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Czech Fiscal Policy: Introductory Analysis

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Abstract

What is the size of quasi-fiscal operations and their impact on the overall fiscal balance and public debt in the Czech Republic? Is the recent increase in Czech fiscal deficits fully attributable to the business cycle, or are there non-cyclical factors in place? And last but not least, what are the long-term perspectives of the fiscal system given the size and speed of the expected population ageing process? These are the issues dealt with in the paper. Our results, although being surrounded by some margin of uncertainty, are quite cautionary. The transparency of the fiscal accounts seems to be insufficient and the size of off-budget operations is not negligible. Moreover, we have been witnessing a rapid increase in the cyclically-adjusted deficits, and Czech fiscal policy exhibits mainly pro-cyclical features. Looking into the more distant future reveals that our current fiscal system is extremely vulnerable to demographic pressures, even by international comparison. We argue that the fiscal authorities should increase the overall transparency of the fiscal accounts, mitigate the pro-cyclical characteristics of fiscal policy and make the whole fiscal system more resistant to the expected demographic pressures.

JEL Codes: E62, H11, H5, H6, H81.

Keywords: ageing populations, cyclically-adjusted balance, fiscal policy, fiscal stance, off-budget transactions, quasi-fiscal policy.

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Nontechnical Summary

It is generally accepted that fiscal development is of particular importance for a central bank when considering its monetary policy. An in-depth understanding of fiscal policy is even more essential in the case of transition economies such as the Czech Republic, which are faced with numerous internal and external challenges. The aim of this paper is to fuel a contemporary debate on fiscal policy orientation by concentrating on three selected issues.

The first section of the paper is devoted to an analysis of off-budget fiscal transactions. We applied a methodology similar to that used by Poláčková-Brixí (2000) and, moreover, we extended the estimates of quasi-fiscal deficits up to 2000. Our findings are quite interesting. Firstly, it is necessary to emphasise that Czech fiscal policy has been implemented in a dualistic way. On the one hand, there are “official” fiscal statistics, and on the other hand some fiscal operations have been realised outside the official scope of fiscal policy in transformation institutions. The amount of the quasi-fiscal deficit is not negligible (on average about 1.5% of GDP a year), so such a fiscal policy leaves doubts about overall transparency and might in turn introduce dangerous by-pass effects into the whole system of public finance. Secondly, adding an indirect (quasi-fiscal) deficit to the official fiscal outcomes partly changed our interpretation of fiscal policy development from 1997 to 1999. Previously, fiscal policy in 1997 and 1998 was usually assessed as restrictive. Taking into account the indirect deficit in transformation institutions leads to the idea that the overall fiscal deficits continued to rise in these years. On the other hand, fiscal policy in 1999 used to be described as expansionary, since the government decided to use fiscal policy as an active (discretionary) counter-cyclical stabilisation instrument. Our data, however, show that the fiscal stimulus was realised a year later – in 2000.

The second section of the paper deals with the impact of the business cycle on the Czech fiscal balance in the last decade. We employed two different calculation methods – the OECD approach and the ESCB technique. There are two crucial messages resulting from the analysis. First, the estimates of the cyclically-adjusted deficits in the Czech Republic have proven their robustness, because the two methods, although being philosophically different, provided very similar results. This forms solid grounds for concluding that the sharply deteriorating Czech fiscal outcomes are basically structural in nature, i.e. independent of the business cycle position. Moreover, another hypothesis was clearly confirmed – Czech fiscal policy has been exhibiting mainly pro-cyclical features. As the paper further documents, both basic assessments hold true even if the quasi-fiscal deficits are included in the analysis.

The last section of the paper explores the long-run fiscal implications of the process of population ageing in the Czech Republic. To the best of our knowledge, this is the first Czech study to try to capture the impact of demographic processes upon the public budgets as a whole, not just the pension system itself. Our results are comparable from an international perspective, since we followed as much as possible the common assumptions and projections developed by the OECD in recent years. The results, although being surrounded by a significant margin of uncertainty due to the very long-term character of the projection exercise, do not provide any grounds for optimistic fiscal outlooks in the Czech Republic. However, this is hardly surprising given that the Czech Republic belongs to the group of countries with the most pronounced population ageing. Moreover, the starting fiscal position of the Czech Republic is very poor, in spite of its (still) low debt level and debt interest payments. The high primary deficit fosters a rapid rise in the debt irrespective of population ageing. Therefore, to cope with the expected fiscal pressures, it is necessary not only to overhaul the pension and health care systems in the medium term, but also to immediately start an intensive strategy of consolidation aimed at significantly reducing the primary deficit.

Preface

Fiscal policy is an extremely interesting research area in transition economies such as the Czech Republic. Public budgets in such countries are faced with two different challenges. Firstly, fiscal accounts are significantly affected by the process of economic transformation itself. The character of the economy has moved from a centrally planned structure to a market-oriented structure. On the expenditure side, government involvement in the economy has declined enormously since the end of the communist era. The revenue side of public budgets has also undergone significant change. Completely new tax systems relying more on indirect taxation were introduced. Moreover, the governments launched a massive privatisation campaign, with the aim of rebuilding the private sector. Hence, the overall fiscal policy environment has been strongly affected by these factors. While privatisation and other windfall incomes have boosted government revenues, public outlays have been often burdened with the costs of these structural changes.

The “transitional” aspects were of particular importance in the first half of the 1990s. Later on, as the process of economic transition became firmly anchored and Central and Eastern European countries became more focused on the European Union, new fiscal policy challenges started to emerge. These issues are, in fact, very similar to the fiscal policy issues debated in EU countries. In particular, fiscal policy experts pay an increasing amount of attention to the impact of the business cycle on fiscal data. Such an analysis can provide us with an answer to the question of the pro-cyclical versus counter-cyclical character of fiscal policy. This is, of course, very important information for a central bank when considering its monetary policy. Moreover, a pro-cyclical fiscal policy accumulating structural deficits would call for a comprehensive reform, since fiscal mismanagement might have an adverse impact not only on the economy itself, but also on the process of EU economic integration. In addition, the issue of (long-term) fiscal sustainability has been gaining more ground, because, similarly to the developed economies, the transition countries will also have to deal with a sharp change in the age structure of their population, which will pose serious risks to the health of public budgets.

The Czech National Bank is fully aware of the importance of having an in-depth understanding of fiscal policy, its determinants and future perspectives. Therefore, when project-based economic research was launched by the Czech National Bank at the end of 2001, fiscal issues were identified as the most important priorities. This working paper represents the first step in this direction, and the research in this area will inevitably be long-term in nature. The fiscal research team consists of experts from both the central bank and the Ministry of Finance. This is a welcome arrangement, since it assures a balanced approach to the problems being analysed. In addition, such cooperation at “expert” level greatly helps in finding a common language for both institutions on many fiscal policy challenges.

The structure of this working paper reflects the aforementioned challenges and weaknesses that fiscal policy must cope with in the Czech Republic. The first section of the working paper deals with off-budget fiscal transactions. It is argued that although “transformation institutions” have become an important quasi-budgetary instrument of the government, quasi-fiscal transactions have not been satisfactorily reflected in the official fiscal statistics. Our aim was, therefore, to estimate the fiscal deficit resulting from off-budget transactions and to include it in the officially reported public budget balance. The results are estimates rather than “hard data”, and the overall work on this issue was mainly experimental in nature. However, the main message seems quite

clear: fiscal policy in the Czech Republic has been implemented in a dualistic way. On the one hand, we have “official” fiscal records, and on the other hand, we execute some quasi-fiscal operations outside the official scope of fiscal policy. The amount of the quasi-fiscal deficit is not negligible (on average about 1.5% of GDP a year), so such a fiscal policy leaves doubts about overall transparency and might in turn introduce dangerous by-pass effects into the whole system of public finance.

The second section of the working paper explores the impact of the business cycle on the Czech fiscal balance in the last decade. In particular, we employed two slightly different methods for calculating the cyclical component of the budgetary balance – the OECD approach and the ESCB approach. The most important fact is that despite “philosophical” differences, the two methods provide us with the same conclusion – the rising fiscal deficits have a structural character. In addition, we can conclude that Czech fiscal policy has predominantly exhibited unwarranted pro-cyclical features. These crucial assessments hold true even if we include the estimate of the indirect (or quasi-fiscal) deficit in our analysis.

The last section of our working paper looks at the long-run fiscal implications of the process of population ageing in the Czech Republic. Attention is devoted not only to public pension outlays, but also to health care spending, education expenditures and child/family allowances. Our results are comparable from an international perspective, since we followed as much as possible the common assumptions and projections developed by the OECD in recent years. The results, although being surrounded by a significant margin of uncertainty due to the very long-term character of the projection exercise, do not provide any grounds for optimistic fiscal outlooks in the Czech Republic. However, this is hardly surprising given that the Czech Republic belongs to the group of countries with the most pronounced population ageing. Moreover, the starting fiscal position of the Czech Republic is very poor, in spite of its (still) low debt level and debt interest payments. The high primary deficit fosters a rapid rise in the debt irrespective of population ageing. Therefore, to cope with the expected fiscal pressures, it is necessary not only to overhaul the pension and health care systems in the medium term, but also to immediately start an intensive strategy of consolidation aimed at significantly reducing the primary deficit.

The results from each of the three sections of the working paper, which for the most part constitute original fiscal research in the Czech context, can be taken separately. Nevertheless, there is definitely a common thread running through the whole paper. Almost 14 years after the Velvet Revolution in the Czech Republic, it is becoming more and more difficult to rationalise the quasi-fiscal (off-budget) transactions reflecting the “transformation needs” of the economy. Moreover, from a systemic point of view, it is quite hard (if not impossible) to argue in favour of the future existence of the “transformation” institutions themselves. We argue that instead of being backward oriented, the fiscal authorities should concentrate much more on contemporary and likely future problems that will inevitably need to be addressed in the Czech Republic. Increasing the overall transparency of the fiscal accounts, mitigating the pro-cyclical features of fiscal policy and making the whole fiscal system more resistant to expected demographic pressures are the areas we consider most important in this respect. We therefore hope that the arguments reflected in this paper will encourage Czech policy-makers to focus more on these issues.

As was mentioned above, the fiscal policy research in the Czech Republic will inevitably be a long-term process. This working paper is nothing else than an attempt to make a pioneering step in this direction. By concentrating our attention on selected areas, we have not been left with enough room to explore other interesting and important fiscal policy aspects. At the end of 2002, therefore, the Czech National Bank decided to continue working on fiscal policy research, and a new fiscal research project for 2003/2004 was adopted. In this “second phase”, we will concentrate in more detail on the fiscal policy aspects of the Czech Republic’s accession to the European Union. The research team consists again of experts from the Czech National Bank and the Ministry of Finance, as well as a representative from the academic world. It will focus mainly on the role of fiscal rules for sustainable fiscal policy development and the importance and relevance of fiscal rules and procedures in the context of a catching-up economy such as the Czech Republic. Moreover, attention should be devoted to fiscal consolidation issues, including a model assessment of the macroeconomic impacts of different consolidation strategies.

Part I.

The Effect of Off-Budget Transactions on Czech Fiscal Policy

1. Introduction

Transformation institutions (TIs)¹ became an important quasi-budgetary instrument of the government in the 1990s. They have been used mostly to improve the performance of the banking system, with the aim of preparing banks for consolidation and privatisation. Another branch of TI activity is business sector restructuring. The importance of TIs has been constantly increasing, as is well documented by their rising balance sheets. In this paper, we argue that these quasi-fiscal transactions are not satisfactorily reflected in the official government financial accounts.² Therefore, fiscal data (deficit and debt) are still biased.

The main aim of our paper is to quantify the fiscal deficit resulting from TI transactions and to include it in the officially reported public budget balance. In this way, we can get a better picture of the real state of Czech fiscal policy in the 1990s and its relation to the overall economic situation. In particular, we wonder whether inclusion of the indirect (quasi-budgetary) deficit in the official fiscal balance would change the fiscal policy interpretation in terms of the extent of the fiscal imbalance and the timing of changes in the fiscal position. We would like to emphasise that our paper is practically motivated and, despite being of a quantitative nature, is mainly experimental in character.

