

ECONOMIC RESEARCH BULLETIN

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EDITORIAL

This issue of the CNB Research Bulletin is focused on fiscal policy. This is the second time in the four-year history and nine issues of the Bulletin that fiscal policy aspects have taken centre stage. This clearly demonstrates the relevance that fiscal policy research has gained in the CNB. Such an observation is hardly surprising given that the Czech economy is gearing up for the euro and fiscal policy seems to be one of the bottlenecks in this process.

Three years ago, in the first fiscal Bulletin, the research was concentrated mainly on getting a more appropriate fiscal database and on some of the macroeconomic aspects of fiscal policy. Now, while keeping the macroeconomic relevance, we focus in more detail on fiscal sustainability and on assessing the impact of tax instruments on real economic activity.

The literature describes many ways of tackling fiscal sustainability. The first article – by Aleš Krejdl – summarises the different approaches to fiscal sustainability and then applies two of the most widely used indicators – the primary gap and the tax gap – to the Czech fiscal outlook. Another way of addressing fiscal sustainability is to develop generational accounts. This is done – for the first time in the case of the Czech Republic – in the article by Kamil Dybczak. This approach sheds new light on how (un)fair our current fiscal policy is from the intergenerational perspective. The last article – by Alena Bičáková, Jiří Slačálek and Michal Slavík – aims to quantify the impact of labour taxation on labour supply and consequently on the fiscal balance. Again, this is the first time that such an analysis has been performed on the Czech economy.

Vladimír Bezděk

IN THIS ISSUE

Fiscal Sustainability – Definition, Indicators and Assessment of Czech Public Finance Sustainability

Many politicians, policy-makers and economic analysts have called Czech fiscal policy unsustainable. The paper explores how to define unsustainable fiscal policy and whether and how to identify unsustainable fiscal policy. In the empirical part the article underpins the conclusion that Czech fiscal policy is unsustainable in the long run.

Aleš Krejdl (on page 2)

Generational Accounts in the Czech Republic

This is the first set of generational accounts for the Czech Republic and it shows fiscal sustainability from a new angle. On the aggregated level, the article confirms the previous research in the sense that Czech fiscal policy is not sustainable. The results clearly demonstrate that the current fiscal system is not fair from the intergenerational perspective, since future agents will have to pay for the generous contemporary fiscal settings.

Kamil Dybczak (on page 4)

Evaluating the Fiscal Impact of Personal Tax Adjustments: The Case of the Czech Republic

Personal income taxes have recently been lowered in many countries, especially in Central and Eastern Europe. A key argument for these fiscal policy steps is that high taxes discourage people from working. It is often argued that the subsequent loss of government revenues could be considerably alleviated by the higher supply of labour. This paper analyses on the Czech micro data what the stimulating effect on employment is likely to be.

Alena Bičáková, Jiří Slačálek and Michal Slavík (on page 6)

Fiscal Sustainability – Definition, Indicators and Assessment of Czech Public Finance Sustainability

Aleš Krejdl

Many politicians, policy-makers and economic analysts have called Czech fiscal policy unsustainable. Although it is hardly ever explained what unsustainable policy actually means, the statement implicitly relates to excessive deficits and an increasing debt ratio. In our paper we ask how we can define unsustainable fiscal policy and whether and how we can identify unsustainable fiscal policy.

Identifying unsustainable fiscal policy is an important task for fiscal and monetary authorities. Fiscal imbalances will lead, sooner or later, to adjustment. The costs of the adjustment depend on whether it is pre-emptive – initiated by the government soon enough to prevent the markets shattering confidence in the country – or whether it was only the financial markets that made a hesitant government bring in unpopular measures. Adjustments triggered by a loss of confidence among financial market participants are generally much more costly. Thus, it is important to detect any unsustainable policies with a sufficient lead so that policy-makers have time to act and to mitigate the costs ensuing from the fiscal correction.

