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Tax and Pension Reform in the
Czech Republic—Implications for Growth
and Debt Sustainability

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**Tax and Pension Reform in the Czech Republic—
Implications for Growth and Debt Sustainability**

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Abstract

The Czech Republic has embarked on an ambitious tax reform and expenditure package to
bring the deficit sustainably below 3 percent, and intends to reduce the deficit to 1 percent of
GDP by 2012. To address the long-term fiscal challenge due to population aging, pension
reform proposals are also being considered. In this paper we assess the macroeconomic
effects of these measures using the Global Fiscal Model. The tax reform package will
achieve a more efficient tax system. If implemented successfully with the intended
expenditure savings measures, debt is projected to improve markedly while output would
expand. Fiscal sustainability will not be restored, however, even if further measures to bring
the deficit to 1 percent of GDP by 2012. Instead, raising the retirement age and prefunding
future aging costs would be needed to keep debt below 60 percent of GDP through 2050.

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I. TAX AND PENSION REFORM IN THE CZECH REPUBLIC— IMPLICATIONS FOR GROWTH AND DEBT SUSTAINABILITY

A. Background

1.   **Czech fiscal policy faces several challenges in the near term**. As a member of the European Union, the Czech Republic remains under the excessive deficit procedure. Fiscal policy has been procyclical owing to increases in mandatory social spending, which is expected to rise in the coming years. At the same time, a relatively high tax burden and regional tax competition are increasing pressures to reduce tax rates. The immediate priority is to reduce deficits in a sustainable manner below the three percent threshold under the Maastricht criteria. Longer term spending pressures for pensions and health care, given significant demographic pressures, also call for further fiscal effort to reduce deficits.

2.   **To address these concerns, the government has adopted a package of fiscal reform measures** to bring the general government deficit below 3 percent by 2008. Key underlying measures include:

- Introduction of a flat rate for the personal income tax at 15 percent in 2008 and 12½ percent in 2009 (from a four-tier progressive schedule of 12, 19, 25 and 32 percent), while broadening the tax base to include social security contributions;

- Phased reduction of corporate income tax from the current 24 percent to 19 percent by 2010;

- Increase in the lower VAT rate from 5 percent to 9 percent;

- Introduction of ceilings on pensions and health insurance contributions at four times the average wage;

- Reduction of social benefits through deindexation and tightening of eligibility criteria, health care reform and a tighter wage bill.

3.   **Several proposals are also being debated to address long-term pressures from aging over the coming decades**. A number of these reform proposals envisage a transition to fully funded private pension schemes where workers can divert part of their social security contributions away from the existing pay-as-you-go public pension scheme. In addition, measures to strengthen public pensions through tax increases and alternative ways of financing the pension deficit, along with parametric changes that increase the retirement age and lower benefits, are also under discussion.

4.   **This paper seeks to analyze the macroeconomic effects of the planned reforms and additional reforms needed to restore fiscal sustainability**. Using the two–country version of the IMF's Global Fiscal Model (GFM), calibrated to the Czech economy, it analyzes the impact of the reforms and the alternative proposals for addressing the long-run fiscal sustainability challenges. Specifically, it will address four main questions:

- How will the fiscal impact of the tax and social expenditure reform affect real activity?

- What are the macroeconomic implications of different reform measures in achieving the medium term objective of a 1 percent deficit target by 2012 as stated in the Convergence Program?

- What alternative package of reforms would be most efficient in achieving lower deficits over the medium term?

- What are the long term debt sustainability implications of these reforms? What additional measures, including pension reform measures, will be needed to address the age-related spending pressures and restore fiscal sustainability?

The paper is organized as follows. Section B focuses on the key challenges and longer term demographic pressures facing the Czech economy. Section C briefly describes the analytical framework and calibration of the GFM for the Czech economy, with technical details provided in the appendix. Section D analyses the impact of the tax and expenditure measures, while the final section explores the implications of additional measures for fiscal consolidation, including pension reform options, on debt sustainability.

B.   Fiscal Challenges and Demographic Pressures

5.   **A key near term challenge is to lower deficits in a sustainable manner below the Stability and Growth Pact (SGP) threshold of 3 percent of GDP**. Given a 'no-policy-change' scenario, deficits are expected to remain above 3 percent at least until 2010, in breach of the Maastricht criterion, adversely affecting euro adoption plans. While the recent fiscal performance suggests that the outturn will be much better than these projections owing to the strength of the economy, a structural improvement in the fiscal balance remains a challenge. The tax burden has been above the regional average to finance the relatively high primary expenditure, particularly social spending. The share of non-discretionary spending is also relatively high compared to the regional peers.[1] Maintaining budgetary flexibility will be increasingly important for macroeconomic stabilization to ensure success following euro adoption.

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[1] See IMF Country Report 07/85.

6.	**Over the longer term, the demographic shift in the Czech Republic is set to change the fiscal position significantly**. Based on Eurostat projections, the working age population is expected to decline starting around 2010 (Figure 1), and the elderly dependency ratio—the ratio of population aged 65 years and above to the population aged 15-64 years—to nearly triple from around 20 percent in 2003 to almost 60 percent in 2050. This change in the share of elderly, which reflects the low fertility rate in the Czech Republic, is much higher than the EU-15 average. The resulting increased demand on pension and long-term care benefits will place significant pressures on age-related spending. Although pension benefits, with a net replacement rate of 58 percent of wages, are relatively less generous than those of regional peers, rapid aging

Figure 1. Demographic Indicators, 2004-50.
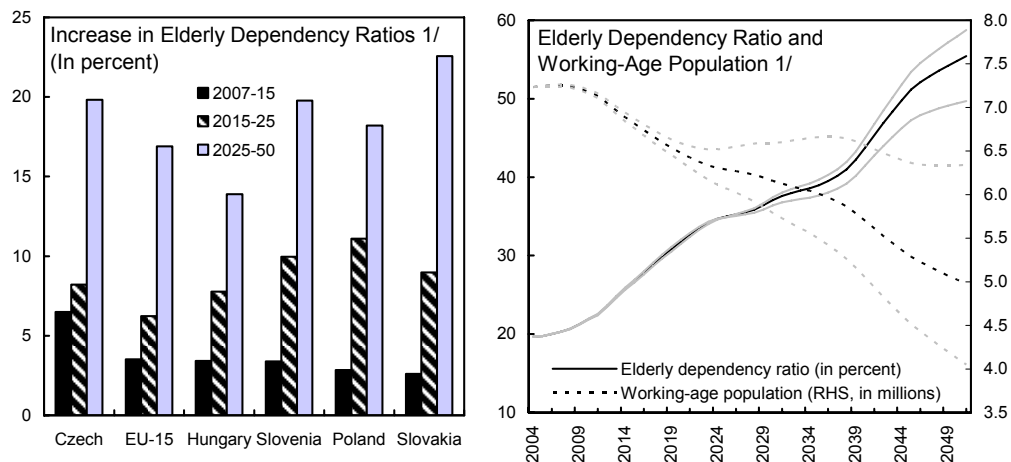
Source: Eurostat.
1/ The ratio of the population aged 65 and above to the population aged 15-64.

is set to increase pension expenditures by 4 percent of GDP and health and education spending by an additional 3¼ percent of GDP in 2005-50 (Figure 2).[2] The Czech authorities and the European Commission's Aging Working Group also estimate that age-related spending will increase by around 7 ¾ percent of GDP by 2050. Combined with a shrinking contribution base, and declining labor force and growth rates, revenues will also decline, adversely affecting the fiscal balance. In the absence of fiscal consolidation measures, these trends imply an unsustainable debt position. Gross debt is projected to reach over 300 percent of GDP by 2050, with primary deficits climbing from 2 percent of GDP to almost 10 percent by 2050 (Figure 3).