The paper consists of five sections. After a short introduction, we discuss the way in which TIs are reflected in current fiscal reporting. Then we take a look at past TI analyses, in particular the World Bank's approach. In fact, this method is actually the basis of our approach, which is described in more detail in Appendix 2. The fourth chapter shows our results – estimates of fiscal deficits stemming from TI transactions and also the contribution of TIs to overall public debt. In conclusion, we give a short résumé of our results, and we also provide a few general remarks on Czech fiscal policy and quasi-fiscal institutions. Detailed information on individual transformation agencies, their history, goals and economic development can be found in Appendix 1. A list of the most important quasi-fiscal transactions realised via KoB/ČKA³ is included in Appendix 3.

¹ TIs consist of the Czech Consolidation Agency (ČKA), Česká finanční (ČF), Konpo and Česká inkasní (ČI). For more details see Appendix 1.

² In 2001, ČKA became an integral part of the definition of government for the purposes of financial reporting. This had a positive impact on the public debt statistics, which should now also include the liabilities of ČKA; nevertheless reporting of fiscal deficits still suffers from inadequate reflection of ČKA's transactions.

³ ČKA was officially established on 1 September 2001 as the successor organisation to the former Konsolidační banka (KoB).

2. Current stage of fiscal reporting on TI transactions

Public budgets in the Czech Republic are divided into central government level and local government level. The central government level includes the state budget, state financial assets, seven extra-budgetary state funds, privatisation funds (the National Property Fund (NPF) and the Land Fund) and nine health insurance companies. The local government budgetary level is represented by municipalities (about 6,250 independent entities) and 14 regions.

As you can see, there is no transformation institution on the list. TIs are sometimes called “off-budget” institutions, because they stand outside the official scope of the public budgets. TIs’ transactions are not explicitly included in the official fiscal reporting.⁴ Their operations are included only indirectly, and with a certain delay, via their losses, which are covered from different components of the public budgets, mainly the state budget and the NPF. The (non)treatment of TI transactions in the official fiscal statistics creates, of course, significant problems when analysing overall fiscal policy.

- First of all, the loss itself does not tell us anything about the extent of TIs’ influence on the economy. A loss is an accounting difference between costs and revenues and bears no relation to any “deficit”⁵ in a given transformation institution.
- And secondly, there is a problem of time inconsistency. A loss from accounting period T is financed by the state with a certain delay – usually of one or two years (T+1 or T+2). And the transactions that created this loss (e.g. the cleaning-up of commercial banks’ balance sheets) were realised in the past (T-1, etc.). Therefore, simply adding expenditures on covering TI losses to the official general government outlays without any time adjustments may paradoxically worsen the analytical quality and reliability of the fiscal data.

The problem of time inconsistency is even more intricate. One might argue that not only are losses from the off-budget institutions included in the public budgets with some delay, but they are usually generated sooner than reflected in the off-budget institutions’ balance sheets. When, for example, a commercial bank issued an evidently non-viable loan in, say, 1994, that loan contributed to the 1994 domestic demand but was reflected five years later when it was transferred to a “hospital” bank (KoB/ČKA). There are, however, two counter arguments. Firstly, in reality it is impossible to make such a time adjustment for every single asset of KoB/ČKA.⁶ And secondly, and more importantly, such an adjustment would neglect the fact that granting the (non-viable) loan was in the first stage (in our case 1994) an entirely private business transaction.⁷

⁴ We have taken into account the fact that since 2001 the loss of KoB/ČKA (loss from the previous budgetary year) has been included in the actual state budget as a part of the “Operation of state financial assets” budgetary chapter. ČKA also became an integral part of the scope of definition of the government. Nevertheless, as was mentioned in the introduction, fiscal reporting problems still persist.

⁵ The “methodology” of our estimate of indirect deficit, which is specified in Appendix 2, is “philosophically” quite similar to the accrual concept of fiscal deficits, since we try, in fact, to quantify changes in the net wealth of TIs.

⁶ The asset side of ČKA’s balance sheet consists of several thousand individual items – loans in particular.

⁷ On the one hand one may emphasise that the biggest commercial banks were at that time (the first half of the 1990s) under direct government influence, because the government used to be the biggest shareholder in these banks. Moreover, “unofficial” political interventions might also have been significant. However, on the other hand, we have to note that, from a legal point of view, all these banks were joint-stock companies running their businesses fully in line with the Commercial Code (and other valid legislation). Also, the scope for potential political influence definitely differed from bank to bank. Some banks were said to be very resistant to such pressures. Political interventions, therefore, cannot be viewed as a systemic deficiency of the banking system itself.

It was exactly at the time the non-viable asset was transferred from the commercial bank's balance sheet to the governmental KoB/ČKA (i.e. in the second phase, in our example five years later) that the transaction crossed the "borders" between the private and public sectors. Therefore, in our opinion, it is "philosophically" correct to consider the fiscal consequences of such transactions exclusively in the second stage of the whole process, abstracting from the technical feasibility of such an approach.

As is documented in Appendix 1, TI transactions mostly reflect government interventions in the banking system and, to a lesser extent, also the costs of business sector restructuring. Development aspects (EIB loans) also played a significant role. All of these areas are typical representatives of government economic policy, and we do not see any reason to account the costs of these policies separately from, and time-inconsistently with respect to, the "standard" general government budget operations. In the future these statistical deficiencies will have to be overcome by fully including TI transactions in the official fiscal statistics. Another possible solution would be to avoid using TIs for new transactions, quickly sell off their portfolio of non-performing loans and low quality assets and in the final stage close down these agencies. Their (unsettled) liabilities would become an explicit part of the official state debt.

3. The World Bank's approach to transformation institutions

Up to this point, transformation institutions have not been the subject of much economic research. The only exception, to the best of our knowledge, is Poláčková-Brixí (2000). In her paper, the author, working for the World Bank, focused on estimating indirect (hidden) state liabilities and indirect fiscal deficits stemming from TI transactions, NPF activities and granted state guarantees. Her main findings are summarised in Table 1.

Table 1: Indirect fiscal deficit

% of GDP	1993	1994	1995	1996	1997	1998
Official fiscal deficit (state budget and state financial assets only)	-0.5	-1.3	0.3	0.5	1.1	1.4
Total indirect deficit in KoB, ČI, ČF and NPF	3.2	1.9	1.0	0.5	1.0	2.0
Indirect deficit from granted state guarantees	0	0	0.1	1.0	3.1	1.5
Adjusted ("real") fiscal deficit	2.7	0.6	1.4	2.0	5.2	4.9

Source: Poláčková-Brixí (2000), table 8, p. 157.

The indirect deficit of transformation institutions was calculated as the outlays of these agencies on programmes of fiscal character plus their interest costs minus transactions between the agencies themselves minus transfers from the state budget and minus own revenues of transformation institutions (e.g. received interest, revenues from sold shares or loans, etc.).

In the case of a deficit stemming from state guarantees, Poláčková-Brixí understands a state guarantee as an indirect state transfer to a given receiver of the state guarantee which is not accounted for on the expenditure side of the actual state budget. The amount of this indirect

support is a positive function of the risk that the guarantee will be called in the future. It is, therefore, equal to the net present value of all future budget expenditures related to potential payments stemming from the guarantee. To avoid duplication, she further adjusted those indirect “expenditures” for all budgetary payments realised due to granted state guarantees.

Poláčková-Bixi’s main conclusion was that from an international perspective, the overall level of the adjusted fiscal deficit is not the biggest problem. What was especially striking was the huge discretion (“degrees of freedom”) that the Czech government uses to implement its economic policies via state guarantees and off-budget transactions. This means that an important part of actual fiscal policy is, in fact, financed at the cost of future budgets. The main accent of Poláčková-Bixi’s work was therefore put on a discussion about the overall health of Czech public budgets, their long-term sustainability and the need to increase the transparency of fiscal policy.⁸

Like any pioneering study, the Poláčková-Bixi paper was also the subject of some criticism. One of the most relevant ideas was the fact that the estimate of the indirect deficit from state guarantees suffers from certain weaknesses. First of all, we have to make an *ex-ante* assessment of the level of risk for each state guarantee, which is a difficult, if not impossible, task. Secondly, to calculate the net present value of risk-adjusted state guarantees, we need to decide on a precise level for the discount rate. It is a well-known fact that even a relatively small change in the discount factor can generate significantly different discounted values. Another criticism stems from the fact that Poláčková-Bixi used as the “official” fiscal balance only part of the general government fiscal data (state budget and state financial assets). Her total adjusted deficit, therefore, neglects the budgets of municipalities, health insurance companies, the Land Fund and extra-budgetary state funds. It would have been much better if she had taken the general government balance as the starting point for her analysis (based, for example, on the GFS cash methodology of the IMF). Irrespective of the possible weaknesses, we consider Poláčková-Bixi’s paper to be an excellent and comprehensive study, one which in fact helped to start a public debate on long-term fiscal issues in the Czech Republic. Her methodology for estimating the indirect deficit in transformation institutions is also the basis of our approach. The only difference is state guarantees, which we do not include in the sources of indirect deficits, mainly because of the practical complications described above.

4. The indirect deficit and debt stemming from operations of transformation institutions

Our main results are presented in the next two tables. The “methodological” details and procedures are specified in Appendix 2.

In the case of Česká inkasní, it is evident that the most intensive quasi-fiscal activities were realised in the first three years, and especially in 1993. Later, the importance of ČI’s transactions dropped significantly and at the end of the decade was quite close to zero.

⁸ We have to mention that the situation has improved somewhat since Poláčková-Bixi’s critique. For example, a new State Budget Rules Act took effect in January 2001. As a result of it, new state guarantees can be granted only by a special law. This means that the government needs the approval of the Parliament. Furthermore, as was discussed earlier, the state budget comprises a new budgetary chapter that includes the loss of KoB/ČKA made in the previous fiscal year.

Table 2: Indirect fiscal deficit

(CZK bn)	1993	1994	1995	1996	1997	1998	1999	2000
Česká inkasní	20.1	6.1	7.0	4.3	3.7	2.4	1.8	0.1
Česká finanční	-	-	-	-	26.4	24.2	-3.8	-2.1
KoB/ČKA	?	2.6	-3.3	0.4	1.2	27.0	35.0	39.4
TOTAL	20.1?	8.7	3.7	4.7	31.3	53.6	33.0	37.4
TOTAL (% of GDP)	2.0%	0.7%	0.3%	0.3%	1.9%	2.9%	1.7%	1.9%

Source: Authors' own estimates.

Česká finanční began assisting the banking sector in 1997, and in the first two years this policy was very costly. In 1999 and 2000, ČF no longer assumed low quality assets and its fiscal balance thus even registered a small surplus, as ČF received transfers from the CNB and realised revenues from the sale of its assets.

In the case of KoB/ČKA, we are not able to calculate the fiscal balance in 1993, because we do not have the necessary data for this year. Nevertheless, if we take into account the information provided in Appendix 3 and the data from Tables 6 and 7 in Appendix 1, we can expect 1993 to be quite similar to 1994, 1995 and 1996, when KoB's deficit was negligible. A sharp break in this tendency is apparent in 1998. In that year, the government started cleaning up the balance sheets of the largest commercial banks in an effort to prepare them for later privatisation. Since that time, KoB/ČKA has also been used more systematically to restructure selected businesses. KoB's indirect deficit during these years, hence, was more than CZK 30 billion a year on average.

As a result of the quasi-fiscal deficit activities, we have been witnessing an increasing dependency of transformation institutions on external financial resources, in particular from the financial markets. As we can see in Table 3, the total indirect debt was slowly decreasing up until 1996, in both absolute and relative terms. Since 1997, the indirect state debt has been growing, even in relation to GDP. In 2000, it reached more than 7% of GDP.

Table 3: Indirect state debt in transformation institutions

(CZK bn)	1993	1994	1995	1996	1997	1998	1999	2000
Česká inkasní	20.1	26.7	28.0	23.9	20.0	16.7	12.2	8.2
Česká finanční	-	-	-	-	9.6	21.3	21.8	15.2
KoB / ČKA	75.8	73.9	72.4	67.1	87.6	106.6	141.1	137.5
Consolidation due to KoB/ČKA	0	-0.1	-15.1	-16.0	-22.0	-28.0	-34.4	-15.5
TOTAL	95.9	100.5	85.3	75.0	95.2	116.6	140.7	145.4
TOTAL (% of GDP)	9.4%	8.5%	6.2%	4.8%	5.7%	6.3%	7.5%	7.4%

Source: Authors' own estimates.