Various definitions and conditions of sustainability have been proposed in the theory. The definition based on the intertemporal budget constraint proposed by Olivier Blanchard is the most widely accepted. It states that fiscal policy is sustainable if the present value of future primary surpluses is equal to the current level of debt – in other words if the government is capable of repaying all its loans with the future excess of revenues over primary expenditures. In mathematical terms the definition of sustainability is consistent with the debt ratio converging to its initial level or to any other finite level.

Although Blanchard's definition based on the intertemporal budget constraint is nowadays widely accepted, there are still some unresolved issues relating to it. The intertemporal budget

constraint is only an accounting identity formalising the belief long held in the economic profession that the government cannot expand its indebtedness forever. However, it is based on the partial equilibrium approach and leaves aside interactions between the budgetary variables and the economy. Public revenues, expenditures, deficit and debt have an impact on other macroeconomic variables, especially the interest rate and the growth rate of GDP, which in turn affect public finance sustainability. Unfortunately, economists have not come to a consensus on a "general" theory governing the interaction between the public budget and the economy. Thus, the usual practice in assessing fiscal sustainability is to assume that the interest rate and the growth rate of GDP are exogenous to fiscal policy and then to analyse possible interactions outside the model.

The high costs of spontaneous adjustment call for the development of indicators that enable unsustainable fiscal policy to be recognised. The accounting identity of the intertemporal budget constraint represents the starting point for the derivation of fiscal sustainability indicators. According to Blanchard a good indicator of fiscal sustainability is one that sends clear and easily interpretable signals when current policy appears to be leading to a rapidly growing debt-to-GDP ratio. Sustainability indicators should not only signal a need for readjustment, but also indicate the magnitude of the adjustment needed.

The most widely used indicators of sustainability are the primary gap and the tax gap. The construction of the two indicators is based on the same approach. First, the sustainable level of the fiscal variable at hand is calculated. Second, the gap is defined as the difference between the sustainable and the current level of the primary deficit or the tax ratio. The sustainable level of the fiscal variable is such that ensures convergence of the debt ratio towards a finite value.

Computation of the primary gap indicator only requires assumptions about the real interest rate and economic growth and does not reflect any future increase in spending. On the other hand, the tax gap intrinsically takes account of the future evolution of public spending and as such better captures the magnitude of the fiscal correction needed. It is recommended to calculate both indicators for different time horizons – very short (1–5 years), long (30–50 years) and infinite.

Politicians tend to be hesitant about adopting corrective measures and are tempted to postpone adjustment. However, the decision to postpone adjustment is not costless. The costs of delayed adjustment can be quantified as the difference between the fiscal gaps (e.g. tax gaps) prevailing at two distinct points in time. Delaying adjustment results in a more rapid accumulation of debt, which goes hand in hand with rising debt servicing costs and ultimately leads to lower primary spending (or higher taxes). In fact, the widening of the fiscal gap indicates the volume of spending that will have to be foregone in future in exchange for temporarily higher spending. It can be shown that the costs depend on the initial value of the fiscal gap and the growth-adjusted interest rate on government debt. The higher the initial gap and the higher the interest rate, the more future spending and/or taxes will have to be sacrificed.

We have calculated sustainability indicators for the Czech Republic on the basis of official projections. The calculations show that the sustainable revenue ratio enabling the future surge in spending (mainly pensions and health care) to be financed is estimated to hover around 48% of GDP in the Czech Republic. It is more than 7 percentage points higher than the current revenue-to-GDP ratio. If governments wished to continue the current spending policies, they would have to increase taxes by 7% of GDP to avoid accumulating excessive debt and becoming insolvent in the future (see Chart 1).

The infinite horizon tax gap is very large even from the international perspective and it will increase further beyond 2008 unless the government sets ambitious fiscal targets.

