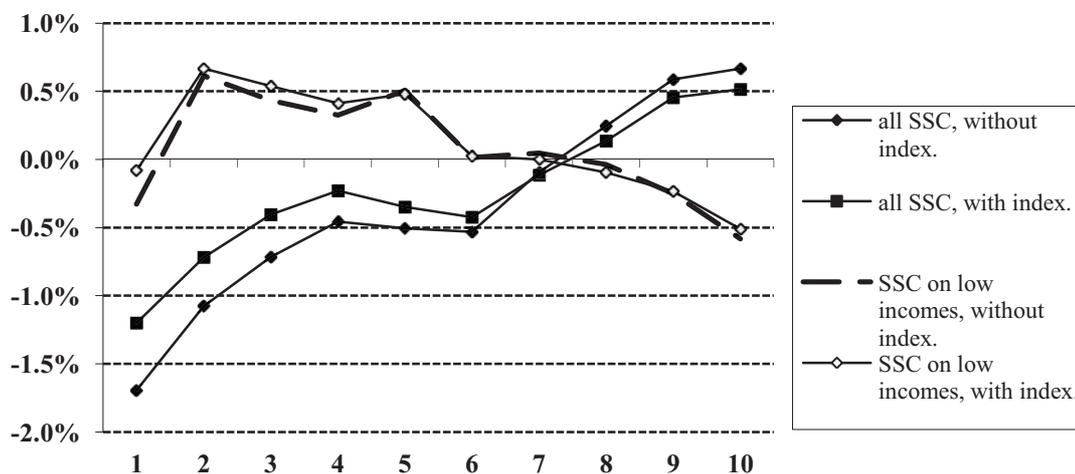


Figure 6.2.16: Spain: change in disposable income with reduction in SSC and increase in all VAT rates, by deciles of equivalent disposable income, with and without indexation of benefits

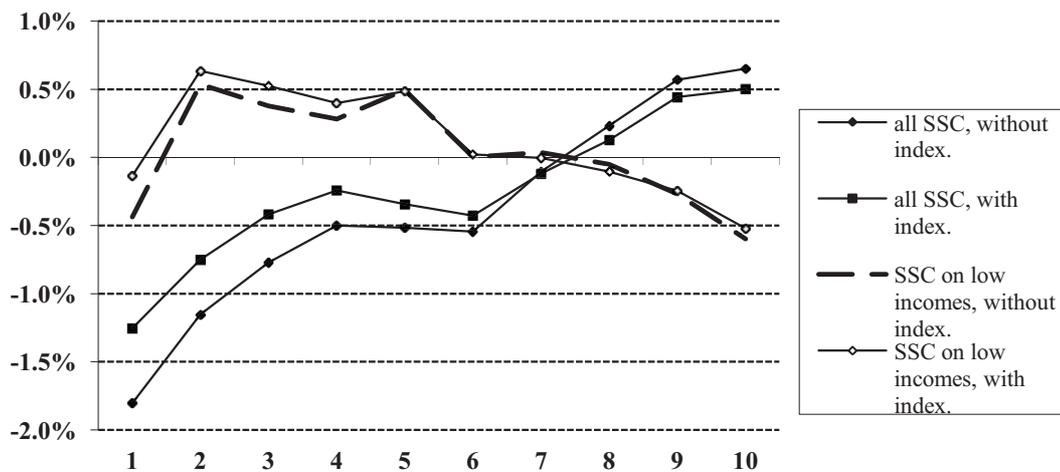
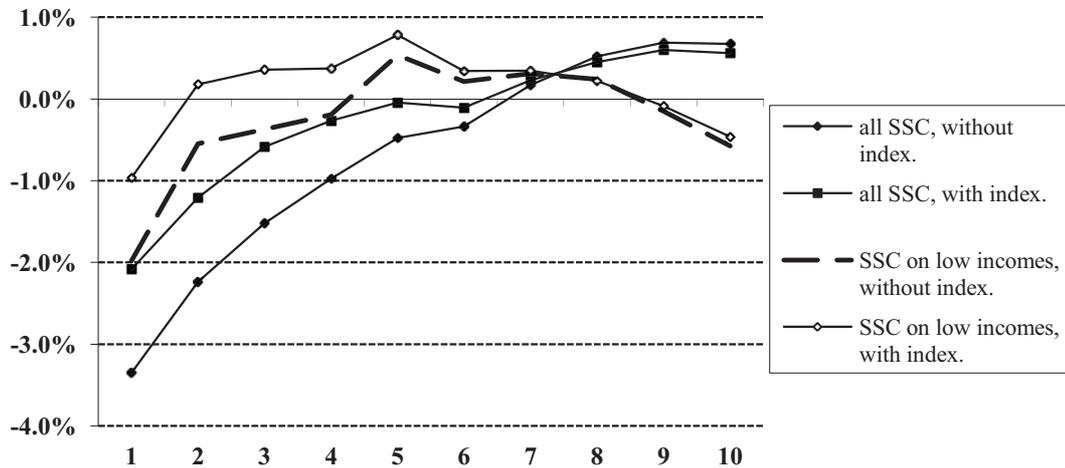


Figure 6.2.17: Spain: change in disposable income with reduction in SSC and uniform VAT rate, by deciles of equivalent disposable income, with and without indexation of benefits



As in the other countries, Spain confirms that the indexation of benefits is never sufficient for changing the distributive signs of the various cases of FD simulated in this work. This indexation always mitigates the regressive impact of FD, when it is already regressive, and produces a more significant reduction of the Gini index from the no-FD baseline case when the FD is progressive. In all cases, however, the changes in the Gini index with indexation are very close to the change in the Gini without it, so the distributive results of FD are confirmed.

Table 6.2.2: Spain: percentage variation in the Gini index of equivalent disposable income after the FD, with and without indexation of cash benefits

	Without benefit indexation	With benefit indexation
1 Increase in ordinary VAT rate		
1.1 change in all SSC rates	+2.20%	+1.89%
1.2 change in SSC rates on low incomes	-0.46%	-0.76%
2 Increase in all VAT rates		
2.1 change in all SSC rates	+2.26%	+1.92%
2.2 change in SSC rates on low incomes	-0.39%	-0.72%
3 Uniform VAT rate		
3.1 change in all SSC rates	+2.76%	+2.04%
3.2 change in SSC rates on low incomes	+0.11%	-0.60%

Note: the numbers in the table refer to the percentage change of the Gini index with respect to the baseline case of the distribution of disposable income before the Fiscal devaluation.

As in Italy and France, in Spain the indexation of benefits reduces the average loss particularly for the households of pensioners and, still as Italy, it has not a great effect for the unemployed. The pensioners remain, however, among the net losers from the FD, as in the other countries considered in this work.

Figure 6.2.18: Spain: change in disposable income with reduction in SSC and increase in standard VAT rate, by condition of the head, with and without indexation of benefits

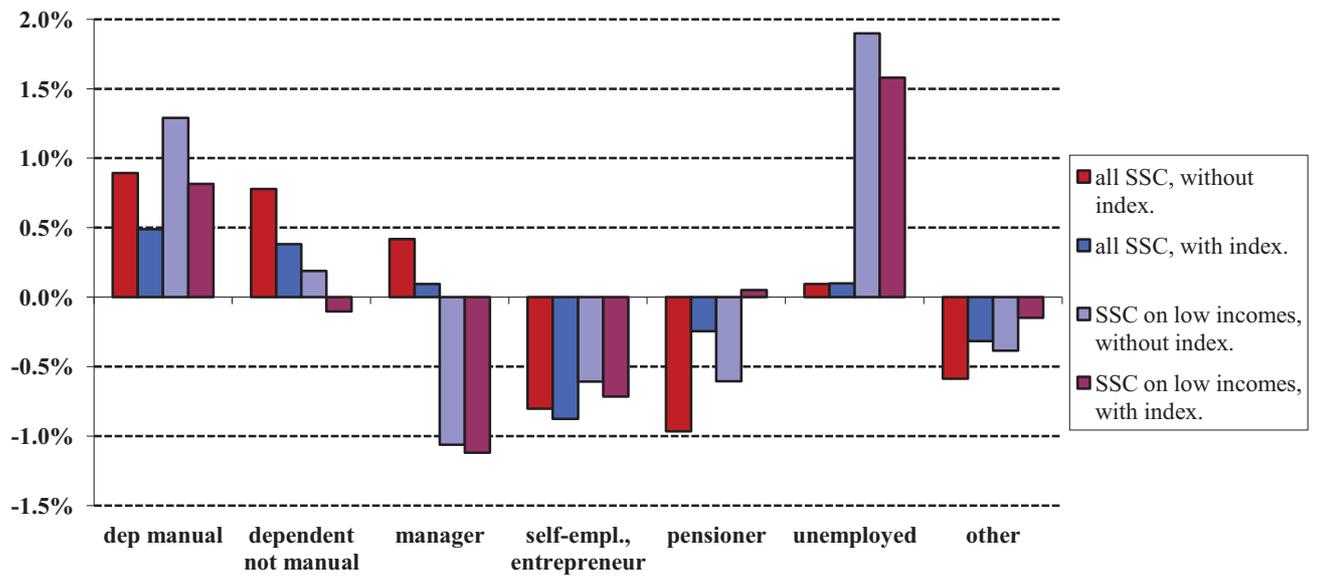


Figure 6.2.19: Spain: change in disposable income with reduction in SSC and increase in all VAT rates, by condition of the head, with and without indexation of benefits

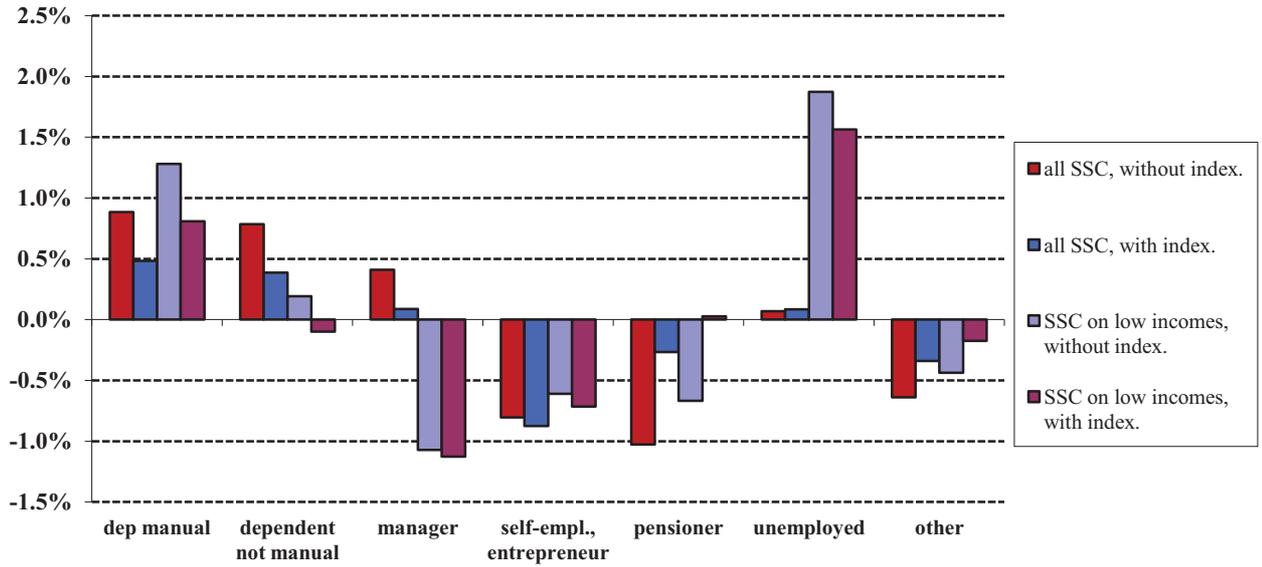
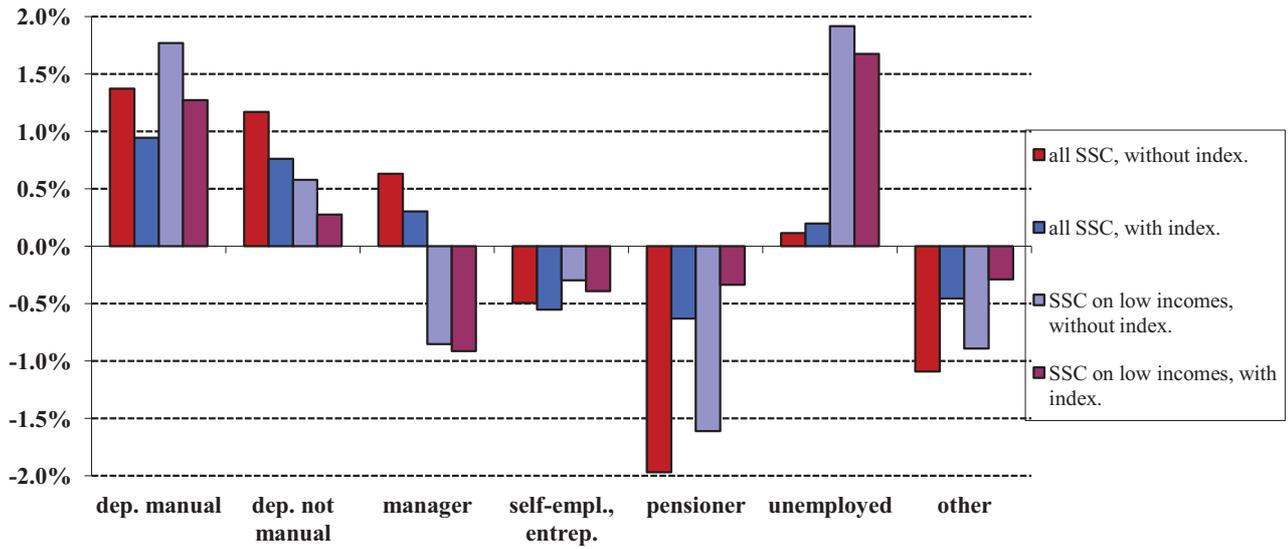


Figure 6.2.20: Spain: change in disposable income with reduction in SSC and uniform VAT rate, by condition of the head, with and without indexation of benefits



7 Simulations of unilateral fiscal devaluation in Austria

7.1 Macro simulations for Austria

We also consider for Austria a budget-neutral tax mix of a SSC reduction and a VAT hike (equivalent to 1% of ex ante GDP). The NiGEM model specifies the least rigid nominal wages in Austria, with a half-life adjustment of only 1.7 years. As a consequence, the real producer wage already returns to its base level in the second year, while fluctuations in employment and unemployment get smaller starting in the third year (see Figure 7.1.1). The isolated VAT-reform is already expansionary after seven years, which contributes to the expansion of GDP under the mixed reform. Following the expansion of the economy, consumption in Austria increases the most of the four countries. With the smallest price elasticity of export demand and the largest expansion of consumption, the trade balance ends in the most unfavourable position relative to the other countries.

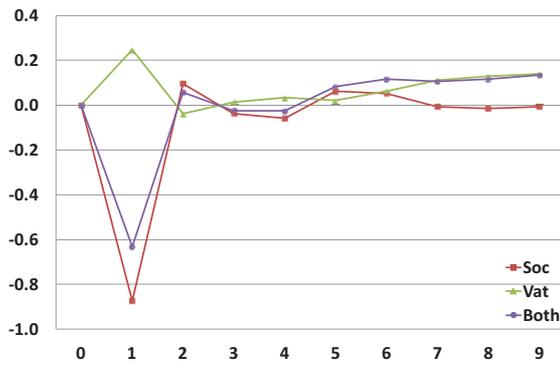
The IHS model finds adjustment paths and long-run outcomes that are similar as discussed for the other countries (Figure 7.1.2). Among the countries considered, fiscal devaluation in Austria has the smallest effects on long-run employment and GDP. The (small) differences with France can again be attributed to differences in tax and benefit systems. The firms' SSC contribution is regressive in Austria, while it is progressive in France. As a consequence, more labour is supplied mainly by low-skilled workers in Austria, implying that productivity-corrected aggregate labour supply and hence output increases less than in France. These skill composition effects are mitigated by more progressive labour taxes in Austria. The tax rate increases stronger in labour income, which dampens the incentive effects of higher wages. The smaller increase in GDP contributes to the larger increase in consumption, as a fraction of GDP. The expansion of consumption is almost identical in Austria and France (0.30% and 0.29%). The growth in long-run consumption is reflected by the fall in net exports (both in terms of GDP).

Sensitivity

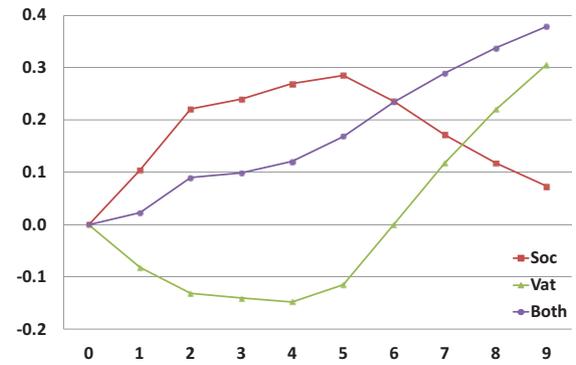
The sensitivity analysis is summarized in Table 7.1.1. In view of the very low price elasticity of exports in the NiGEM model, even doubling its value has hardly an effect on any of the variables. Long-run GDP in the IHS model is less sensitive to price indexation of social transfers since social security is less generous in Austria than in France. Despite the small population fraction of low-skilled workers (18%), targeting the reduction of the SSC rate is still detrimental to steady-state GDP. The trade balance ratio in the long run is almost the same in all IHS scenarios.

