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Options for Fiscal Consolidation in the United Kingdom

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Abstract

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This paper examines the macroeconomic effects of different timing and composition of fiscal adjustment in the United Kingdom using the IMF's Global Fiscal Model. Early consolidation dampens aggregate demand in the short term, but increases output in the long term as smaller primary surpluses are needed as a result of lower interest payments. Reducing government transfers or current government spending provides larger gains than increasing taxes, in particular compared to raising corporate or personal income taxes. We show that these conclusions are robust under alternative behavioral assumptions and parameterizations. A reduction in global saving would make early consolidation more urgent from both cyclical and long-term perspectives. Finally, we show that tax reform aimed at increasing incentives to save could provide support to fiscal consolidation measures.

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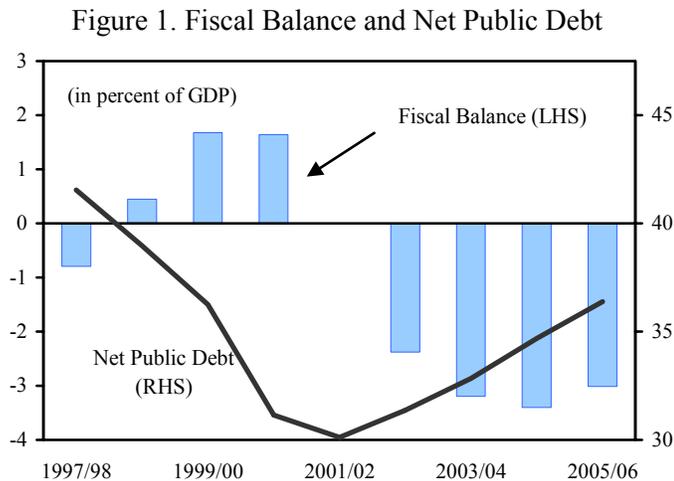
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I. INTRODUCTION

Fiscal rules introduced in 1997—a Golden rule and a Sustainable Investment rule—are a central part of the U.K. fiscal policy framework to ensure sound public finances over the medium term. The Golden rule requires that the public sector’s current balance be non-negative on average over the economic cycle and the Sustainable Investment rule requires net public sector debt to be kept at a stable and prudent level (which the Treasury regards as below 40 percent of GDP). These fiscal rules, aimed at ensuring fiscal solvency and avoiding procyclical fiscal stimulus while providing scope for automatic stabilizers to operate fully, have contributed to enhancing the credibility of the fiscal framework by anchoring expectations and improving transparency.

However, the fiscal deficit remained large during the period of strong economic growth in 2003–04 and now poses a challenge to the fiscal rules. The past five years have seen a sizable deterioration in the fiscal position owing largely to a rise in current spending that outstripped the improvement in revenue. With the overall deficit above 3 percent of GDP in recent years, net public debt has edged up to about 35 percent of GDP in FY2004/05 from a low of 30 percent of GDP in FY2001/02 (Figure 1).² While the level of public debt remains relatively low, going forward, a reduction in the overall deficit will be needed to continue to meet the fiscal rules. Against this backdrop, the paper aims at exploring the macroeconomic consequences of the timing and composition of fiscal consolidation.



Source: U.K. Office of National Statistics
1/ Debt ratio at the end of fiscal year using centered-GDP as the denominator.

² The fiscal year runs from April through March.

This paper investigates the macroeconomic effects of various options for fiscal consolidation. For this purpose, the paper uses a two-country version of the IMF's Global Fiscal Model (GFM), calibrated to the U.K. economy. GFM is a theory-based annual simulation model developed specifically to examine a range of fiscal issues (see Botman and others, 2006, for details on GFM).³ The paper poses the following questions:

- What is the trade-off between early versus delayed fiscal adjustment? The paper will contrast the macroeconomic effects of a delayed fiscal consolidation with higher government debt versus an early fiscal adjustment to contain the debt ratio at about 37 percent of GDP.
- How does the type of fiscal adjustment matter? The study will compare the impact of fiscal consolidation on the economy when it takes place through increases in taxes (on either labor income, corporate income, or personal income), or through a reduction in government transfers or lower current government spending.
- To what extent are the effects robust when taking into account uncertainty about the behavioral response of consumers and producers to changes in fiscal policy? The paper examines some of the key components that may affect the impact of fiscal consolidation, including the sensitivity of labor supply to changes in the real wage, and the substitutability between capital and labor. Furthermore, the paper analyzes the impact of a reduction in global savings on the U.K. economy, and how this affects the timing and instrument of fiscal adjustment.

II. THE MODEL AND CALIBRATION

GFM is a dynamic general equilibrium macro model suitable for the evaluation of alternative fiscal policies when Ricardian equivalence does not hold. In the presence of Ricardian equivalence, the timing of fiscal adjustment does not matter for the real economy. However, for the two-country version of GFM used in this paper, there are three reasons why Ricardian equivalence does not hold:

- The private sector is assumed to be more “impatient” than implied by the government budget constraint. This is because of the overlapping-generations structure of the model—consumers have finite lives as they face a constant probability of death. Because the private sector uses a discount factor that is higher than the real interest rate, the effects of future policy actions are discounted more rapidly than is implied by the government budget constraint (consumers discount future tax liabilities because there is a chance they will no longer be alive to pay them). As a result, fiscal policy changes influence national saving.

³ For applications of the model in the context of fiscal reform in Canada and the United States, see Bayoumi and Botman (2005); Bayoumi, Botman, and Kumar (2005); Kumhof, Laxton, and Muir (2005); and Botman and Laxton (2004).

- Markets are not fully competitive. Firms and workers have some monopolistic power, so that prices and wages are above their perfectly competitive levels. In addition, profits reflect both returns to capital and economic rents extracted by firms. Compared with the case of perfect competition, these rents reduce the distortionary impact of corporate and personal income taxes.
- Some consumers have no access to financial markets. Consumers that are liquidity-constrained consume their entire disposable income. As a result, the pattern of taxes matters, with higher taxes causing their consumption to fall one-for-one.

The model embodies a stylized representation of the U.K. tax and expenditure system. The analysis incorporates three taxes: a labor income tax levied on wage compensation paid by workers or employers (payroll tax); a corporate income tax levied on accounting profits of firms; and a personal income tax levied on labor income, accounting profits, government transfers, and interest income (on government bonds and net foreign assets). Since liquidity constrained consumers have no wealth and do not save, they are not directly affected by corporate income taxes. It is assumed that for all three taxes, there is a single (although different) marginal rate, which coincides with the average tax rate. Revenues raised by taxation are spent on lump-sum transfers to consumers, government consumption of both traded and nontraded goods, and servicing government debt. At present, GFM does not incorporate a sales tax or VAT (value-added tax).

Other main aspects of the model can be briefly summarized as follows:

- Consumption and production are characterized by constant elasticity of substitution utility and production functions, respectively.
- There are two factors of production—capital and labor—which are used to produce either traded or nontraded goods. Labor and capital can move freely between the traded and nontraded sectors, but are not mobile internationally.
- Investment is driven by a Tobin's Q relationship, with firms responding sluggishly to differences between the future discounted value of profits and the market value of the capital stock.
- Wages and prices are fully flexible. The central bank implements money targeting.
- The model's financial market block is highly stylized. There are two kinds of assets, namely government debt (which can be traded internationally) and equity (which is held domestically). International trade in government debt implies the equalization of real interest rates across countries over time.