Governments can choose an alternative path towards sustainability. They can set a primary surplus target consistent with the sustainable primary balance. On the basis of our calculations the sustainable primary balance stands at 0.4% of GDP. By observing this target governments would stabilise the debt ratio in the long run. However, compliance with this target

CHART 1

Tax gap in international comparison

(% of GDP)



Source: EC (2003); author's calculations

would require immediately raising taxes or cutting spending by some 3.0% of GDP and containing any future spending pressures (projected at 7.3% of GDP) either by systemic reforms preventing age-related spending from rising or by annual discretionary spending cuts and tax increases.

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Generational Accounts in the Czech Republic

Kamil Dybczak

Generational accounting is an approach reflecting the long-term implications of current fiscal policy arrangements for intergenerational redistribution and fiscal sustainability taking into account the expected demographic development. This methodology was developed by Auerbach, Gokhale and Kotlikoff in 1991. The method aims to compare the present value of the growth-adjusted lifetime burden faced by a representative current and future agent on condition that the intertemporal budget constraint holds. Alternatively, the method quantifies the total amount of the government liabilities stemming from the current fiscal policy proceeds indefinitely. We applied this methodology and constructed the first set of generational accounts in order to assess the sustainability of the present fiscal policy in the case of the Czech Republic.

To assess the intergenerational imbalance (sustainability of public finances), different indicators based on the generational accounting methodology can be constructed. First, we assume that the government is not willing to change the current settings of the system for the time being. As a result, all the changes needed to attain fiscal sustainability will be faced by future generations. Thus, the condition for examining the sustainability of a particular fiscal policy is based on comparing the growth-adjusted per capita burden, i.e. the generational accounts, of current and future representative agents. Second, we quantify the total lifetime net taxes of all generations without applying the intertemporal budget constraint. The criterion of fiscal sustainability is the so-called “sustainability

gap”. It is defined as the total amount of the government liabilities resulting from the current fiscal policy pursued indefinitely, i.e. the imbalance in the intertemporal budget constraint. Alternatively, the sustainability gap equals the total present value of lacking public revenues which is desired to fulfil the intertemporal public budget constraint. If the sustainability gap is positive the present value of all potential public expenditures exceeds the present value of all public revenues. Since the absolute present value of the sustainability gap is hard to interpret, it is recommended to relate the sustainability gap to GDP.

When quantifying different indicators of fiscal sustainability and intergenerational redistribution it is important to determine the value of expected productivity growth g and the discount rate r . Depending on the value of g and r the final results can be significantly different. Nevertheless, we found no effect of different values of r and g and combinations thereof on the main results of our analysis. In all cases of different expected productivity growth g and discount rate r the present value of the net tax burden of a current representative agent is negative, i.e. this agent obtains more transfers than pays in taxes over his/her whole lifetime. By contrast, the generational accounts of future generations are positive. This implies that next generations will face the opposite situation to currently living generations from the tax and transfer point of view. The higher generational account of future generations indicates that the present fiscal policy is not sustainable and should be changed.

TABLE 1

Generational accounts of current and future generations under different scenarios
(CZK thousands)

g (%)	1			2			3		
	3	5	7	3	5	7	3	5	7
r (%)									
GA current	-1081	-902	-862	-1497	-948	-883	-2629	-1090	-904
GA future	1938	1624	1440	2044	1782	1515	2018	1944	1635
Sustainability gap (%GDP)	454	211	131	797	297	131	1608	460	214

If the structure of public revenues and expenditures is held fixed and the demography develops in accordance with our projection, we estimate the sustainability gap to be positive regardless of the combination of g and r . The sustainability gap indicates the size of the adjustment needed to achieve fiscal sustainability, i.e. it is defined as the accumulated present value of future deficits owing to changes in demography parameters and unchanged fiscal policy between 2004 and 2150. For example, if the discount rate equals 5% and productivity grows at 2%, the government accumulates debt of 297% of 2004 GDP between 2004 and 2150, as presented in Table I. If g increases by just 1 percentage point to 3%, the ratio of the sustainability gap to GDP rises to 460% *ceteris paribus*. It seems that indexation of taxes and benefits is an important factor for the potential development of public finances.