Figure 7.1.1: Fiscal devaluation in Austria – NiGEM

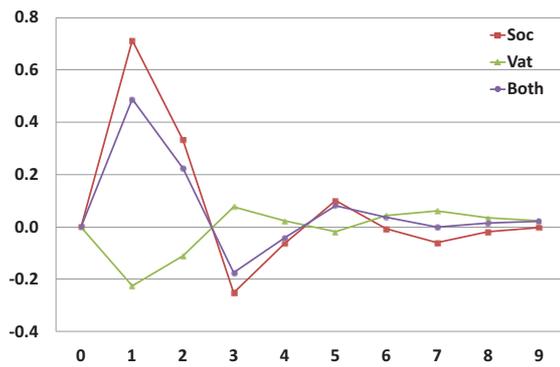
Real producer wage



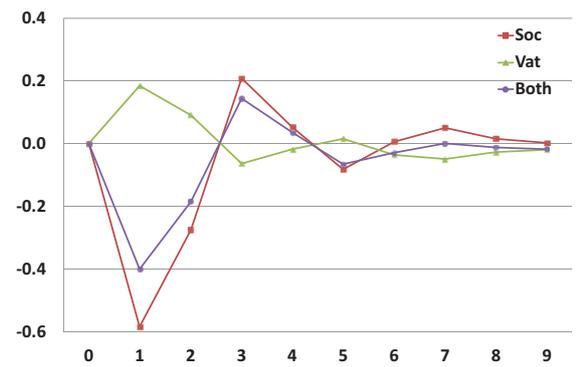
Real GDP



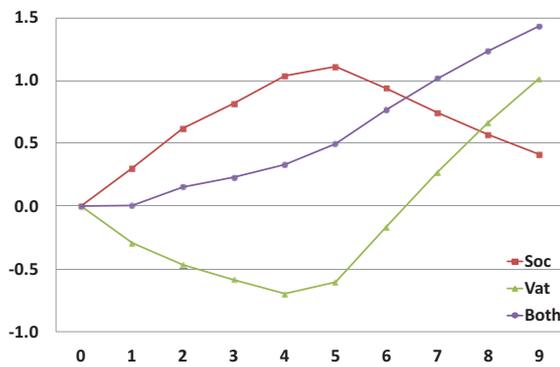
Employment



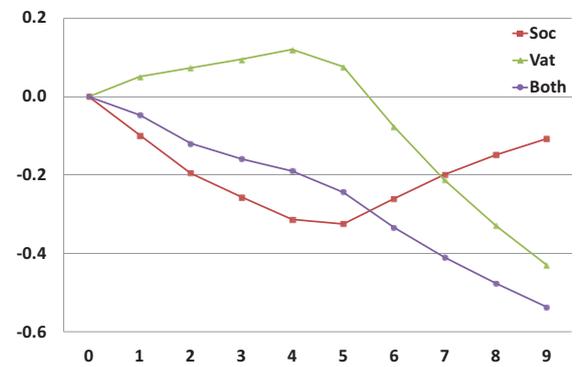
Unemployment rate



Consumption



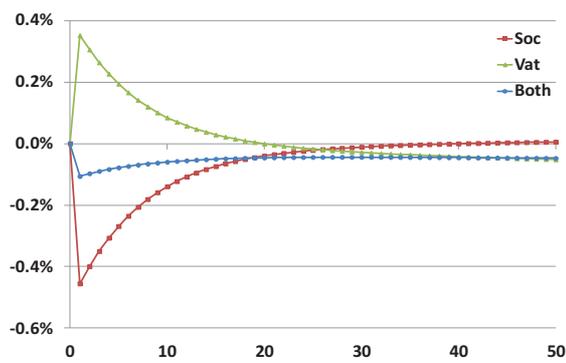
Trade balance (%GDP)



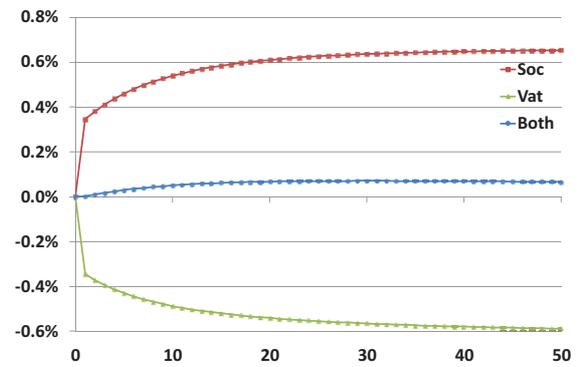
Note: horizontal axis: years; vertical axis: % difference from the baseline, % point difference for the unemployment rate and trade balance.

Figure 7.1.2: Fiscal devaluation in Austria – IHS

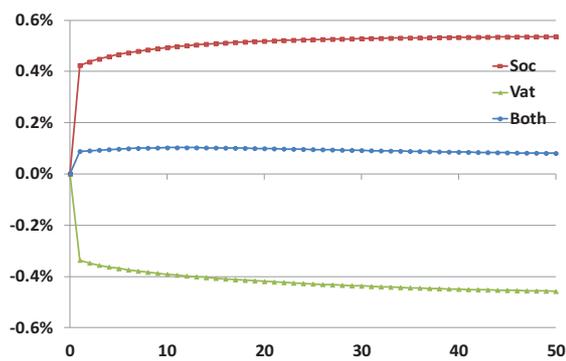
Real producer wage



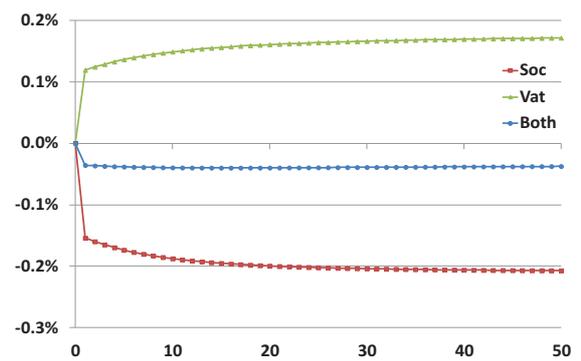
Real GDP



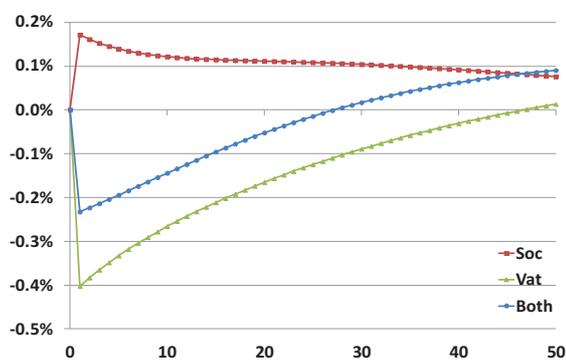
Employment



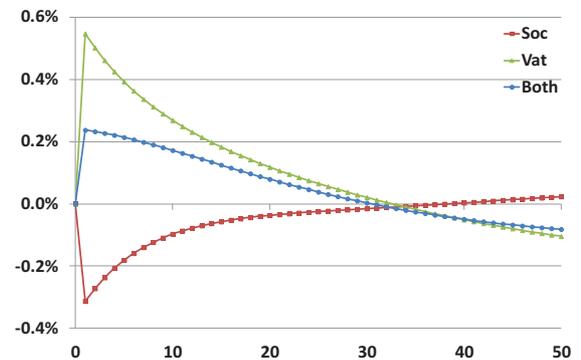
Unemployment rate



Consumption (%GDP)



Trade balance (%GDP)



Note: horizontal axis: years; vertical axis: % difference from the baseline for the first 3 figures, % point difference for the last three.

Table 7.1.1: Sensitivity analysis for Austria

	GDP		TB (%GDP)	
	<i>Iy</i>	<i>9y</i>	<i>Iy</i>	<i>9y</i>
<i>NiGEM</i>				
Basecase	0.02%	0.38%	-0.05%	-0.54%
Indexation	0.04%	0.45%	-0.07%	-0.65%
Wage rigidity	0.00%	0.41%	-0.02%	-0.84%
Export elasticity	0.02%	0.38%	-0.05%	-0.54%
<i>IHS</i>	<i>SR</i>	<i>LR</i>	<i>SR</i>	<i>LR</i>
Basecase	0.00%	0.06%	0.24%	-0.12%
Indexation	-0.01%	0.04%	0.26%	-0.13%
Ex ante budget closure	-0.03%	0.06%	0.41%	-0.12%
Targeted SSC	0.20%	-0.30%	0.42%	-0.11%

Summary

The short-run and long-run outcomes for the main aggregates are finally presented in Table 7.1.2. Compared to the NiGEM outcomes of the other countries, the real labour cost returns the fastest to its initial level, leading to only a short increase of employment. Following the expansion of GDP, the increase in consumption and the decrease in net exports are the largest in Austria. The IHS model finds the smallest long-run increases of employment and GDP but the largest increases of consumption and the trade balance. The decline of the real transfers and the redistribution in favour of future generations again drive these results. The sensitivity analysis yields a similar pattern as discussed for the other countries.

Table 7.1.2: Summary of fiscal devaluation in Austria

	SR max. ** (NiGEM)	LR (IHS)
Real producer wage	-0.63%	-0.06%
Real GDP	0.38%	0.06%
Employment	0.49%	0.07%
Unemployment rate*	-0.40%	-0.04%
Consumption (LR*)	1.43%	0.12%
Trade balance (%GDP)*	-0.54%	-0.12%

* % point difference; ** maximum effect (in absolute value) during first 9 years

7.2 Micro simulations for Austria

For Austria, the distributive impact of FD has been computed using ITABENA, a tax-benefit-microsimulation model for Austria that has been developed by IHS in 2005. It has, since then, been constantly maintained and updated, and served as basis for a wide range of policy evaluations. It entails the Austrian tax-benefit system and primarily calculates disposable income of Austrian individuals and households. The model is based on a representative micro-data set, the Austrian version of the EU-SILC 2004-2010 (EU-Community Statistics on Income and Living Conditions). The annual survey SILC contains detailed information on individual and household characteristics as well as detailed information on gross incomes out of various sources. The wave of 2010 – used within this project – contains information on 6,186 households (14,079 individuals).

The information is used to calculate, step by step, the elements of the Austrian tax-benefit system, considering income taxes, social security contributions, family allowances, parental leave benefits, social assistance and so forth. ITABENA accounts for every tax or benefit which is relevant for the composition of the disposable income from a household or an individual perspective. When disposable income is calculated, a detailed representation of given household's income components can be delivered. Moreover, the model allows for the calculation of counterfactual taxes and benefits, thus making it possible to change elements of the system in order to evaluate ex-ante the distributional effects of a given reform proposal. These effects can be analysed for different groups, e.g. by income deciles, household composition, age, gender or any other socio-economic characteristic.

In order to account for indirect taxes a consumption module has been added in the current project. The EU-SILC does not contain the consumption data required for this module. We therefore link the wave of 2010 to the Austrian Household Budget Survey 2009/10 (HBS), that contains detailed expenditure data on the household level as well as socio-economic information on 6,534 households. The Austrian household budget survey is conducted every five years. We have used the last version (2009/10).

We match a similar record from the budget dataset to each record from the SILC using grade-correspondence within pre-defined clusters. We cluster according to the criteria of the age group of the household head (above or below 65 years of age), whether the household is a couple household, whether there are children in the household, and according to equivalent-income decile, to make sure that the estimates of the ITABENA model mirror the aggregate expenditure behaviour of Austrian households. To further improve the quality of the match, we also cluster according to the educational attainment of the household head.

In the current project the matched dataset of EU-SILC 2010 and HBS 2009/10 was updated to 2012 in the following way:

- Wage incomes were updated by the increase of wage incomes from 2009⁶⁴ to 2012 (7.3%).
- Expenditures were updated by the increase in private consumption from 2009 to 2012 (11.1%).
- All other monetary variables were increased by the nominal increase of GDP from 2009 to 2012 (12.7%).

All uprating values are according to the IHS Economic Forecast 2012 to 2013.⁶⁵

The tax-benefit rules applied are the ones valid in 2012. Private expenditure in our dataset reaches € 126,336m in 2009 values⁶⁶, in the system of national accounts it is € 145,678m⁶⁷. Our model results in revenues out of VAT of € 14,047m in 2009 values; according to the system of national accounts revenues out of VAT equalled € 22,158m⁶⁸.

In Austria there are three different rates of VAT plus the 0% rate:

- 20% (standard rate)
- 12% (special rate)
- 10% (reduced rate)

The special rate of 12% is applicable for farm gate sale of wine, what could not be distinguished in our data. The reduced rate of 10% applies (coarsely) on food, rent, pharmaceuticals, transport and books. The only real 0% VAT rate that could be distinguished in our data (and in reform type 3 be abolished) is on travelling abroad. VAT exemptions where the seller cannot subtract the VAT paid on inputs are for example bank and insurance services, medical and social services, education, postal services. One big share of the 0%-VAT-net-expenditures shown below is due to imputed rents (€ 11,162m).

According to our model the net expenditures and equivalent revenues out of VAT for every rate are the following in 2009 values:

- 20%: € 53,413m → VAT of € 10,683m
- 12%: could not be distinguished
- 10%: € 33,642m → VAT of € 3,364m
- 0%: € 25,234m

⁶⁴ The income data in EU-SILC 2010 is from the year 2009.

⁶⁵ <http://www.ihs.ac.at/publications/lib/prognose290312.pdf> [12-05-25]

⁶⁶ no uprate here

⁶⁷ http://www.statistik.at/web_de/statistiken/volkswirtschaftliche_gesamtrechnungen/index.html [12-05-25]

⁶⁸ http://www.statistik.at/web_de/statistiken/oeffentliche_finanzen_und_steuern/oeffentliche_finanzen/steuereinnahmen/index.html [12-05-25]

Social security contributions for dependent workers are shared between employers and employees. They include contributions to health, retirement, unemployment and accident insurance as well as contributions to housing, family and insolvency funds. The rates depend on the status of the employee (blue- or white-collar worker, civil servants). The following table summarizes the rates valid in 2012 as applied in the simulations.

Table 7.2.1: SSC rates in Austria in 2012

	employer			employee		
	blue collar	white collar	civil servants	blue collar	white collar	civil servants
health	3.70%	3.83%	3.55%	3.95%	3.82%	4.10%
retirement	12.55%	12.55%	0.00%	10.25%	10.25%	12.55%
unemployment	3.00%	3.00%	-	3.00%	3.00%	-
accident	1.40%	1.40%	0.47%	0.00%	0.00%	0.00%
housing fund	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
family fund	4.50%	4.50%	0.00%	0.00%	0.00%	0.00%
insolvency fund	0.55%	0.55%	-	0.00%	0.00%	-
total	26.20%	26.33%	4.52%	17.70%	17.57%	17.15%

Contributions are paid on an income higher than € 5.236⁶⁹ and lower than € 58.800⁷⁰. The employees' contribution rate to retirement insurance for civil servants is continuously adjusted to the rates of private sector employees (transition rules for different cohorts). Unemployment contribution rates paid by employees depend on the income: Below monthly €°1.186 the rate is 0°% (with full insurance), up to €°1.294 1°%, up to €°1.456 2°% and above this threshold 3°%.

Different rates apply for self-employed (distinguishing farmers and others) and retirees. As there are no employers' contributions for these groups their rates have not been touched in the conducted simulations.

In the simulations with the SSC change for all wages all rates paid by employers were cut by 8.77°%. In the simulations for low incomes only the rates for the 18.12°% of employees with the lowest income (above the threshold relevant for social insurance – see above) were cut by 83.65°%. The Gini indexes for the baseline distribution, i.e. before the fiscal devaluation, are 0.2456 for the distribution of disposable equivalent income and 0.3011 for equivalent expenditure.

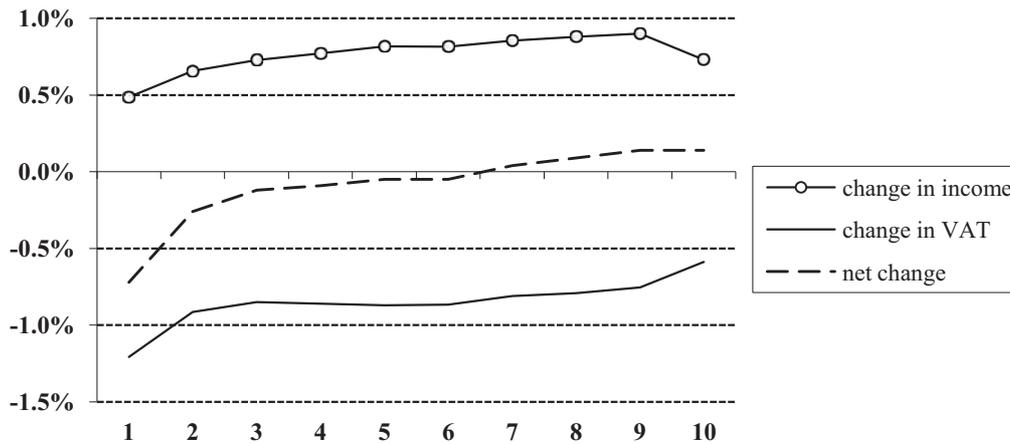
⁶⁹Under this threshold only accident insurance (paid by the employer) applies. The employee has the option to voluntarily pay for health and retirement insurance.

⁷⁰There is no upper limit in the retirement insurance for civil servants and no upper limit in the contributions to the family fund.

1 Increase only in the standard VAT rate

The decrease in SSC on all employees by 8.77% is followed by the increase in the standard rate of VAT by 9.09% (from 20% to 21.8%) so as to keep budget balance after FD. In the other case, the revenues from SSC are reduced on low earners by 83.65%, and the standard rate of VAT is raised by 7.30%, to reach 21.5% from 20%. Figure 7.2.1 shows, for the case of a uniform change in SSC, the separate modifications in disposable income and in VAT burden, as well as the difference between these two curves, i.e. the net effect on income. The increase in disposable income is greater for the higher deciles, while the change in VAT is regressive. As a result, this reform is regressive, with a worsening income position in particular for the poorest decile. The Gini index increases slightly, by 0.37%, from 0.2456 to 0.2465.

Figure 7.2.1: Change in disposable income and VAT (as a percent of disposable income) after the FD in Austria – decrease in all SSC rates



The opposite conclusion can be reached if we restrict the change in SSC only on low incomes (Figure 7.2.2): the regressivity of the change in VAT is more than compensated by the increased incomes of the low deciles, for a progressive net impact. Indeed, the Gini index falls from 0.2456 to 0.2441, a reduction by -0.61%. Figure 7.2.3 contains only the net changes for these two cases, in order to allow a better comparison between them.

Figure 7.2.2: Change in disposable income and VAT (as a percent of disposable income) after the FD in Austria – decrease in SSC rates for low incomes

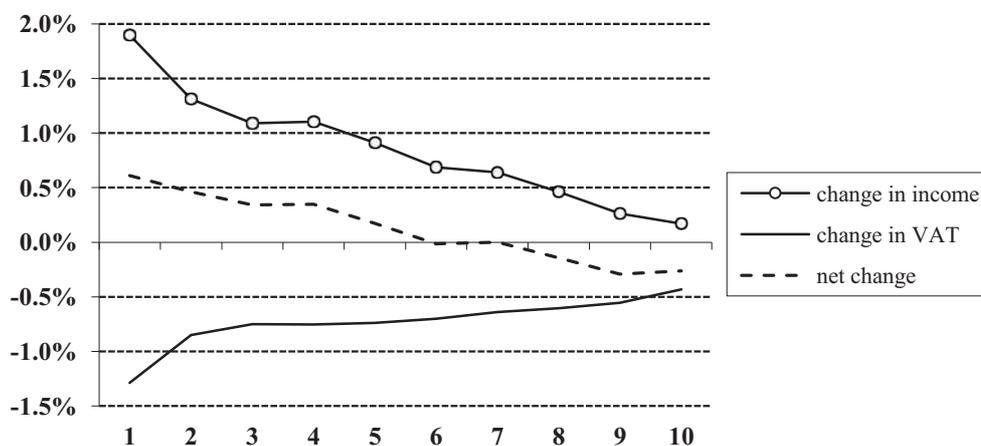
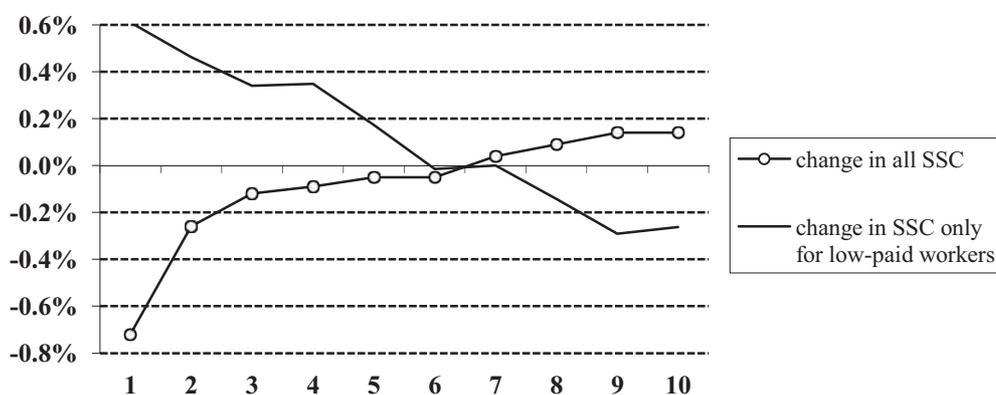
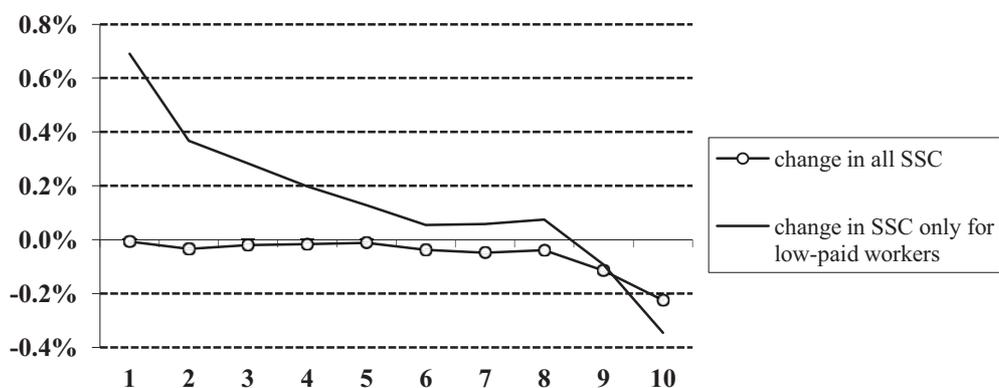


Figure 7.2.3: Change in disposable income after FD in Austria by deciles of equivalent disposable income



Turning to the incidence by deciles of equivalent expenditure (Figure 7.2.4), with universal reduction in SSC the effect is nearly proportional or slightly progressive: both expenditure and VAT increase regularly from low to high deciles, and only in the top decile the increase in the VAT burden is significantly greater than the increase in expenditure. On the other hand, with targeted SSC reduction the bottom deciles obtain a gain in expenditure level much higher than the rest of the population, so the effect is progressive.