The model has been parameterized to reflect key macroeconomic features of the United Kingdom. In particular, key parameters—the ratios of consumption, investment, government spending, wage income, and income from capital relative to GDP—are calibrated to match

the U.K. economy. Similarly, fiscal variables—tax rates on capital, labor, and personal income, and government debt—have been calibrated to correspond to the U.K. fiscal structure. The size of the U.K. economy is assumed to be around 5 percent of the world economy, which implies U.K. policies have only a minimal impact on the global rate of interest.

Behavioral parameters are based on microeconomic estimates and set equal across the United Kingdom and the rest of the world (RoW). These include parameters characterizing real rigidities in investment, markups for firms and workers, the elasticity of labor supply, the elasticity of substitution between labor and capital, the elasticity of intertemporal substitution, and the rate of time preference.⁴ Sensitivity analysis examines the impact of changing the values of the following key parameters:

- The sensitivity of labor supply to the real wage: The baseline value (0.04) is at the mid-range of values found by microeconomic studies. An alternative simulation assumes a value close to the lower limits of these estimates representing the case of inelastic labor supply.
- The elasticity of substitution between labor and capital in the production function: The baseline value is 0.8, with an alternative simulation using a value of 1 (the Cobb-Douglas case).
- The elasticity of intertemporal substitution: The baseline value for this parameter that describes the sensitivity of consumption to changes in the real interest rate is 0.33. The parameter value in the alternative simulation (0.2) is consistent with the lower end of microeconomic estimates.
- The wedge between the rate of time preference and the yield on government bonds: This parameter—which determines consumers’ degree of impatience—has not been subject to extensive microeconomic analysis. The baseline value of the wedge is set to 10 percent, with an alternative simulation using 1 percent. The baseline value implies an effective planning horizon of 10 years, which is obviously much lower than the probability of survival for most of the population, but it is a simple way of introducing a form of myopia into the model.
- The fraction of consumers that has no access to financial markets: In the baseline, 20 percent of the population is assumed to be liquidity-constrained and consumes its entire disposable income every period. This fraction is consistent with empirical evidence for the United Kingdom reported in Al-Eyd and Barrel (2005). To investigate the importance of this assumption, an alternative simulation assumes that all consumers can use financial markets to smooth their consumption over time.

⁴ See Laxton and Pesenti (2003) for a more detailed discussion of evidence on parameter values.

The impact of fiscal policy on real activity combines responses from aggregate supply and demand. Aggregate supply changes are triggered through the “distortion channel.” Fiscal policy influences include the impact of wage taxes on the incentive to work and the effect of corporate income tax rates on the incentive to invest in productive capital. Aggregate demand changes largely depend on fiscal policy’s effects on wealth and interest rates. The strength of the wealth channel is influenced by the level of consumer “impatience.”

III. MACROECONOMIC EFFECTS OF ALTERNATIVE FORMS OF FISCAL CONSOLIDATION

The baseline features delayed consolidation. In the baseline, government debt increases to about 43 percent of GDP by FY2009/10. This is consistent with a scenario in which no fiscal consolidation is forthcoming in the near future. The financing gap—the difference between revenue and expenditure—is assumed to close after FY2009/10 by gradually increasing labor income taxes on workers. The consolidation generates the primary surpluses required to stabilize the debt ratio at 45 percent of GDP.

In the baseline, the initial financing gap stems from higher government transfers which stimulate aggregate demand in the short term, especially by liquidity-constrained consumers (Figure 1). The increase in domestic demand is supported by real exchange rate appreciation—following higher interest rates in the United Kingdom than the rest of the world. As government debt rises, however, labor income taxes on workers need to be increased—by about 2 percentage points—to stabilize the government debt-to-GDP ratio, taking into account the need to finance higher interest expenses. The long-run increase in the real interest rate is muted by the fact that the United Kingdom is a relatively small open economy. Labor effort, investment, and consumption all decline in the medium term, implying a permanent output loss of about 0.3–0.4 percent.

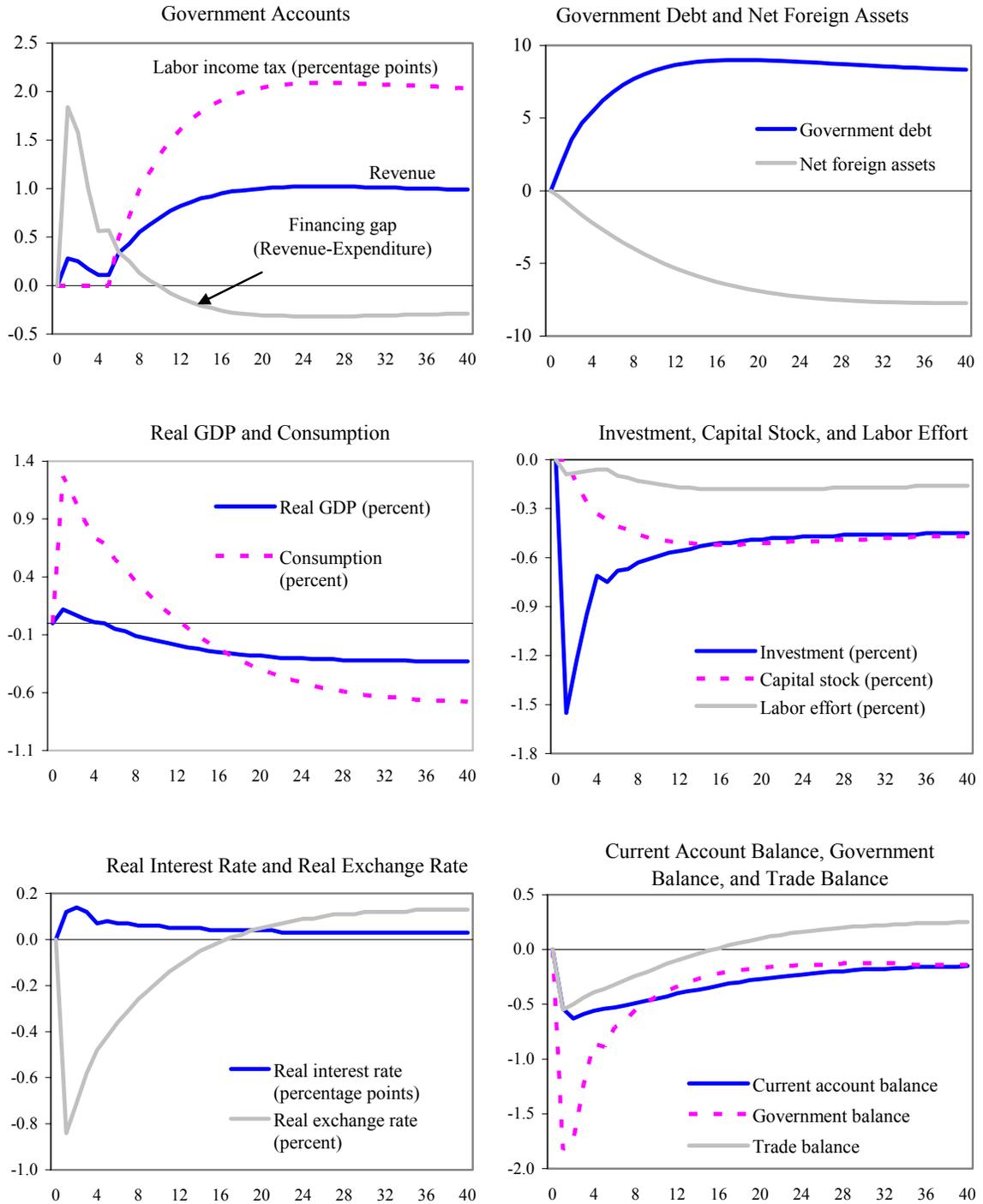
In contrast, early consolidation that prevents the increase in government debt yields considerable long-term output gains. Under this scenario, a gradual consolidation from FY2006/07 onwards stabilizes the debt-to-GDP ratio at 37 percent. Early consolidation dampens aggregate demand in the short term but increases output in the long term because the government’s interest payments, and consequently tax rates, are lower compared to delayed consolidation.⁵ The consolidation—either early or delayed—can take place through (i) lower government transfers; (ii) lower government consumption of traded and nontraded goods; (iii) higher labor income taxes levied on workers; (iv) higher labor income taxes levied on employers; (v) higher personal income taxes; or (vi) higher corporate income taxes. Regarding these different options for raising revenue (see Figures 2–5),