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[2] The long term age-related spending projections are based on a Generational Accounting model that assumes the replacement rate for pensions are maintained while health care spending per capita increases at a rate slightly above productivity growth rates. For further details, see IMF Country Report No. 05/275.

7.   **These projections are based on a no-policy-change scenario and are subject to significant uncertainties**.

- It is assumed that the labor participation rate rises from around 72 percent in 2007 to almost 77 percent in 2050 and the age profiles underlying the generational accounting of each of the fiscal variables takes into account the increase in retirement age envisaged under the current pension plan. However, these assumptions can vary substantially depending upon the effective retirement age and the increase in the life expectancy over time.

- These projections assume labor productivity growth—to which per capita income, revenues and government spending are linked—to decline from 4½ percent in 2005 to stabilize at around 3 percent. This reflects the Czech economy gradually catching up to EU average income levels with productivity growth flattening out.

- The projections assume the real interest rate at a constant 4 percent. Given rapidly increasing debt, the risk premium can be expected to drive the cost of debt financing significantly higher.

- This scenario does not assume a change in government policy to address the rising debt dynamics. Realistically, given the projected explosive debt path, restoring sustainability will require consolidation through lower spending or higher taxes, in turn affecting output. Fiscal consolidation measures would affect the initial conditions, while pension reform measures could significantly affect the projected debt path.

Figure 2. Long-Term Fiscal Pressures in the Czech Republic
(in percent of GDP)
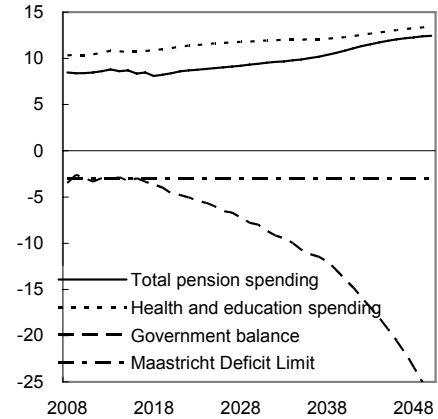
Source: IMF Staff Calculations.

Figure 3. Debt Dynamics From Population Aging in the Czech Republic 1/
(in percent of GDP)
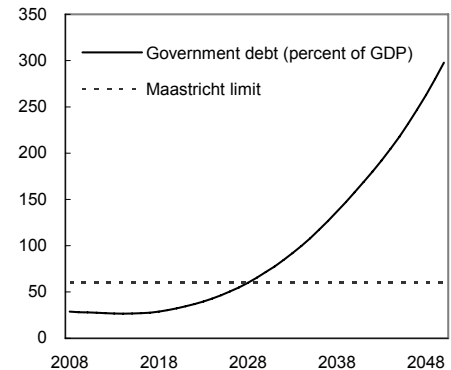
Source: GFM simulations.
1/ Includes the estimated deficit of 4 percent of GDP by end 2007, but not the tax reform and expenditure savings measures. Total increase in pension expenditure until 2050 equal to 4.1 percent which is modeled as an increase in lump-sum transfers. Additional spending on health and education equal to 3.3 percent of GDP until 2050 which is modeled as an increase in government spending (subject to home bias).

8.   **Next, we analyze the impact of the fiscal and pension reforms on growth and debt sustainability in comparison to the baseline of a 'no-policy-change' scenario.** Three different scenarios are examined. In the first scenario, we assess the growth impact of the 2007 tax and expenditure reform measures. In the second scenario, we evaluate alternative tax and spending proposals for achieving the authorities' stated medium term goal of a 1 percent of

GDP fiscal deficit by 2012. Finally, we consider several pension reform proposals that seek to restore debt sustainability.

C. Analytical Framework

9.   **The GFM is calibrated to capture the key economic and fiscal features of the Czech Republic (see Appendix I)**.[3] The model is based on a two-country, two-sector macroeconomic dynamic neo-Keynesian framework. It has a rich fiscal structure with a wide menu of taxes, social security contributions, and government transfers and spending which allows an analysis of various fiscal consolidation measures and their impact on debt sustainability in an endogenous macroeconomic model. The framework ensures a role for fiscal policy—a breakdown in Ricardian equivalence—through both demand and supply channels. On the demand side, fiscal policy has an impact on consumer behavior because consumers are impatient and have a different discount rate than the government. A fraction of consumers are also liquidity constrained with limited access to financial markets which prevents them from saving optimally over time. Supply side effects take place due to distortionary effects of taxes on labor supply and investment.

10.   **Several model-specific assumptions play an important role in the transmission channels**. Home bias towards non-tradable goods in government spending is an important channel through which fiscal consolidation affects domestic output. As a small, open economy with full capital mobility, interest rates are determined by the euro area; however, a risk-premium that depends upon the net foreign asset position is introduced in the model driving a wedge between the domestic and foreign interest rates. Despite allowing for an interest rate differential, monetary policy is absent in the model since full nominal wage and price flexibility is assumed. Furthermore, in the absence of an explicit demographic structure in the model, the path for government transfers are imputed exogenously using the microeconomic Generational Accounting model as described above. In addition, GFM is a model without growth. During the catching-up phase, the real growth rate of the economy exceeds the real interest rate implying that debt accumulation is lower than the deficit. To capture this effect of a catch-up economy, the fiscal costs from aging is adjusted in the simulations and this growth adjustment is the equivalent of the difference between the deficit and debt accumulation.

D. Assessing the Fiscal Reform Package

Tax reform

11.   **The analysis of the 2007 fiscal reform package first considers the scenario with only the tax policy measures**. Three key policy measures are included which are compared with the

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[3] See Botman, Laxton, Muir and Romanov (2005) for a detailed discussion of the model features. See Bayoumi, Botman and Kumar (2005) for an examination of the impact of tax reform and pension reform in the United States.

baseline scenario described above. First, a reduction in the personal income tax (PIT) rate to 15 percent from 2008 onwards; second, a decline in the corporate income tax to 21 percent in 2008, 20 percent in 2009 and 19 percent in 2010; and finally, an increase in the lower VAT rate from 5 percent to 9 percent along with increases in selected excise and environmental tax rates. As part of the reform, the lower PIT rate is applied on a broader base that includes the social contribution payments. In addition, there will be a substantial increase in the tax credit for lower income taxpayers. However, the GFM framework does not incorporate such base broadening measures and it is based on effective rather than the statutory tax rates. The model thus uses estimates of the impact of the reform measures which are based on those published by the authorities (Table 1).[4, 5]

Table 1. Estimates of Impact of Key Fiscal Reform Measures

Measures	Fiscal Impact (in percent of GDP)		
	2008	2009	2010
Introduction of a flat rate of personal income tax at 15 percent (while broadening the tax base to include social security contributions and increased tax credits)	-0.6	-0.7	-0.8
Phased reduction of corporate income tax from the current 24 percent to 19 percent by 2010;	-0.2	-0.6	-0.8
Raising the lower VAT rate from 5 percent to 9 percent and increasing excise and environmental taxes	1.0	1.0	0.9
Introduction of a ceiling on social security contributions	-0.2	-0.2	-0.2
Tighter government wage bill	-0.1	-0.2	-0.3
Reduction and streamlining of social benefits, and health care reform	-0.5	-0.7	-0.6
Total	0.6	0.4	0.1

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[4] These estimates differ from the authorities estimates (October 2007 Fiscal Outlook) due to adjustments made to exclude savings accruing from the postponement of some laws such as the casualty and sickness insurance.