Figure 7.2.4: Change in disposable expenditure after FD in Austria by deciles of equivalent disposable expenditure



The distributive effects by family type and condition of the head confirm what has been already found for other countries: the most significant losers are the households of pensioners, while families with children obtain a gain which is more relevant with a targeted reduction in SSC.

Figure 7.2.5: Change in disposable income after FD in Austria by family type

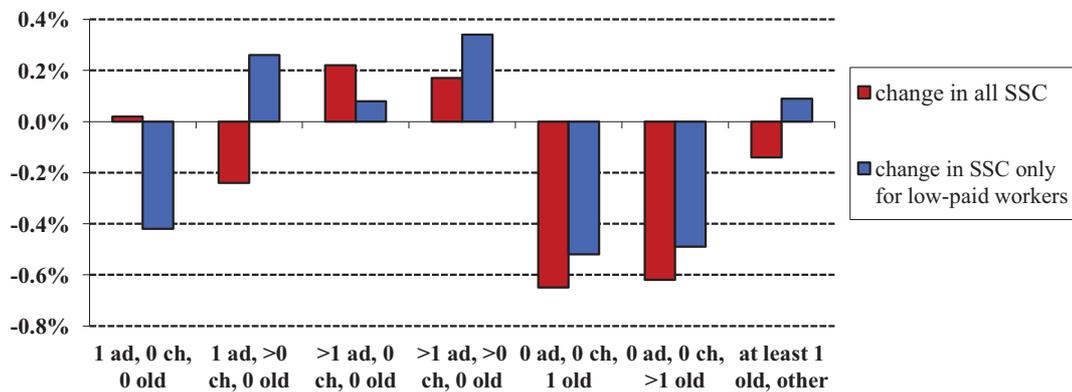
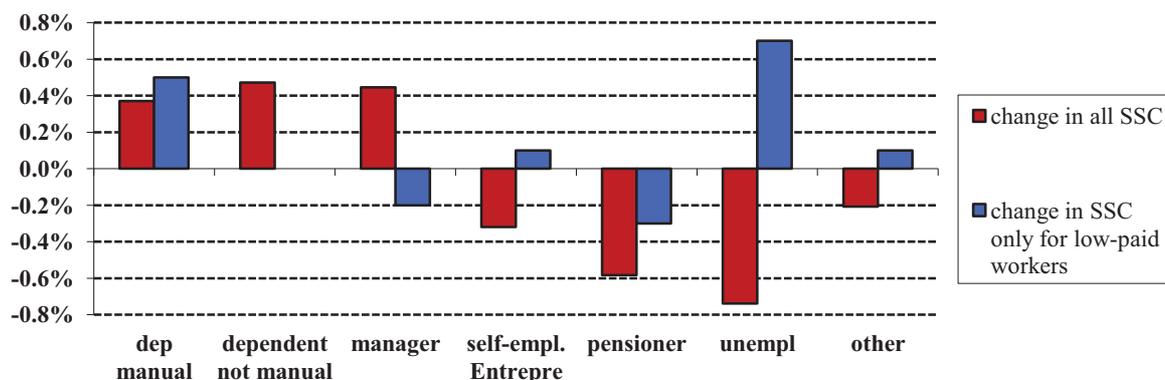


Figure 7.2.6: Change in disposable income after FD in Austria by condition of the household head



2 Proportional increase in all VAT rates

When SSC rates are decreased for all workers, they fall by 8.77%; the corresponding percentage increase in VAT rates is 6.91%, so the new VAT rates are 10.7% and 24%. With targeted reduction of SSC, they fall by 83.65% on low earners, and all VAT rates must rise by 5.56% so as to keep a balanced budget. This case, as in other countries, strongly resembles the previous one in terms of its distributive impact. The Gini index for the universal change in SSC rates rises by 0.43% (previously by 0.37%), while it falls by 0.56% (previously by 0.61%) if only SSC rates on low income workers are reduced.

Figure 7.2.7: Change in disposable income after FD in Austria by deciles of equivalent disposable income

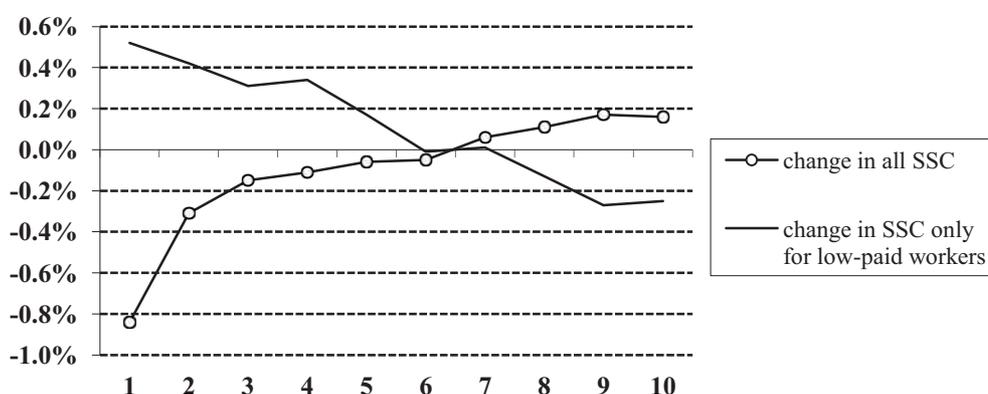


Figure 7.2.8: Change in disposable expenditure after FD in Austria by deciles of equivalent disposable expenditure

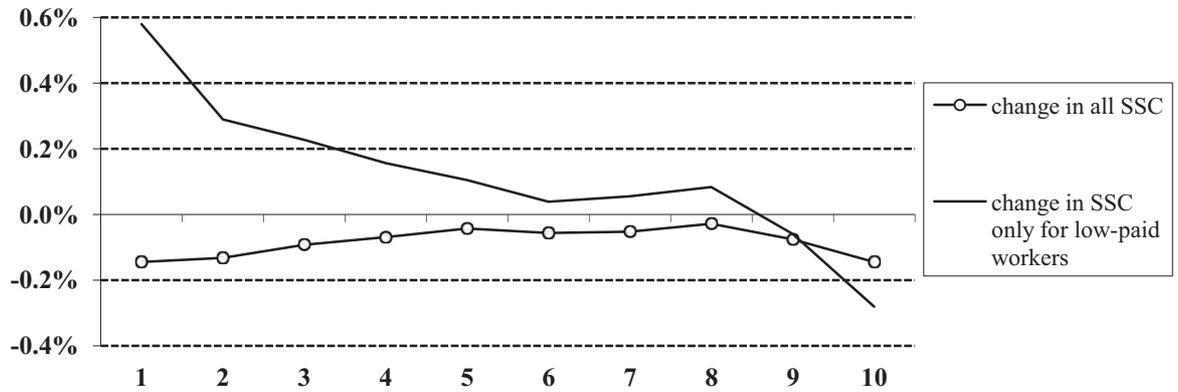


Figure 7.2.9: Change in disposable income after FD in Austria by family type

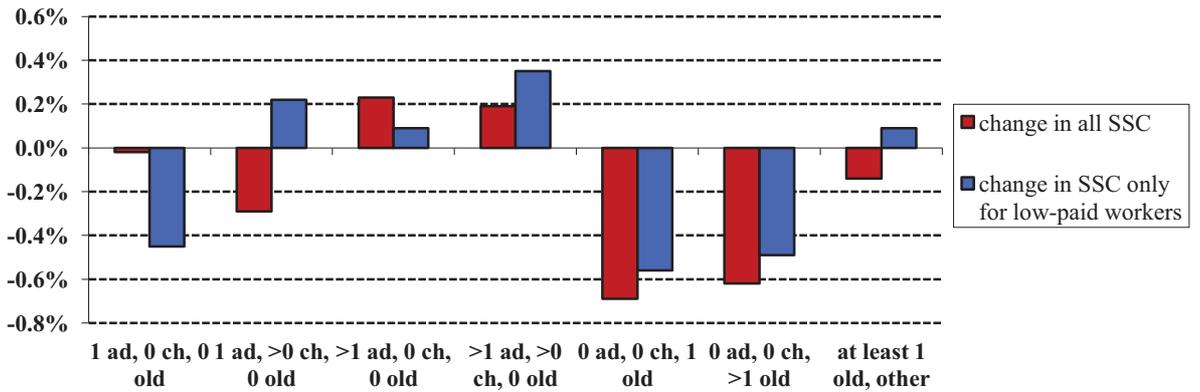
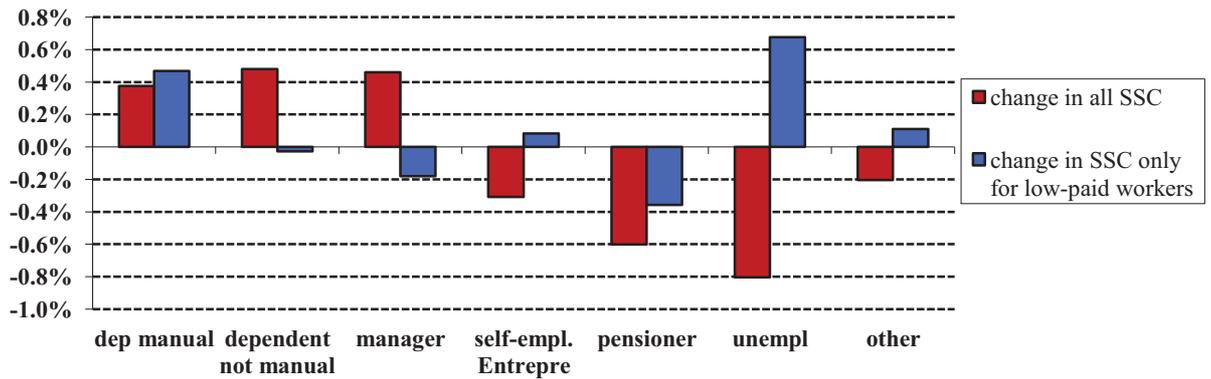


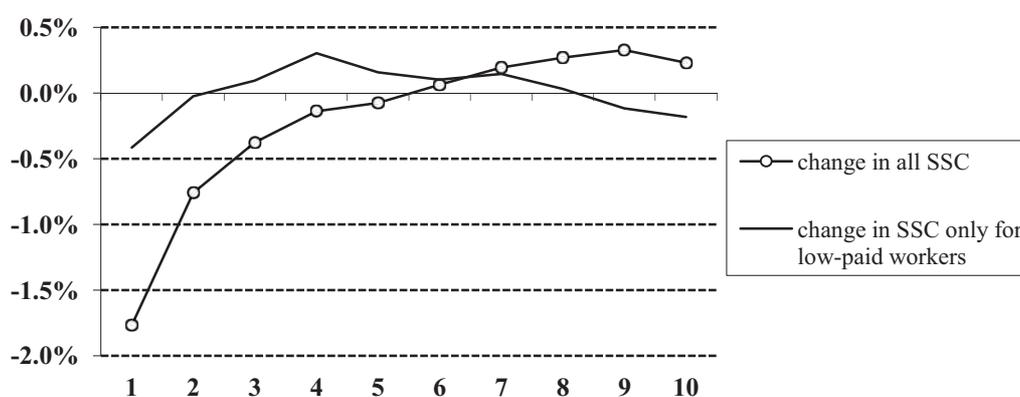
Figure 7.2.10: Change in disposable income after FD in Austria by condition of the household head



3 Uniform VAT rate

The uniform VAT rate that allows balancing the budget after a uniform reduction of SSC rates equivalent to 1% of GDP turns out to be 16.72%. With a decrease of SSC for low earners by 83.65%, the new uniform VAT rate is 16.51%. The distributional effect of the first reform is strongly regressive, while that of the second is substantially proportional. In the first case, both the income change and in particular the VAT increase are in favour of the richest deciles: the VAT burden on income before the reform rises by 2.2% for the poorest decile and by 1.4% in the second decile, while the increase is only 0.5% for the top one. Consequently, the Gini index rises from 0.2456 to 0.2475, i.e. by 0.79%. With targeted reduction in SSC, the result is very different because of the much more relevant increase in disposable income for the bottom part of the distribution, while the distributive effect of the VAT increase is similar in the two cases, and the Gini index, particularly sensible to what happens in the central part of the distribution, falls by 0.20% to 0.2451.

Figure 7.2.11: Change in disposable income after FD in Austria by deciles of equivalent disposable income



Across the deciles of equivalent expenditure, however, this reform is always regressive, with the incidence graph that closely resembles the Figure 7.2.12 of the Italian case.

Figure 7.2.12: Change in disposable expenditure after FD in Austria by deciles of equivalent disposable expenditure

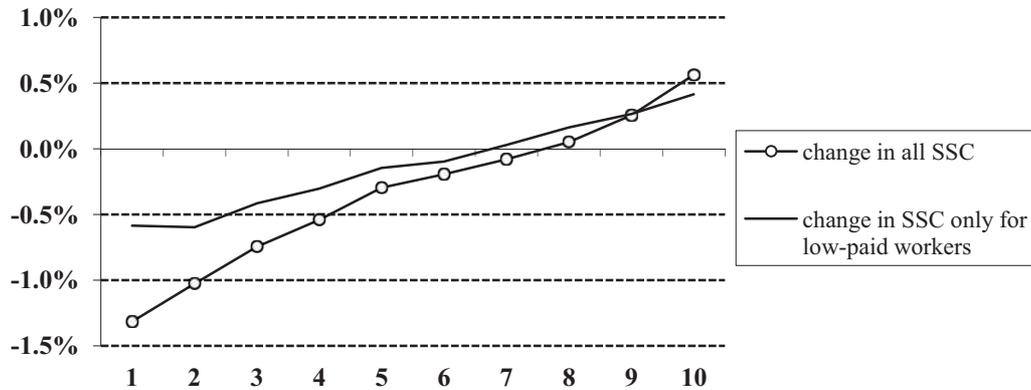


Figure 7.2.13: Change in disposable income after FD in Austria by family type

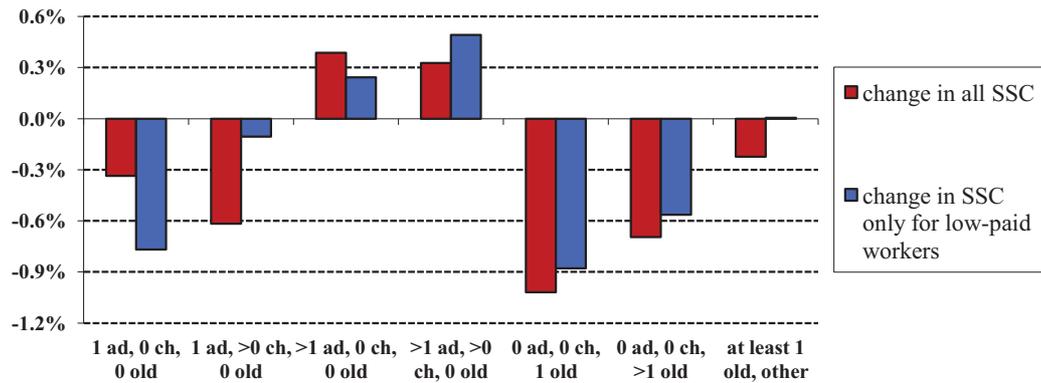
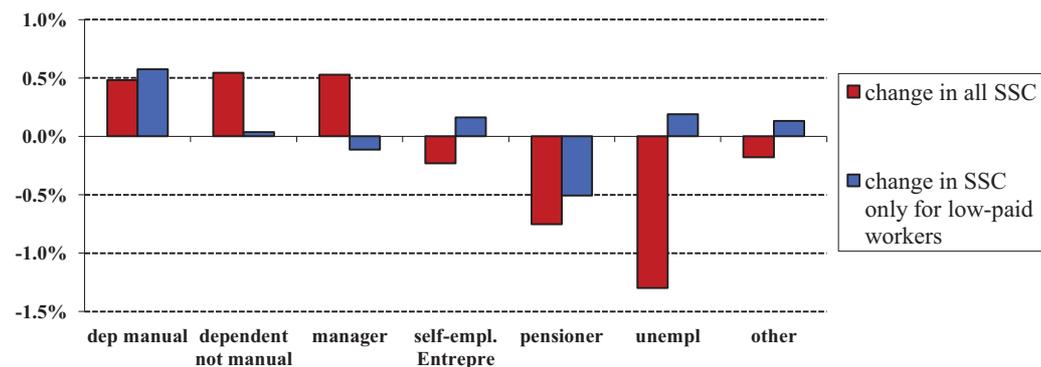


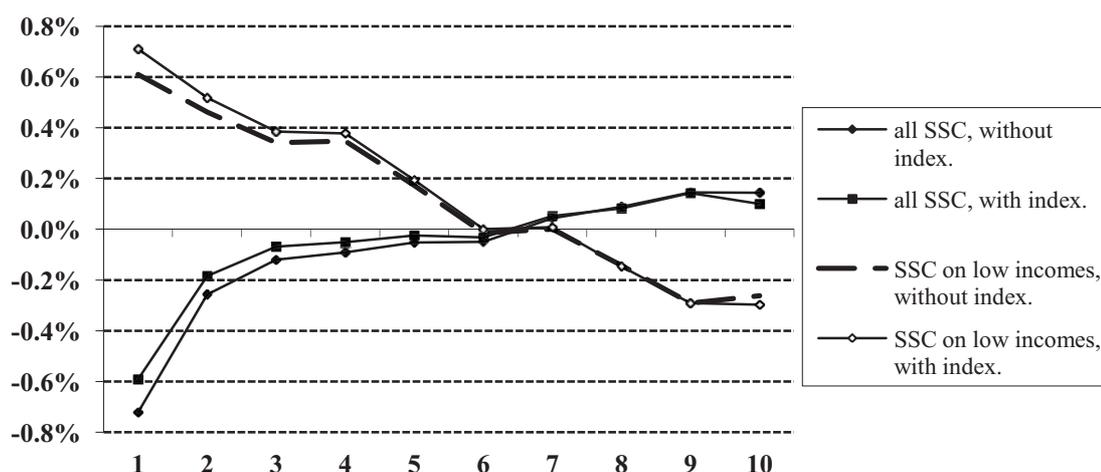
Figure 7.2.14: Change in disposable income after FD in Austria by condition of the household head



Indexation of benefits in Austria

In Austria the “proportional tax” that must be imposed so as to keep public budget neutrality after the indexation of cash transfers (which are increased in the various cases by percentages varying from 0.71% to 1.23%) is on average around 0.15% of average disposable household income. The impact of the indexation of benefits is close to the French and Italian cases: the distributive effects of the fiscal devaluation are very similar to those of the no-indexation scenario. Only for the left section of the income distribution there is a significantly positive impact, but in no case this effect is sufficient to change the overall distributive sign of the reform. When the reduction in SSC rates is extended to all earnings, the reduction of the regressive impact seems a bit stronger than in Italy.