⁵ In case trade in financial assets is imperfect between the United Kingdom and the rest of the world, the benefits of an early rather than a delayed consolidation would be larger as higher government debt in the United Kingdom would imply a larger increase in the real interest rate.

- An increase in labor taxes has larger long-term benefits than increasing corporate income taxes. Capital is more responsive to changes in tax rates, while labor supply is less responsive. In this context, it should be noted that corporate income taxation becomes less distortionary if profit margins increase, as a larger share of the tax burden falls on rents rather than the required return to capital (i.e., goods price markups are high). Also, despite being less favorable than raising taxes on labor income, an early adjustment through higher corporate income taxation is still beneficial relative to delaying fiscal adjustment.
- On the other hand, the short-term loss in output is reduced if the early consolidation takes place through higher corporate or personal income taxes. This result stems from the sluggish response of investment to changes in after-tax returns in light of the assumed adjustment costs on capital accumulation. Also, raising corporate income taxes affects optimizing, forward-looking consumers, while higher transfers increase disposable income of liquidity-constrained consumers. The latter individuals smooth their consumption over time, implying a more subdued response of aggregate demand in the short term.
- The gains are largest, and occur more rapidly, if consolidation takes place through lowering government expenditure. This owes much to the fact that, regardless of the timing of the consolidation, reducing transfers or government spending has the advantage of preventing further tax distortions.
- The trade-off between short-term costs and longer-term benefits of an early consolidation occurs regardless of the type of consolidation (Figure 6). The exception is corporate income taxes for which it is preferable to raise them earlier regardless of the planning horizon of policymakers (Figure 6, panel 6) as the protracted increase in corporate taxes discourages forward-looking investors at an early stage. In GFM, efficiency losses occur regardless of which side of the market is taxed, as evidenced by the fact that raising labor income taxes on workers has the same effect as increasing the payroll tax on employers.⁶

⁶ Total after-tax wage income accruing to workers changes the same whether there is an increase in payroll taxes levied on workers or on employers. However, in the former case hours worked declines through a drop in labor supply—increasing the real wage. While in the latter case, hours worked declines (although by less) through a reduction in labor demand causing the real wage to fall as well.

Figure 2. Baseline: Macroeconomic Effects of Delayed Consolidation
(Deviation from initial steady state in percent of GDP)



Source: IMF staff estimates.