5. Concluding remarks

The following section summarises our main findings in terms of fiscal deficits. As the basic “official” fiscal balance, we choose the general government deficit adjusted for net lending⁹ and subsidies to transformation institutions. This is represented by the first row in Table 4. Such a concept of deficit is generally accepted as the best basis for the economic analysis of fiscal policy in the Czech Republic, because the data are not optically reduced by privatisation and other windfall revenues. Moreover, this deficit is not burdened with public budget transfers to transformation institutions.¹⁰

Then we add the estimated indirect deficit from transformation institutions (second row in Table 4) to the basic fiscal deficit and we get the overall fiscal deficit in the Czech Republic (third row in Table 4). We argue that the indirect deficit was on average about CZK 25 billion a year (or about 1.5% of GDP).

A similar approach was used in the case of overall public debt (see Table 5). If we take into account the indirect state debt in transformation institutions, the overall public debt in 1994 was about 26% of GDP. This ratio (and even the debt in absolute terms) was decreasing until 1996, at which time it was 18% of GDP. Since 1997, there has been a clear rising tendency due to the costs of banking sector restructuring and expansionary fiscal policy. Overall public debt in 2000 reached more than 24% of GDP.

Table 4: Overall fiscal deficit

(CZK bn)	1994	1995	1996	1997	1998	1999	2000
General government deficit (adjusted for net lending and subsidies to TIs)	14.4	12.1	15.7	24.3	25.0	44.7	66.8
Indirect deficit for TIs	8.7	3.7	4.7	31.3	53.6	33.0	37.4
Overall fiscal deficit (CZK bn)	23.1	15.8	20.4	55.6	78.6	77.7	104.2
Overall fiscal deficit (% of GDP)	2.0%	1.1%	1.3%	3.3%	4.3%	4.1%	5.3%

Source: Authors' own estimate.

Table 5: Overall public debt

(CZK bn)	1994	1995	1996	1997	1998	1999	2000
Officially reported public debt	207.8	210.9	206.7	217.5	240.0	275.2	332.4
Indirect debt for TIs	100.5	85.3	75.0	95.2	116.6	140.7	145.4
Overall public debt (CZK bn)	308.3	296.2	281.7	312.7	356.6	415.9	477.8
Overall public debt (% of GDP)	26.1%	21.4%	18.0%	18.6%	19.4%	22.0%	24.4%

Source: Authors' own estimates.

⁹ In Czech fiscal reality, net lending means in particular privatisation revenues.

¹⁰ The rationale is as follows. First of all, these outlays do not create primary demand pressures, because they represent “only” the final financial settlement of transactions that had an impact on aggregate demand in the past. Secondly, if we consider transformation institutions as an integral part of the general government, then subsidies to TIs from the NPF or the state budget are internal financial operations of the government that cannot increase the overall fiscal deficit.

We are persuaded that the findings presented above strongly support the following conclusions:

- 1) *Our results are in broad agreement with the analysis made by Poláčeková-Brixí (2000).* This is quite apparent if we compare Tables 1 and 2, despite the fact that our methodology was not completely the same as Poláčeková-Brixí's approach.¹¹ Our findings on indirect deficit and debt are only estimates and should thus be treated with a certain amount of caution. On the other hand, the validity of the presented data is certainly higher if it is in line with the previous independent calculations.
- 2) *We have partly changed our interpretation of fiscal policy development from 1997 to 1999.* Previously, fiscal policy in 1997 and 1998 was assessed as restrictive. Taking into account the indirect deficit in transformation institutions leads to the idea that the overall fiscal deficits continued to rise in these years, even if we adjust them for negative business cycle development. On the other hand, fiscal policy in 1999 used to be described as expansionary, since the government decided to use fiscal policy as an active (discretionary) counter-cyclical stabilisation instrument. Our data, however, show that the fiscal stimulus was realised a year later – in 2000. When interpreting the overall fiscal deficit in the 1990s, we should be aware that the necessity of (costly) banking sector restructuring in the second half of the 1990s was a painful consequence of the economic policy adopted in the first half of the 1990s.¹² In the second half of the decade, the government had very little choice: the question was not *whether* or not to clean up the balance sheets of commercial banks, but simply *when and how* to do it. The relatively small indirect and overall budgetary deficits up to 1996 should therefore also be assessed in this broader context.
- 3) *Fiscal policy in the Czech Republic has been implemented in a dualistic way. On the one hand, we do have "official" fiscal statistics, and on the other hand, we realise some fiscal and quasi-fiscal operations outside the official scope of fiscal policy in transformation institutions. This creates, in our opinion, significant problems and dangerous by-pass effects.*
 - a) *Low transparency of the "official" fiscal policy.* From 1997 to 1999, the indirect (hidden) deficit was about 25% higher than the officially reported fiscal balance. There are many countries all over the world that have faced a difficult period of banking and business sector restructuring (e.g. Finland and Sweden in the early 1990s). The costs of banking crisis in these countries were reported fairly and in an open manner in the official fiscal statistics without any delay. For this reason, the fiscal deficits in the given year (years) peaked at 10% of GDP or even more. The Czech fiscal system, contrary to this transparent practice, tends to hide the real amount of those interventions and to acknowledge it only partially, step-by-step and belatedly.
 - b) *There has been an unpleasant change in the structure of the overall fiscal deficit.* Despite the fact that in the last three years of our sample (1998–2000) the overall deficit has been

¹¹ As was mentioned in Section 3, contrary to Poláčeková-Brixí, we do not estimate the indirect deficit stemming from granted stated guarantees. Nevertheless, this has only a limited impact on the total results, because most of the state guarantees were connected with banking sector restructuring and EIB development loans. Thus, most of what Poláčeková-Brixí estimated as a deficit operation within "state guarantees" we have fully included in the transformation institutions themselves.

¹² The economic policy at that time was characterised by a generally weak legal and regulatory framework, weaknesses in institutional arrangements, weak corporate governance, political interventions in the banking sector, etc.

quite stable (between 4% and 5% of GDP), it has changed significantly in terms of its structure. Table 4 demonstrates very clearly that the “classical” part of the overall deficit, i.e. the part not subject to transformation costs (first row in Table 4), is accelerating. This deficit also grew at a rapid pace in 2001 and 2002. We can also expect the indirect deficit to have increased significantly during these two years.¹³ Therefore, the overall fiscal deficit is certainly much higher than 5% of GDP. Czech fiscal policy has been faced with serious structural difficulties. We assume that even after overcoming the “transformation costs” (indirect deficit), which are of a temporary nature, the overall fiscal balance will not “automatically” lower and more sustainable deficit levels will not be attained unless the government completely overhauls its fiscal policy. Therefore, our findings should also be understood as an explicit call for starting immediate and significant fiscal corrections.

¹³ Due to the IPB/ČSOB case. The costs of government assistance to this bank have not been precisely quantified yet. However, they are estimated to be at least CZK 100 billion (about 5% of GDP).

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Appendix 1

Transformation institutions – their origin and development

Transformation institutions consist of the financial group of Česká konsolidační agentura (Czech Consolidation Agency; also abbreviated ČKA) and Česká inkasní (ČI). ČKA was officially established on 1 September 2001, and it is the successor organisation to the former Konsolidační banka (KoB).

A1.1 Czech Consolidation Agency's financial group

The most important part of the whole group is Czech Consolidation Agency itself. The rest of the group is composed of ČKA's subsidiaries – Česká finanční (ČF), Konpo, Sanakon, Prisko and the Revitalisation Agency. The last three institutions are negligible in financial terms, therefore in our analysis we will concentrate on ČKA, ČF and Konpo only.

A1.1.1 Czech Consolidation Agency

As was mentioned above, ČKA is the legal and economic successor of Konsolidační banka. The main purpose of the transformation from KoB to ČKA was to improve the overall conditions for the effective management and realisation of low quality assets. Unlike KoB, ČKA is not a banking institution under the Act on Banks and hence it is not subject to the banking regulations. ČKA is allowed neither to provide loans nor to accept deposits from the public. According to the special law on ČKA, the government guarantees all its liabilities.

The former KoB was the oldest and most important institution dealing with the administration of bad assets. The original KoB was established by the Czechoslovak Ministry of Finance on 25 February 1991 as a specialised bank to resolve some of the circumstances relating to the centrally planned economy before 1990. Shortly after its establishment, KoB absorbed the claims from permanently revolving stock loans (“TOZ” loans – a special type of loan provided in the centrally planned economy) – with a face value of CZK 110.8 billion. In 1992, KoB purchased from commercial banks additional non-performing loans with a total nominal value of CZK 14.7 billion. At the beginning of 1993, as a result of the separation of Czechoslovakia, the original federal bank was divided into independent Czech and Slovak entities.

The range of ČKA's activities has gradually increased as the process of economic transformation has proved to be more and more difficult and costly. In addition to dealing with the centrally planned “legacy”, KoB has been repeatedly used to clean up the balance sheets of commercial banks and to restructure some important domestic companies. Moreover, in the second half of the 1990s, KoB also operated as a bank specialising in the financing of development projects (in close cooperation especially with the European Investment Bank). KoB was thus the main government agent for providing assistance and investment in transportation, communication, water system infrastructure and ecological projects.¹⁴ The rising importance of KoB is apparent when we look at a simple version of its balance sheet (Table 6).

¹⁴ This “development” part of KoB's balance sheet (totalling about CZK 21 billion) was transferred to Českomoravská záruční a rozvojová banka at the end of 2000.

Table 6: Balance sheet of KoB/ČKA from 1991 to 2001

CZK bn at year-end	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Aggregate Balance (net)	83.5	79.9	103.1	110.5	123.3	114.8	129.7	141.1	195.7	214.2	242.9
<i>Selected assets</i>											
Total loans (net)	80.1	78.2	74.7	76.2	73.1	69.3	79.3	97.0	101.5	122.3	122.0
Securities (net)	-	0.1	8.1	3.2	18.2	18.8	17.6	15.4	15.4	0.3	0.8
Ownership interests (net)	-	-	-	10.4	10.6	10.5	8.6	9.1	9.9	5.6	3.9
Deposits and loans at banks	0.4	0.7	2.1	6.9	7.1	7.2	9.5	13.6	15.6	20.9	32.3
<i>Selected liabilities</i>											
Liabilities to banks	31.8	28.1	29.1	27.2	26.2	25.6	41.0	57.4	101.1	110.9	100.0
Redistribution credit (CNB)	38.8	38.8	38.8	38.8	38.8	36.8	36.8	32.4	28.3	12.8	11.7
Liabilities to clients	-	9.0	7.6	12.3	9.5	8.5	5.9	3.8	4.5	11.7	29.2
Issued securities	-	-	-	-	-	2.0	9.0	14.0	14.0	14.0	13.5
Total external financing	70.6	75.9	75.5	78.3	74.5	72.9	92.7	107.6	147.9	149.4	154.3
Reserves	0.5	1.5	1.8	5.8	6.1	6.3	6.3	6.3	7.4	13.0	44.0
Reserve funds	0.3	0.4	17.1	17.4	32.4	32.2	31.5	31.4	31.4	31.4	29.3
Registered capital	-	1.0	5.0	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9

Source: <http://www.cka.cz/>.

Note: Data for 1991 and 1992 represent the Czech share in KoB's federal balance sheet.

The following table provides more detailed information on selected balance sheet items.

Table 7: Selected KoB/ČKA balance sheet items from 1991 to 2001

CZK bn at year-end	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<i>Credit portfolio</i>											
"Old" block total	80.1	81.2	74.6	67.9	63.8	60.8	59.4	58.0	53.3	48.5	42.0
Loans for TOZ	80.1	66.1	62.3	55.7	49.7	42.3	39.4	37.7	33.0	29.5	25.9
Purchased loans (KB, IB)	-	15.1	12.3	12.2	11.4	9.9	9.2	9.1	8.4	8.0	6.0
Restructured loans	-	-	-	-	2.7	8.6	10.8	11.2	11.9	11.0	10.1
"New" loans total	-	-	2.3	10.3	13.6	18.2	34.7	67.0	107.5	139.2	152.7
Loans assumed to DBV	-	-	-	-	-	-	-	15.0	13.7	12.6	11.5
EIB development loans	-	-	-	-	-	-	-	12.9	18.0	-	-
Total loans (gross)	80.1	81.2	76.9	78.2	77.4	79.0	94.1	125.0	160.8	187.7	194.7
Adjusting entries	-	-3.0	-2.2	-2.0	-4.4	-9.7	-14.8	-28.1	-59.3	-65.4	-72.7
Total loans (net)	80.1	78.2	74.7	76.2	73.0	69.3	79.3	97.0	101.5	122.3	122.0
<i>Security portfolio</i>											
Bonds (net)	-	-	3.0	3.1	18.2	18.6	17.4	15.4	15.4	0.3	0.8
Shares (net)	-	0.1	5.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0
Total securities	-	0.1	8.1	3.2	18.2	18.8	17.6	15.4	15.4	0.3	0.8
<i>Ownership interests</i>											
Gross	-	-	-	10.4	10.6	10.6	14.1	15.4	14.9	11.5	10.7
Adjusting entries	-	-	-	-	-	-0.1	-5.5	-6.3	-5.0	-5.9	-6.9
Net	-	-	-	10.4	10.6	10.5	8.6	9.1	9.9	5.6	3.9
Profit/loss	-	0.00	0.96	0.01	0.00	-5.06	-10.36	-14.39	-36.09	-12.75	-57.65

Source: <http://www.cka.cz/>.