[5] The estimates used in the simulations, which are based on an earlier government proposal, differ from the above as they do not take into account some additional measures incorporated in the final version approved by the Parliament such as the reduction of personal income tax to 12.5 percent in 2009 and faster reduction of corporate income tax in 2008. Thus, the tax reform scenario in the simulations presents a more favorable impact than is foreseen in the approved package. The simulations also provide a more optimistic scenario given that certain expenditure measures for 2009/10 (such as health care) that have been included are not yet fully identified and approved.

12.   **In the near term, consumption is expected to decline (Figure 4)**. This behavior reflects the combined effect of the higher VAT rates, the increase in disposable incomes from the personal income tax cuts, and the increase in the real interest rate.[6] A higher VAT would lead to a permanent decline in consumption. On the other hand, lower income taxes would stimulate consumption; but the net impact is subject to several sources of uncertainty: optimizing consumers would increase consumption only modestly (depending upon their planning horizon) as they seek to smooth their lifetime consumption by saving part of the higher income while the 'rule-of-thumb' consumers who have no access to financial markets and do not save—assumed to be 40 percent of the population—would instead consume the entire increase in income. Overall consumption declines by 0.8 percent of GDP.[7] Subsequently, consumption rises as the optimizing consumers gradually consume their higher wealth, more than offsetting the impact of the higher consumption tax. By raising the price of consumption, the consumption-leisure tradeoff faced by the consumer also implies that labor supply will decline.

13.   **The combination of reduced corporate and labor income taxes with an increase in indirect taxes would be growth-enhancing**. The main channel of increased output would be through higher investment. Investment would rise by nearly 5 percentage points in 2008 relative to the baseline and by nearly 1 percent of GDP over the medium term. On net, the shift to a less distortionary tax base such as VAT from direct taxes would create incentives for increased investment and labor and thus lead to an expansion of output. In an aging society, the shift to indirect taxation is also appealing as it would increase reliance on a more stable tax base rather than a gradually shrinking direct tax base.
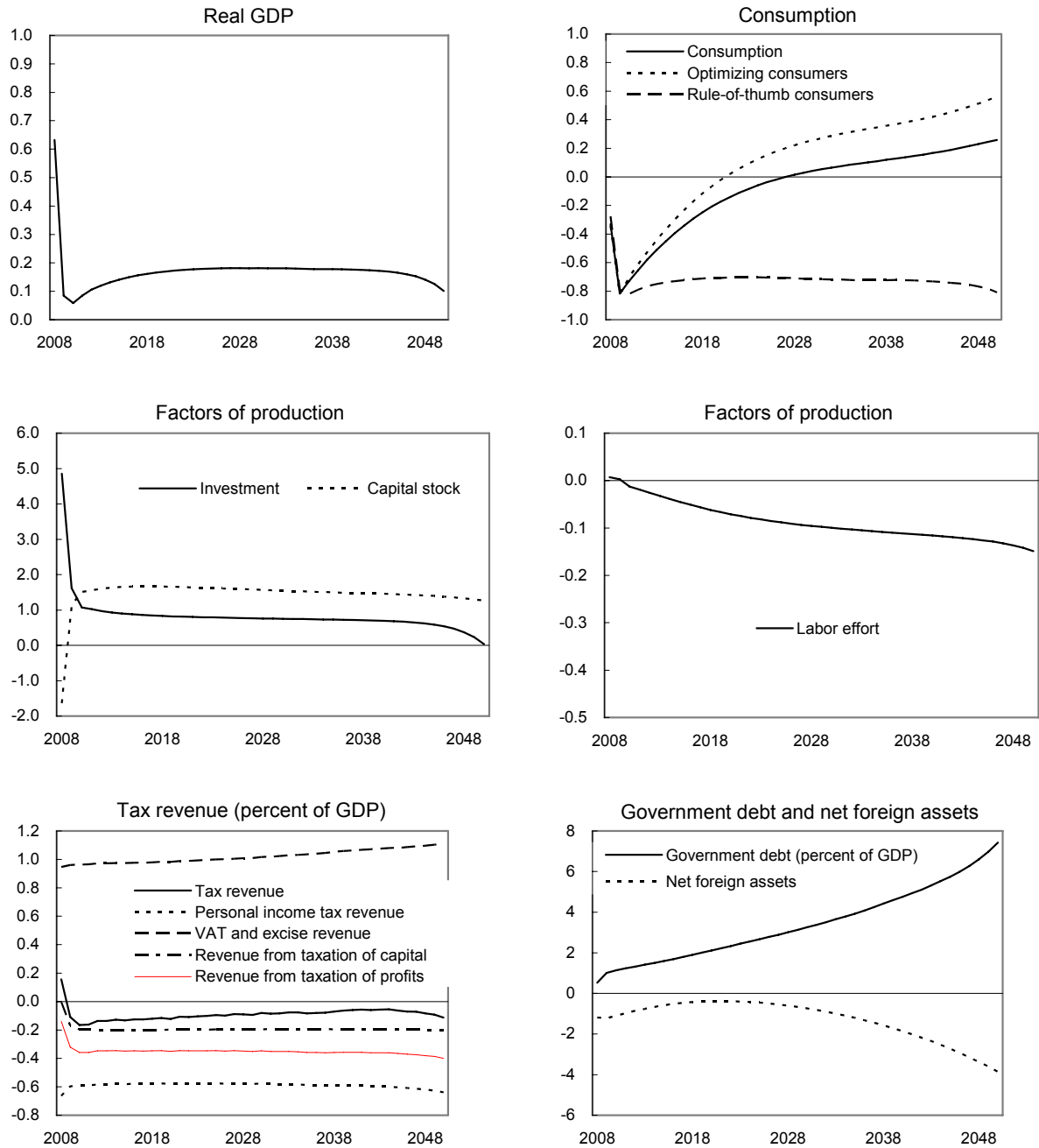
14.   **Despite the favorable impact on growth, the tax package would result in a higher government debt**. Since the tax reform package is revenue-losing from 2009 onwards, the resulting increase in fiscal deficits would push debt up further by nearly 8 percent of GDP relative to the baseline scenario. This estimate, however, does not take into account the reduction of personal income taxes to 12.5 percent that was incorporated in the final version of the reform package.

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[6] Since the model assumes a small open economy, the interest rate is predominantly determined by the euro area interest rate. Deviations from this rate reflect the presence of a risk premium that depends on the size of external borrowing. The sensitivity of the premium is set at a relatively low level in the model, while external indebtedness increases substantially only in the medium term under the no-policy-change scenario. Since the model does not incorporate nominal rigidities, monetary policy is absent. In reality, monetary policy would be expected to offset such a rise in interest rates, mitigating the impact on consumption. For further details, please see chapter 3 on monetary policy implications of the fiscal reform program.

[7] In the absence of consumer durables, the model does not predict a decline in consumption in 2008 from anticipation effects from the VAT hike in 2008, that would lead to higher consumption towards the end of 2007. Furthermore, the increase in the lower VAT rate generally applies to non-durables such as food, education materials, for which forward buying would be limited.