Figure 3. Impact on Real GDP of Tax Increases

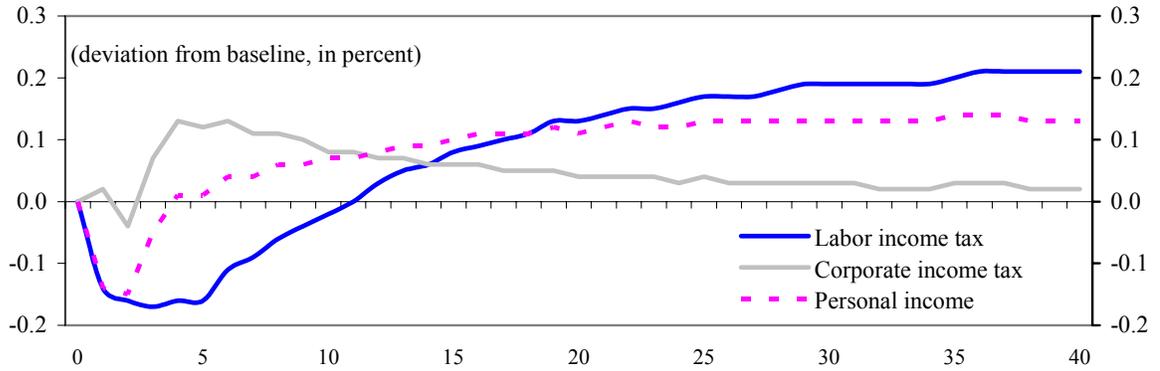


Figure 4. Impact on Real GDP: Corporate Tax and Markups

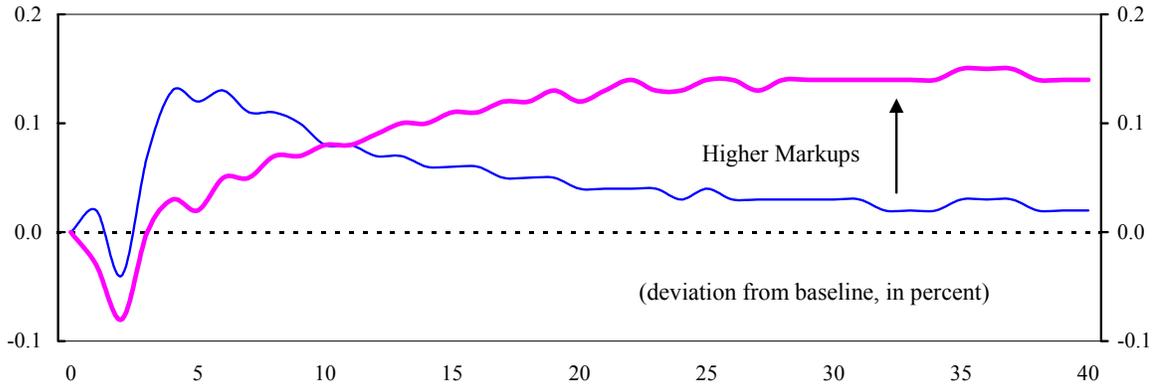
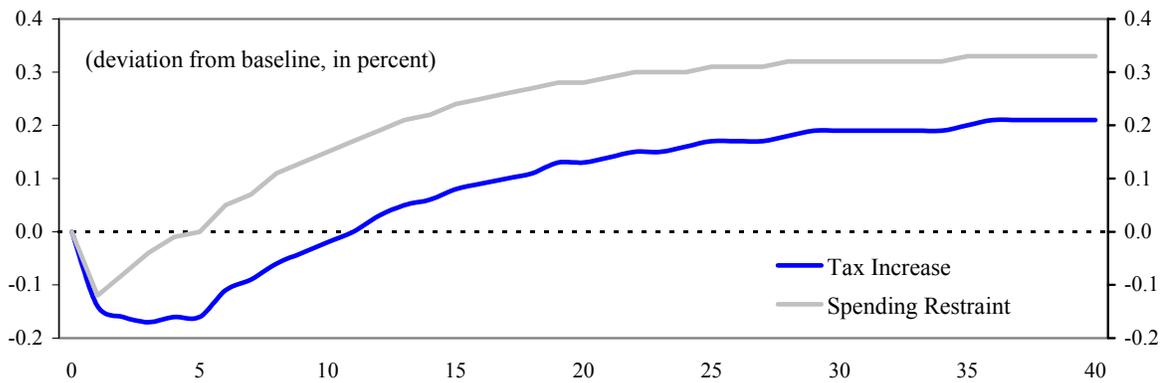
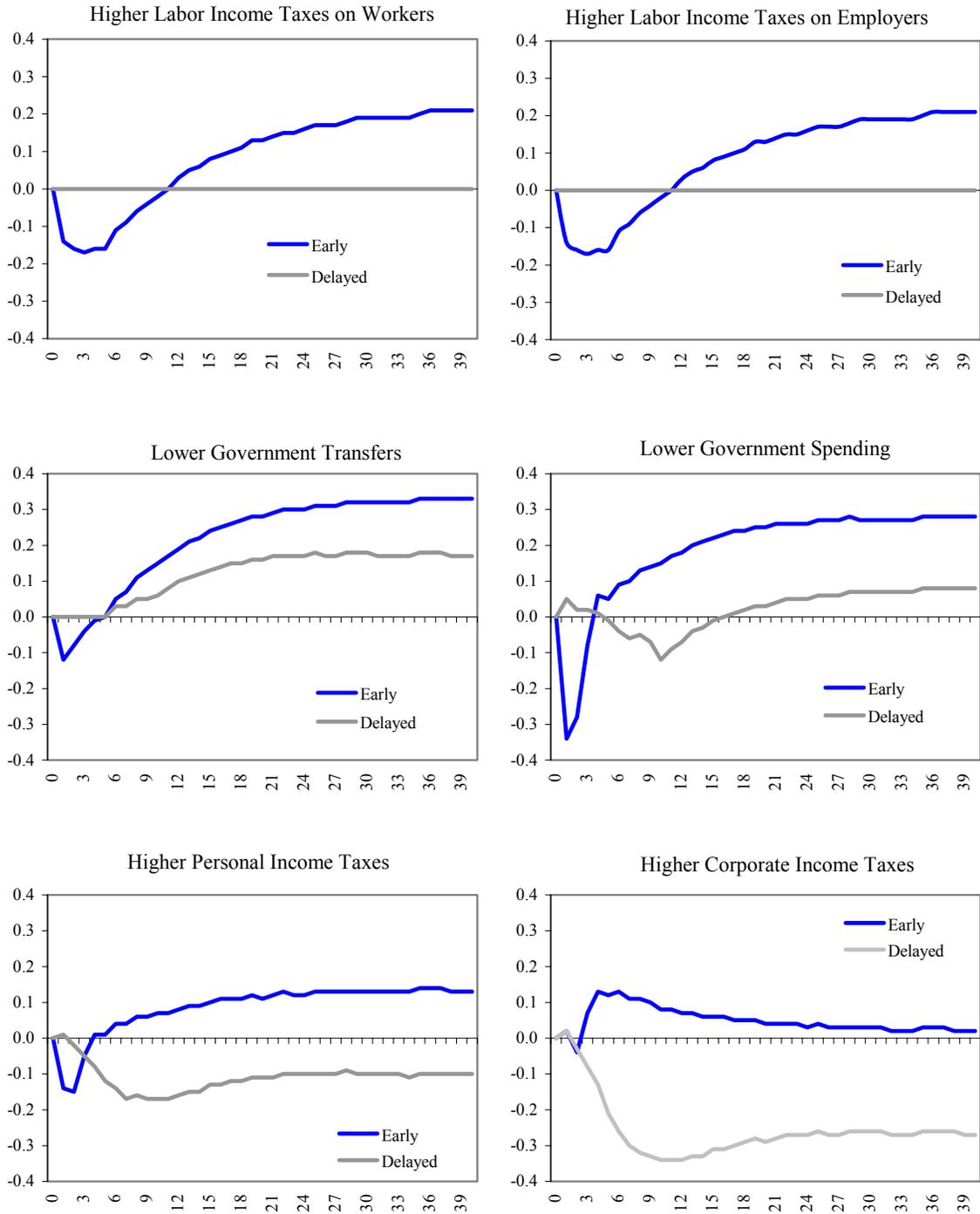


Figure 5. Impact on GDP of Spending Restraint vs. Tax Increase



Source: IMF staff estimates.

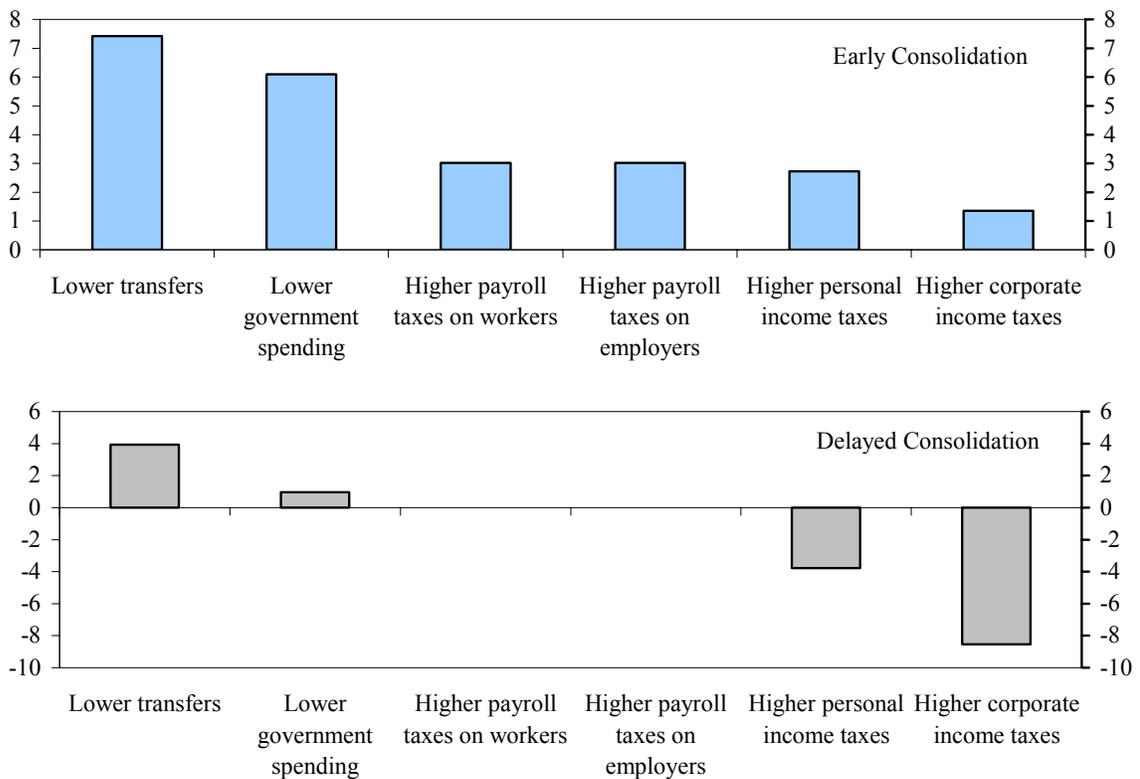
Figure 6. Effect on Real GDP of Alternative Types and Timing of Consolidation
(Deviation from baseline in percent of GDP)



Source: IMF staff estimates.