Note: Data for 1991 and 1992 represent the Czech share in KoB's federal balance sheet.

The marked rise in loans, which has been apparent since 1997, is the result of the pre-privatisation clean-up of the balance sheets of commercial banks. In 1998 and 1999, there was also another factor – development loans from EIB. The costs of business sector restructuring have not contributed to the increase in KoB's activities too much.¹⁵ Part of the increase in total loans in 2000 was caused by a new phenomenon – loans provided to the National Property Fund (NPF) to avoid a temporary lack of liquidity.¹⁶ Credit development in 2001 was influenced mainly by the assuming of “black” assets from CSOB/IPB (CZK 24.9 billion). KoB also acquired long-term receivables from health insurance companies against bankrupt clients with a book value of CZK 4.2 billion. Last but not least, KoB transferred some poor-quality receivables (from Česká spořitelna and Komerční banka) into its portfolio in mid-2001. On the other hand, in June 2001, KoB sold a “pilot” block of receivables with a total nominal value of CZK 19.1 billion (the price was CZK 1.35 billion, which gives a rate of return of 7.1%). It is interesting to take a look at bonds. In 1995, this item went up by CZK 15 billion as a result of bonds issued by the NPF to support reserves in KoB's balance sheet. The bonds were fully repaid by the NPF in 2000.

On the liability side of KoB's balance sheet, there is a clear tendency towards a rising dependency on external financing. The structure of external financing has also been changing. Loans provided by the Czech National Bank (these liabilities are the counterpart to “TOZ loans” and “purchased loans” on the asset side of the balance sheet) have been gradually decreasing. On the other hand, liabilities to banks and clients have been constantly rising. In 1996, KoB also started issuing its own bonds.

The quality of KoB's assets is generally very low, so KoB has to make provisions against future losses. KoB must also manage a significant volume of off-balance sheet liabilities (e.g. liabilities stemming from the IPB case and guarantees granted to ErsteBank for Česká spořitelna). To maintain adequate liquidity for financing future contingent liabilities, KoB has to create sufficient reserves. The costs of provisions and reserves are the main reason for the sharp deterioration in KoB's economic performance in recent years. KoB's losses are financed mostly through government bond issues. In this way, the implicit (“hidden”) state debt is gradually being transformed into official (explicit) government debt.

A1.1.2 Česká finanční

ČF was founded on 2 July 1992 as a subsidiary of KOB Invest. In February 1997, ČF was bought by the Czech National Bank to implement the “Stabilisation Programme” defined by Czech Government Resolution No. 539 of 16 October 1996. This programme was aimed at reinforcing the stability of the banking sector in the Czech Republic and was designed for small and medium-sized banks. The CNB increased ČF's registered capital in two steps from an initial CZK 0.5 million to CZK 15.8 billion during 1997 and 1998. In June 2000, ČF was sold for a symbolic price to KoB. This was a practical step towards concentrating the non-performing loans and bad assets in one institution as much as possible.

¹⁵ But one might argue that cleaning up the balance sheets in commercial banks is in fact nothing other than indirect state assistance to domestic companies and entrepreneurs.

¹⁶ At the end of 2000, these loans amounted to CZK 14 billion. A year later, the figure was CZK 22.2 billion. On the other hand, we have to mention that in December 2001 the NPF made a deposit at KoB of EUR 593 million (about CZK 20 billion). The NPF received this money as privatisation revenue from the sale of Komerční banka.

The Stabilisation Programme was focused on small and medium-sized banks. They were allowed to sell non-performing assets (especially loans and shares) to ČF for their book value, up to a maximum of 110% of the registered capital of each bank. At the same time, the banks accepted that they would repurchase those assets after seven years (in fact, only the rump assets that ČF failed to realise during the Stabilisation Programme). The programme is financed by a loan from KoB, and the losses stemming from it are continuously covered by subsidies from the NPF. Therefore, ČF does not have to adjust the book value of its assets for risk.

ČF also operates another specialised programme – the Consolidation Programme. This programme was launched by the CNB. Its principles are quite similar to the Stabilisation Programme. Under this scheme, small banks could change their poor quality assets (loans and shares) for “credit” provided to ČF (a perfect quality asset), although, contrary to the Stabilisation Programme, on a permanent basis. The Consolidation Programme is financed by credit provided by the Czech National Bank, and the losses from this scheme are continuously covered by transfers from the CNB. Hence, ČF has not made any provisions. As for the Consolidation Programme, we have to note that the government (in Resolution No. 51) issued a guarantee for the CNB to back potential losses up to CZK 22.5 billion.

The next table gives us a more concrete idea about the development of ČF in financial terms from 1997 to 2001.

Table 8: Balance sheet of Česká finanční from 1997 to 2001

CZK bn at year-end	1997	1998	1999	2000	2001
Total assets	22.2	43.9	42.2	43.9	38.8
Consolidation Programme	11.5	34.3	33.7	X	X
Stabilisation Programme	10.7	9.7	8.4	X	X
Total liabilities	22.2	43.9	42.2	43.9	38.8
Own resources	0.1	7.7	5.5	13.8	12.2
Registered capital	2.5	15.8	15.8	13.8	13.8
Profit/loss from previous years	0.0	-1.6	-4.8	-0.0	-0.1
Actual profit/loss	-2.4	-6.5	-5.5	-2.2	-5.1
Funds created from profits	-	-	-	2.2	3.5
External resources	21.9	36.2	36.7	30.0	26.6
Long-term bank loans (KoB/ČKA) – Stabilisation Programme	12.3	14.9	14.8	14.8	12.2
Consolidation Programme	9.6	21.3	21.8	15.2	14.0
Alternative segmentation of external resources					
Bank loans (CNB and KoB)	21.9	33.5	32.2	30.0	14.0
Short-term liabilities	0.0	2.7	4.5	0.0	0.4
Long-term liabilities (ČKA)	-	-	-	-	12.2

Source: Annual reports of ČF in 1997, 1999 and 2001; and “The development of Česká finanční” (in Czech only).

Note: All data are on a net basis.

X = Data not available

According to the volume of its balance sheet, ČF is the second most important institution dealing with the management of non-performing assets. As many of the banks which joined the Stabilisation and/or Consolidation Programmes no longer exist (due to bankruptcy and liquidation) or have lost their banking licences, we can assume that the real value of ČF's assets is very low (in fact almost negligible).

A1.1.3 Konpo

Konpo was established in January 2000 as a subsidiary of Komerční banka. KoB bought a 100% share in Konpo in mid-March 2000, fulfilling Czech Government Resolution No. 187 on the pre-privatisation restructuring of the assets of Komerční banka. Immediately upon the change in ownership, Konpo received selected non-performing loans and low-quality assets with a total nominal value of CZK 60 billion. The total price that Konpo paid for this asset package was CZK 36 billion. The whole transaction was financed by a loan (for the same amount) granted by KoB to Konpo.¹⁷ By the end of 2001, the balance sheet (net of provisions) had reached CZK 23.8 billion. As in the case of the other transformation agencies, the real value of Konpo's assets is quite low.

A1.2 Česká inkasní

Česká inkasní was founded by the Ministry of Finance in 1993 pursuant to Czech Government Resolution No. 689. The main objective of ČI was to purchase and manage non-performing receivables from Československá obchodní banka (ČSOB). These receivables were connected with high political risks (debtors from countries such as Syria, Libya and Iraq). The following tables present a simple version of the balance sheet of ČI in 2000 and an estimate for 2001.

Česká inkasní registers negative own resources as a result of provisions made against losses from low quality assets. The only financing item on the liability side of ČI's balance sheet is, thus, external capital, which is represented by loans gained mainly from ČSOB. Under a 1995 Resolution of the Czech Government, there is a time schedule for gradually covering ČI's losses and liabilities (by 2003) using resources from the NPF.

Table 9: Balance sheet of Česká inkasní in 2000 (CZK bn)

ASSETS		LIABILITIES	
Total assets (gross)	23.4	Total liabilities (gross)	6.5
Receivables	21.3	Own resources	-3.1
Financial investments	2.1	Registered capital	0.0001
Deposits	0.03	External resources	9.6
Provisions	-16.9		
Total assets (net)	6.5	Total liabilities (net)	6.5

Source: Draft of the State Budget Act for 2002, Part K: Performance of public budgets, table24, p.49.

¹⁷ Therefore, we do not need to look for more detailed information on Konpo's activities, because all the fiscal consequences of Konpo's transactions are already reflected in KoB's balance sheet.

Table 10: Balance sheet of Česká inkasní in 2001 (CZK bn) - estimate

ASSETS		LIABILITIES	
Total assets (gross)	19.5	Total liabilities (gross)	3.3
Receivables	17.9	Own resources	-1.6
Financial investments	1.3	Registered capital	0.0001
Deposits	0.2	External resources	4.9
Provisions	-16.2		
Total assets (net)	3.3	Total liabilities (net)	3.3

Source: Draft of the State Budget Act 2002, Part K: Performance of public budgets, table 24, p. 49.

Appendix 2

The methodology of quantification of the indirect deficit and indirect state debt

We have used detailed data from the balance sheets and profit-and-loss statements of transformation institutions.¹⁸ The data have an annual frequency and cover the period from 1993 to 2000 in the case of Konsolidační banka and Česká inkasní and 1997 to 2000 in the case of Česká finanční. We would like to point out that our quantifications should be viewed as estimates and treated, therefore, with some caution.

a) Indirect deficit

The aim of our approach is, in fact, to estimate the changes in net wealth for transformation institutions and is thus quite similar to the concept of the accrual deficit. We monitor the financial transactions of off-budget agencies in the given year. We presume that the assets assumed by transformation institutions are of very low quality. If a transformation institution “creates” an asset (e.g. a provided or assumed loan, bought shares, etc.), this means a decrease in the net wealth of this agency, since the price of the transaction is much higher than the real value of the created asset. From a fiscal point of view, it is equal to deficit financing. On the other hand, future incomes from the realisation of assets (sold receivables or shares, etc.) lead to a decrease in the deficit or a higher surplus. The main channels of indirect deficit operations are as follows:

- *Granted/assumed loans.* We start with the total amount of loans (in gross terms) at the beginning of the given year and deduct it from the stock of loans (gross) at the end of the same year. A positive (negative) value means a deficit (surplus). This difference must then be adjusted for the nominal value of sold or written-off receivables during that year (increase in deficit) and for revenues received from sold receivables (decrease in deficit).¹⁹
- *Other claims on clients.* This method is the same as for loans.

¹⁸ We owe a debt of thanks to our colleagues in transformation institutions who kindly agreed to give us the necessary data. Any errors and omissions in this paper remain, of course, our own responsibility.

¹⁹ In the case of Konsolidační banka, we also had to adjust the data for loans provided to Česká finanční to implement the Stabilisation Programme.

- *Ownership interests and securities.* Again, we look at the change in the total gross value of ownership interests and securities. In next step, this is increased by the nominal value of sold assets and decreased by the revenues realised from these sales.
- *Report on profit and loss.* If the sum of the interest differential (interest costs minus interest revenues), non-interest costs minus non-interest revenues, operational (administrative) costs, other costs minus other revenues and investment outlays is positive, it increases the indirect deficits (outlays > revenues). Otherwise, it has a positive impact on the indirect deficit.