Figure 4. Czech Republic: Macroeconomic Effects of Tax Reform
(Deviation from "no-policy change" scenario in percentage points, unless noted otherwise)

Real GDP

Consumption

Factors of production

Factors of production

Tax revenue (percent of GDP)

Government debt and net foreign assets

Source: Staff calculations.

Tax and expenditure reform

15.   **In combination with a successful implementation of expenditure-savings measures, the tax reform would reduce debt and expand output (Figure 5)**. The authorities' plan targets a reduction of expenditures on average of around 0.7 percent of GDP from 2008 onwards. The model predicts that the combination of tax and expenditure measures are less growth friendly over the medium term than the tax measures alone as permanently lower transfers reduce consumption. Nevertheless, longer-run growth is higher owing to the more favorable debt dynamics that is supportive of a lower real interest rate. The model predicts debt to be lower by 60 percent of GDP compared to the baseline scenario so that the gross debt level

Figure 5. Czech Republic: Macroeconomic Effects of Tax Reform and expenditure restraint
(Deviation from "no-policy change" scenario in percentage points, unless noted otherwise)
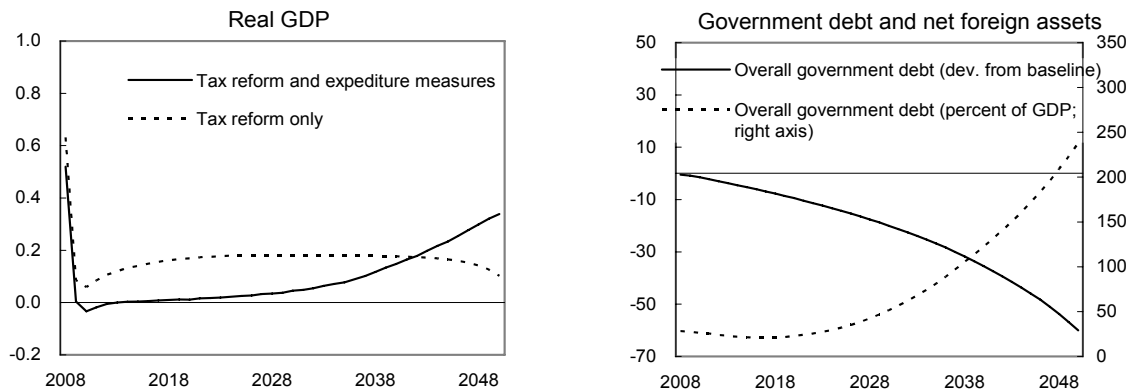
Source: Staff calculations.

approaches 250 percent of GDP. Thus, the challenge of long-run debt sustainability is not addressed by this reform package. Nevertheless, the reform package is growth-enhancing and reduces debt relative to the no-policy-change scenario although, it should be borne in mind that since these expenditure measures have not yet been fully identified, these estimates represent an optimistic assessment of the fiscal reform package.

16.   **These results are also robust to alternative specifications of the parameters as shown by the sensitivity tests** (Appendix II). We consider scenarios with more patient consumers who have a longer planning horizon, fewer rule-of-thumb consumers that are subject to credit constraints, less elastic labor supply and a lower intertemporal elasticity of substitution. Among these, only in the case with a longer planning horizon of consumers, consumption smoothing leads to a more limited decline in consumption relative to the baseline which contributes to higher output. In other cases, the economic impact relative to the baseline is broadly similar, although the baseline level itself is affected more significantly under these scenarios.

E. Adjustment Strategies to Achieve the Medium Term Objective

17.   **Additional adjustment measures necessary to meet the authorities' medium term objective are also considered**. In the Convergence Program, the authorities have targeted a medium term deficit target of 1 percent in 2012, requiring a further reduction in deficit of about 1½ percent of GDP over 2010-2012. To achieve this adjustment, we consider alternative packages of revenue-based and expenditure-based measures. We consider alternative revenue proposals of: (i) a higher VAT and income tax base-broadening measures; (ii) increases in social security contributions. On the expenditure side, we simulate the impact of (iii) lower government spending; and (iv) reduced government transfers. In addition, the impact of a combination of these measures is also assessed. The simulations examine the relative impact of these measures on debt and growth and whether they are sufficient to address the long-run debt sustainability challenges with a no-policy-change scenario from 2012 onwards.

Figure 6. Debt Dynamics From Population Aging in the Czech Republic 1/
(in percent of GDP)
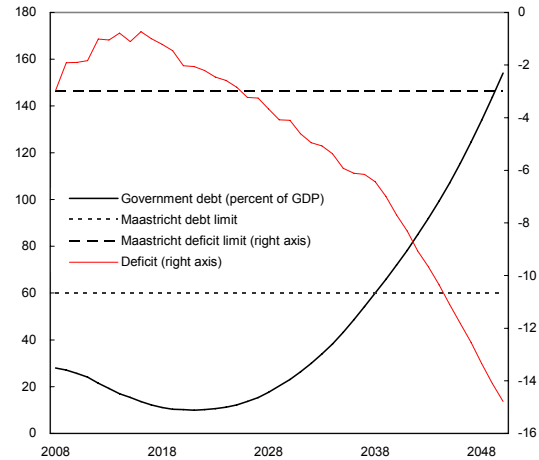
Source: GFM simulations.
1/ The simulation iIncludes, in addition to the baseline no-policy-change scenario, the effects of tax reform proposals and expenditure restraint and further deficit reduction between 2010-12 to reach the intended goal of a 1-percent of GDP deficit by 2012.

18.   **Fiscal consolidation through lower government transfers has a relatively minimal impact on growth compared to other revenue-enhancing measures (Figure 7)**. Since lump sum government transfers are non-distortionary and the decline in consumer demand also impacts imports, the net effect on growth in the near term is limited. In contrast, a reduction in government consumption which is assumed to fall entirely on non-tradables due to the home bias in the model, has the most significant contractionary impact on growth. In line with the discussion in section D, an increase in VAT has the smallest negative impact on growth relative to other revenue measures as it is the least distortionary tax applied—it has a larger base that includes accumulated savings. Irrespective of these measures, debt still climbs to almost 150 percent of GDP, suggesting the need for further measures that directly address age-related spending pressures.