Evaluating the short- and long-term macroeconomic effects through a net present value calculation confirms the significant benefits of early consolidation (Figure 7). The gains of early consolidation compared to delayed adjustment through higher labor income taxes are between 1½ and 7½ percent of GDP depending on the type of instrument. When adjustment is delayed, the benefits of lowering transfers or government spending compared to higher personal or corporate income taxes are even more pronounced than for an early consolidation. This is because of the distortions arising from the increase in tax required to service the higher level of government debt.

Figure 7. Net Present Value of Alternative Forms of Fiscal Consolidation
(Deviation from baseline (delayed consolidation via higher labor income taxes) in percent of GDP)



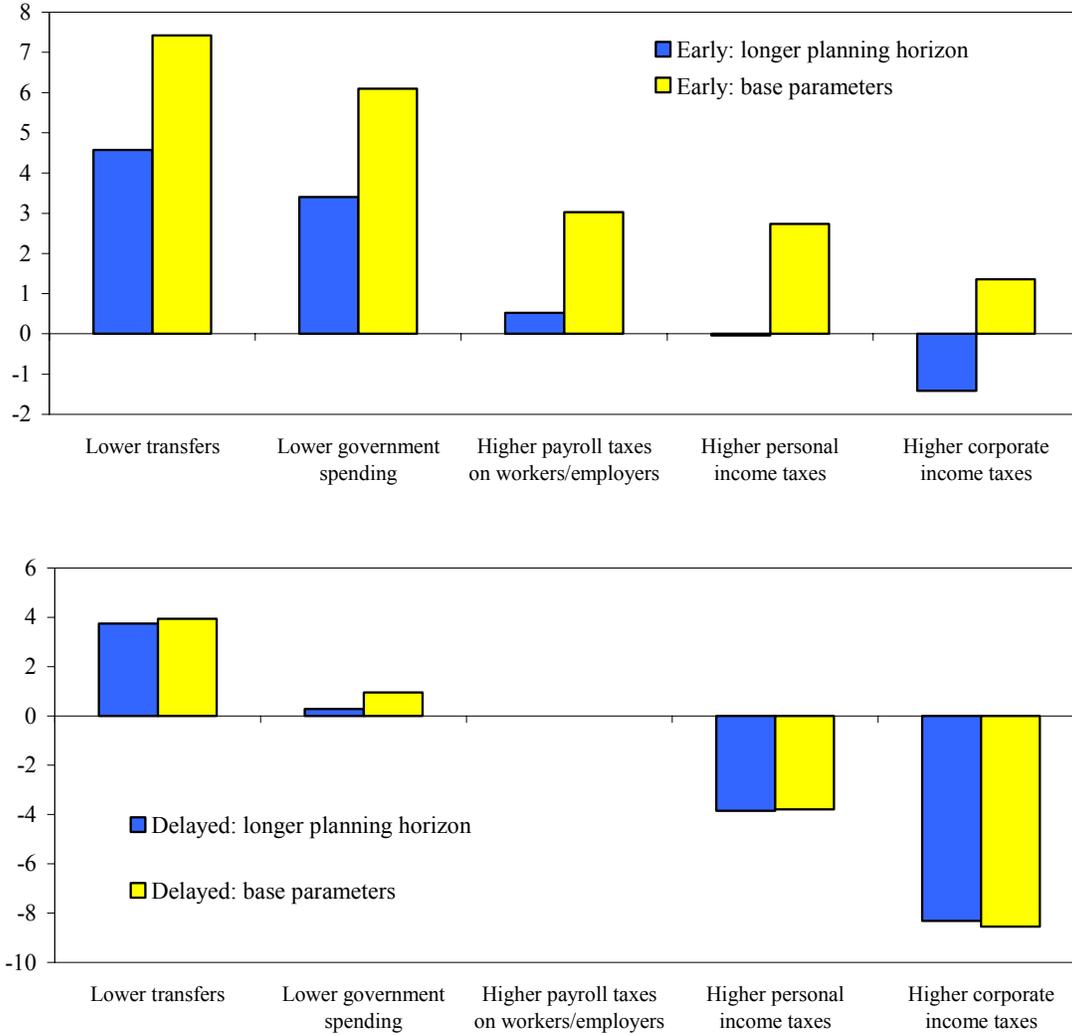
Source: IMF staff estimates.

IV. SENSITIVITY ANALYSIS AND FISCAL POLICIES IN THE REST OF THE WORLD

Sensitivity analysis indicates that the results are broadly robust to changes in behavioral parameters. The key factors affecting the *timing* of consolidation are the planning horizon of consumers and the sensitivity of consumers to a change in the real interest rate. The key factor affecting the *type* of consolidation is the sensitivity of workers to a change in the real wages.