Notes:

- a) In 2000, Konsolidační banka sold a 30% share in Škoda Auto Mladá Boleslav to Volkswagen Group for CZK 12.1 billion. KoB obtained this stake in 1993 from the Czech government free of charge as a capital injection into its balance sheet. As KoB assumed these (extremely lucrative) shares for free, we consider the sale as a typical privatisation transaction. As a result, the income of CZK 12.1 billion has no positive impact on KoB's deficit in 2000, since it is only a "financing" transaction.
- b) In the case of Česká finanční, we reduce the deficits by transfers from the Czech National Bank (about CZK 2 billion a year). From the economic point of view, however, it is clear that these transfers are a partial monetisation of the indirect deficit.

b) Indirect debt

The starting point was again the balance sheets of the transformation agencies. Their indirect debt is defined as the sum of external resources on the liability side of their balance sheets. These are represented by loans from the financial markets (including the Czech National Bank), loans from clients and issued bonds. This data has to be consolidated because of the following factors:

- On KoB/ČKA's asset side, there are receivables for municipalities and state funds (including the NPF). This debt has already been reported in the "official" public debt. In our paper, we consider transformation institutions to be an integral part of the public budgets, so intergovernmental transactions should not have any impact on the overall public debt. By the same rationale, we do not include deposits of municipalities and state funds in the indirect debt of KoB/ČKA.
- From 1995 to 1999, we had to adjust the data for the NPF's bonds issued in 1995 to support the balance sheet of KoB. Again, transactions between two governmental agencies cannot affect the overall public debt.
- In the case of Česká finanční, we had to adjust its debt for credit from KoB, which finances the Stabilisation Programme. Again, the motivation was to avoid duplication, as the debt effects of this operation were already accounted for in the balance sheet of KoB.

Appendix 3

The most important transactions of Konsolidační banka/Česká konsolidační agentura

- 1991: KoB assumed “TOZ” loans with a nominal value of CZK 80.1 billion (Czech share in the federal KoB).
- 1992: KoB assumed receivables from Komerční banka and Investiční banka with a total nominal value of CZK 14.7 billion.
- 1994: KoB received non-performing assets from Česká spořitelna with a total nominal value of CZK 3.0 billion (the ČS 1 block).
- 1998: March – KoB assumed “DBV loans” from Investiční a Poštovní banka with a total nominal value of CZK 16.1 billion.
December – KoB assumed non-performing loans from Česká spořitelna with a total nominal value of CZK 10.4 billion (the ČS 2 block).
- 1999: August – KoB assumed non-performing loans from Komerční banka with a total nominal value of CZK 23.1 billion for a price of CZK 13.6 billion (the KB 2 block).
November – KoB assumed non-performing receivables from Česká spořitelna with a total nominal value of CZK 33.3 billion for a price of CZK 20 billion (the ČS 3 block).
- 2000: KoB bought Konpo from Komerční banka for a symbolic price. Konpo was used to assume non-performing loans from Komerční banka with a total nominal value of CZK 60 billion (the KB 2 block). KoB provided a loan (of CZK 36 billion) to Konpo to finance the whole transaction.
KoB signed a “pre-privatisation” agreement with Erste Bank on the issuing of a guarantee framework for non-performing loans in the credit portfolio of Česká spořitelna with a maximum nominal value of CZK 14.9 billion (the ČS 4 block).
December – “Development” loans (loans granted mostly by the European Investment Bank) were transferred from KoB’s balance sheet to Českomoravská rozvojová a záruční banka (the total nominal value of these loans was about CZK 21 billion).
- 2001: January – KoB provided a loan to the NPF (CZK 12.2 billion) + another CZK 2 billion in March.
February – The government agreed to sell a pilot package of receivables with a total nominal value of CZK 19.1 billion to Goldman Sachs for CZK 1.35 billion. The transaction was finalised in June.
May – KoB assumed receivables from health insurance companies with a total nominal value of CZK 4.2 billion.
July – KoB assumed non-performing loans from Česká spořitelna (total nominal value of CZK 7.9 billion at a price of CZK 4.7 billion).
August – ČSOB, KoB and the Ministry of Finance signed an agreement on the future transfer of “black” assets from ČSOB to KoB with a total nominal value of CZK 45.9 billion.

Part II.

Cyclically Adjusted Fiscal Balance – OECD and ESCB Methods

1. Introduction

The revenue and expenditure sides of public budgets are influenced by many factors. The fiscal balance is not the result of actual government decisions only. Budgetary outcomes are also dependent, among other factors, on the business cycle, windfall revenues and demographic developments. These factors can significantly blur the overall fiscal picture, and this is why it is not easy to assess fiscal policy at first sight. What is the real character of fiscal policy? Is it expansionary or restrictive? Is it pro-cyclical or does it have stabilisation effects? To answer these questions, it is necessary to make a comprehensive analysis of fiscal policy development, and in particular to adjust the fiscal balance for one-off revenues and expenditures and to estimate the cyclical and structural components of the overall fiscal balance.²⁰

In practice, there are several methods for calculating the cyclical balance. One of the most widely used approaches to estimating the cyclically adjusted fiscal balance is the OECD's method (Van den Noord, 2000). The OECD has developed a technique that is internationally comparable, theoretically sound and relatively easy to employ and interpret. This method is becoming even more prominent because the European Commission, the most important user of cyclically adjusted balances for the surveillance of budgetary policies, has adjusted its method to the OECD approach (European Commission, 2002). Firstly, the Commission uses the budgetary sensitivity parameters based on tax and expenditure elasticities calculated by the OECD. Secondly, the Commission is moving from its method used to calculate potential GDP resting on a statistical filter (Hodrick-Prescott filter) to a production function approach. Another technique of cyclical adjustment was developed recently within the ESCB (ECB, 2001). The aim of this paper is to apply both the OECD and ESCB methods to Czech fiscal data and to compare their results.

This paper is organised as follows. The second section concentrates on the OECD adjustment approach. The next section briefly describes the ESCB technique of cyclical adjustment. In the fourth section, we compare the results of both methods applied to Czech fiscal policy and then we draw conclusions. There are also two appendices attached to this paper where detailed information on the output gap derivation and all necessary elasticity regression equations can be found.

²⁰ From a theoretical point of view, one should make a clear distinction between cyclically-adjusted balances and structural balances. The former aims at excluding the incidence of the business cycle only, whereas the latter may additionally correct fiscal outcomes for other non-recurrent effects. It is important to emphasise that this paper is concerned purely with the narrow concept, as it seeks to identify the influence of the business cycle only. But as we work with the cash fiscal balance (GFS 86 methodology), we exclude financial operations (privatisation revenues, lending and repayments) and cash transfers to transformation institutions from the fiscal balance.

2. The OECD approach

The OECD approach involves three steps:

In the first step, the sensitivity of various forms of taxation and expenditure with respect to economic fluctuations is estimated. Before estimating particular output elasticities, cyclical revenues and expenditures have to be identified. On the revenue side, value-added tax, excises, import duties, corporate income tax, personal income tax and social security contributions were identified as sensitive to the cycle and adjusted for the cycle. On the expenditure side, expenditures related to employment policies are considered to be the only item sensitive to the cycle. Generally, the calculation of the respective elasticities is based on the decomposition of the “aggregate” (or reduced-form) elasticity with respect to GDP into the product of elasticity with respect to the relevant economic base and the relationship of the economic base and GDP.

Disentangling the trend and cycle of real GDP. Potential output is estimated using the Cobb-Douglas production function (see Appendix 1 for more information).

The output gap and the elasticities from the preceding two steps are used to derive the cyclical component of revenues and expenditure. Combining revenue and expenditure elasticities with the estimate of the output gap gives the full cyclical component of the budget. The structural balance is calculated by subtracting the cyclical component of revenues and expenditures from the general government balance.

2.1 The cyclical sensitivity of tax revenues and expenditures

The OECD approach is based on the observation that economic activity influences tax bases (wage bill, profits, consumption, etc.) and unemployment, which in turn determine tax proceeds and public expenditure. This finding is reflected in the way the elasticities are estimated. The “aggregate” elasticity of a particular revenue and expenditure category is calculated in two steps. First, the elasticities of tax proceeds or expenditure with respect to the relevant bases have to be determined. Most taxes are levied *ad valorem*, with the tax rate set as a certain per cent of the tax base. The tax rate is usually independent of the size of the tax base. Thus, the nature of most taxes makes it possible to assume proportionality between tax proceeds and the relevant base, i.e. unit elasticity. If this assumption cannot be applied due to progressivity of the tax or some other factor violating the proportionality assumption, information from the tax code and additional data sources are used to extract the elasticity. Second, the regression analysis is used to estimate the elasticities of the relevant tax bases and unemployment with respect to cyclical economic activity, i.e. the output gap. These two sets of elasticities are subsequently combined into reduced-form elasticities that link the cyclical components of taxes to the output gap. A similar breakdown of the expenditure elasticity into a gauge of cyclical unemployment and the sensitivity of current expenditure to cyclical unemployment has been introduced.

The two-step procedure (estimates of the cyclical sensitivity of tax bases and estimates of the sensitivity of tax proceeds to changes in the tax base) facilitates the economic interpretation of the elasticities. The *a priori* assumption of unit elasticity of most tax proceeds to the tax base enables us to avoid estimating the elasticity on the basis of regression analysis, which often leads to biased estimates due to frequent tax law changes. To avoid biased elasticity estimates, dummies

capturing the tax law changes are usually introduced into the regression equations. In the case of the Czech Republic, the introduction of dummies is complicated by the fact that the Czech tax system has undergone too many changes with a significant impact on tax proceeds. It is almost impossible to trace back all the changes and include them in the regression analysis. The proportionality assumption allows these obstacles to be circumvented and makes the approach comparable across various countries. Thus, this feature can be regarded as the main advantage of the OECD approach.²¹

On the other hand, based on regression analysis, the estimated cyclical sensitivity of the tax base can reflect just the “average” cyclical responsiveness over the sample period. The actual year-to-year behaviour of the cyclical sensitivity of budget items may be more erratic, as specific tax bases may react atypically over the cycle depending on the nature of the economic shock. By concentrating on elasticity with respect to the output gap, the OECD approach cannot incorporate actual composition effects. If the economic expansion is driven by private consumption, tax proceeds (mainly VAT and excises) are likely to increase more than in the case of economic growth of the same magnitude fuelled by foreign demand. Composition effects can be very strong in the short term but should average out over longer periods.

The results of elasticity estimates are summarised in Tables 1, 2 and 3.

²¹ This is, however, not to say that the proportionality assumption actually solves the aforementioned econometric problems. The proportionality assumption may, nevertheless, serve as a second-best solution if econometric problems prevent a reliable empirical elasticity estimation.

Table 1

	Macroeconomic tax base	Elasticity with respect to base	Output elasticity of employment	Employment elasticity of wages	Output elasticity of tax yields	Specific assumptions
Tax category:		A	B	C	$D = B \cdot (1 + A \cdot C)^1$	
Personal income tax	wage rate	2.2 ²	0.3	1.0 ³	1.0	-
Social security contributions	wage rate	1.0	0.3	1.0	0.6	-
Corporate income tax	gross operating surplus	1.0 ⁴	0.3	1.0	$D = (1 - (1 - E) \cdot B \cdot (1 + C)) / E$	E Profit share in GDP = 43%

1. Derivations of the equations used for computing “aggregate” elasticity with respect to real GDP can be found in the technical appendix of the OECD Working Paper (Van den Noord, 2000).
2. The wage elasticity of personal income tax per worker was derived as a ratio of the statutory marginal tax rate to the average tax rate calculated for the particular tax bracket using data from the TRESIMA spreadsheet used by the Ministry of Labour and Social Affairs. Actually, there are four tax brackets in the Czech PIT system and marginal rates range from 15 to 32%. The picture is, however, significantly blurred by the existence of several dozen exceptions, special deductible items and tax allowances.
3. Regression yields a value exceeding one (1.1), which is implausible. The OECD average is 0.5. As a result, a value of 1 has been calibrated.
4. The output elasticity for corporate income tax was derived under the assumption of a strictly proportional tax rate, such that cyclical variations in the tax yield correspond to fluctuations in the tax base. As a result, unit elasticity has to be applied by definition.

Table 2

	Macroeconomic tax base	Elasticity with respect to base	Output elasticity of tax base	Output elasticity of tax yields
Tax category:		A	B	$C = A \cdot B$
Value-added tax	Private consumption	1.0	1.0	1.0
Excises	Private consumption	1.0	1.0	1.0
Import duties	Imports of goods	1.0	1.5	1.5

Table 3

	Benefit share in expenditures	Output elasticity of employment	Employment elasticity of labour supply	Trend unemployment rate	Output elasticity of unemployment benefits	Output elasticity of expenditures
Expenditure category:	A	B	C	D	$E = -B \cdot ((1 - C) \cdot D - 1)$	$F = A \cdot E$
Unemployment benefits	0.5%	0.3	0.0 ¹	6.4%	-4.4	-0.02

1. Regression yields both a negative and positive value depending on the specification. It has been assumed that labour supply does not respond to employment fluctuations.