Figure 7. Comparing Alternative Measures to Reach 1 Percent of GDP Deficit by 2012 1/
(Deviation from baseline no-policy-change scenario, in percentage points, unless noted otherwise)
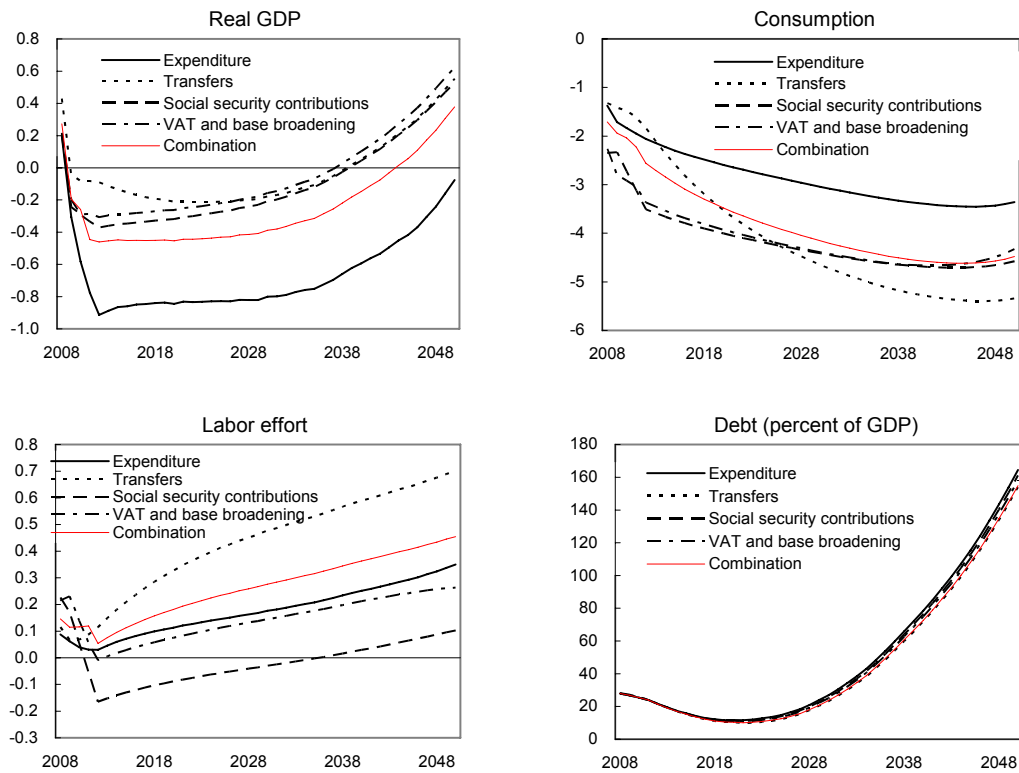
Source: Staff calculations.
1/ Includes the effects of tax reform and expenditure restraint. Further deficit reduction between 2010-12 to reach the intended goal of a 1-percent of GDP deficit by 2012.

19.   **In practice, a combination of the revenue and expenditure measures can be expected to achieve the medium term objective, rather than relying on large changes in any specific tax or expenditure measure alone**. Such a package of measures also compares favorably to individual measures in terms of output and consumption losses. Henceforth, the paper assumes that this combination package of measures will be implemented and further measures to restore debt sustainability built upon it.

F. Achieving Long Term Sustainability: Pension Reform Proposals

20.   **To achieve long term fiscal sustainability in the face of age-related spending pressures, several key pension reform proposals are examined**. In particular, three proposals under discussion by the authorities are simulated: (i) extension of the retirement age to 65 years (ii) prefunding of reserves through fiscal consolidation measures and (iii) a default option of increased social security contributions to achieve debt sustainability. The criteria for sustainability is based on fulfillment of the SGP threshold of 60 percent debt to GDP ratio and the 3 percent deficit to GDP ratio. These proposals are simulated as incremental to the medium term consolidation through a package of measures described above. As an alternative, a voluntary opt-out of the mandatory public pension system is also considered.

Extension of retirement age

21.   **Extending the retirement age would relieve fiscal pressures, although not sufficiently to attain debt sustainability over the longer term (Figure 8)**. The simulation considers increasing the statutory retirement age from 63 to 65 years phased in by 2018. The reduction in government transfers would contribute to a further decline in output. But, in addition to reducing the burden on future pension benefits, increasing the statutory retirement age would increase labor supply with associated gains in social contributions and tax revenues. The resulting impact in lowering the deficit would reduce gross debt and even lead to a small build-up of reserves.[8] Nevertheless, this measure is not significant enough to compensate for the increase in the old-age-dependency ratio and deficits still rise, crossing the 3 percent of GDP threshold by 2039.

Delayed fiscal consolidation

22.   **To fulfill the debt sustainability criteria through 2050, an additional combination of fiscal measures is considered (Figure 9)**. In the delayed consolidation scenario, further yearly measures comprising VAT, base broadening and expenditure savings are undertaken from 2039 onwards to keep the deficit below 3 percent, while also maintaining debt below 60 percent of GDP. These measures prevent the current steep increase in debt towards 2050 but also lead to a substantial decline in consumption and output during this period, implying a significant shift of the fiscal burden to future generations.

Figure 8. 1-Percent of GDP Deficit by 2012 Through Reform Package and Raising Retirement Age
(Deviation from "no-policy change" scenario in percentage points, unless noted otherwise)
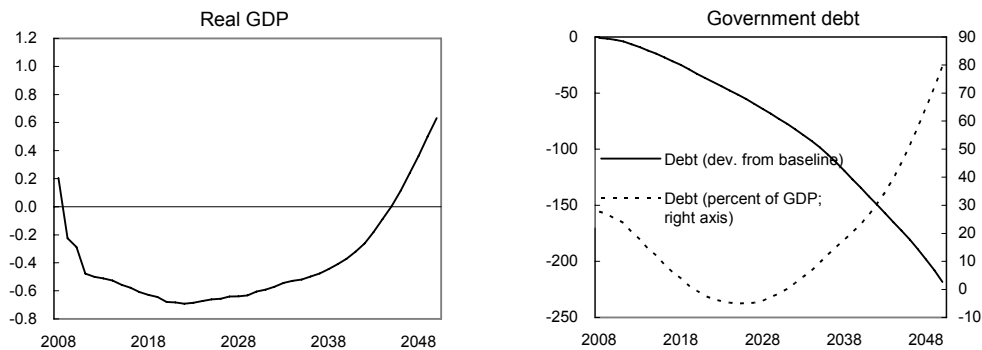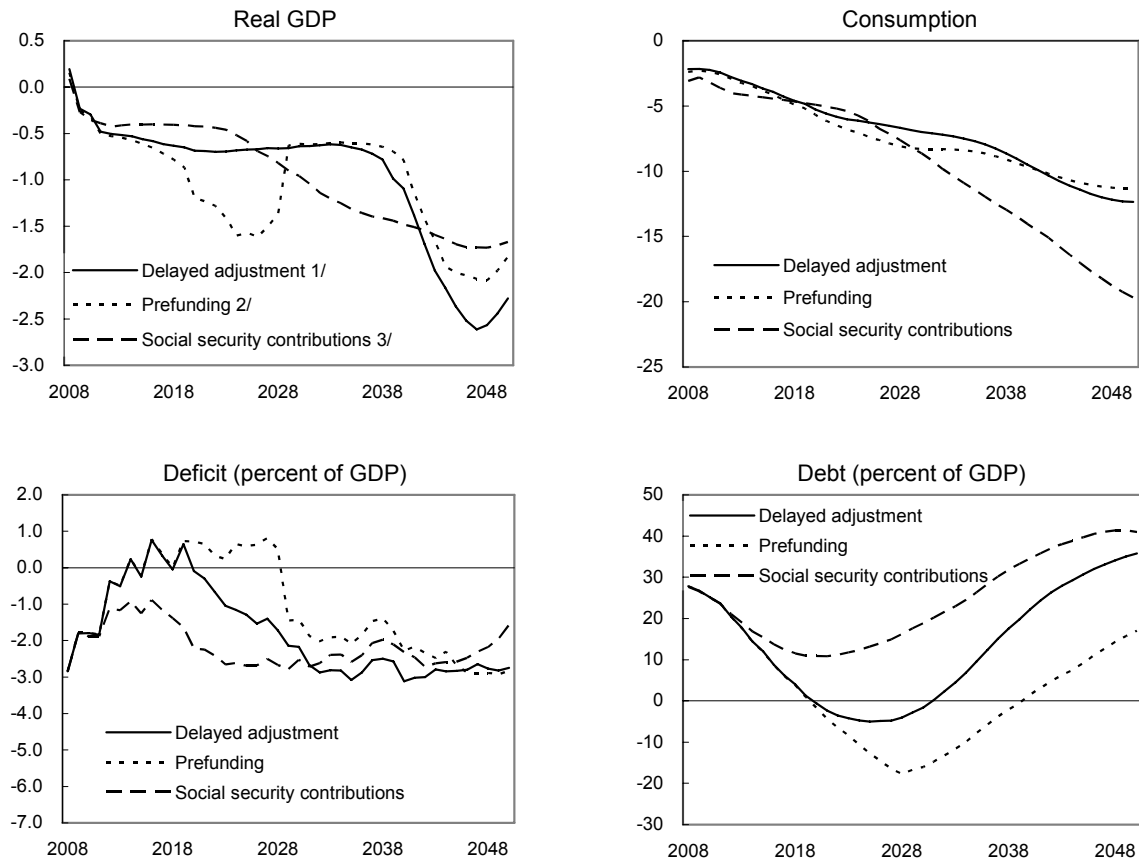

Source: Staff calculations.