Figure 7.2.15: Austria: change in disposable income with reduction in SSC and increase in standard VAT rate, by deciles of equivalent disposable income, with and without indexation of benefits



Austria confirms that the indexation of benefits is never sufficient for changing the distributive signs of the various cases of FD simulated in this work. This indexation always mitigates the regressive impact of FD, when it is already regressive, and produces a more significant reduction of the Gini index from the no-FD baseline case when the FD is progressive. In all cases, however, the changes in the Gini index with indexation are very close to the change in the Gini without it, so the distributive results of FD are confirmed.

Figure 7.2.16: Austria: change in disposable income with reduction in SSC and increase in all VAT rates, by deciles of equivalent disposable income, with and without indexation of benefits

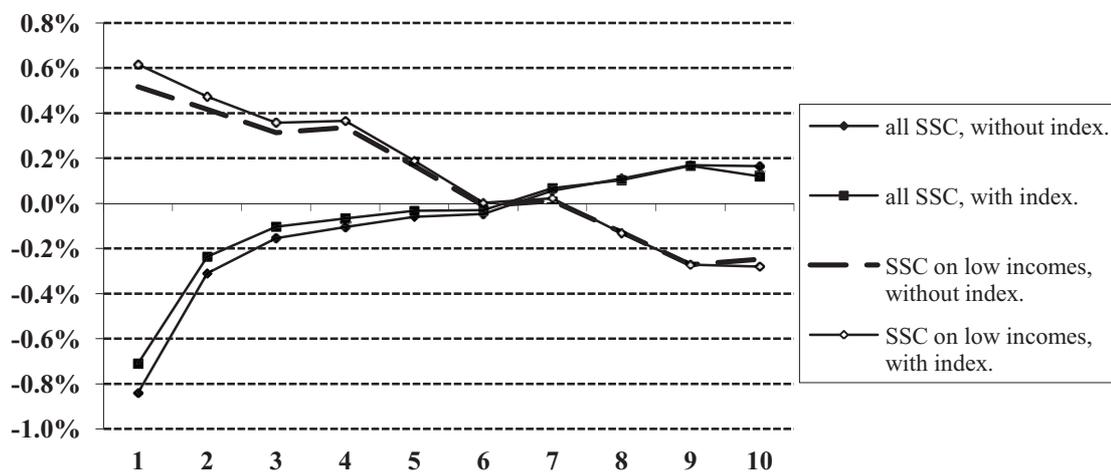


Figure 7.2.17: Austria: change in disposable income with reduction in SSC and uniform VAT rate, by deciles of equivalent disposable income, with and without indexation of benefits

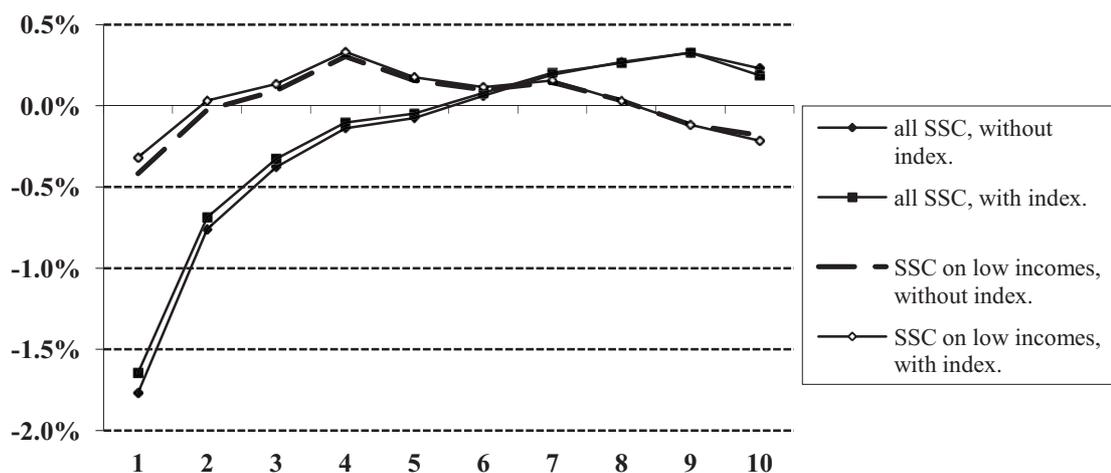


Table 7.2.2: Austria: percentage variation in the Gini index of equivalent disposable income after the FD, with and without indexation of cash benefits

	Without benefit indexation	With benefit indexation
1 Increase in ordinary VAT rate		
1.1 change in all SSC rates	+0.37%	+0.30%
1.2 change in SSC rates on low incomes	-0.61%	-0.67%
2 Increase in all VAT rates		
2.1 change in all SSC rates	+0.43%	+0.35%
2.2 change in SSC rates on low incomes	-0.56%	-0.62%
3 Uniform VAT rate		
3.1 change in all SSC rates	+0.79%	+0.71%
3.2 change in SSC rates on low incomes	-0.20%	-0.26%

Note: the numbers in the table refer to the percentage change of the Gini index with respect to the baseline case of the distribution of disposable income before the Fiscal devaluation.

As in Italy and unlike France, in Austria the indexation of benefits reduces the average loss particularly for the households of pensioners and, unlike Italy, also for the unemployed. The pensioners remain, however, among the net losers from the FD, as in the other countries considered in this work.

Figure 7.2.18: Austria: change in disposable income with reduction in SSC and increase in standard VAT rate, by condition of the head, with and without indexation of benefits

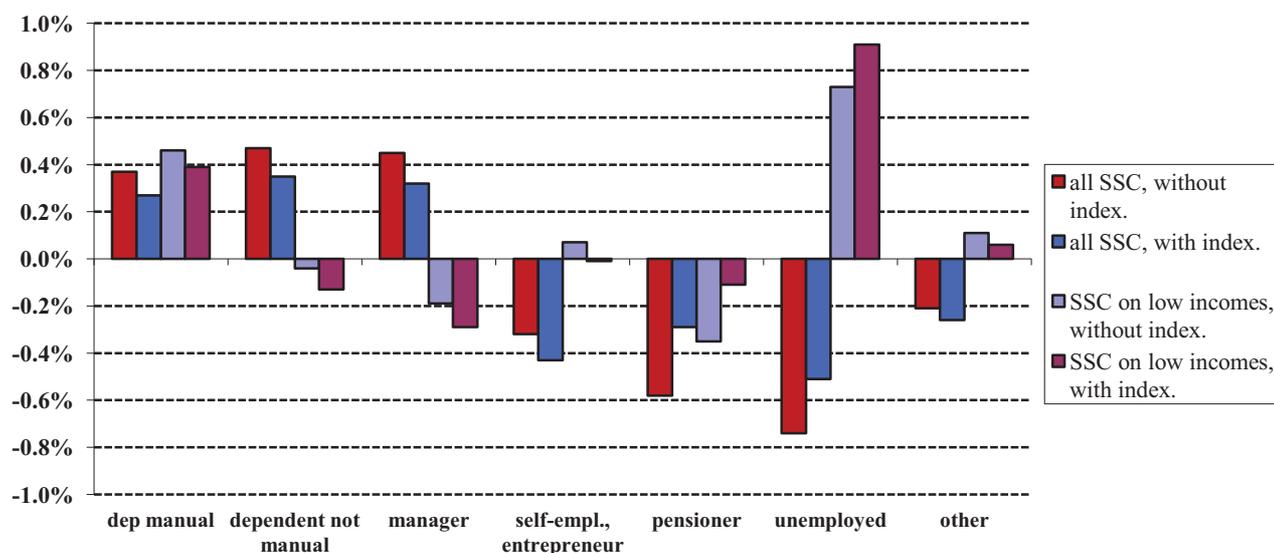


Figure 7.2.19: Austria: change in disposable income with reduction in SSC and increase in all VAT rates, by condition of the head, with and without indexation of benefits

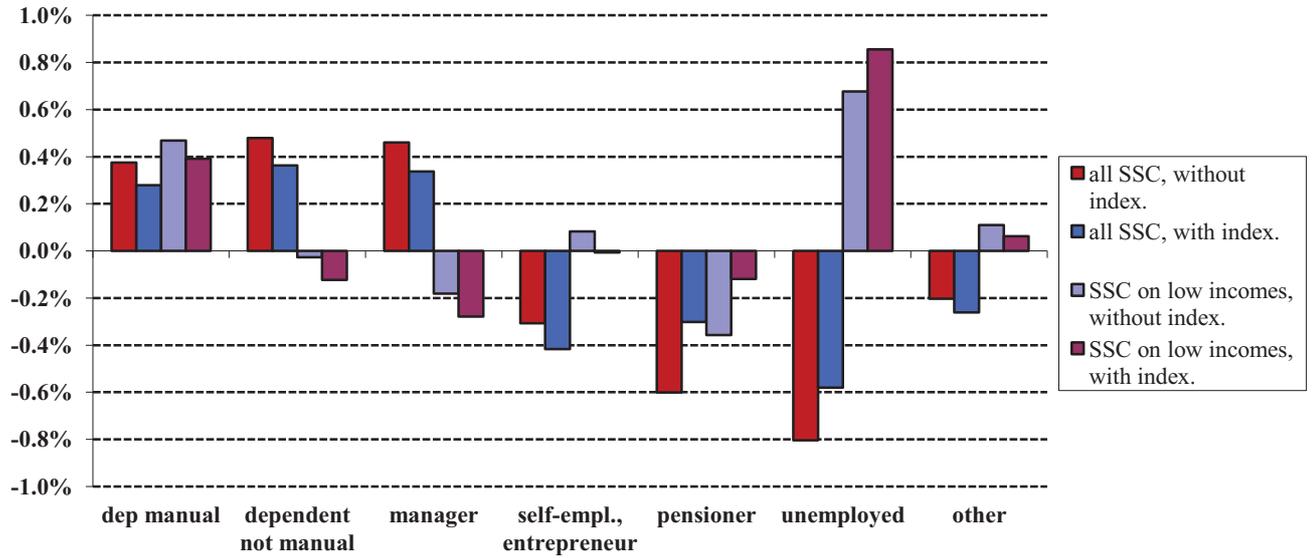
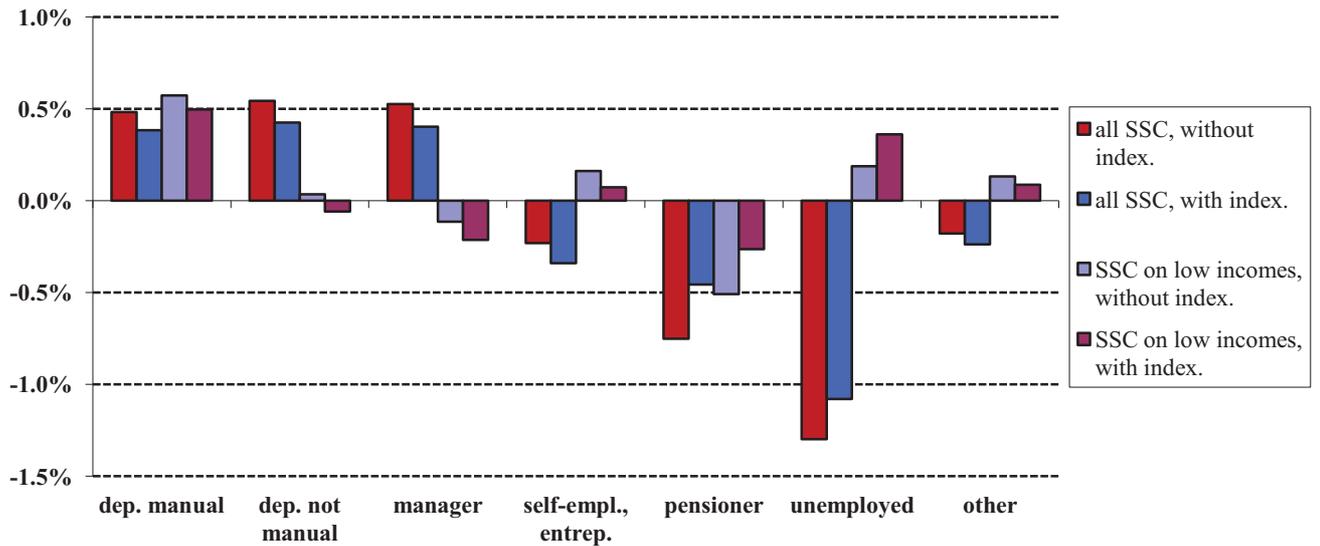


Figure 7.2.20: Austria: change in disposable income with reduction in SSC and uniform VAT rate, by condition of the head, with and without indexation of benefits



8 Comparisons of unilateral fiscal devaluation

8.1 Macro simulations

Fiscal devaluation is found to have a small, expansionary effect on employment and GDP in the short run, according to the NiGEM outcomes (see Table 8.1.1 and Figure 8.1.1). The positive impact on labour market outcomes is short-lived when the nominal wage adjusts more rapidly to the tax reform. According to the NiGEM estimates, the reduction in the relative price has a small positive effect on net exports, whereas the expansion of domestic demand has a large negative effect. As a consequence, fiscal devaluation does not contribute to an improvement of the trade balance in the short run.⁷¹ The tax reform is ultimately most expansionary in Austria and Italy and least expansionary in France. A reversed pattern holds for the trade balance effects: net exports fall the most in the former countries and the least in France.

Shifting to the long-run outcomes of IHS in Table 8.1.2 and Figure 8.1.2, we observe permanent, though small effects on (un)employment and GDP for all countries. An improvement of the trade balance during the first years turns into a deterioration in the long run.⁷² The interpretation of different outcomes across countries points at the relevance of specific features of the economies and its institutions. The effectiveness of the reform depends on the extent to which it achieves a reduction of the tax wedge and the resulting distortions. This interacts with the degree of progressivity of the tax and benefit system, in particular of the SSC system. The latter system is characterized as very progressive in France; as proportional in Italy and Spain and as regressive in Austria. Results are sensitive to the degree of price indexation of social transfers, in particular in the case of generous social security systems. By incorporating skill composition effects, this model finally demonstrates the relevance of considering that different groups of workers might respond differently to a reform and that a reform might treat groups differently.

The results of the different models are compared by checking the ranking over the countries. Both short-run and long-run effects on (un)employment are found to be the largest for Spain. The GDP expansion in the short run is small in France compared to the other countries, whereas the differences in the long run are small. Long-run effects are most favourable for Spain. Fiscal devaluation has the largest short-run as well as long-run effects on consumption and net exports in Austria.

⁷¹This is in line with QUEST results in EC (2008) but contrary to other studies.

⁷²While supporting the small, positive effects on labour market variables, the CEPIL model for France finds a small improvement of the trade balance in the long run.

Table 8.1.1: Summary of largest short-run outcomes of NiGEM model

	France	Italy	Spain	Austria
Real producer wage	-0.70%	-1.00%	-0.59%	-0.63%
Real GDP	0.17%	0.36%	0.32%	0.38%
Employment	0.70%	0.74%	0.94%	0.49%
Unemployment rate*	-0.60%	-0.56%	-0.65%	-0.40%
Consumption	0.63%	1.27%	1.27%	1.43%
Trade balance (%GDP)*	-0.09%	-0.39%	-0.37%	-0.54%

* % point difference

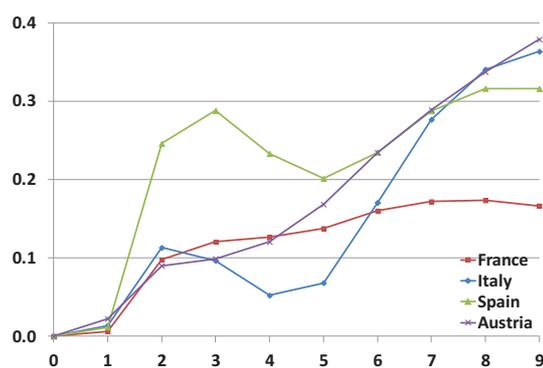
Table 8.1.2: Summary of long-run outcomes of IHS model

	France	Italy	Spain	Austria
Real producer wage	-0.07%	-0.04%	-0.08%	-0.06%
Real GDP	0.09%	0.10%	0.12%	0.06%
Employment	0.08%	0.11%	0.15%	0.07%
Unemployment rate*	-0.04%	-0.03%	-0.08%	-0.04%
Consumption (%GDP)*	0.09%	0.07%	0.09%	0.12%
Trade balance (%GDP)*	-0.09%	-0.05%	-0.06%	-0.12%

* % point difference

Figure 8.1.1: Fiscal devaluation – NiGEM

Real GDP



Trade balance (%GDP)

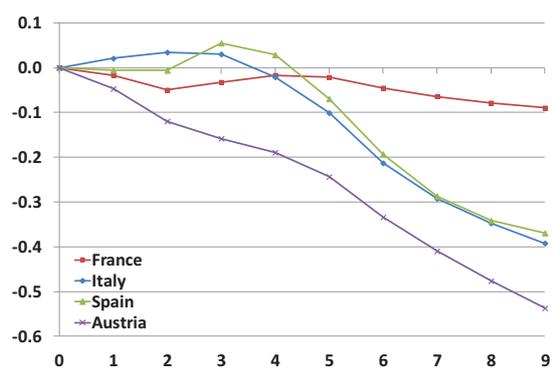
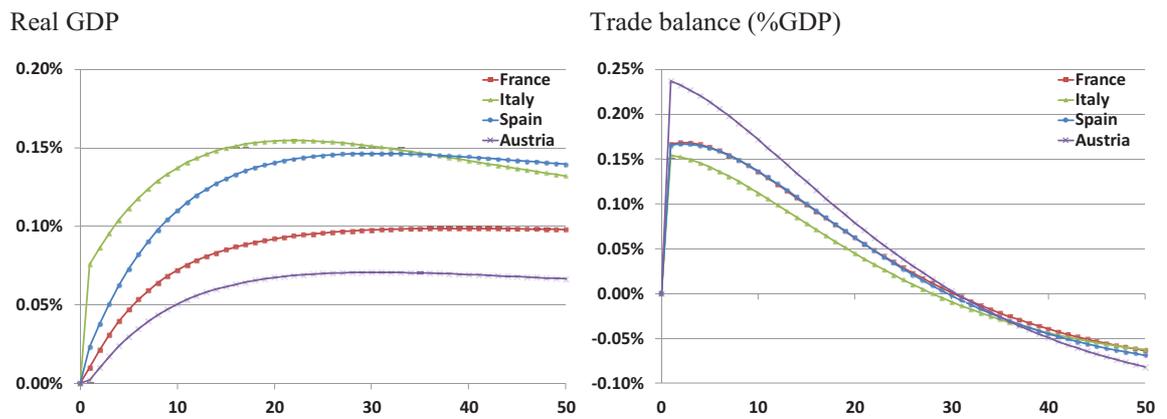