First of all, it should be noted that the reported elasticities are to be interpreted as the short-run cyclical sensitivity of the given variable. The regression equations used for estimating the cyclical sensitivity of tax bases are fully comparable to those applied by the OECD.²² All regression coefficients were statistically significant at the 5% level. Regression coefficients which appeared implausible were replaced by calibrated values.

The row showing the derivation of the output elasticity of personal income tax indicates that if output were 1% higher, employment would increase by 0.3% (a kind of “Okun law” relationship). Thus, employment is subject to less volatile fluctuations during the business cycle, as output volatility is partially absorbed by changing labour productivity. Higher employment would exert upward pressure on the real wage rate (a sort of Phillips curve relationship). In this case, an increase in employment of 1% would bring about a corresponding change in the real wage rate. The increase in the tax base is transmitted to higher tax proceeds. The wage elasticity of income tax per worker was extracted from an aggregated sample of more than one million employees containing data on income tax paid in a particular tax bracket.

The same procedure was used to derive the cyclical sensitivity of social security contributions. The only difference is the proportionality assumption made with respect to the wage elasticity of social security contributions, which is justified by the tax legislation – a common rate for most taxpayers is applied. Moreover, the unit elasticity of social security contributions with respect to the wage rate was confirmed by regression analysis. The resulting output elasticity of social security contributions (0.6) seems to be in contradiction with the observed behaviour of the social security contributions/GDP ratio. Since 1994, social security contributions as a percentage of GDP have increased, with the exception of 1998, which indicates higher-than-unit elasticity with respect to *nominal* GDP. However, the elasticity reported here captures the sensitivity of social security contributions to *real* GDP fluctuations, because this concept of elasticity is relevant for the purposes of gauging the variations in the fiscal deficit during the cycle. If wage increases do not fully and immediately reflect labour productivity growth (this situation corresponds to the parameter values reported in Table 1), the tax base may expand at a slower pace than output, which gives rise to elasticity below unity.²³

Empirical studies focusing on tax elasticity estimation often find it difficult to calculate the output elasticity of corporate income tax. This results from the legal possibility of making use of various tax shields and other operations when determining taxable income (e.g. loss carry-over rules and the presence of various tax incentives). In turn, the relation between corporate income tax and

²² See P. van den Noord (OECD 2000), Technical Appendix: “Determining the cyclical components of budget balances”, which contains a specification of all the regression equations applied to estimate the cyclical sensitivity of tax bases. The results for the Czech Republic are summarised in the Statistical Appendix.

²³ This approach neglects the potential impact of the changing output gap on prices. As a result, there is no scope for price elasticity of the tax base. If the wage rate is adjusted according to expected price inflation, it can result in the short-run price elasticity of the wage rate considerably exceeding one (actual inflation turned out to be lower than expected inflation). If this is the case, in the course of time the ratio of social security contributions to GDP can rise despite the output elasticity of the wage rate being below one. The reason is that the inflation-driven growth of the wage rate overcompensates for the slowly adjusting productivity component of the wage increase.

profits (and output) is blurred.²⁴ The OECD approach derives a relationship for the cyclical sensitivity of corporate income tax based on the proportionality assumption of corporate income and output. The proportionality assumption implies that the tax elasticity is equal to the elasticity of the tax base (corporate income, i.e. profits) with respect to output. If output rises, employment changes in the same direction and the increasing employment puts upward pressure on wages. Thus, the wage bill rises and affects corporate profits. The impact of a growing wage bill on the growth rate of profits depends on the value of the output elasticity of employment and the employment elasticity of wages.²⁵ In practice, variations in employment are less volatile than variations in output while wages show a cyclical pattern, so the output elasticity of corporate income tax should differ from 1 and is most probably larger than 1.

It follows from the derivation of the output elasticity of corporate income tax that the outcome is very much dependent on the proportionality assumption. The regression analysis does not support this assumption, the estimated elasticity being significantly lower.²⁶ However, it should be noted that the elasticity obtained from time series regression could be somewhat underestimated. First, during the last decade corporate income tax (together with personal income tax) was subject to more frequent legal changes than other taxes. Second, the loss carry-over rule gives rise to non-linearity, which is hard to model, and traditional regression techniques applied to the time series may lead to biased estimates. At the current stage, theoretical derivation of the output elasticity of corporate income tax conditional on the proportionality assumption seems to represent a good approximation of reality and is preferred over a purely econometric estimate.

The proportionality assumption was maintained with regard to indirect taxes, namely value-added tax, excises and import duties. As a result, the reduced-form elasticity depends solely on the cyclical sensitivity of the tax base, i.e. private consumption and imports of goods. Interpreting the short-run regression coefficients, private consumption fluctuates with output, while imports of goods exhibit larger fluctuations during the cycle as compared to real GDP. As a result, the output elasticity of VAT and excises is equal to one, and the output elasticity of import duties significantly exceeds one.

The proportionality assumption is fully warranted with respect to value-added tax because private consumption is a very close proxy of the tax base. The only reason for the elasticity differing from one is the existence of two rates. If the composition of consumption changes systematically over the cycle (substitution between goods and services subject to different tax rates), the elasticity can depart from the theoretical value. But regression analysis does not provide such evidence. It is more difficult to maintain the proportionality assumption with regard to excises. The tax base of excises is much narrower than aggregate private consumption, which can give rise to an elasticity

²⁴ In the national accounts, corporate profit is expressed in net terms, thus allowing subtraction of losses from profits in the given year over the economy as a whole. Contrary to that, the tax legislation does not, of course, enable such immediate “macroeconomic” profits-losses compensation when it comes to determining tax bases and paying CIT.

²⁵ The aggregate elasticity of corporate income tax is more sensitive to changes in the output elasticity of employment.

²⁶ Corporate income tax was regressed on a quarterly proxy of gross operating surplus (GDP less compensation of employees) and seasonal dummies (Q2 and Q4). The elasticity of tax proceeds with respect to the macroeconomic base (lagged by four quarters) was equal to 0.57.

significantly different from unity.²⁷ To make the analysis comparable, unit elasticity was applied. The same qualification can be raised in the case of import duties.²⁸

The elasticities obtained can be used to calculate the output elasticity of tax revenues and total revenues. The elasticity of tax (total) revenues is equal to the weighted sum of the individual tax elasticities, with the weights corresponding to the shares of the individual tax categories in overall tax revenues (general government revenues). The elasticity of tax revenues amounts to 0.91 and the elasticity of total revenues equals 0.81. If the results are compared to the elasticities reported by the OECD, social security contributions are the only tax category with a lower elasticity (0.6) than the OECD average (0.8). Higher elasticity was found for corporate income tax (1.5, compared to the OECD average of 1.3) and indirect taxes (1.0 compared to 0.9). The output elasticity of personal income tax was the same as in the OECD countries (1.0).

On the expenditure side, unemployment benefits are considered the only item sensitive to the cycle. It was assumed that unemployment benefits are strictly proportional to unemployment. In other words, unemployment benefit rates and the percentage of the unemployed entitled to receive benefits (relative to all the unemployed) are seen to be independent of the cycle. On the basis of this assumption, it is possible to decompose the output elasticity of unemployment benefits into the output elasticity of employment and the employment elasticity of labour supply. Regression analysis did not reveal any systematic relationship between the labour force and the cycle in the Czech Republic, which is why the employment elasticity of labour supply was set equal to zero.²⁹ Then the output elasticity of unemployment benefits collapses into a simple expression containing only the trend unemployment rate and the output elasticity of employment, which are weighted by the share of unemployment-related expenditure in total expenditure to obtain the output elasticity of total expenditure. The output elasticity of unemployment benefits tells us that during a cyclical upswing employment grows. If the labour force does not change, the number of unemployed shrinks by the number of newly employed, but the percentage change in the number of unemployed depends on the unemployment rate. If the proportionality assumption holds, unemployment benefits change by the same rate as the number of unemployed.

The output elasticity of expenditures is much lower in the Czech Republic (-0.02) than in the OECD countries (-0.3). This finding can be fully explained by the very low level of unemployment benefits in the Czech Republic. This reasoning is confirmed by almost the same output elasticity of unemployment expenditures (-4.4, as compared to the OECD average of -4.3). This comparison indicates that if the share of unemployment benefit in expenditures were at the

²⁷ Excises were regressed on real private consumption, trend and seasonal dummies (Q3). Excises represent specific taxes, which means that in the absence of tax law changes, proceeds from excises depend on the volume of consumption only. This is why nominal quantities were regressed on real quantities. However, in reality the tax levied per volume unit is regularly adjusted. The trend was used to capture this systematic adjustment. The regression yields elasticity exceeding unity (1.1) but is reasonably close to the *a priori* assumption.

²⁸ Import duties were regressed on imports of goods, the trend capturing the declining effective tax rate as a result of trade liberalisation and a dummy variable (1996:Q3). The estimated elasticity (0.83) is not that distant from the theoretical assumption.

²⁹ Two different specifications lead to completely different elasticity estimates – with opposite signs. The striking fact is that both parameter estimates are statistically significant (at the 10% significance level).

same level as in the OECD countries, the output elasticity of expenditures would equal the OECD average.

The output elasticity of revenues and expenditures can provide a measure of the sensitivity of the budget balance to the cycle. It follows from these elasticities that a one per cent increase in output will improve the deficit-to-GDP ratio by 0.35 percentage points.³⁰ Most of the budget sensitivity is on the revenue side, while the expenditure side is almost insensitive to the cycle. The corresponding number for the OECD average is 0.49. The lower sensitivity of the budget balance in the Czech Republic results from the very low share of unemployment benefits in expenditures and the lower output elasticity of revenues. The lower elasticity of revenues results from the relatively high share of social security contributions in tax revenues and the lower cyclical sensitivity of social security contributions.

3. The ESCB approach

The foundation of the ESCB approach consists in estimating the cyclical component of the individual revenue and expenditure items with respect to the relevant macroeconomic bases. Contrary to the European Commission and OECD methods, neither aggregate output nor the output gap play an explicit role in the ESCB technique. The ESCB method calculates budgetary elasticities with respect to less aggregated data such as private consumption, the private wage bill and the number of unemployed persons. This method thus takes into account the fact that the individual components of aggregate demand may exhibit different trends and fluctuations, especially in the short run. Moreover, the individual components of aggregate demand are subject to different tax burdens. This fact further reinforces the importance of composition effects for short-term fiscal performance. Such short-term heterogeneity of macroeconomic components can have a sizeable effect on the respective budgetary variables.

Therefore, the main advantage of the ESCB approach as compared to the EC and OECD methods is that it is able to reflect the “composition effect” when estimating the cyclical and structural fiscal balance. In simple terms, this means that, for example, a 1% increase in the dynamics of real GDP caused primarily by improved foreign demand will probably have less of a positive impact on budgetary development than a GDP improvement of the same order fuelled mainly by domestic demand. The composition effect can be particularly important from the short-term point of view, where some of the less aggregated relevant macroeconomic bases need not be in line with aggregate output.

Another innovation of the ESCB method is that it concentrates solely on the part of the individual revenue or expenditure categories which really shows a cyclical character. The ESCB approach aims at avoiding the certain logical asymmetry that is present in the OECD and EC methods. In particular, the ESCB argues that some budgetary outlays at the same time represent budgetary

³⁰ The sensitivity of the budget balance to the cycle is given by the sum of the output elasticity of revenues and expenditures multiplied by their respective GDP ratios. Strictly speaking, the result represents semi-elasticity, i.e. the change in the budget balance as a percentage of GDP for a 1% change in GDP.

revenues.³¹ The OECD and EC methods assume zero elasticity of these items on the expenditure side of public budgets, whereas on the revenue side, they are fully included in the elasticity calculations. This must lead to biased results since each budgetary transaction should be treated consistently at all stages of cyclical adjustment. In other words, if we accept the hypothesis of zero elasticity of a given budgetary item on the expenditure side, it would be a logical mistake to include the effects of the same transaction in the cyclical adjustment on the revenue side of the budget.