Next, Table 2 presents information about the impact of changing demographic factors on the generational accounts of future agents. The results indicate the present value of the growth-adjusted net taxes of a representative future agent

and older. In other words, the number of people really facing the burden accumulated by previous generations is decreasing. This implies that the government should not hesitate too long with revising the current system if it wishes to sustain fiscal policy without dramatic changes in taxes and transfers of future generations. The costs of delayed action seem to be considerable.

To conclude, we constructed the first set of generational accounts for the Czech Republic in order to analyse the sustainability of public budgets. We found that a representative living agent obtains more benefits than he/she pays in taxes in 2004, i.e. the account of this representative agent is negative. In addition, the total amount of the government liabilities resulting from the current fiscal policy pursued to 2150 reaches about 300% of GDP in 2004 for g equal to 2% and r equal to 5. Finally, the costs of postponed adjustment of government revenues and expenditures seem to be considerable. We conclude that the present fiscal policy seems not to be sustainable, i.e. public budgets in the Czech Republic should be stabilised by changing the current system of taxes and benefits to reflect potential demographic development.

TABLE 2

Growth-adjusted generational accounts of future generations in different years
(CZK thousands)

	2004	2009	2014	2019
GA future	1782	2265	2845	3531
base year=100	100	127	160	198

which guarantees fiscal sustainability. According to our calculations, it is evident that the generational account of the future agent increases over time in the case of the Czech Republic.

The timing of fiscal reform is therefore a very important factor from the intergenerational point of view, since the population is getting smaller

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Evaluating the Fiscal Impact of Personal Tax Adjustments: The Case of the Czech Republic

Alena Bičáková, Jiří Slačálek and Michal Slavík¹

On 1 January 2006 the Czech government extended the lowest tax bracket and decreased the income tax rates for the lowest two brackets by 3 and 1 percentage points respectively.² We evaluate the fiscal impact of this change for two alternative scenarios: (1) a “passive” scenario – a simple accounting exercise that assumes that labour supply will not react to growth in the net wage, and (2) an “active” scenario that incorporates as part of the impact the stimulating effect of the policy change on labour supply.

We use the Mikrocensus 2002 dataset (Czech Household Income Survey) to pin down the cross-sectional distribution of wages and to estimate the response of employment to net wages.

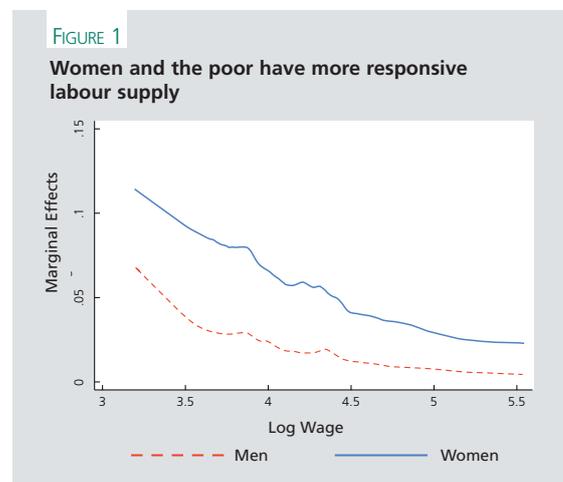
The key input to calculating the “active” scenario is the wage elasticity of labour supply. In order to obtain its values, we first estimate the standard model of the probability of working, using econometric techniques (Heckman and probit regressions) that correct for the fact that wages of the inactive and the unemployed are not observed.³ In doing so we pay special attention to constructing the correct wage variable: “the effective net wage”⁴, which takes into account the tax and social benefit structure. We are thus able to capture both the effect of taxes on labour supply and the destimulating effects of the social benefit system due to the fact that when a person works more, she receives less in social benefits because her income rises.