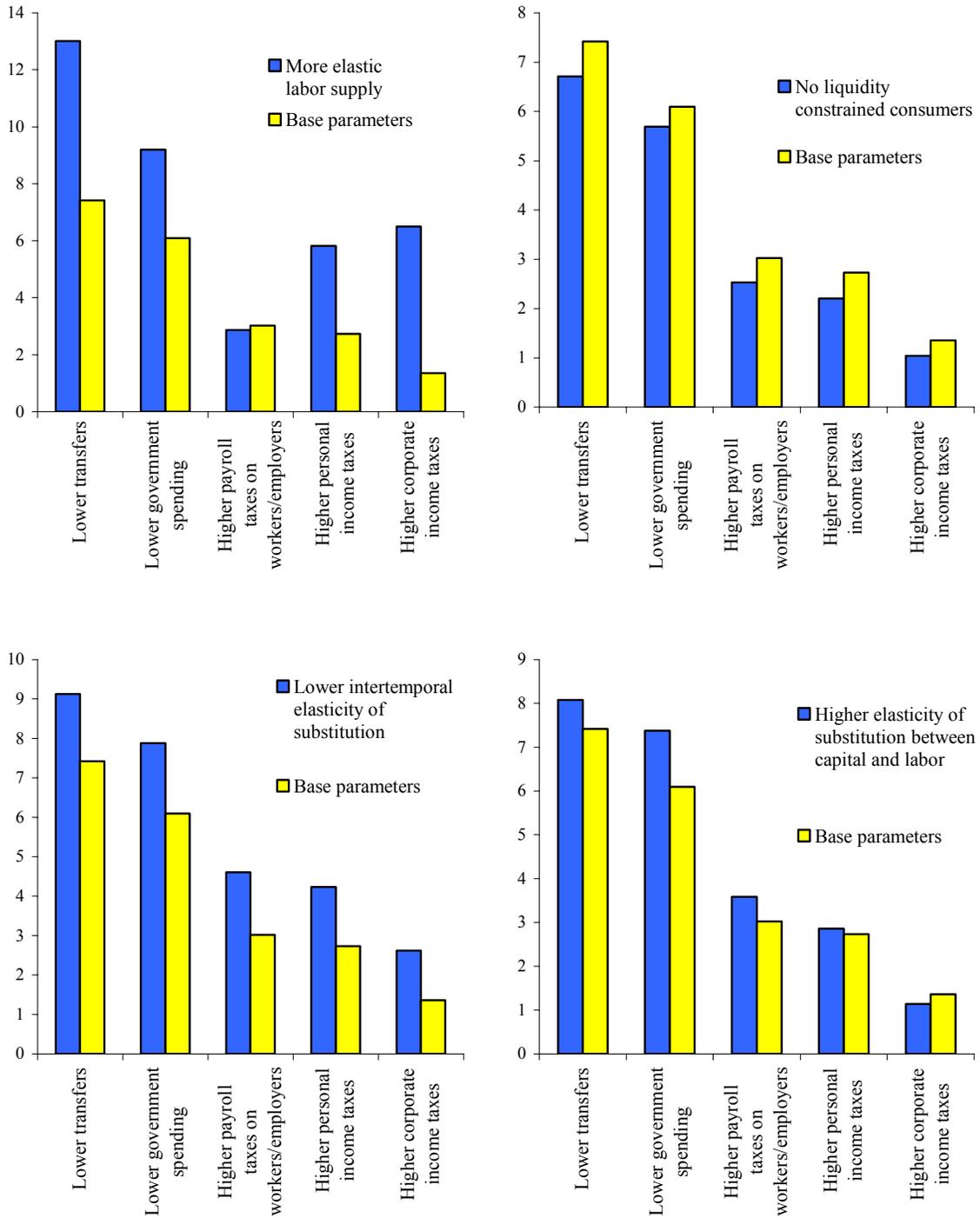
- A longer planning horizon of consumers reduces the cost of delayed consolidation (Figure 8). If consumers discount the future less—a planning horizon of 100 years instead of 10 years in the scenarios discussed thus far—their intertemporal choices become similar to those in a representative agent model. The crowding-out effect of higher government debt is smaller as consumers anticipate that higher government transfers will be followed by higher labor income taxes in the future, leading them to save a higher fraction of the short-term increase in disposable income. Nevertheless, significant benefits of early consolidation through lower transfers or lower government spending remain although consolidating early via higher corporate income taxes now becomes more costly than delaying and adjusting via higher labor income taxes. The reason is that optimizing agents are now more forward-looking and incorporate the fact that the after-tax rate of return will be lower in the future, leading them to substitute towards higher consumption and lower capital accumulation.
- Reducing the sensitivity of consumption to changes in the real interest rate increases the benefits of early consolidation. As can be seen from Figure 9 (third panel), a lower intertemporal elasticity of substitution increases the benefits of all early consolidation measures compared to the baseline of delayed consolidation. Delaying consolidation increases net foreign liabilities, alongside the increase in government debt. As a result, the United Kingdom needs to run trade balance surpluses to service the interest cost on these liabilities. For the trade balance to be in surplus, saving in the United Kingdom needs to increase. As consumption becomes less responsive, interest rates need to increase by more to provide the incentive to save more. As a result, capital accumulation will decline by more, implying that delayed consolidation becomes more costly.
- Increasing the sensitivity of workers to changes in the after-tax real wage increases the benefits of consolidating through lower transfers and government spending (Figure 9). As labor supply becomes more elastic, labor income taxation becomes more distortionary as workers reduce labor effort more. In fact, corporate income taxes become less distortionary than labor income taxes in the alternative scenario. By contrast, completely inelastic labor supply would make labor income taxation lump sum, reducing the benefits of alternative types of consolidation measures.

Figure 8. Sensitivity Analysis: Longer-Planning Horizon
(Deviation from baseline (delayed consolidation via higher labor income taxes) in percent of GDP)



Source: IMF staff estimates.

Figure 9. Sensitivity Analysis of Alternative Forms of Early Consolidation 1/
 (Deviation from baseline (delayed consolidation via higher labor income taxes) in percent of GDP)



Source: IMF staff estimates
 1/ Effect on real GDP in net present value terms.

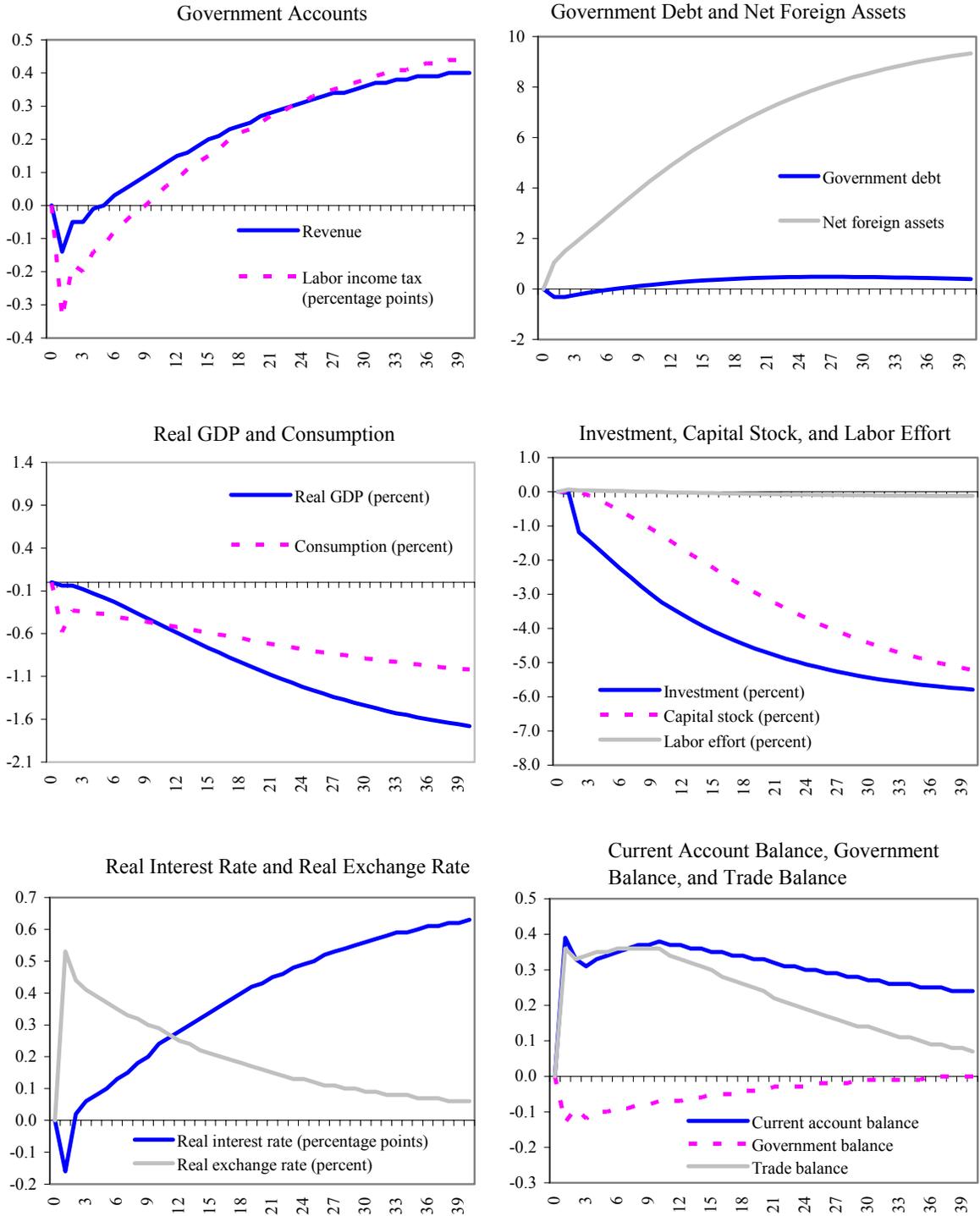
- Increasing the access of consumers to financial markets or increasing the substitutability between factors of production has only a marginal effect on the results. Essentially, if all consumers have access to financial markets and are able to smooth their consumption over time, aggregate consumption is determined in a more forward-looking manner. This reduces the crowding-out effects of government debt, but not substantially. Conversely, a higher substitutability between capital and labor generally increases the costs of delaying consolidation, while making consolidation through higher corporate income taxation less harmful as it is easier for firms to substitute towards labor.