3.1 Identification of cyclical revenues and their corresponding bases

Firstly, it is necessary to decide which income and outlay budgetary categories show cyclical behaviour, i.e. their fluctuation is a function of the business cycle. Tax receipts and social security contributions are usually tested for cyclical behaviour. In our paper, we work with indirect taxes (VAT and excises), direct taxes (PIT and CIT)³² and social security contributions.³³ For the purposes of our analysis, we have excluded property taxes, which do not correspond primarily to cyclical effects. The selection of appropriate tax candidates was not very difficult. On the other hand, our situation was complicated by the fact that, in line with the ESCB's suggestions, we had to make partial adjustments to the individual revenue components (details can be found in Section 3.5). Table 4 recapitulates all cyclical budgetary revenues together with their corresponding macroeconomic bases.³⁴

Table 4: Cyclical budgetary revenues and their macroeconomic bases

VAT	C_s
Excises	C_s
PIT	L, ω_s
CIT	GOS
SSC (social security contribution)	W_s

Where

C_s means private consumption,

L employment in private sector,

ω_s average wage in private sector,

GOS gross operating surplus of firms,³⁵

W_s private wage bill.

³¹ For example, VAT or excises paid by the state when purchasing goods and services, or personal income tax paid by government employees from their wages

³² The abbreviations stand for personal income tax and corporate income tax.

³³ Contributions for the state pension system, the unemployment scheme, sickness benefits and the public health care system.

³⁴ The sorting of the macroeconomic bases with the individual revenue categories fully conforms to ECB (2001).

³⁵ Gross operating surplus is a proxy for the corporate tax base. It was calculated as nominal GDP minus compensation of employees.

3.2 Identification of cyclical expenditures and their relevant bases

The business cycle affects both the revenue and expenditure sides of public budgets. Whereas selection of appropriate revenue categories is not a difficult task, the situation is completely different when it comes to budgetary expenditures. Some papers have even given up a cyclical analysis of public outlays.³⁶ It is generally assumed that cyclical expenditures are outlay fluctuations that correlate with changes in unemployment. Nevertheless, experience has shown that it is quite difficult to precisely identify these categories and, even more importantly, to fill them with reliable data.

Facing these difficulties, we decided to include unemployment benefits and state social support outlays in our analysis despite the fact that beneficiaries of state social support programmes also include employed people with a low level of wages. Another problem was how to deal with spending on active labour market policy, since these expenditures may exhibit some kind of cyclical behaviour. As the level of these expenditures is fully determined by a discretionary government decision, we do not include them in the cyclical expenditure component. We also do not consider the budgetary costs of early retirement programmes, since there are no reliable statistics nor estimates splitting these outlays into a part “substituting” unemployment benefits and another part related rather to the personal, family and social preferences of individuals, which are independent of the business cycle. The following table provides a summary of selected expenditure items and related macroeconomic bases.

Table 5: Cyclical expenditures and corresponding macroeconomic bases

Unemployment benefits	U
State social support benefits	U

Where U is the number of unemployed persons.

3.3 Estimation of revenue and expenditure cyclical component

The cyclical component of the individual revenue and expenditure items was calculated in the standard way³⁷ as the actual nominal value of the revenue or expenditure item times the elasticity of that revenue/expenditure category to its macroeconomic base times the percentage “gap” between the trend and the actual levels of this base in real terms (equation 1).

$$B_{c,t}^j = B_t^j * \varepsilon_{B_j, M_j} * m_{c,t}^j \quad \text{where} \quad (1)$$

$B_{c,t}^j$ is the cyclical component of the analysed revenue of the expenditure budgetary item,
 B_t^j captures the actual (nominal) value of that budgetary item,
 ε_{B_j, M_j} represents the elasticity of the budgetary item with respect to its macroeconomic base,
 t means the time index, and

³⁶ For example, Bezděk & Král (2001), Krejdl & Schneider (2000) and also partially EC (2000 and 2001)

³⁷ Exactly the same equation as (1) was applied in the OECD approach to derive the cyclical tax revenues, but ε stands for the elasticity of revenues with respect to the output gap and the gap in the macroeconomic base (m) is replaced by the output gap.

$m_{c,t}^j$ stands for the cyclical component of the corresponding macroeconomic variable (macroeconomic base “gap”) in real terms, where

$$m_{c,t}^j \text{ is defined as } (M_t^j - M_{tr,t}^j) / M_{tr,t}^j \text{ where} \quad (2)$$

$M_{tr,t}^j$ is the trend value of the given base in real terms, and

M_t^j measures the actual value of that base in real terms.

Equation (1) was applied to the individual revenue and expenditure categories in the following way:

Cyclical component of VAT: $VAT_{c,s,t} = VAT_{s,t} * \varepsilon_{VATs,Cs} * c_{s,t}$ where (3)

$VAT_{s,t}$ is the value added tax income paid by the private sector,

$VAT_{c,s,t}$ means the cyclical part of that revenue item,

$\varepsilon_{VATs,Cs}$ captures the elasticity of “private” VAT to private consumption,

$c_{s,t}$ measures the relative (in % terms) private consumption “gap”, and

s stands for seasonally adjusted data, since all revenue elasticities have been regressed on quarterly data.

Cyclical component of excises: $EX_{c,s,t} = EX_{s,t} * \varepsilon_{EXs,Cs} * c_{s,t}$ where (4)

$EX_{s,t}$ is the amount of excise tax collected from private sector taxpayers,

$EX_{c,s,t}$ represents the cyclical part of such defined revenues,

$\varepsilon_{EXs,Cs}$ measures the elasticity of “private” excises to private consumption.

Cyclical component of PIT: $PIT_{c,s,t} = PIT_{s,t} * (\varepsilon_{PITs,\omega} * (w_{s,t} - e_{s,t}) + I * e_{s,t})$ where (5)

$PIT_{s,t}$ is the amount of personal income tax collected from private sector employees,

$PIT_{c,s,t}$ stands for the cyclical component of the revenues,

$\varepsilon_{PITs,\omega}$ measures the elasticity of “private” PIT with respect to the average private sector wage,

$w_{s,t}$ means the “gap” in the real private sector wage bill, and finally

$e_{s,t}$ captures the “gap” in private sector employment.

Cyclical component of social security and health care contributions:

$$SSC_{c,s,t} = SSC_{s,t} * \varepsilon_{SSCs,Ws} * w_{s,t} \text{ where} \quad (6)$$

$SSC_{s,t}$ represents the total amount of social security and health contributions paid by private sector employees,

$SSC_{c,s,t}$ measures the cyclical component of that budgetary income,

$\varepsilon_{SSCs,Ws}$ captures the elasticity of “private” contributions to the private sector wage bill, and

$w_{s,t}$ is the “gap” in the real private sector wage bill.

Cyclical component of CIT: $CIT_{c,s,t} = CIT_{c,t} * \varepsilon_{CITs,GOSs} * gos_{s,t}$ where (7)

$CIT_{s,t}$ means corporate income tax revenues,

$CIT_{c,s,t}$ is the cyclical component of that budgetary income,

$\varepsilon_{CIT,GOS}$ represents the elasticity of CIT to gross operating surplus, and

gos_t measures the “gap” in gross operating surplus.

Cyclical component of unemployment-related outlays: $EXP_{c,t} = EXP_t * \varepsilon_{EXP,U} * u_t$ (8)

where

EXP_t means the actual amount of these expenditures (on an annual basis),

$EXP_{c,t}$ is the cyclical part of unemployment-related outlays,

$\varepsilon_{EXP,U}$ measures the elasticity of those expenditures to the number of unemployed persons, and

u_t captures the “gap” in the number of unemployed persons.

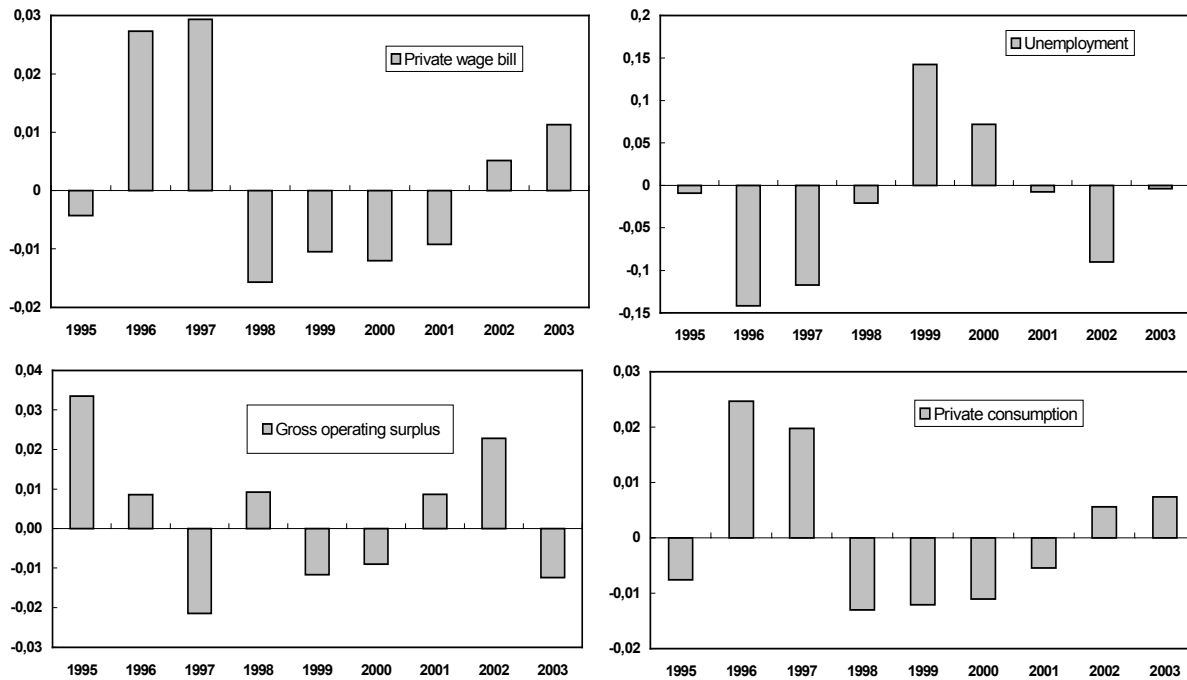
3.4 Estimation of macroeconomic base trends

A Hodrick-Prescott filtering technique was employed to get estimates of the trend levels of all the relevant macroeconomic bases.³⁸ A great advantage of this econometric method is undoubtedly its “user friendly” features and low data requirements. It is a technical filtering method for smoothing actual data to get a trend, the elasticity of which depends strongly on setting the λ parameter. This method gives biased results if the given time series exhibits sudden structural breaks. In such a situation, the structural break affects the cyclical component of the previous and following observations. This problem can be partially mitigated by choosing lower values of λ . Such a solution was also adopted in the ESCB (ECB, 2001)³⁹, and we have followed a similar method. Due to the limitations of time series length and availability, we have to use data on a quarterly basis. Therefore, we chose λ equal to 480 (instead of the “classical” 1600 for quarterly data), which corresponds to $\lambda = 30$ in the case of annual data. We also tested the sensitivity of our results to the value of λ , and certain differences were identified at both edges of the time series. We prolonged all the time series up to 2006 to partially eliminate problems with the trend values at the end of the analysed period, which is defined as 1994 to 2003.⁴⁰

³⁸ For more details on the HP filtering technique, see, for example, Hodrick & Prescott (1980) or Canova (1994).

³⁹ Instead of a generally suggested value of 100 for annual data, ESCB experts used λ equal to 30. This choice stemmed from a detailed analysis of the “reasonable” length of the business cycle over which budgets should be balanced.

⁴⁰ All elasticities were estimated on a data sample ranging from 1994:Q1 to 2002:Q3.

Chart 1: Gaps in the relevant macroeconomic variables (in %)

Source: Authors' own calculations.

3.5 Estimation of budgetary elasticities

Two methods were applied to derive individual budgetary elasticities. We mainly employed a regression analysis (in logarithm terms), which directly gives estimates of elasticities.⁴¹ In the case of PIT, we chose a different method, since we used detailed data on the composition of the tax burden according to individual tax brackets.⁴² The elasticity is then defined as a weighted average of the marginal tax rate expressed as a share in the average tax rate for all tax brackets. The weights are the personal income tax paid in the relevant tax bracket. We did not estimate the PIT elasticity to the number of employed persons, since we accepted an assumption of unit elasticity.⁴³

As was mentioned earlier, prior to the elasticity estimation itself it was necessary to adjust the revenue data. In the case of VAT, we adjusted it using a proxy variable⁴⁴ for that part of income which is related to government purchases of goods and services. The same approach was followed in the case of excises. PIT was first of all decreased for its withholding components⁴⁵ that do not

⁴¹ Detailed results are provided in the statistical appendix.

⁴² The data stem from the Trexima database, which was created for the purposes of the Ministry of Labour and Social Affairs.