Figure 8.1.2: Fiscal devaluation – IHS

8.2 Micro simulations

This section provides a summary of the distributional effects of FD obtained with the tax-benefit microsimulation models employed. Table 8.2.1 sums up for the four countries the overall distributive impact of the various cases of FD on the deciles of equivalent disposable income, adopting the following symbols to denote the general impact of each case:

- *strongly regressive*
- *regressive*
- 0 *neither regressive nor progressive*
- + *progressive*
- ++ *strongly progressive.*

Table 8.2.1: Distributional effects of FD on equivalent disposable income

	France	Italy	Austria	Spain
<i>Change in income by deciles</i>				
1 Increase in ordinary VAT rate				
1.1 change in all SSC rates	--	-	--	--
1.2 change in SSC rates on low incomes	+	++	++	+
2 Increase in all VAT rates				
2.1 change in all SSC rates	--	-	--	--
2.2 change in SSC rates on low incomes	+	++	+	+
3 Uniform VAT rate				
3.1 change in all SSC rates	--	--	--	--
3.2 change in SSC rates on low incomes	--	+	+	-
<i>% Change in the Gini index</i>				
1 Increase in ordinary VAT rate				
1.1 change in all SSC rates	+0.67%	+0.19%	+0.37%	+2.2%
1.2 change in SSC rates on low incomes	-0.31%	-0.77%	-0.61%	-0.46%
2 Increase in all VAT rates				
2.1 change in all SSC rates	+0.73%	+0.28%	+0.43%	+2.26%
2.2 change in SSC rates on low incomes	-0.30%	-0.70%	-0.56%	-0.39%
3 Uniform VAT rate				
3.1 change in all SSC rates	+2.03%	+0.90%	+0.79%	+2.76%
3.2 change in SSC rates on low incomes	+0.99%	-0.09%	-0.20%	+0.11%

The first section of the table tries to summarize the visual impression that emerges from the observation of the variations in net disposable income (change in disposable income minus the change in VAT) across deciles. The bottom section provides the percentage changes in the Gini indexes after each reform, always starting from the status quo distribution before the reform. There are many points in common among the results for the different countries. First, if the SSC reduction is extended to all employees, the effect of FD is always regressive, whatever the type of change in VAT rates. Second, the regressive impact is particularly clear if the public budget is balanced with the

adoption of a uniform VAT rate, therefore implying that the current structure of VAT rates actually benefits low-income households. Third, if the SSC reduction is targeted to low incomes, then the impact of FD becomes progressive and in many cases it is significantly progressive. Fourth, with a uniform VAT rate, only in two cases (Italy and Austria) the concentration of SSC reduction on low incomes is sufficient to make the reform beneficial for the worse off. In the other two countries (France and Spain) the reform is still regressive, even if much less than in the case of a general cut in SSC.

Across countries, Italy and Austria provide very similar results. In France and Spain, on the other hand, it is very difficult to produce a progressive impact for FD, and if the structure of VAT rates is changed towards uniformity then the effect is regressive in any case, particularly in France. Earlier we showed that in France the incidence of SSC on the poorer deciles is very low, so a cut in them is not particularly beneficial to the first deciles of the distribution, while on the other hand the current design of VAT rates seems able to help poorer households.

That a move towards a uniform VAT rate may hurt poorer households is not a new result. The recent study by IFS et al. (2011), for example, maintains that (p. 391) “If zero and reduced rates were abolished... The progressive pattern of existing zero and reduced rates mean that such a reform would be regressive: poorer households (both measured in terms of their income or spending) would end up paying more VAT, whilst richer households would end up paying less VAT.” (see also Copenhagen Economics, 2007, p. 32). Our results show, however, that even in this case the concentration of SSC reductions on low earners could make the FD progressive in two out of the four examined countries. About the other two cases, as we have already observed in the description of the French results, the finding of a regressive impact from FD is not a sufficient reason to reject this policy option. A government could indeed raise, through the change in VAT rates or with other instruments, more revenue in addition to what is needed to guarantee budget neutrality, and use the surplus to compensate the losers. Our results just emphasize that such a distributional correction is likely to be necessary so as to avoid a worsening in the income or expenditure distribution, if the reduction in labour costs is universal or if it does not translate fully into higher earnings.

The observation of the changes in the Gini indexes suggests that if the reduction of SSC rates is universal, then the country with the strongest regressive impact is indeed always Spain, irrespective of the type of change in VAT rates, followed by France, while Italy and Austria show very similar and more moderate impacts. If the reduction in SSC is targeted to low earners, then in many cases inequality falls, but there is not a consistent ordering among the countries: Italy shows the larger fall in the Gini index with an increase in the ordinary VAT rate or in all rates, while if all VAT rates are equalized the highest reduction of inequality takes place in the Austrian case.

If the distributive results are evaluated on the deciles of equivalent expenditure (Table 8.2.2), the results do not change very much. Now, however, and unlike the classification by income deciles, even a general reduction of SSC rates, if financed with an increase only in the ordinary VAT rate, has slightly progressive effects in at least two countries, Austria and Italy. Italy is the only country where the adoption of a uniform VAT rate does not produce a significant regressive effect.

Table 8.2.2: Distributional effects of FD on equivalent expenditure

	France	Italy	Austria	Spain
<i>Change in income by deciles</i>				
1 Increase in ordinary VAT rate				
1.1 change in all SSC rates	-	+	+	--
1.2 change in SSC rates on low incomes	+	+	++	+
2 Increase in all VAT rates				
2.1 change in all SSC rates	-	+	0	--
2.2 change in SSC rates on low incomes	+	++	++	+
3 Uniform VAT rate				
3.1 change in all SSC rates	--	--	--	--
3.2 change in SSC rates on low incomes	--	-	--	-
<i>% Change in the Gini index</i>				
1 Increase in ordinary VAT rate				
1.1 change in all SSC rates	+0.22%	-0.33%	-0.11%	+0.99%
1.2 change in SSC rates on low incomes	-0.23%	-0.90%	-0.38%	.
2 Increase in all VAT rates				
2.1 change in all SSC rates	+0.28%	-0.20%	-0.01%	+1.05%
2.2 change in SSC rates on low incomes	-0.17%	-0.75%	-0.30%	.
3 Uniform VAT rate				
3.1 change in all SSC rates	+1.38%	+0.73%	+0.92%	+1.031%
3.2 change in SSC rates on low incomes	+0.86%	+0.16%	+0.62%	.

Tables 8.2.3 and 8.2.4 show which groups (defined by condition of the head) benefit more and less from the FD, respectively. In general, the biggest beneficiaries are households of employees in Italy and Spain, non manual workers in France and Austria. With uniform VAT rate, households of manual workers are in general the greatest beneficiaries only if SSC are reduced only for low-paid workers. Conversely, the FD reform has negative impacts in particular for households of pensioners and self-employed workers, who do not directly benefit from the SSC reduction (unless there are employees in their households) but are subject to higher VAT rates. Households of pensioners never appear in the table of “winners” from the FD, while the unemployed sometimes benefit if the SSC cut is reserved to low earners (cohabiting sons or partners of the unemployed head).

Table 8.2.3: Who benefits more from the FD, by condition of the head of household

	France	Italy	Austria	Spain
1 Increase in ordinary VAT rate				
1.1 change in all SSC rates	Manager	Employee manual	Employee not manual	Employee manual
1.2 change in SSC rates on low incomes	Employee manual	Employee manual	Unemployed	Unemployed
2 Increase in all VAT rates				
2.1 change in all SSC rates	Manager	Employee manual	Employee not manual	Employee manual and not manual
2.2 change in SSC rates on low incomes	Employee manual	Employee manual	Unemployed	Unemployed
3 Uniform VAT rate				
3.1 change in all SSC rates	Employee not manual	Manager	Employee not manual	Employee manual
3.2 change in SSC rates on low incomes	Employee not manual	Employee manual	Employee manual	Employee manual and Unemployed

Table 8.2.4: Who loses more from the FD, by condition of the head of the household

	France	Italy	Austria	Spain
1 Increase in ordinary VAT rate				
1.1 change in all SSC rates	Pensioner	Self-employed, entrepreneur	Unemployed	Self-employed, Pensioner
1.2 change in SSC rates on low incomes	Manager	Manager	Pensioner	Manager
2 Increase in all VAT rates				
2.1 change in all SSC rates	Pensioner	Self employed, entrepreneur, pensioner	Unemployed	Pensioner
2.2 change in SSC rates on low incomes	Manager, self-employed, entrepreneur	Manager	Pensioner	Manager
3 Uniform VAT rate				
3.1 change in all SSC rates	Pensioner	Other	Unemployed	Pensioner
3.2 change in SSC rates on low incomes	Pensioner	Other	Pensioner	Pensioner

The comparison of winners and losers by household type (Tables 8.2.5 and 8.2.6) confirms that almost everywhere households of adults with or without children are the biggest beneficiaries, while the elderly are always among the biggest losers.

Table 8.2.5: Who benefits more from the FD, by type of household

	France	Italy	Austria	Spain
1 Increase in ordinary VAT rate				
1.1 change in all SSC rates	>1A, 0C, 0O	>1A, 0C, 0O	>1A, 0C, 0O	>1A, 0C, 0O
1.2 change in SSC rates on low incomes	>1A, 0C, 0O	1A, >0C, 0O	>1A, >0C, 0O	>1A, 0C, 0O
2 Increase in all VAT rates				
2.1 change in all SSC rates	>1A, 0C, 0O	>1A, 0C, 0O	>1A, 0C, 0O	>1A, 0C, 0O
2.2 change in SSC rates on low incomes	>1A, 0C, 0O	1A, >0C, 0O	>1A, >0C, 0O	>1A, 0C, 0O
3 Uniform VAT rate				
3.1 change in all SSC rates	1A, 0C, 0O	>1A, 0C, 0O	>1A, 0C, 0O	>1A, 0C, 0O
3.2 change in SSC rates on low incomes	1A, >0C, 0O	>1A, 0C, 0O	>1A, >0C, 0O	>1A, 0C, 0O

* Number of Adults, Children and Older persons

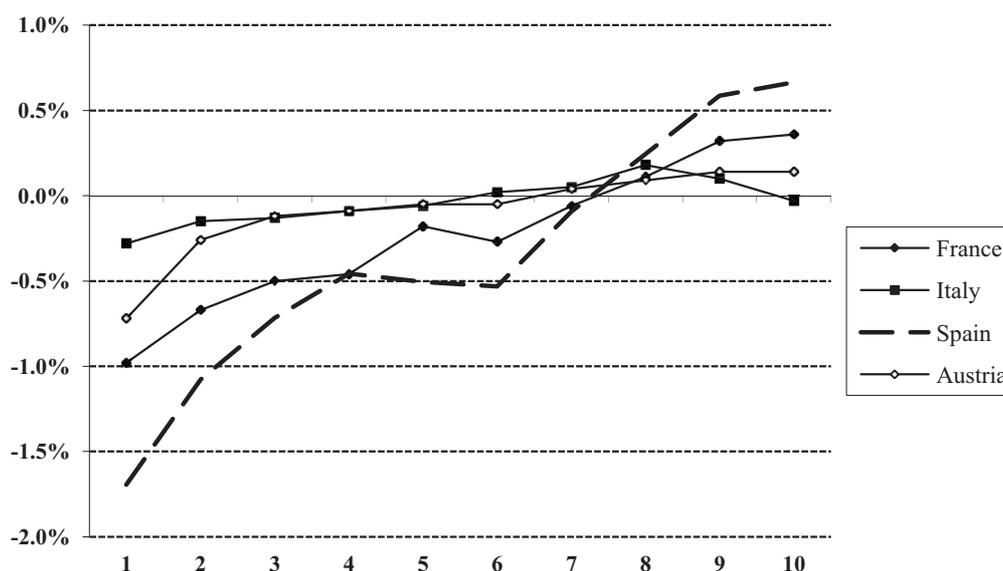
Table 8.2.6: Who loses more from the FD, by type of household

	France	Italy	Austria	Spain
1 Increase in ordinary VAT rate				
1.1 change in all SSC rates	0A, 0C, >1O	0A, 0C, >1O	0A, 0C, 1O	0A, 0C, 1O
1.2 change in SSC rates on low incomes	1A, 0C, 0O	0A, 0C, >1O	0A, 0C, 1O	0A, 0C, 1O
2 Increase in all VAT rates				
2.1 change in all SSC rates	0A, 0C, >1O	0A, 0C, >1O	0A, 0C, 1O	0A, 0C, 1O
2.2 change in SSC rates on low incomes	0A, 0C, >1O	0A, 0C, >1O	0A, 0C, 1O	0A, 0C, 1O
3 Uniform VAT rate				
3.1 change in all SSC rates	0A, 0C, >1O	0A, 0C, >1O	0A, 0C, 1O	0A, 0C, 1O
3.2 change in SSC rates on low incomes	0A, 0C, >1O	0A, 0C, >1O	0A, 0C, 1O	0A, 0C, 1O

* Number of Adults, Children and Older persons

Another useful way to compare the results obtained for different countries is to put in a single graph the percentage changes in (net) disposable income for a given reform for the four countries. Figure 8.2.1 for example shows the % change of disposable income in the case of a general reduction in SSC financed with an increase only in the standard VAT rate. It is clear that the effect is always regressive, particularly in Spain and then in France, while in Italy and Austria it is not far from proportional.

Figure 8.2.1: Change in disposable income with reduction in all SSC and increase in standard VAT rate, by deciles of equivalent disposable income



If, on the other hand, the increase in only the standard VAT rate is used to finance a targeted reduction in SSC for low earners (Figure 8.2.2), then the impact is progressive, with the partial exception of Spain.

Turning to the case of the introduction of a uniform VAT rate on all goods and services, the impact is very similar and regressive across the four countries if the reduction in SSC is general (Figure 8.2.3). It varies more across countries with a targeted change in SSC rates (Figure 8.2.4): still regressive in France, uncertain in Spain with a marked regressivity in the first deciles, neutral in Austria and very lightly progressive in Italy.

Figure 8.2.2: Change in disposable income with reduction in SSC on low-paid workers and increase in standard VAT rate

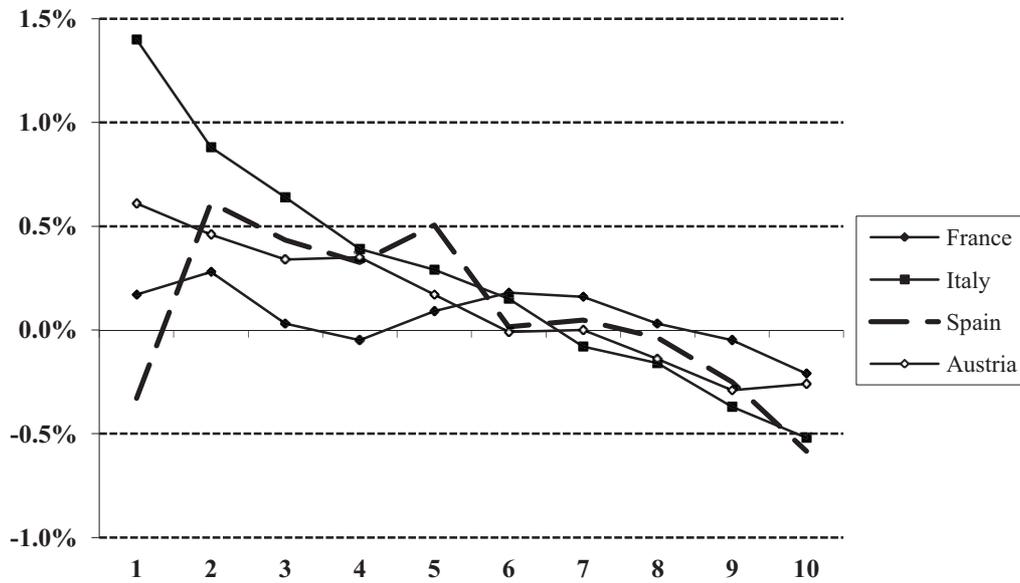


Figure 8.2.3: Change in disposable income with reduction in all SSC and uniform VAT rate

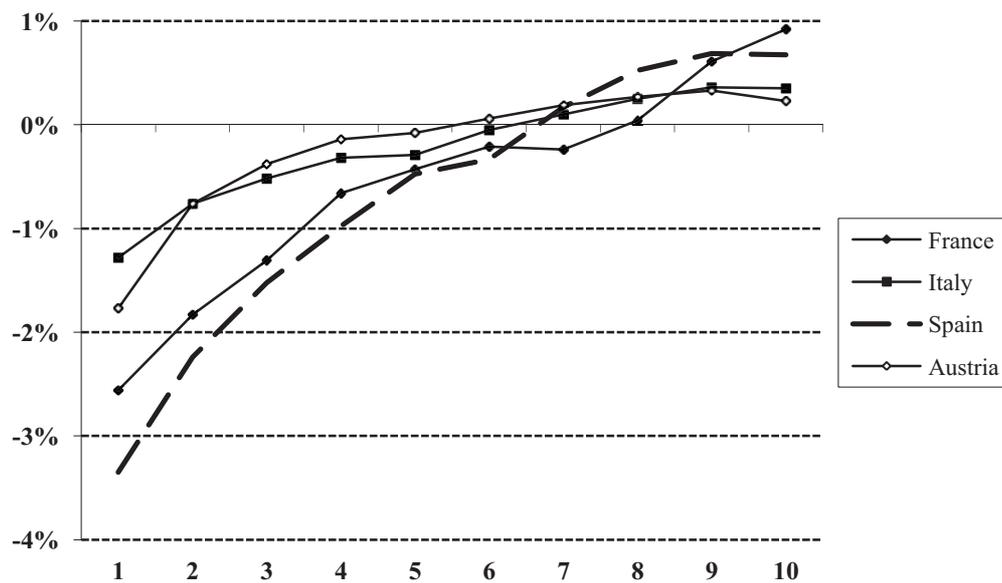
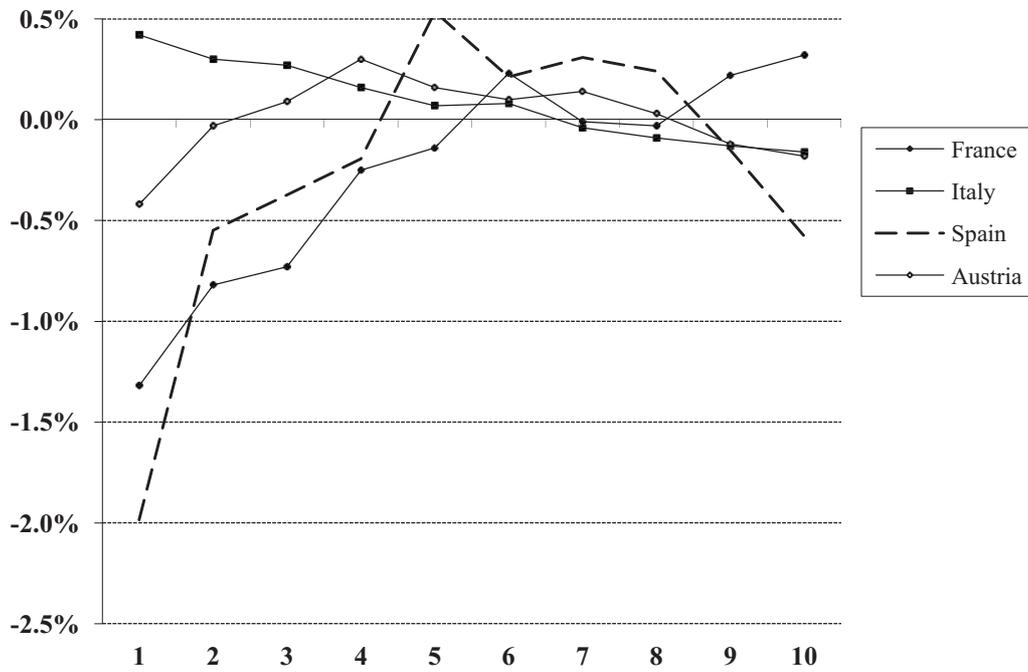


Figure 8.2.4 Change in disposable income with reduction in SSC on low-paid workers and uniform VAT rate



9 Simulations of multilateral fiscal devaluation

As discussed in the literature survey (Section 2.8), fiscal devaluation can have negative and positive spillovers on other economies. On the one hand, improving competitiveness of one country harms the external position of other countries. On the other hand, exports of other countries benefit from the expansionary effects on GDP of fiscal devaluation (EC, 2008, p. 198). In this section we examine whether a country benefits more from a unilateral than from a simultaneous implementation of the tax shift. For this purpose we use the NiGEM model as it allows for spillover effects between countries.⁷³ The tax reform is modelled in exactly the same way as in the unilateral scenario: the SSC is reduced by 1% of GDP and the VAT is increased by 1% of GDP. The labour tax rate is changed, starting in year 5, to ensure that the debt ratio ultimately returns to its starting level. We consider two multilateral scenarios:

- In the first scenario fiscal devaluation is undertaken jointly by France, Italy and Spain (labelled FRITSP).
- The second scenario extends the set of devaluing countries to Germany, the Netherlands and Belgium. Incorporating the remaining euro-countries makes little difference for the main findings, as can be seen from the GDP shares in the Euro Area in Table 9.1 (labelled FRITSPGENLBE).