The choice between early and delayed consolidation in the United Kingdom is also likely to be affected by changes in global interest rates. In particular, changes in global savings and investment have implications for the real interest rate in the United Kingdom and changes in consumption in the rest of the world affect the demand for imports from the United Kingdom. Furthermore, foreign fiscal policies affect the real exchange rate, implying potential wealth effects on U.K. consumers. In order to illustrate these channels of interaction, we consider a gradual, but permanent increase in government debt by 10 percentage points in the rest of the world because of a temporary reduction in labor income taxes.

A reduction in global savings would have a significant impact on the U.K. economy by pushing up real interest rates (Figure 10). A less benign global financing environment, simulated here as an increase in government debt in the rest of the world, increases real interest rates by about 70 basis points in the long run. This results in crowding out of investment in the United Kingdom as well as higher (labor income) taxes because of higher financing costs of government debt. These two channels are magnified in the short run by the negative wealth effect of real exchange rate depreciation despite higher exports of the United Kingdom to the rest of the world, and in the long run, by a permanent decline in output.

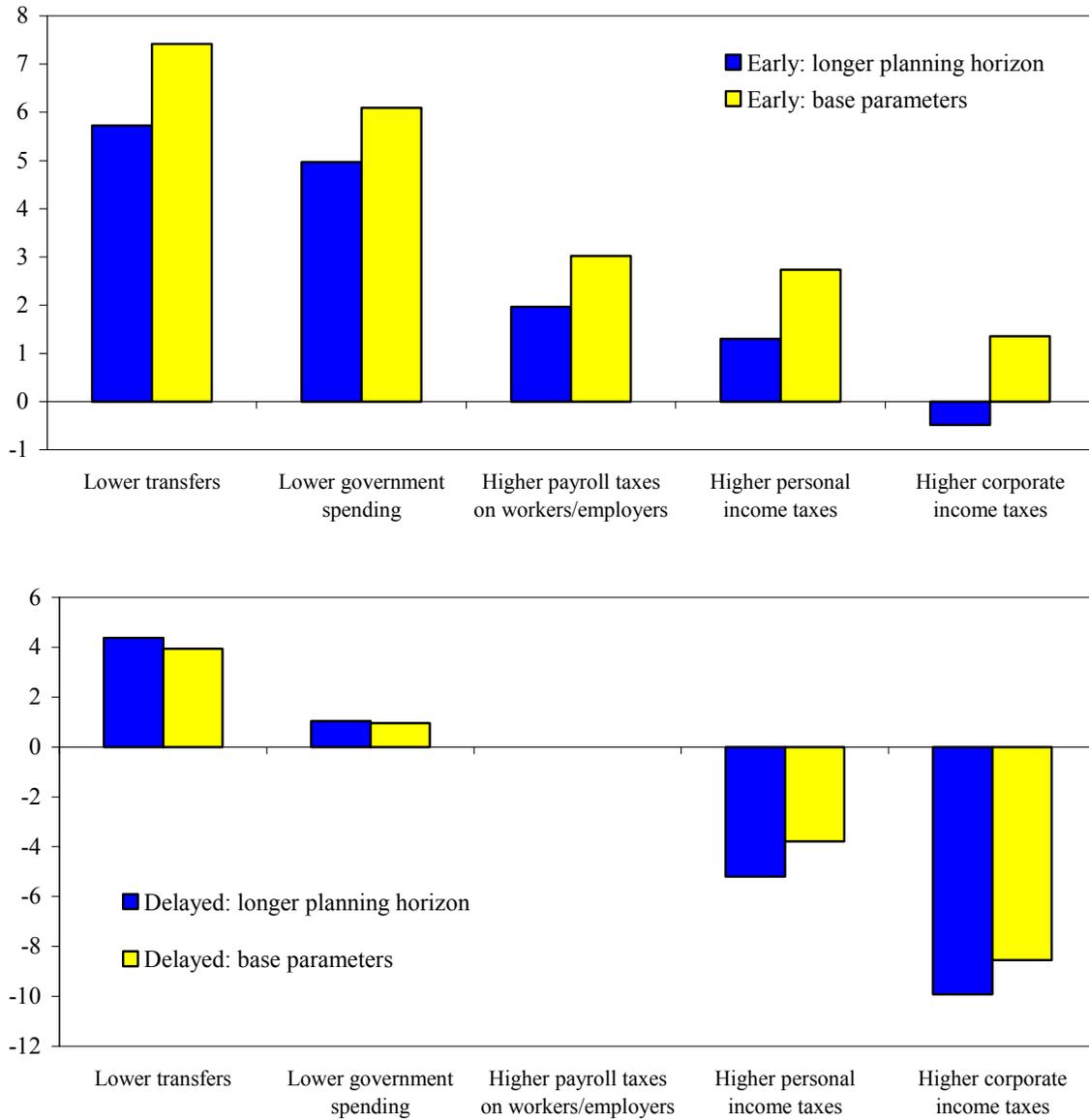
In such a scenario, delaying fiscal consolidation in the United Kingdom becomes more costly. From a cyclical perspective, it would be preferable to have a fiscal adjustment before a reduction in global savings reduces U.K. output. In addition, early consolidation becomes more beneficial from a longer-term perspective (Figure 11). Higher world real interest rates imply that any increase in government debt in the United Kingdom requires a further increase in taxes. As a result, early consolidation preventing higher debt becomes more beneficial, and consolidating through lowering transfers or reducing government spending becomes more attractive as well. Raising corporate income taxes becomes more harmful as the incentive to save for domestic capital accumulation would decline at the same time as there is a higher world demand for U.K. savings.

Figure 10. Effects on the United Kingdom of a Reduction in Global Savings
(Deviation from initial steady state in percent of GDP unless otherwise noted)



Source: IMF staff estimates.