The empirical model of the probability of working has the following structure:

$$E = f(\hat{w}_i, y, D, X),$$

where E is an indicator of employment ($E = 1$ if an individual works and 0 otherwise), f is a known nonlinear function, \hat{w}_i is the logarithm of the effective net wage, y is non-labour income, D captures the demographic characteristics of the household and X all other factors.

The response of employment to independent variables in nonlinear models (such as probit in this case) is not constant and is therefore often investigated using so-called “marginal effects”. The marginal effect with respect to the net wage is the reaction of the probability of employment to a small (1%) increase in the wage. This reaction varies across individuals depending on their characteristics as described by the independent variables.



The variation of the marginal effects of the wage on the probability of employment across different wage levels is illustrated for men and women separately in Figure 1. The figure summarises two key findings. First, the effects of wage increases on women are (for almost any given wage level) at least twice as large as on men. Second, the sensitivity of labour supply to the wage declines with the wage level. Both facts – that the wage elasticity of women is higher than that of men and that low wage earners are more wage elastic than high wage earners – are consistent with what has been found in the previous literature.

Quantitatively, the figure suggests that the wage elasticity of the probability of working is generally

¹ This article is based on Bičáková, Slačálek and Slavík (2006).

² The two lowest tax rates were lowered from 15% to 12% and from 20% to 19% and the lowest tax bracket was extended from CZK 9,100 to CZK 10,100 per month.

³ It is well known that when these missing wages are systematically lower, estimating labour supply without accounting for this fact induces bias.

⁴ The effective net wage is defined and discussed in detail in the paper.

quite low: For most individuals, a 10% increase in the net effective wage raises the probability of employment by less than 1 percentage point. In the paper we report that this marginal effect is 0.018 and 0.055 for a typical man and a typical woman respectively. This means that a 10% increase in the wage increases the probability of working for women by 0.55 percentage points.

Figure 1 already suggests that the stimulating effect of lower taxes and higher wages on employment (“the employment effect”) is not going to contribute much to offsetting the shortfall in government revenues. Table 1 compares in detail the impact on

fall from more than CZK 66 billion to roughly CZK 55 billion. At the same time the government has to pay CZK 3 billion less in social benefits (thanks to higher net wages). However, the overall net impact on the budget (PIT+HSI-SB) is still a shortfall of almost CZK 9 billion.

Comparing the 2006 legislation for the active scenario we see that PIT revenues rise by only CZK 40 million (due to higher labour supply). While the revenues from health and social insurance are also somewhat higher (by CZK 200 million) and social benefits lower (by CZK 130 million) than in the passive scenario of the 2006 legislation, the total

TABLE 1

Fiscal implications of income tax reforms – estimation sample
(CZK billions, 2006)

	Baseline	2006 Legislation
Passive Scenario		
Personal Income Tax (PIT)	66.47	54.90
Health and Social Insurance (HSI)	315.84	315.84
PIT+HSI	382.31	370.74
Social Benefits (SB)	32.50	29.50
PIT+HSI-SB	349.81	341.24
Active Scenario		
Personal Income Tax (PIT)	-	54.94
Health and Social Insurance (HSI)	-	316.04
PIT+HSI	-	370.99
Social Benefits (SB)	-	29.37
PIT+HSI-SB	-	341.62

the consolidated public sector budget of the Czech tax reform of 2006 for two alternative setups (the baseline setting with the “old” tax system of 2005 and the 2006 legislation setting) and for the two alternative scenarios: passive and active (which uses labour supply elasticities to account for the employment effect).

Consider first the passive scenario. Because the tax rates are lowered, personal income tax (PIT) revenues

employment effect is small: roughly CZK 380 million. Thus even accounting for the stimulating effect of lower taxes the shortfall in net revenues remains more than CZK 8 billion.

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