We again assume that the ECB does not adjust the nominal interest until 2015. After 2015 the interest rate is increased in response to higher inflation and higher nominal GDP. Forward-looking currency markets anticipate the tightening of monetary policy, causing an immediate depreciation of the euro. The maximum impact on the exchange rate of the euro against the dollar is 0.84% in year 9 in the 3-country scenario and 1.58% in the 6-country scenario.

⁷³ Barrell et al. (2007 and 2012) have used the NiGEM model to compare fiscal multipliers in unilateral and multilateral scenarios. Barrell et al. (2012) discuss simulations of the fiscal consolidation programmes planned in 2012. On the one hand, output contracts more in a joint policy scenario compared to a unilateral scenario due to negative spillovers. On the other hand, this effect might be offset by a lower interest rate set by the ECB and a large depreciation of the exchange rate in a multilateral setting. GDP in France is negatively affected by a joint policy action while the opposite holds for the 3 other countries considered in our study (Figure 16).

Table 9.1: GDP shares (%) in 2011

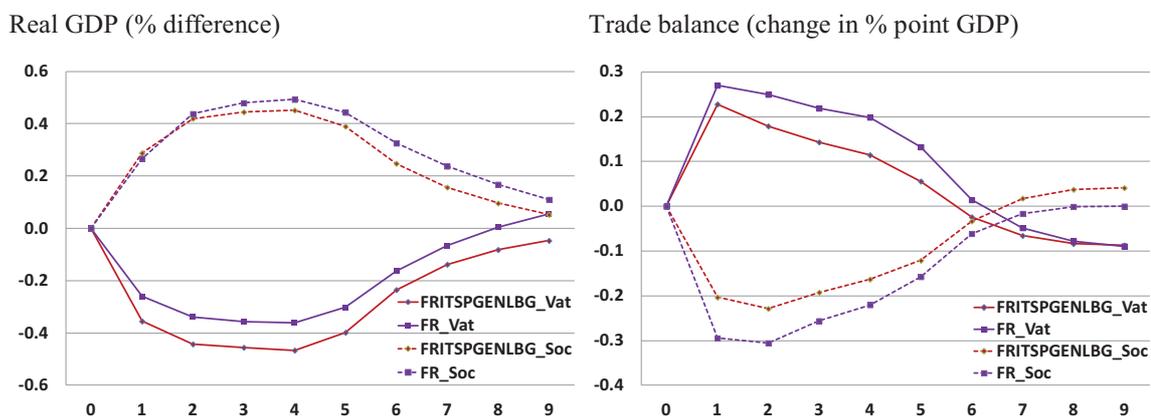
Country	GDP share
Germany	27.8
France	21.6
Italy	17.1
Spain	11.6
Netherlands	6.5
Belgium	4.0
Austria	3.3
Greece	2.4
Finland	2.1
Portugal	1.9
Ireland	1.7

Simulation outcomes for individual countries and the Euro Area are presented in Figures 9.1 to 9.6. Results for the main variables are given for all countries in Table 9.2. Effects on the Euro Area are weighted averages over 11 countries, using the GDP shares in Table 9.1 as weights.

9.1 Effects on France

In order to explain the full effects of fiscal devaluation, we first consider the components of the tax reform in isolation. Figure 9.1 compares the effects for France on GDP (left) and the trade balance (right) between the unilateral scenario and the second multilateral scenario (Remember that the 6 largest countries join the reform in the latter scenario). Red lines correspond to the unilateral case and purple lines to the multilateral case.

Figure 9.1: Multilateral reduction of the SSC rate and increase in the VAT rate: effects on France – NiGEM



The full lines refer to an increase in the VAT rate. GDP in the multilateral scenario contracts more than in the unilateral scenario. This finding can be explained by a worse export performance. Export demand mainly suffers from the contractive effects of foreign VAT hikes. Exports fall the more the larger the number of VAT raising countries. Exports are also affected by changes in relative export prices. The higher nominal wage claims increase prices in all VAT raising countries. French export prices increase the more the higher the number of joining countries. When labour costs increase in more countries, French firms can apply a higher pass-through to export prices. French prices strongly depend on the German participation: if Germany does not increase VAT, increases of French export prices are much smaller. As a consequence, the trade balance improves less in the multilateral scenario during the first years.

Opposite effects are found for the reduction of the SSC rate (given by the dotted lines). As this reform is expansive, GDP in the Euro Area increases more when more countries implement it. For the devaluing country itself, GDP expands less in the multilateral scenario. The value of French exports does increase more when more countries reduce SSC, because of favourable quantity effects and a smaller fall of prices. This contributes to a smaller deterioration of the trade balance in the multilateral scenario.

Finally, we discuss the full effects of fiscal devaluation as presented in Figure 9.2. The real producer wage is hardly differently affected in the unilateral and multilateral scenarios because the positive effect of the VAT increase is offset by the negative effect of the SSC reduction. For instance, in the second multilateral scenario real labour costs increase the most after the VAT increase and fall the most after the SSC reduction, such that the combined effect is similar across the scenarios. As indicated by the results for the isolated reforms, the expansion of French GDP is smaller the more countries devalue. GDP is hardly affected in the scenario with 6 participating countries. Differences in employment effects are in line with GDP effects but remain small. This implies that the growth of GDP is mainly driven by increases in total demand. With fixed labour supply, effects on the unemployment rate are mirrored by the employment effects. The ranking of the consumption effects is in line with the GDP effects: consumption is stimulated the most in the unilateral scenario. Concerning the trade balance effects, we have seen that both the positive effects of the VAT increase and the negative effects of the SSC reduction are smaller in the multilateral scenarios. The overall fiscal devaluation effect is a sum of these positive and negative outcomes, and therefore it is small (maximal 0.1% of GDP) and its sign varies in time.

Figures 9.3 and 9.4 confirm that the patterns discussed for France also hold for Italy and Spain:

- The effects on the real producer wage and (un)employment are similar across the unilateral and multilateral scenarios.
- GDP expands the most in the unilateral scenario and the gains are lower when more countries coordinate the tax reform.
- The consumption effects are in line with the GDP effects: consumption benefits the most from a unilateral devaluation.
- Net exports (as %GDP) fall the least when GDP increases are the smallest, meaning that the trade balance weakens less when more countries join the reform.

9.2 Effects on Germany

Before discussing the effects on the Euro Area, it is informative to examine the effects on Germany. Notice that we include in Figure 9.5 also the scenario in which Germany unilaterally implements fiscal devaluation.⁷⁴ We find similar results for Germany. First, as expected, Germany is the least affected in the multilateral scenario in which it does not participate (blue line). Second, the developments of the real producer wage and (un)employment hardly differ between the unilateral and the second multilateral scenario, indicating the importance of the German participation in the joint reform. As found for the other countries, GDP and consumption effects are larger in the unilateral scenario than in the multilateral scenarios.

9.3 Effects on Euro zone

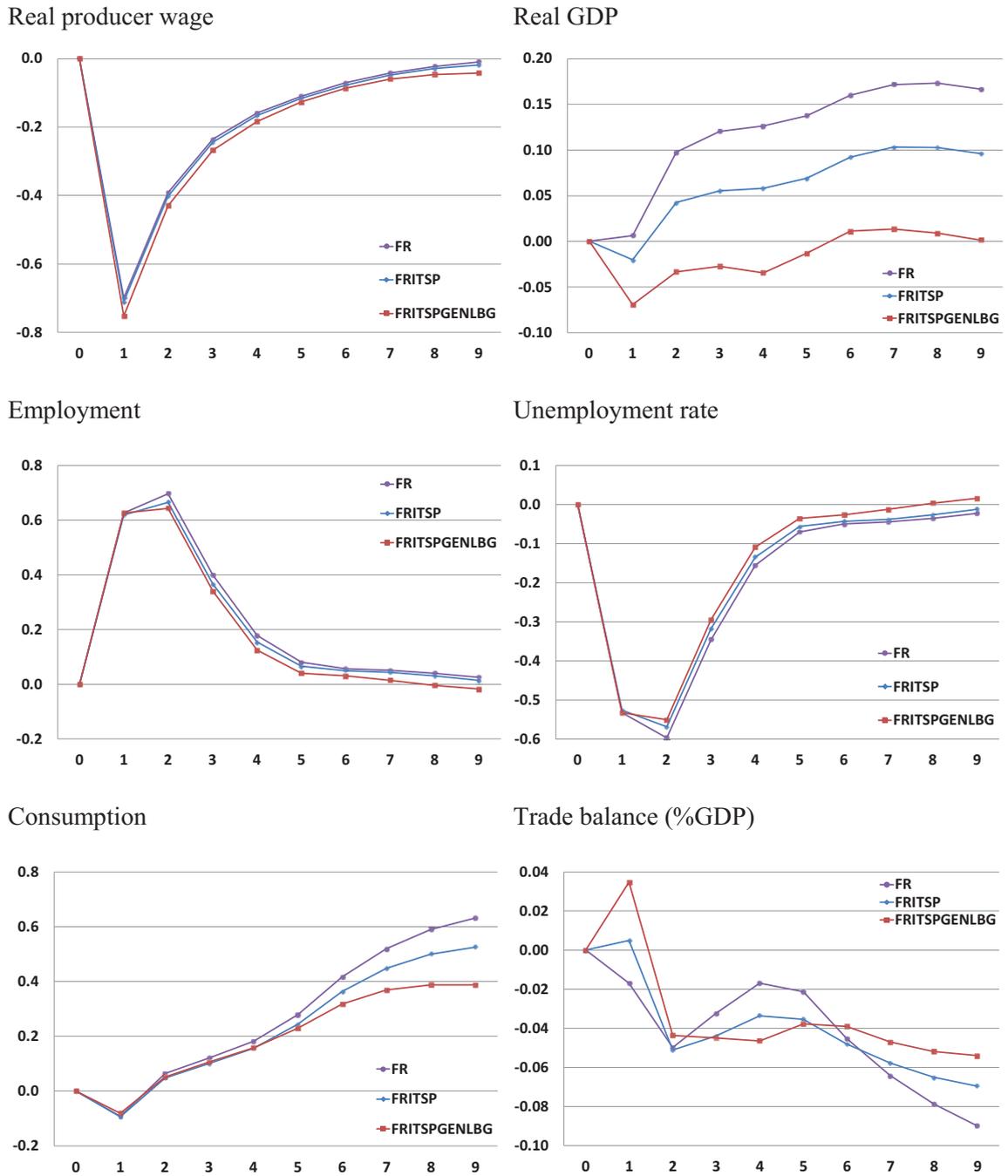
Effects on the Euro Area are given by weighted averages over 11 countries in Figure 9.6. As expected, real producer wages in the Euro Area fall the most on impact in the broad second scenario but at the same time recover the fastest in this case (see red line). The ranking of the GDP effects is opposite to the one found for the French, Italian and Spanish economies, at least after year 5. In case fiscal devaluation is implemented by all the large countries, a contraction of GDP during the first years is followed by the strongest expansion during the last years. The effect on the EA aggregate is dominated by the relatively strong effect in Germany. The initial fluctuations in employment and unemployment are the largest in the extensive second scenario but both variables return quickly to the starting level in all scenarios. The consumption effects are again in line with the GDP effects. Consumption is first most depressed and later most expanded in the second scenario. The ranking of the ultimate effects on the trade balance (as %GDP) is opposite to the one of the GDP effects. The trade balance deteriorates the strongest in the expansionary, second scenario.

⁷⁴ The euro depreciates by 0.19% in the first year and 0.30% in the ninth year following the unilateral fiscal devaluation in Germany.

9.4 Summary

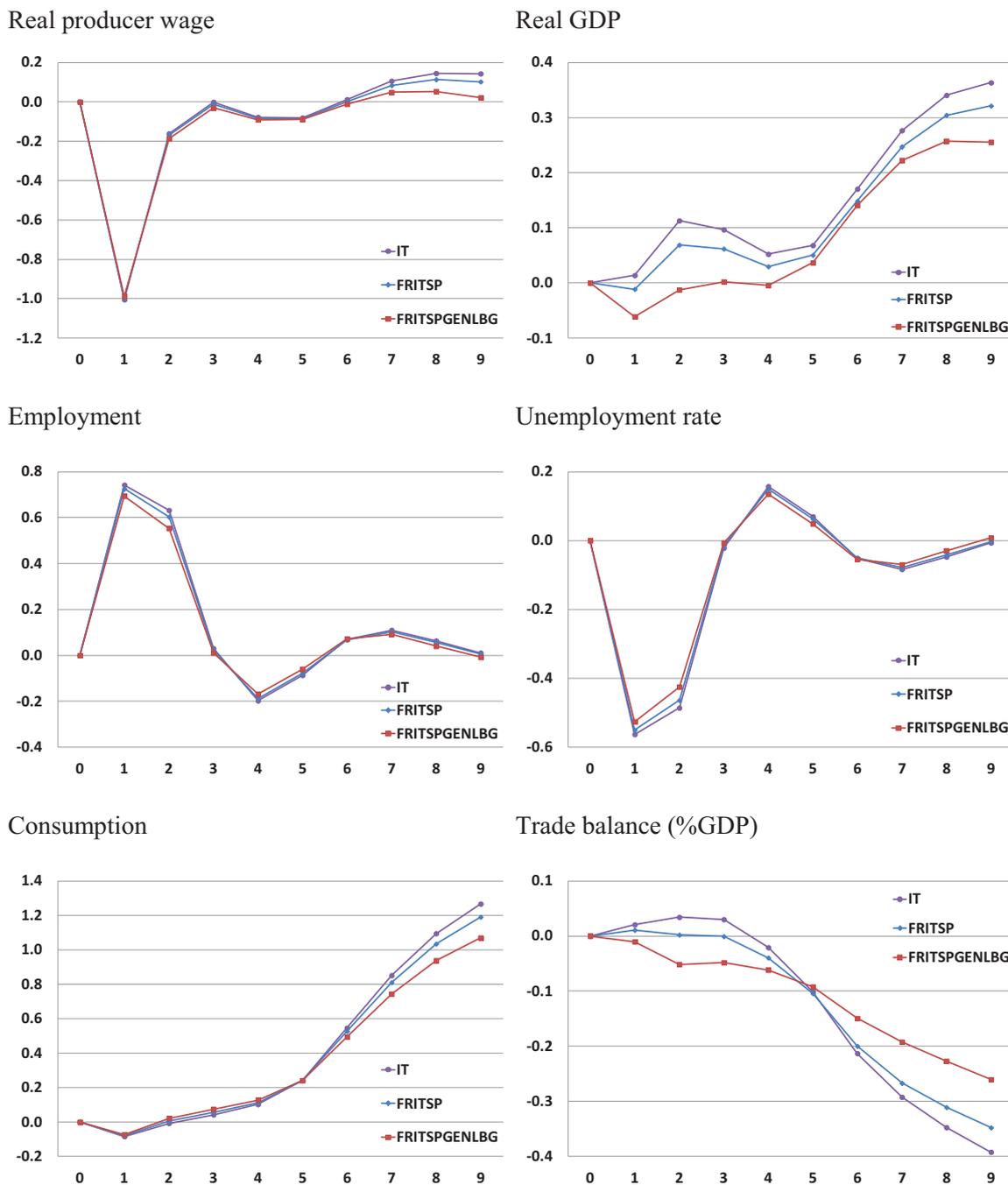
The evaluation of the different scenarios shows that the unilateral implementation of fiscal devaluation is the best option for a country that wants to expand its GDP. The GDP effects are less favourable when the three countries France, Italy and Spain coordinate the tax swap. A Euro Area-wide implementation is the least attractive option for these individual countries. In contrast, when the aim of the reform is to stimulate the economy of the EU as a whole, a broad implementation is considered the best alternative. This finding again reflects that the positive spillovers dominate the negative spillovers according to the NiGEM estimates. Others, arguing that the trade channel is the main driver of the GDP expansion, claim that an EA-wide fiscal devaluation is not effective, because it fails to improve the competitive position of an individual country vis-à-vis its EA trading partners. Anyway, one should realize that output gains remain small and temporary in every scenario.