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[8] Since GFM does not endogenously model the direct effect on labor supply from increasing the retirement age, the impact on the working age population and revenue is estimated exogenously using a microeconomic model. The macroeconomic effects of this projected deficit are then simulated using the GFM.

Figure 9. Comparing Alternative Strategies to Achieve Debt Sustainability
(Deviation from baseline no-policy-change scenario, in percentage points, unless noted otherwise)

Source: Staff calculations.
1/ Includes the effects of tax reform and expenditure restraint and raising the retirement age. Further deficit reduction between 2010-12 to reach a 1-percent of GDP deficit by 2012 through a combination of measures. Subsequent adjustment: higher VAT rate (2041-45; 2.5 percentage points in effective terms), base broadening (2046-47), and lower current government spending and transfers (2039 onwards).
2/ Includes the effects of tax reform and expenditure restraint and raising the retirement age. Further deficit reduction between 2010-12 to reach a 1-percent of GDP deficit by 2012 through a combination of measures. Subsequent adjustment: higher VAT rate (2020-24; 0.5 percentage points in effective terms), base broadening (2025-27), and lower current government spending and transfers (2020 onwards).
3/ Includes the effects of tax reform and expenditure restraint, but no increase in the retirement age. Further deficit reduction between 2010-12 to reach a 1-percent of GDP deficit by 2012 through higher social security contributions on workers or employers. Subsequent yearly adjustment in the social security contribution rate to remain within Maastricht debt and deficit limits.

Prefunding through upfront consolidation

23.   **Prefunding of the deficits would help ensure inter-generational equity**. We examine the impact of frontloading the measures mentioned above as early as 2020 such that deficits remain below the 3 percent of GDP threshold through 2050. These measures lead to a decline in gross debt sufficiently to build up fiscal reserves from 2020. This comes at a higher output cost and decline in consumption over the medium term as government transfers are reduced and

VAT is increased. However, prefunding would allow for higher output in the longer run than would be the case otherwise. Prefunding thus provides several advantages. By ensuring that the output costs are borne primarily by the beneficiaries of the government transfers, greater generational equity is achieved. Early consolidation is also attractive as it ensures that output losses occur at a time when the economy is still experiencing the gains from income convergence. Prefunding could be achieved by reducing gross debt or by building up a separate pension reserve fund: the two would be equivalent if the costs of borrowing is equal to the return on the reserve assets.

24.   **If consolidation efforts are smoothed across generations, output costs for future generations could be minimized**. In this scenario, although long run debt and output levels would be similar, the transition path would vary considerably. The early fiscal surplus and lower initial debt levels cushions the impact of rapidly rising pension deficits, preventing a rise in interest rates. This allows for a relatively higher levels of capital accumulation and output growth over the medium term.

Increase in social security contributions

25.   **In the absence of pension reforms, social security contributions would need to rise to offset the age-related spending pressures and maintain debt within the Maastricht limits until 2050**. Social security contributions would thus begin rising from 2010 to achieve the 1 percent of deficit by 2012.[9] Subsequently, the social security contribution rate adjusts annually to ensure deficits remain below the 3 percent of GDP limit and debt is maintained within the 60 percent threshold in 2050.

26.   **The rise in the social security contributions would adversely impact labor supply and consumption**. In this scenario, the distortionary effect of the labor tax leads to a decline in labor supply. The increase in taxes would offset the higher age-related spending. Compared to the alternative consolidation scenarios described above, output costs are more limited as it does not involve a reduction of government spending—which is subject to home bias in the model— thereby limiting the decline in domestic demand. Since the three measures are quite equivalent from the GDP perspective, given the detrimental effect on consumption of increasing social security contributions, the option of prefunding appears preferable to the other measures.

Voluntary transition to private pensions

27.   **Following some of the reform proposals under discussion, we consider an alternative proposal to allow workers to voluntarily divert part of their social security contributions to private pension funds (Figure 10)**. To illustrate the effects of this policy, we

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[9] It is assumed that the higher social security contributions are applied on employees. In GFM, the impact would be identical if instead social security contributions paid by employers would increase.

have to make a number of simplifying assumptions. In particular, it is assumed that 4 percentage points (1/3rd of the current social security contributions paid by the worker) of wage incomes are transferred to private accounts. Workers up to the age of 46—the assumed average age of workers—have the option to participate from 2012 onwards and it is assumed that all of those eligible will opt out, which thus amounts to half the labor force. The government thus loses 2 percent of the social security contributions in 2012 and, assuming workers start working at the age of 27 years, the revenue loss will gradually rise until it reaches 4 percent in 19 years, i.e. 2031. It is also assumed that everyone retires at age 65 so that private pensions start paying benefits after 19 years (2031). Benefits under the public pension system are unchanged till then, driving up the transition deficits and debt. Subsequently, benefits will start declining and debt will stabilize. The model does not allow for higher investment returns from the private pension funds.

28.   **The macroeconomic impact of voluntary private pension contributions depends to a large extent on consumer myopia**. Given this option, consumers who are liquidity constrained and those that are impatient do not fully save the surplus that accrues from the reduction in social security taxes. Effectively, the myopic consumers discount the lack of traditional social security benefits in the future. Consumption and output increase in the short run at the expense of a large long run decline. In the long run, consumption falls due to a decline in the traditional social security benefit payments. If consumers have longer planning horizons—making them more Ricardian—there is less of an initial consumption boom as they factor in the loss of traditional pension benefits in the long run. Consumers save more in the form of private pension contributions which results in higher capital accumulation, output and consumption over the long run. To offset the consumer myopia, a revenue neutral tax incentive could be considered that increases voluntary incentives to save. For example, if there is a reduction in corporate income tax that encourages capital accumulation, with an offsetting shift towards indirect taxation (VAT), private savings would increase leading to higher output over time.