Figure 11. Fiscal Consolidation in the United Kingdom if Global Savings Decline
(Deviation from baseline (delayed consolidation via higher labor income taxes) in percent of GDP)



Source: IMF staff estimates.

V. COMBINING FISCAL ADJUSTMENT AND TAX REFORM

Tax reform aimed at increasing incentives to save could provide support for fiscal consolidation. Specifically, there are potential benefits from revenue-neutral tax reform given that taxation of corporate income is more distortionary. To investigate the potential benefits of such tax reform, the paper assumes that corporate income taxes are permanently reduced by 3 percentage points in the context of early consolidation, which is offset by either increasing labor income taxes, or reducing transfers or government expenditure.

Lower taxation of savings produces significant long-term output gains (Figure 12). A reduction in corporate income taxes increases the after-tax marginal product of capital. This in turn stimulates saving and investment in the economy, which in the long term increases output. This reflects a move to a more efficient tax system—although less egalitarian. Introducing tax reform alongside fiscal consolidation produces somewhat earlier output gains and especially makes consolidation through lower transfers more effective. Compared to early consolidation without reform, the short-term output losses are somewhat larger as the benefits of lower corporate income taxation accrue over time via higher capital accumulation supported by increased national savings. In net present value terms, tax reform could provide a substantial boost to consolidation efforts.

VI. CONCLUSIONS

The conclusions of this analysis can be summarized as follows:

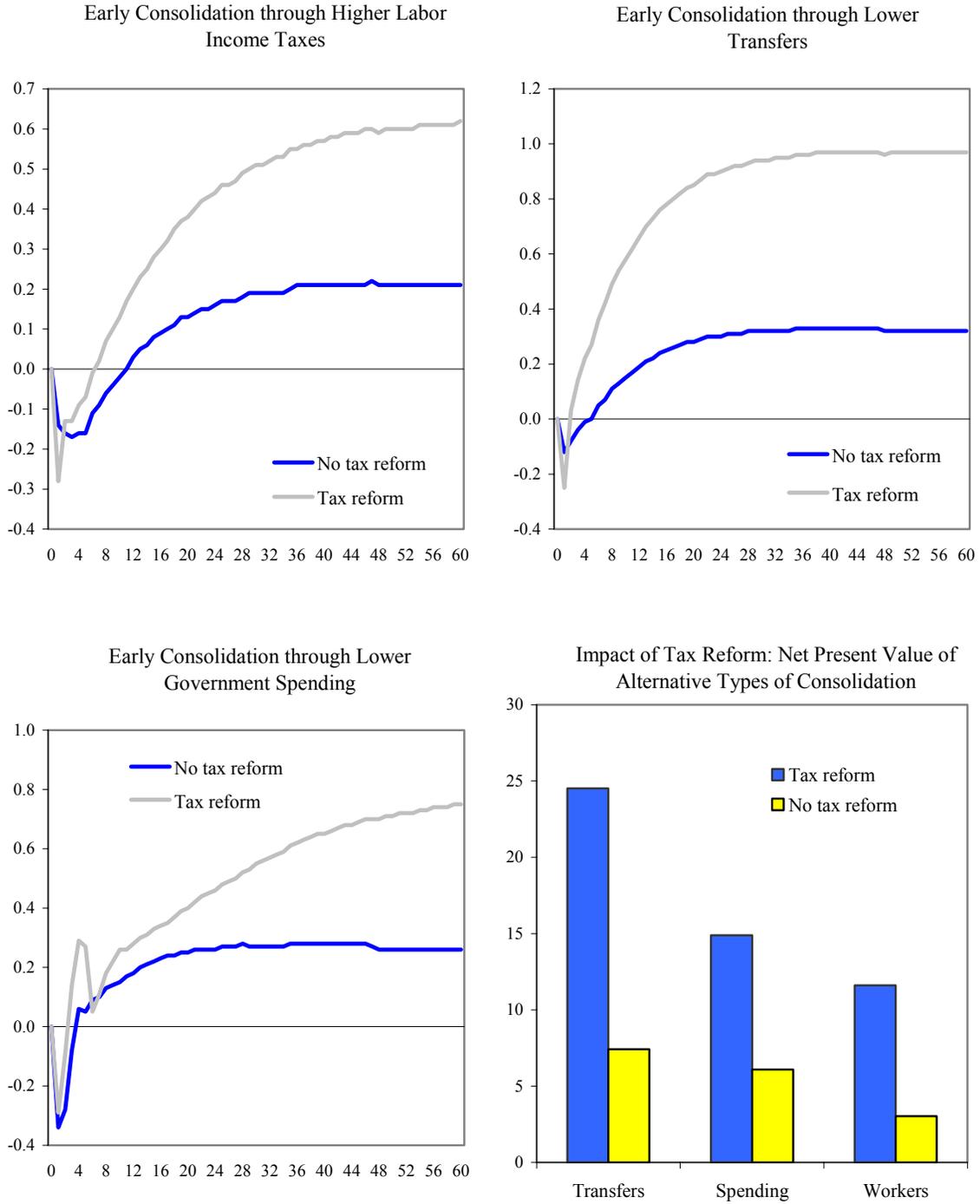
- There are significant potential benefits from early fiscal adjustment. The long-term gains of preventing a rise in government debt more than outweigh the short-term costs of fiscal adjustment.
- Reducing transfers or government spending on goods provides larger gains than raising taxes. In particular, raising corporate or personal income taxes creates larger distortions by reducing capital accumulation.
- The benefits of early consolidation decline if consumers have a longer planning horizon, but increase if consumption is less sensitive to changes in the interest rate. These behavioral assumptions affect the crowding-out effects of government debt and therefore the costs of delaying fiscal adjustment.
- Consolidating through reducing transfers or lowering government spending becomes more attractive if workers are more sensitive to changes in the after-tax real wage. This factor increases the distortions created by raising labor income taxes, also making consolidation through rising other types of taxation relatively more attractive.
- A reduction in global savings would make early consolidation more urgent from both cyclical and long-term perspectives. A reduction in global savings increases the real interest rate in a small open economy such as the United Kingdom. This causes a

substantial reduction in investment, more than offsetting any positive effects on U.K. exports. Higher interest rates also increase the costs of debt service substantially, requiring larger fiscal adjustment in case it is delayed.

- Tax reform aimed at increasing incentives to save could provide support to fiscal consolidation measures. This applies in particular to the long-term benefits of early fiscal adjustment.

The 2005 Pre-Budget Report contained measures aiming at a modest reduction in the overall deficit over the medium term broadly consistent with the findings above. On staff projections, with the measures—an increase in the tax rate on oil company profits and current spending restraint—the overall deficit would come down to about 2 percent of GDP by FY2009/10, stabilizing net public debt at about 40 percent of GDP. Although specifics have not yet been provided, the envisaged fiscal consolidation through spending restraint is a good example of an early and gradual consolidation discussed in this paper, which would prevent the steady increase in government debt.

Figure 12. The Effects of Combining Early Fiscal Consolidation and Tax Reform 1/
 (Deviation from baseline (delayed consolidation via higher labor income taxes) in percent of GDP)



Source: IMF staff estimates
 1/ Effects on real GDP.

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