Figure 9.2: Multilateral fiscal devaluation: effects on France – NiGEM



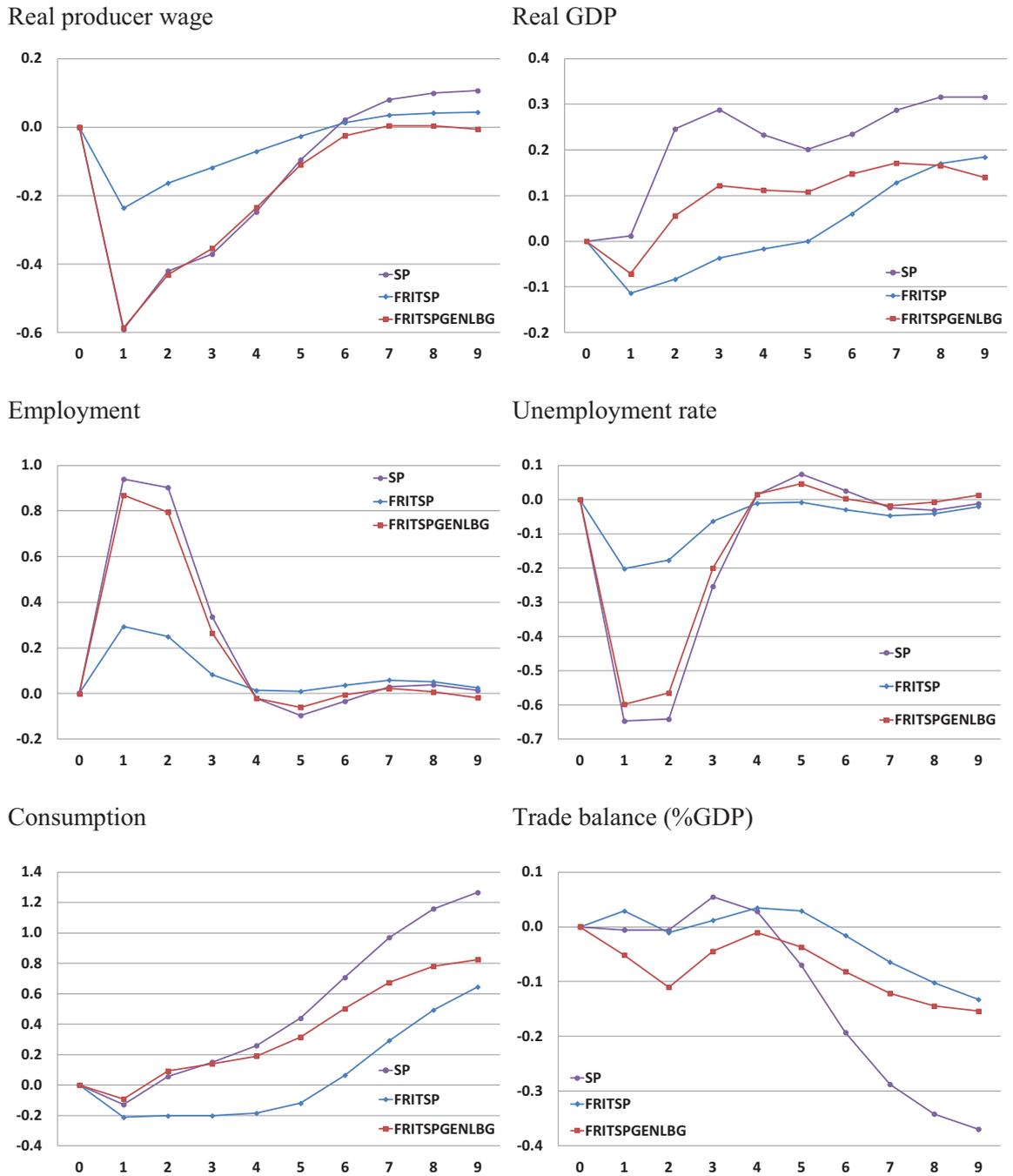
Note: horizontal axis: years; vertical axis: % difference from the baseline, % point difference for the unemployment rate and trade balance.

Figure 9.3: Multilateral fiscal devaluation: effects on Italy – NiGEM



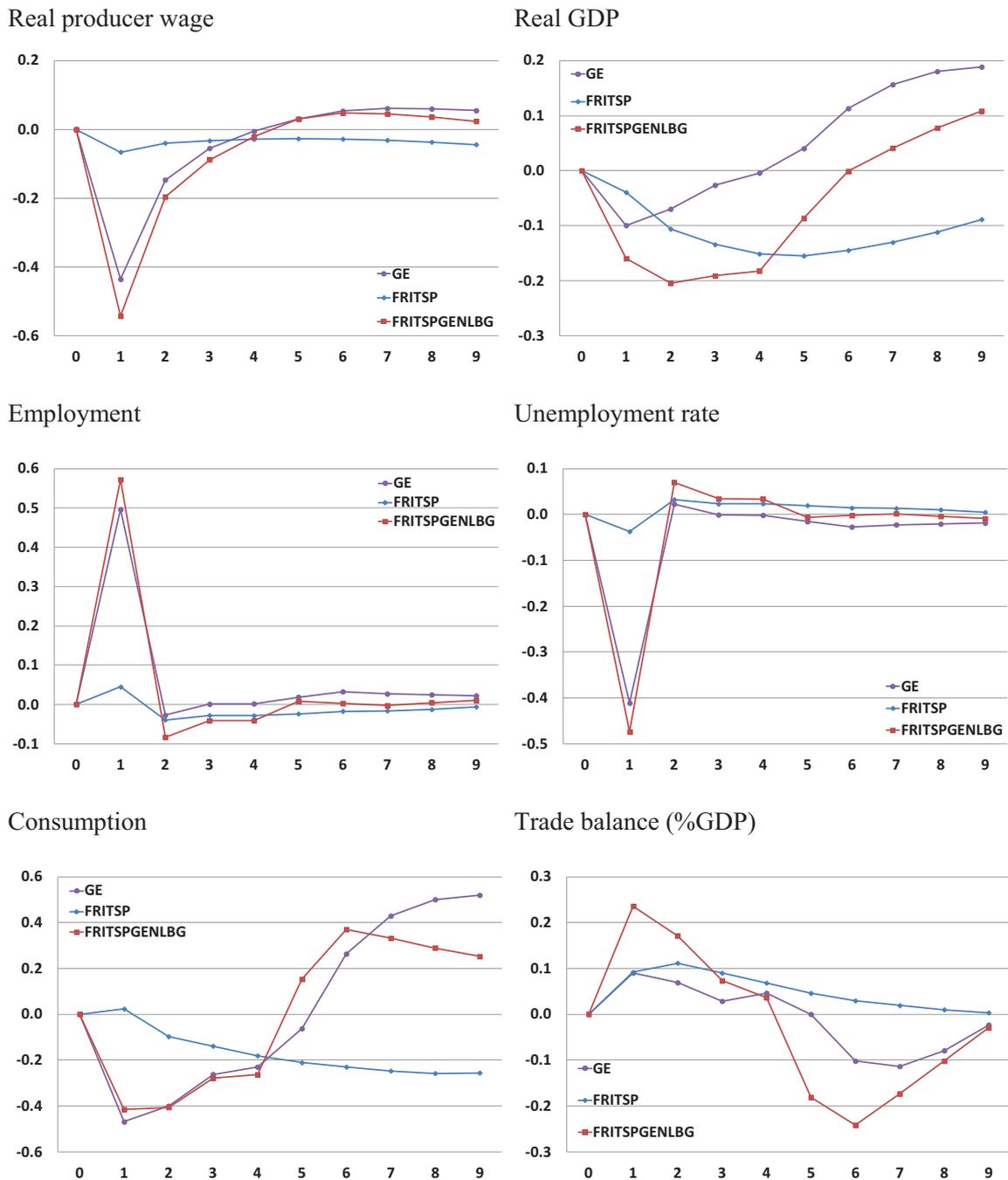
Note: horizontal axis: years; vertical axis: % difference from the baseline, % point difference for the unemployment rate and trade balance.

Figure 9.4: Multilateral fiscal devaluation: effects on Spain – NiGEM



Note: horizontal axis: years; vertical axis: % difference from the baseline, % point difference for the unemployment rate and trade balance.

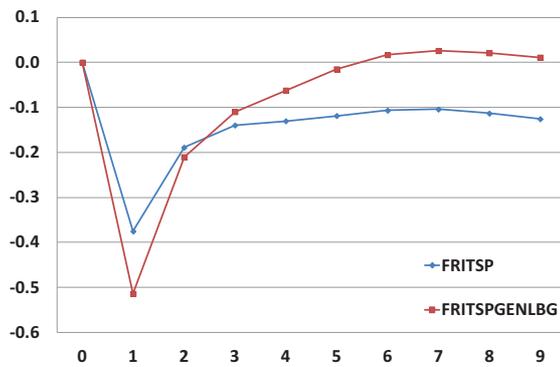
Figure 9.5: Multilateral fiscal devaluation: effects on Germany – NiGEM



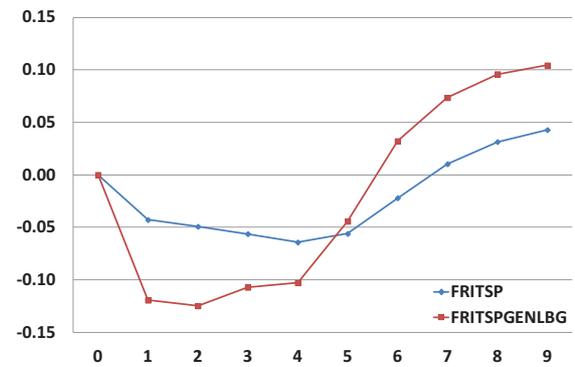
Note: horizontal axis: years; vertical axis: % difference from the baseline, % point difference for the unemployment rate and trade balance.

Figure 9.6: Multilateral fiscal devaluation: effects on Euro 11 – NiGEM

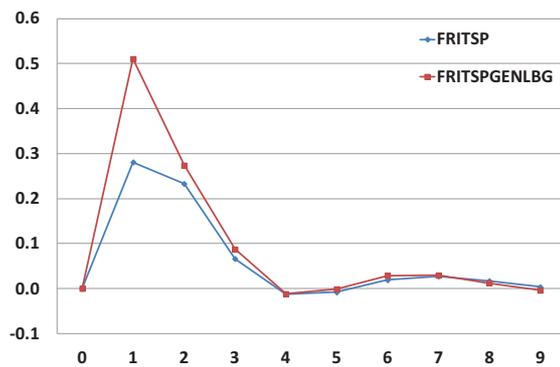
Real producer wage



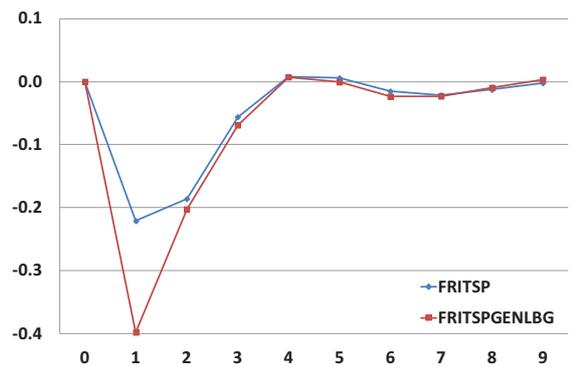
Real GDP



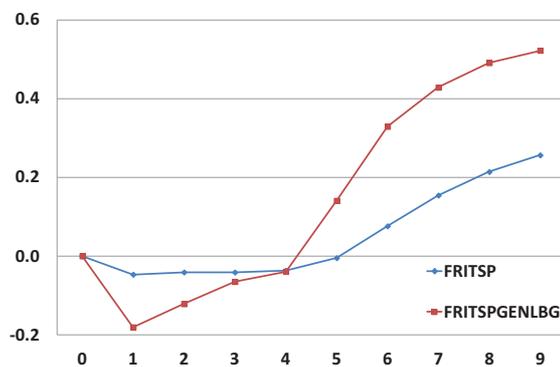
Employment



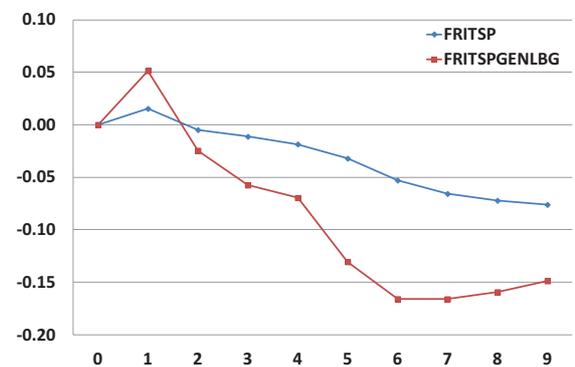
Unemployment rate



Consumption



Trade balance (%GDP)



Note: horizontal axis: years; vertical axis: % difference from the baseline, % point difference for the unemployment rate and trade balance.

Table 9.2a: Effects in first year of fiscal devaluation in unilateral and multilateral scenarios (%-deviations from basecase)

	FR	IT	SP	OE	GE	NL	BG	GR	FN	PT	IR	EA
<i>Real producer wage</i>												
1 country	-0.70	-1.00	-0.59	-0.63	-0.44							
FRITSP	-0.71	-1.00	-0.24	0.02	-0.07	0.02	-0.02	0.00	0.01	0.05	0.04	-0.38
GEFRITSPNLBG	-0.75	-0.99	-0.59	0.02	-0.54	0.13	-0.79	-0.01	0.03	0.10	0.08	-0.51
<i>GDP</i>												
1 country	0.01	0.01	0.01	0.02	0.10							
FRITSP	-0.02	-0.01	-0.11	-0.04	-0.04	-0.06	-0.08	-0.04	-0.04	-0.03	-0.05	-0.04
GEFRITSPNLBG	-0.07	-0.06	-0.07	-0.12	-0.16	-0.28	-0.17	-0.10	-0.12	-0.07	-0.13	-0.12
<i>Employment</i>												
1 country	0.63	0.74	0.94	0.49	0.50							
FRITSP	0.62	0.73	0.29	-0.04	0.04	-0.06	-0.04	-0.02	-0.04	-0.11	-0.06	0.28
GEFRITSPNLBG	0.63	0.69	0.87	-0.09	0.57	-0.32	0.71	-0.04	-0.09	-0.23	-0.14	0.51
<i>Unemployment</i>												
1 country	-0.53	-0.56	-0.65	-0.40	-0.41							
FRITSP	-0.53	-0.55	-0.20	0.03	-0.04	0.05	0.03	0.01	0.03	0.08	0.05	-0.22
GEFRITSPNLBG	-0.53	-0.53	-0.60	0.07	-0.47	0.26	-0.54	0.02	0.07	0.17	0.10	-0.40
<i>Consumption</i>												
1 country	-0.09	-0.08	-0.13	0.01	-0.47							
FRITSP	-0.09	-0.08	-0.21	-0.01	0.02	-0.01	0.00	-0.01	0.02	0.05	0.20	-0.05
GEFRITSPNLBG	-0.08	-0.07	-0.09	-0.03	-0.41	-0.52	-0.06	-0.01	0.01	0.11	0.25	-0.18
<i>Trade balance (% GDP)</i>												
1 country	-0.02	0.02	-0.01	-0.05	0.09							
FRITSP	0.01	0.01	0.03	-0.06	0.09	-0.05	0.03	0.00	-0.02	-0.03	-0.02	0.02
GEFRITSPNLBG	0.03	-0.01	-0.05	-0.12	0.24	-0.16	0.01	-0.01	-0.06	-0.07	0.01	0.05

FRITSP: reform in 3 countries: France, Italy and Spain

FRITSPGENLBE: reform in 6 countries: France, Italy, Spain, Germany, Netherlands and Belgium

Table 9.2b: Effects after 9 years of fiscal devaluation in unilateral and multilateral scenarios (%-deviations from basecase)

	FR	IT	SP	OE	GE	NL	BG	GR	FN	PT	IR	EA
<i>Real producer wage</i>												
1 country	-0.01	0.14	0.11	0.13	0.05							
FRITSP	-0.02	0.10	0.04	-0.11	-0.04	-0.05	-0.01	-0.06	-0.09	0.00	-0.06	-0.13
GEFRITSPNLBG	-0.04	0.02	-0.01	-0.16	0.02	0.20	0.11	-0.09	-0.11	0.03	-0.07	0.01
<i>GDP</i>												
1 country	0.17	0.36	0.32	0.38	0.19							
FRITSP	0.10	0.32	0.18	-0.18	-0.09	-0.10	-0.13	-0.16	-0.10	-0.09	-0.10	0.04
GEFRITSPNLBG	0.00	0.26	0.14	-0.25	0.11	0.44	0.21	-0.24	-0.13	-0.11	-0.10	0.10
<i>Employment</i>												
1 country	0.03	0.01	0.01	0.02	0.02							
FRITSP	0.01	0.01	0.02	0.00	-0.01	0.00	-0.05	-0.01	0.00	-0.04	0.02	0.00
GEFRITSPNLBG	-0.02	-0.01	-0.02	0.00	0.01	0.01	0.05	-0.01	0.00	-0.06	0.05	0.00
<i>Unemployment</i>												
1 country	-0.02	-0.01	-0.01	-0.02	-0.02							
FRITSP	-0.01	0.00	-0.02	0.00	0.01	0.00	0.03	0.00	0.00	0.04	-0.02	0.00
GEFRITSPNLBG	0.02	0.01	0.01	0.00	-0.01	-0.01	-0.04	0.00	0.00	0.05	-0.04	0.00
<i>Consumption</i>												
1 country	0.63	1.27	1.27	1.43	0.52							
FRITSP	0.53	1.19	0.64	-0.22	-0.26	-0.29	-0.25	-0.21	-0.16	-0.14	0.04	0.26
GEFRITSPNLBG	0.39	1.07	0.82	-0.36	0.25	2.15	0.84	-0.34	-0.24	-0.17	0.03	0.52
<i>Trade balance (% GDP)</i>												
1 country	-0.09	-0.39	-0.37	-0.54	-0.02							
FRITSP	-0.07	-0.35	-0.13	0.07	0.00	0.06	0.05	0.06	0.05	0.08	-0.06	-0.08
GEFRITSPNLBG	-0.05	-0.26	-0.15	0.15	-0.03	-0.88	-0.39	0.10	0.09	0.11	-0.07	-0.15

FRITSP: reform in 3 countries: France, Italy and Spain

FRITSPGENLBE: reform in 6 countries: France, Italy, Spain, Germany, Netherlands and Belgium

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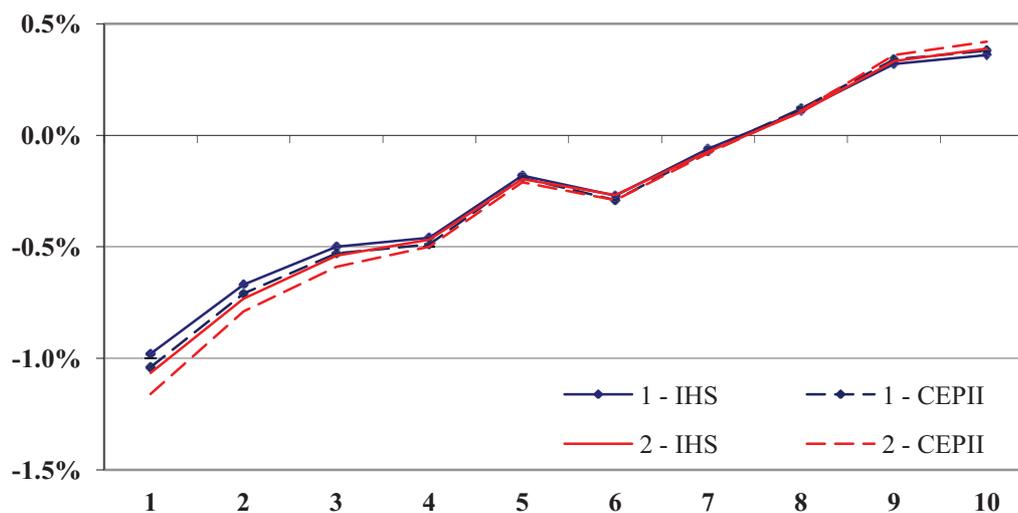
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Appendix 1: Micro simulations for France based on the CEPII macro model.