Figure 10. Pension Reform From 2012 Onwards After 1-Percent of GDP Deficit Through Package
(Deviation from 1-percent of GDP deficit by 2012 only, in percentage points)
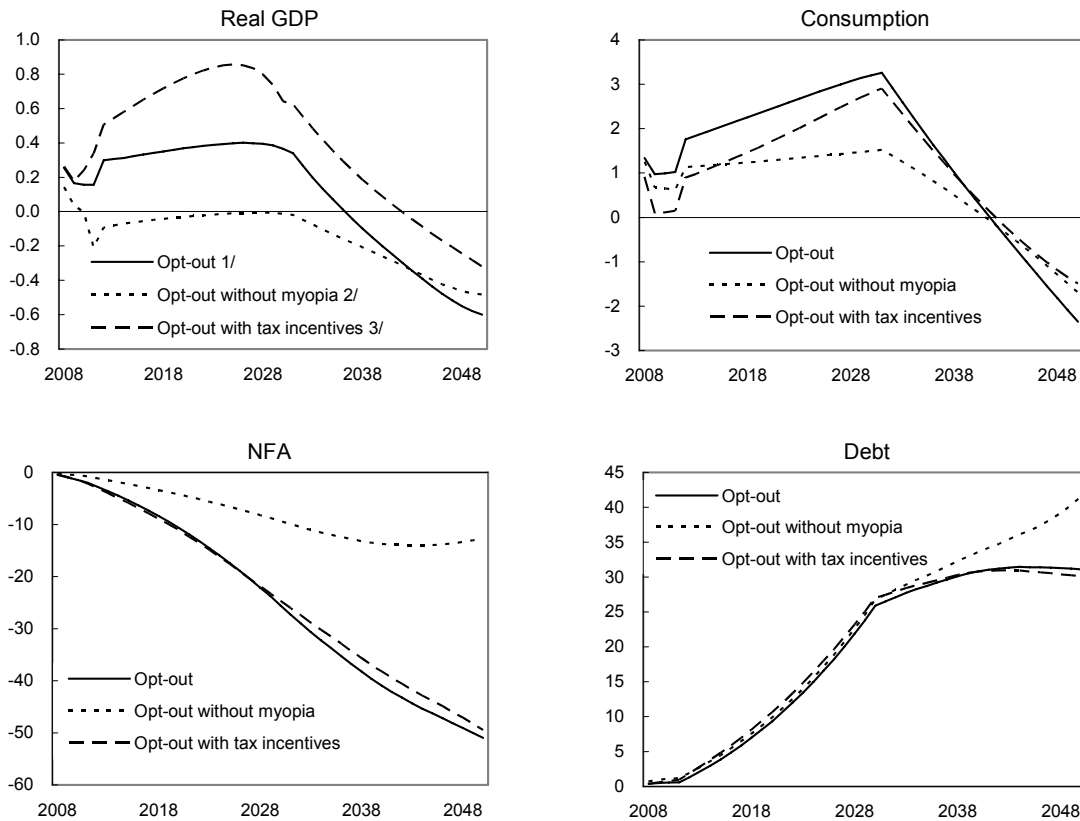
Source: Staff calculations.
1/ Includes the effects of tax reform and expenditure restraint and further deficit reduction between 2010-12 to reach a 1-percent of GDP deficit by 2012 through a combination of measures. From 2012 onwards, 4 percentage points (in effective terms) of social security contributions can be diverted to private pension savings accounts effective terms. All workers younger than 46 in 2012 are assumed to participate. Revenue loss to the government peaks in 2031, but savings on public pensions also start to accumulate from 2031 onwards.
2/ Same as in Footnote 1, except that the planning horizon of optimizing consumers is equal to 100 years (q = 0.99).
3/ Same as in Footnote 1, but incorporates incentives to save and invest through a revenue neutral tax reform from direct (corporate income) to indirect (VAT), which gradually increase from 2012 onwards to reach 1.25 percent of GDP by 2031.

29.   **Given the output costs associated with consolidation measures needed for restoring fiscal sustainability, strong emphasis should be laid on complementary structural reform measures that improve productivity and labor supply**. Micro-level incentives generated by the tax and welfare reform discussed in this paper will be important in this regard, both for increasing the effective retirement age as well as through minimizing welfare traps created by the marginal effective tax rates. Furthermore, in line with the Lisbon agenda, reform policies

will need to focus on enhancing investment in research and development; and increasing the flexibility of the labor and the product markets.[10]

G. Conclusions

30. **The Czech government has recently adopted a package of fiscal reform measures that seeks to address a number of challenges**. As an EU member, an immediate priority for Czech fiscal policy is to reduce deficits in a sustainable manner below the three percent of GDP threshold. The fiscal consolidation also needs to improve incentives to work and enhance competitiveness. Longer term spending pressures stemming from pensions and health care, given significant demographic pressures, also call for early reform efforts to put public finances on a sustainable path.

31. **In this context, the recently approved fiscal reform package is assessed in terms of its macroeconomic impact on growth and long run debt sustainability**. The main findings are as follows:

- The tax and expenditure reform package is efficiency-enhancing: it supports growth as the tax system becomes less distortionary. The debt burden is also lowered slightly, assuming the expenditure measures are fully implemented. However, debt dynamics remain unsustainable over the long run.

- A ranking of an alternative set of consolidation measures to achieve the medium term objective of 1 percent of GDP deficit target suggests that a combination of reducing government transfers and spending and further increasing indirect taxation has the lowest output and consumption costs.

- Given the aging pressures, restoring debt sustainability will require additional reforms above and beyond the measures described above. A further increase in the retirement age is desirable, but will also not suffice.

- The choice of the pension reform measures will depend on additional considerations such as intergenerational equity and consumer myopia. Upfront consolidation that allows for prefunding of pension reserves would promote generational equity in sharing the fiscal burden of aging. Opting out of the public pension system would limit output costs over the medium term, but at a cost of sizable transition deficits and long-term output loss, depending upon the degree of myopia of consumers.

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[10] See Botman and Kumar (2007) for an analysis of the impact of structural reforms on alleviating Germany's fiscal sustainability pressures. Also see IMF Working Paper No. 08/52 for a discussion of the microeconomic impact of the Czech fiscal reform package on work incentives.

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Appendix I. Analytical Framework

The GFM is a general equilibrium New Open Economy Macroeconomics model designed to address fiscal issues in an interdependent world economy. To allow a role for fiscal policy, specific model features are introduced which leads to a breakdown of Ricardian equivalence in this intertemporal model. In particular, the private sector has finite horizons and is more impatient than the government. Consumers discount government's fiscal policy actions more heavily, thus affecting the national savings rate. In addition, some of the consumers (rule-of-thumb consumers) lack access to capital markets and are liquidity constrained. Finally, the monopolistic power of firms creates a wedge in prices and wages compared to the perfectly competitive outcome, which reduces the distortionary effects of tax policy.

Other key features of the model are:

- Three agents: a representative agent with perfect foresight, firms producing final consumer goods and government;

- Two sectors: tradables and non-tradables;

- Two factors of production: capital and labor, which are mobile across sectors;

- Two country setup: home and foreign, across which goods and capital are also perfectly mobile;

- Two types of assets: an international tradable government bond and domestic equity;

- Consumption and output are based on constant elasticity of substitution utility and production functions;

- Investment is determined by a Tobin's Q relationship – a discounted value of future profits and capital stock;

- Flexible prices and wages;

- Four types of taxes: social security contribution tax on wages, corporate income tax on accounting profits of firms, personal income tax on labor income, interest income, accounting profits, and government transfers; and value added tax on consumption;

- Government spending which falls on (i) non-traded goods (ii) debt servicing and (iii) lump sum transfers to consumers.

Model Parameters

The model parameters are calibrated to fit Czech macroeconomic data. The steady state macroeconomic variables—consumption, investment, government spending, labor and capital income to GDP—are the end-2006 data for the Czech economy. Fiscal variables—social security contributions, capital and personal income tax, and debt to GDP ratios—also reflect end-2006 data. As a small economy—the Czech Republic is assumed at about 2.5 percent the size of the world GDP—interest rates are largely determined by euro area monetary policy.

The model parameterization for consumer and firm behavior is based on microeconomic estimates in the literature. For simplicity, it is assumed that these parameters are the same for the home and foreign economies. The effective planning horizon parameter is set at 0.9, which translates to a planning horizon of 10 years. Since this value is lower than the probability of survival, this captures consumer myopia in the model. The elasticity of labor supply to real wages, is set to 0.92. The elasticity of intertemporal substitution is set at 0.33. This is slightly lower than econometric estimates, but these estimates are based on models with habit formation, which is not a feature of this model. The intratemporal elasticity of substitution between labor and capital is set at 0.75 for the baseline case; in the Cobb Douglas case, this would be close to 1. About 40 percent of consumers are assumed to be liquidity constrained. Details on the steady state values and parameters are presented below:

Table A1. GFM Parameterization

	Czech Republic
Elasticity of Substitution	
for holding money (rho)	3
between consumption and leisure (eta)	0.92
for the production of the final good	
between tradables and nontradables (eps)	0.6
between domestic tradables and imports (omega)	2.5
between imports from differing countries (omicron)	1.5
Bias in	
the production of	
tradables over non-tradables (gamma)	0.75
domestically produced tradables over imports (alpha)	0.16
imports from (nu)	
Czech Republic	...
Rest of the world	0
Production Functions	
Tradables	
Elasticity of factor substitution (xit)	0.75
Bias towards	
Labor (1-mut)	0.23
Capital (mut)	0.78
Non tradables	
Elasticity of factor substitution (xin)	0.75
Bias towards	
Labor (1-mun)	0.23
Capital (mun)	0.78
Real Rigidities	
Investment (psi)	1
Markups over marginal cost	
for tradables (thetat)	14.3
for nontradables (thetan)	14.8
Probability of survival (q)	0.9
Share of rule-of-thumb consumers (srt)	0.4

Table A2. Initial Steady-State Ratios

	Czech Republic
Sectoral Shares as a Ratio to Nominal GDP	
tradables sector	54.5
non tradables sector	45.5
Labor Income Shares as a Ratio to Nominal GDO	50.91
tradables sector	27.74
non tradables sector	23.17
Consumption to Nominal GDP Ratio	49.6
forward looking	38.65
rule of thumb	10.96
Government consumption to Nominal GDP Ratio	24.2
Investment to Nominal GDP Ratio	26.19
domestic	9.28
imported	16.92
Exports to Nominal GDP Ratio	45
Imports to Nominal GDP Ratio	45
NFA to Nominal GDP Ratio	0
Real Interest Rate	3
Terms of Trade	1.17
Real Exchange Rate	0.92
CPI Inflation	2

Table A3. Initial Steady-State of Fiscal Variables

Government Debt to GDP	27.3
Tax Rates	
Corporate Income Tax Rate	20.4
as a percent of total income	4.3
Personal Income Tax Rate	6.18
as a percent of total income	4.34
Labor Income Tax Rate (employees)	8.69
as a percent of total income	3.61
Labor Income Tax Rate (employers)	25.76
as a percent of total income	10.4
VAT and excise tax	13.1
as a percent of total income	6.53
Transfer Rate as a Share of Income	7.75

Appendix II. Sensitivity Analysis

Sensitivity analysis shows that the conclusions are robust to alternative parameterization of the model. If consumers had longer planning horizons (of 100 years instead of 10 years as assumed in the above simulations), they would lower consumption in anticipation of the longer run fiscal consolidation, increasing capital accumulation and longer run output gains. Similarly, if all consumers had complete access to capital markets, there would be less of an increase in consumption following the tax cuts, increasing savings and long run output. The more elastic the labor supply, the more distortionary would be raising social security contributions and VAT.

A 1. Sensitivity Analysis: Macroeconomic Effects of Tax Reform and Expenditure Restraint 1/
(Deviation from baseline in percentage points)
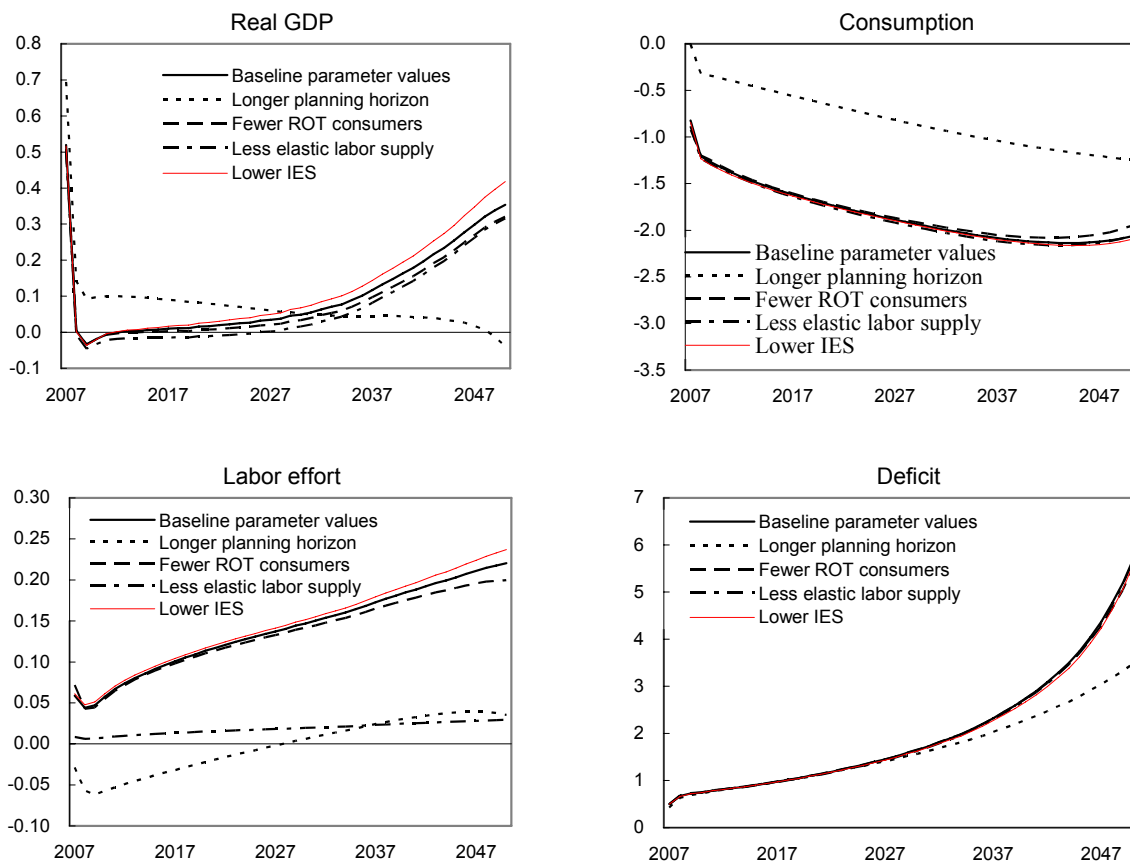
Source: Staff calculations.

1/ Baseline parameters values are reported in Table 3. Alternative simulations consider: (i) longer planning horizon (q = 0.99; 100 years); (ii) fewer rule-of-thumb consumers (10 percent of consumers); (iii) less elastic labor supply (eta = 0.99; almost completely inelastic labor supply; and (iv) a lower intertemporal elasticity of substitution (rho = 0.25). Results reported are deviations from the baseline with alternative parameter values.