In the main text the microsimulations regarding the French case have been conducted using the macro results (reduction in SSC rates corresponding to 1% of GDP) from the IHS model. If instead we use the results from the CEPII macro model, we obtain very similar results, as Figure A1.1 shows. The figure presents two couples of curves: the continuous ones are the percentage changes in net disposable income (by deciles of equivalent disposable income) for two cases already presented in the main text, while the dashed curves refer to the new results obtained starting from the CEPII macro model. We consider only the case of universal reduction of SSC rates, but the case with targeted cuts is similar.

Figure A1.1: Comparison between the distributive impact of the FD with macro results from IHS or CEPII models, with universal reduction in SSC rates.



Note: 1: increase in only the ordinary VAT rate; 2: increase in all rates.

Appendix 2: Micro simulations without budget balance

As explained in the text, all the distributive results presented so far have been obtained under the assumption of budget balance. We have taken from the macro simulations only the percentage change in SSC rates (and the information on the share of low-wage workers), and looked for the changes in VAT rates that provide a compensating revenue, after taking into account that the increase in disposable income of workers produces modifications in personal income tax, household expenditure and cash benefits.

We have also performed a parallel set of micro simulations, taking from the macro models the percentage changes in both SSC and VAT rates, even if in the microdata this reform is not fiscally neutral. This appendix shows briefly some results of these alternative simulations, making a comparison to the results presented in the main text.

The following figures show, for the case in which only the standard VAT rate is changed, the percentage variation in net disposable incomes with and without budget balance. There are parallel curves of percentage changes, for the same reform simulated with or without budget balance. The distributive impact of each case of FD, therefore, does not change. The distributive results presented in the main text are therefore robust to a fuller consideration, in the micro simulations, of the results from the macro models. Similar conclusions can be reached with the two other cases of modification of the VAT rates; their results are not reported here for space reasons, but are available from the authors.

Figure A2.1: France: Percentage change in net income after FD with increase in standard VAT rate, with and without budget balance

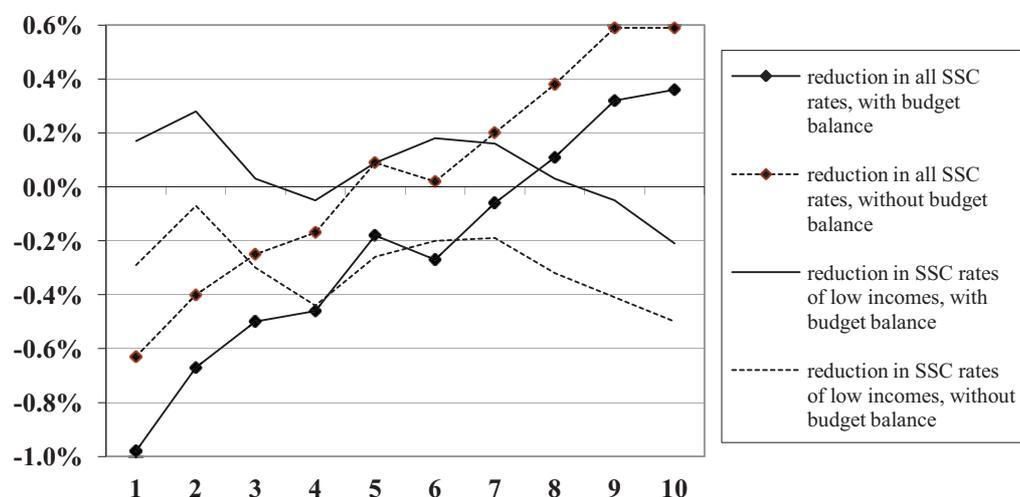


Figure A2.2: Italy: Percentage change in net income after FD with increase in standard VAT rate, with and without budget balance

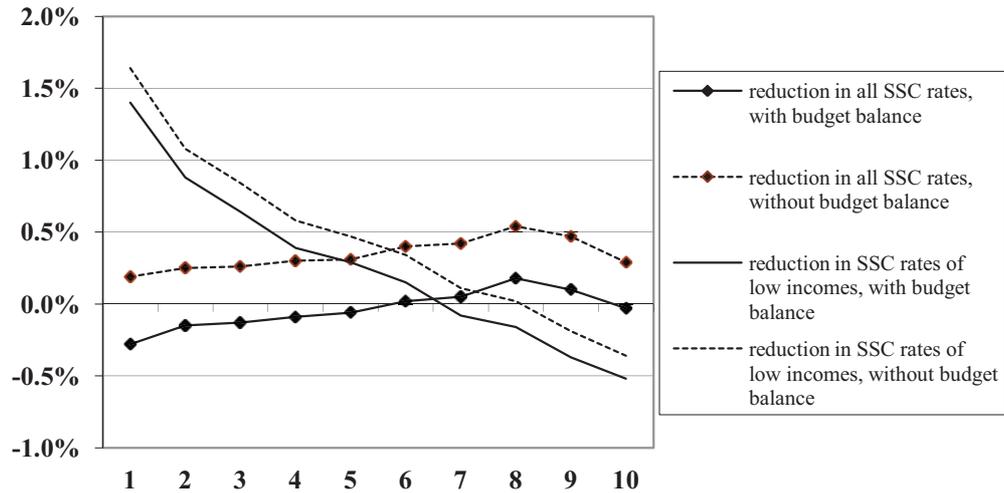
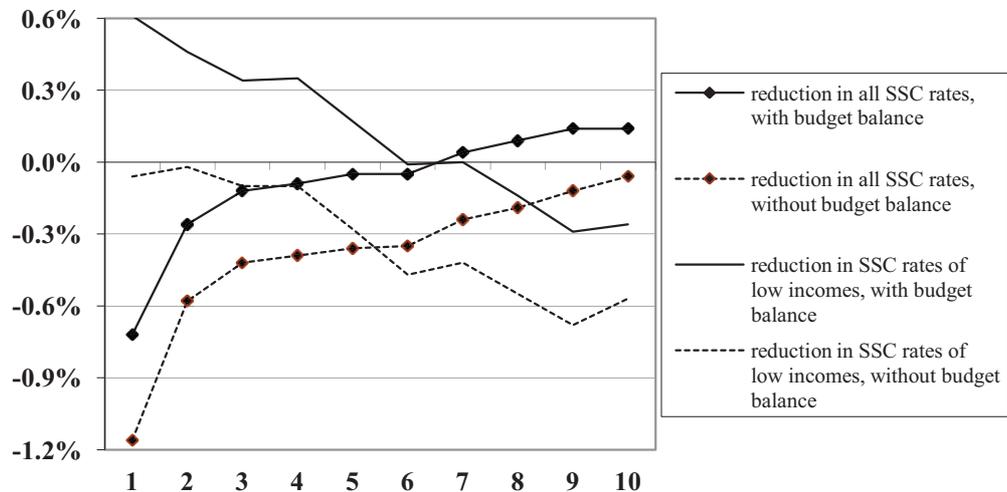


Figure A2.3: Austria: Percentage change in net income after FD with increase in standard VAT rate, with and without budget balance



Appendix 3: A uniform share of low-paid workers

One of the alternative set of simulations performed in our study concerns the case of a targeted reduction of SSC rates only for low-paid workers. The share of low-paid workers varies across the four countries, being derived from the macro models that incorporate different assumptions about who should be considered as “low earner” in each country.

In this Appendix, we set instead the same share of low earners in each country, so as to verify whether and by how much our results are influenced by this particular choice. In practice, we set this share as 30%. Since for France this is the share used in the main simulations, the results for France do not change, and we concentrate on the other three cases: Italy and Spain, which start from a share of low earners much higher than 30%, and Austria, starting from a much lower share than 30%. For this sensitivity analysis we do not change the VAT rates that guarantee revenue neutrality *ex post*, but modify the SSC revenue. In the case of Italy, for example, the share of low-paid workers falls from 45.7% to 30%, so the percentage reduction of the SSC rates for this group should increase with respect to the 26% used in the main exercise, so that it still corresponds to 1% of GDP from the macro model. It turns out that in Italy the % reduction of SSC rates for the now smaller group of low earners goes up from 26% to 55%. For Spain, the reduction in the pool of beneficiaries means that for them the SSC rates are set to nearly zero. For Austria, instead of reducing SSC rates by 83.65% for the poorest 18.12%, now they are reduced by 46% for the poorest 30%. The VAT rates remain the same as in the previous scenarios.

Figure A3.1 shows, for Italy, the % change in net disposable income, by deciles of disposable income, after the fiscal devaluation, for the three different types of modifications in the VAT rates and for the two hypotheses about the number of low earners (46% or 30%). When the share of low earners falls, so that the same aggregate benefit is concentrated on a smaller group, the reform becomes more progressive, since the beneficiaries of the SSC cut belong on average to lower deciles than before. The reduction in the Gini index after the reform is therefore higher for all the three hypotheses on the new structure of VAT rates. Figure A3.2 shows that when almost half of employees are considered as low earners, then even many households belonging to the richest deciles benefit from the targeted cut in SSC, since at least one of their members qualify for the reduction. With a more selective definition of the low earners, however, the share of households benefiting from the cut in contributions falls, with respect to income, much more rapidly than before, so that the whole measure is more progressive. In Austria, on the other hand, the reforms become slightly less progressive. Spain provides results that are very similar to those of Italy, with a greater share of total benefits concentrated among the lower deciles.

Figure A3.1 Italy: % change in net disposable income after the FD with two different hypotheses on the share of low-paid workers, by deciles of equivalent disposable income

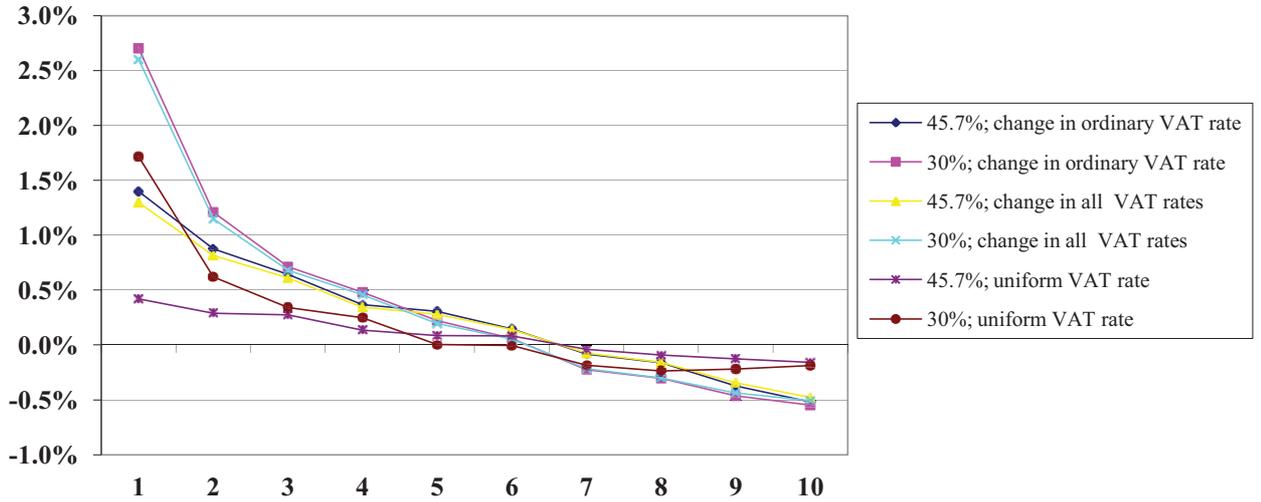


Figure A3.2 Italy: share of households with at least one low earner, for two definitions of low earners and by deciles of equivalent disposable income

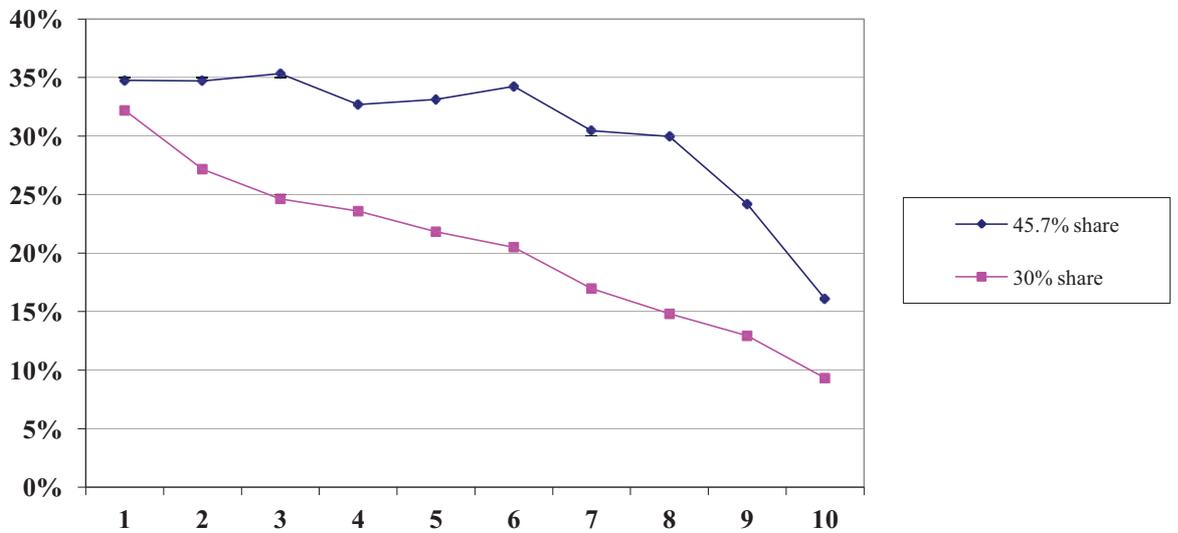


Figure A3.3 Austria: % change in net disposable income after the FD with two different hypotheses on the share of low-paid workers

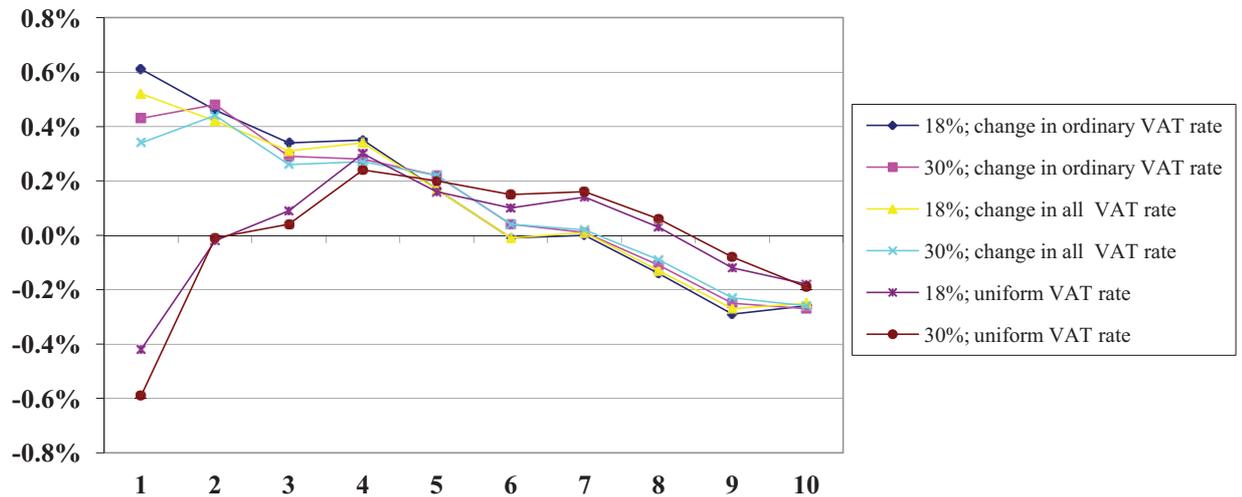


Figure A3.4 Spain: % change in net disposable income after the FD with two different hypotheses on the share of low-paid workers

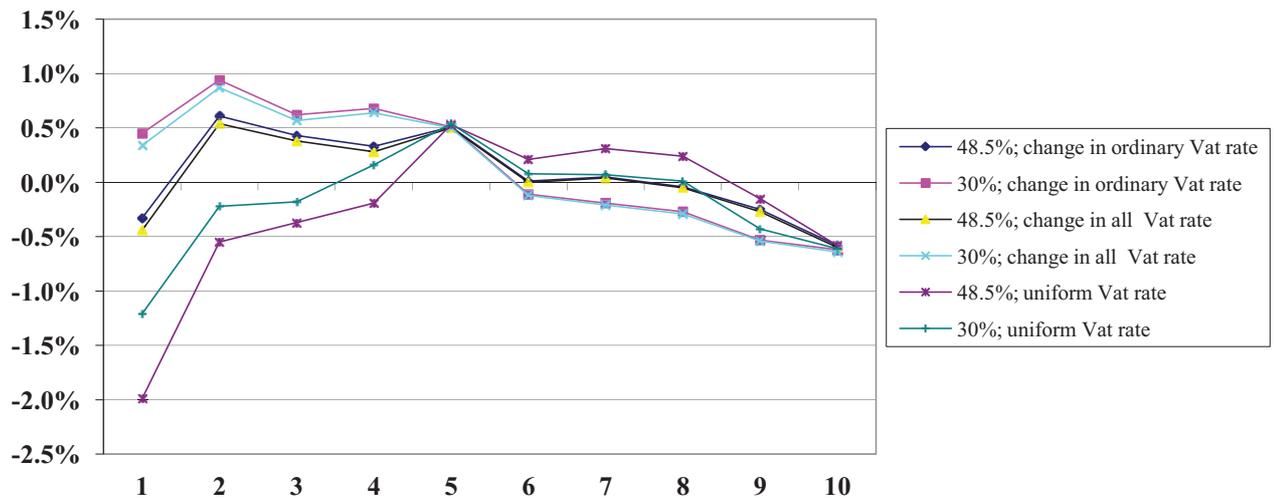


Table A3.1 compares the change in the Gini index after the FD when the SSC reduction is general and if it is concentrated on low incomes, defined both differently in each country, and also with a common 30% share. The distributive results with the 30% share are similar to those with differentiated rates of low earners. As expected, in Italy and Spain there is a more redistributive effect, while in Austria the FD becomes less

progressive when the reduction in SSC is spread to a broader pool, but the signs of the Gini variations change only in one case for Spain, but also in this case the direction of the effect of targeting the cut in SSC rates is the same as before. We can therefore conclude that the simulations performed in the main text with cuts in SSC targeted to low incomes are comparable among the different countries.

Table A3.1 % change in the Gini index of disposable equivalent income before and after FD, with different shares of low-paid workers

	France	Italy	Spain	Austria
1 Increase in ordinary VAT rate				
1.1 change in all SSC rates	+0.67%	+0.19%	+2.2%	+0.37%
1.2 change in SSC rates on low incomes (different national shares of low earners)	-0.31%	-0.77%	-0.46%	-0.61%
1.2 change in SSC rates on low incomes (common 30% share)	-0.31%	-1.01%	-0.82%	-0.55%
2 Increase in all VAT rates				
2.1 change in all SSC rates	+0.73%	+0.28%	+2.26%	+0.43%
2.2 change in SSC rates on low incomes (different national shares of low earners)	-0.30%	-0.70%	-0.39%	-0.56%
2.2 change in SSC rates on low incomes (common 30% share)	-0.30%	-1.16%	-0.75%	-0.51%
3 Uniform VAT rate				
3.1 change in all SSC rates	+2.03%	+0.90%	+2.76%	+0.79%
3.2 change in SSC rates on low incomes (different national shares of low earners)	+0.99%	-0.09%	+0.11%	-0.20%
3.2 change in SSC rates on low incomes (common 30% share)	+0.99%	-0.33%	-0.27%	-0.15%

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