⁴³ Both the different methods of elasticity derivations as well as the assumption of unit PIT elasticity to the number of unemployed have also been used by the ESCB (ECB, 2001).

⁴⁴ The relevant proxy variable is defined as the percentage share of government consumption in total final consumption.

⁴⁵ Withholding tax on deposit interest and dividends

depend on the chosen tax base.⁴⁶ Then we needed again a proxy variable⁴⁷ to detect, and in next step, deduct the “government” part of PIT from total collected PIT. The same approach was chosen for social security and health contributions. CIT was not adjusted at all.

The estimated elasticities were confronted with theoretical assumptions as well as international empirical counterparts. The elasticity⁴⁸ tells us what on average will be the reaction (in percentage points) of a given budgetary item to a 1% change in its relevant macroeconomic base. Our results are summarised in the following table.

Table 6: Estimated revenue and expenditure elasticities

	Czech Republic	Average of EU-15 (min. – max.)
$\epsilon_{VATs,Cs}$	0.77	0.99 (0.69 – 1.21)
$\epsilon_{EXs,Cs}$	0.98	
$\epsilon_{SSCs,Ws}$	1.03	0.99 (0.89 – 1.00)
$\epsilon_{PITs,\omega}$	2.2	1.55 (1.20 – 2.60)
$\epsilon_{CIT,GOS}$	0.44	1.18 (0.72 – 1.50)
$\epsilon_{EXP,U}$	0.78	0.88 (0.20 – 1.07)

Source: Authors' own calculations and ECB (2001).

Czech VAT has a standard (22%) and a reduced (5%) tax rate. Our elasticity is slightly lower than we would expect (approximately unit elasticity). This might be the result of price elasticity of the tax base.⁴⁹ In the case of excises, the resulting elasticity is in line with our assumptions, since tax proceeds should depend on the volume of real consumption only.⁵⁰ Taking both indirect taxes together, the overall weighted indirect tax elasticity would amount to about 0.84. This value is close to the middle of the EU-15 interval.

Social security and health care contributions are characterised by a linear rate (35% of the gross wage for social security and 12.5% for health contributions). Therefore, one can assume unit elasticity, and this is also confirmed by the regression equation. On the other hand, we have to mention that our approach to elasticity derivation assumes implicitly no space for the potential price effect on social and health contribution proceeds.

The method of extracting the PIT elasticity has already been explained above. Our result seems quite high, since a higher value in the EU can only be found in the Netherlands. Nevertheless, we do not consider the Czech value to be unrealistic. In the ESCB paper, half of the EU countries

⁴⁶ In the case of withholding tax on dividends, we assume dividend-smoothing behaviour by companies, which negates the cyclical nature of dividends.

⁴⁷ Percentage share of government wage bill in total wage bill for the whole economy

⁴⁸ In our case, it involves more “reactivity”, since, due to the relatively short time series, we are not able to eliminate the bias of estimates caused by too many changes to the Czech tax codes since the mid-1990s.

⁴⁹ Regressing VAT on nominal private consumption produced practically unit elasticity. This suggests that prices may be correlated with the business cycle, which may, in turn, bias the estimates based on the real tax base terms. However, applying unit elasticity would have only a negligible impact on the overall cyclical balance. Even so, the area of potential price effects definitely remains open for further comprehensive research.

⁵⁰ However, we should be aware of the fact that in practice the tax base for excise taxes is narrower than total private consumption.

were treated in the same way as we treated them, and in the other half of the cases, the authors preferred an econometric approach to estimating PIT elasticity. For those countries in which the non-econometric approach was used, the PIT elasticities were relatively high.

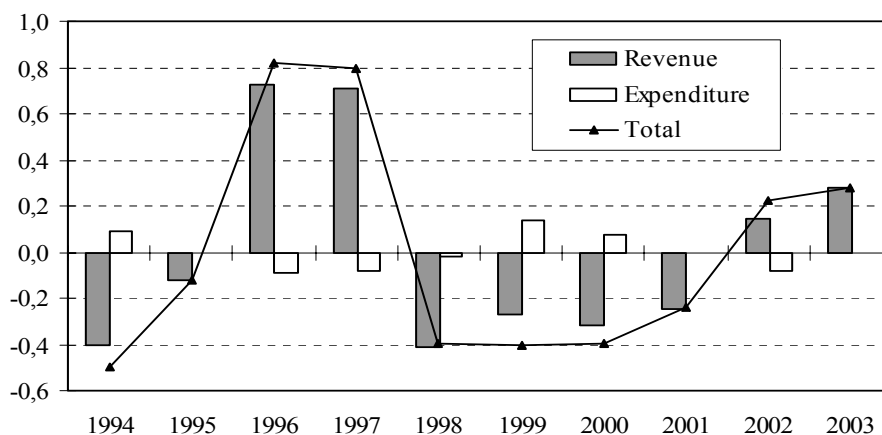
It is generally accepted that CIT is somewhat difficult in nature since its structure and legal arrangements are very complicated.⁵¹ We used gross operating surplus as a proxy for the aggregate CIT base, and we included weighted lagged variables (from one to four quarters) in the regression equation. It is necessary to bear in mind that the Czech elasticity is extremely low from an international perspective. On the other hand, even such a result undoubtedly represents significant progress, since previous attempts at cyclical adjustment applied to the Czech fiscal system tended to completely exclude this kind of government income from the cyclical analysis due to the above-mentioned practical difficulties.

The expenditure elasticity to unemployment is almost at the same level as the European average. What is striking is the width of the range between the lowest and highest European values. We understand this as indirect evidence of all the difficulties connected with estimating that elasticity.⁵² Luckily, the weight of the expenditure component in the total cyclical balance is, as documented later, very small, or even negligible, and this is in line with the evidence for the majority of the European countries. Therefore, the potential uncertainty on the expenditure side of the cyclical balance cannot create any significant bias for the overall cyclical balance.

3.6 Cyclical fiscal balance

The cyclical fiscal balance is the sum of its revenue and expenditure components. The following chart demonstrates that the weight of the revenue component dominates its expenditure counterpart.

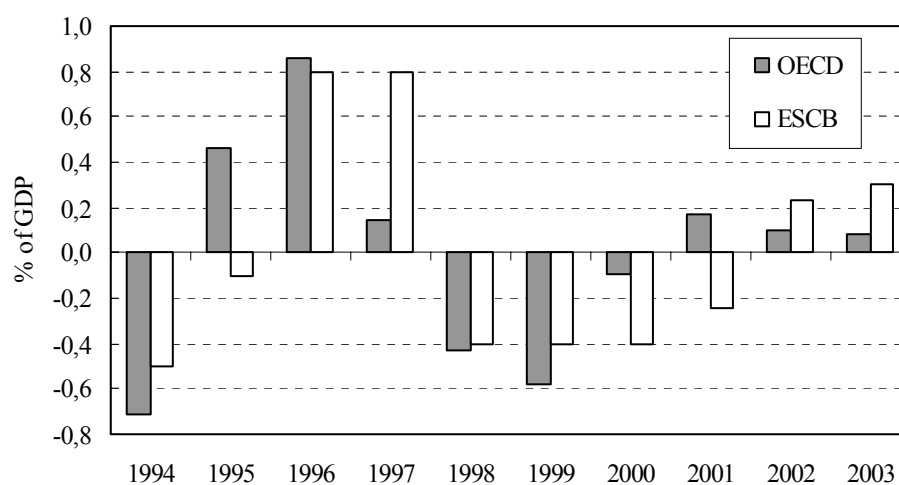
Chart 2: Cyclical balance and its revenue and expenditure components (% of GDP)



Source: Authors' own calculations.

⁵¹ For example, the law enables a decrease in the actual tax base for losses from the past seven years. There are many tax base deductible items in the law, and so on.

⁵² The first problem comes when selecting the appropriate expenditures (and then having reliable data), which should react to the business cycle. On top of that, the calculation of this elasticity itself is no easy task at all. However, the width of the "European" range is partially due to an extremely low Greek outlier.

Chart 3: Cyclical balance – comparison of the OECD and ESCB approaches

Source: Authors' own calculations.

Table 7: “ESCB” cyclical balance with respect to employed elasticities

(% of GDP)	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
“ESCB” elasticities	-0.50	-0.12	0.82	0.80	-0.40	-0.40	-0.39	-0.24	0.23	0.28
“OECD” elasticities	-0.52	-0.08	0.88	0.79	-0.40	-0.43	-0.43	-0.25	0.29	0.27
Difference	0.02	-0.04	-0.06	0.01	0.00	0.03	0.04	0.01	-0.06	0.01

Source: Authors' own calculations.

It is quite interesting to look at the cyclical fiscal balance in more detail and to compare explicitly the results provided by each method, i.e. by the OECD and ESCB techniques. This is done in the following chart. Generally speaking, both methods deliver very similar estimates of the cyclical balance, ranging between -0.8% and $+0.8\%$ of GDP depending on the phase of the business cycle. Nevertheless, certain deviations can be identified in three particular years – 1995, 1997 and 2001. Those years might be real candidates for the composition effect that was described earlier.

To test this hypothesis we decided to re-calculate the “ESCB” cyclical balance figures using the “OECD” estimated elasticities.⁵³ Such a process makes it possible to adjust the above discrepancy for the impact of the different elasticities used in the two calculation approaches. The results are summarised in Table 7.

It is obvious that the composition effect has been proven in all three cases. Changing the “ESCB” derived elasticities with their “OECD” based counterparts showed only a very limited, in fact

⁵³ In fact we replaced the elasticities reported in Table 6 with those from Table 1 (column “elasticity with respect to base”).

insignificant, impact on the cyclical balance estimates. The difference in cyclical balances thus cannot be attributed to the role of different elasticities.⁵⁴

4. The cyclically adjusted fiscal balance according to the OECD and ESCB methods

Due to the existence of automatic fiscal stabilisers, i.e. taxes and expenditures automatically changing with the level of economic activity, budgetary balances respond to cyclical fluctuations in economic activity. The cyclical component, or the extent to which automatic fiscal stabilisers affect general government revenues, expenditures and consequently the overall balance, depends on many factors. The most important factors are the size of the general government sector, the tax structure (share of individual taxes in total revenues), progressivity of taxes and generosity of unemployment benefits. The output elasticity of various taxes and unemployment benefits reflecting the structural parameters of the economy is another important factor determining the size of automatic fiscal stabilisers. The size of automatic fiscal stabilisers in the Czech Republic was estimated to be 0.35.⁵⁵ An increase in output by one percentage point will, on average, improve the budget balance by 0.35% of GDP. Deviations of actual GDP from its potential level result in cyclical surplus or deficit.

Knowledge of the cyclical balance enables us to calculate the cyclically adjusted or structural balance. The structural balance is calculated by subtracting the cyclical component of revenues and expenditures from the actual balance. The structural balance is used to assess the fiscal position. Firstly, the structural balance shows what part of the actual balance is independent of the economic cycle. Large structural deficits indicate unsustainable fiscal policy and call for fiscal consolidation. Secondly, the change in the structural primary balance, i.e. the fiscal stance, is a measure of how many resources, for reasons unrelated to the economic cycle, are added to or withdrawn from the economy through the general government. A change in the structural primary balance approximates the discretionary fiscal policy pursued by the government. A rise (fall) in the cyclically adjusted deficit has expansionary (contractionary) effects, which may support or dampen the effects of automatic fiscal stabilisers, depending on the phase of the economic cycle.

The structural primary balance is defined as the difference between the total primary fiscal balance and the cyclical balance. For the purposes of our analysis, we have used the GFS (Government Financial Statistics advocated by the IMF) cash primary balance adjusted for net lending⁵⁶ and subsidies to transformation agencies, which do not fuel primary demand pressures.⁵⁷

⁵⁴ The variations in cyclical balances cannot be explained by the different treatment of budgetary revenues and expenditures in the ESCB and OECD techniques either. If we allowed the ESCB technique not to avoid the logical asymmetry (see Section 3 for more details) as was practised in fact in the OECD approach, the “ESCB” cyclical balance would tend to be higher on average. This would further increase, not decrease, the difference between the “ESCB” and “OECD” cyclical balances in 1995 and 1997. In 2001 the impact would be roughly zero.

⁵⁵ Based on the OECD approach.

⁵⁶ Affected mainly by privatisation revenues. Those incomes have a one-off unrepeatable character and hence should not be accounted for as a standard fiscal revenue.

The fiscal balance defined in that way can be used, with a certain degree of tolerance, as an easily available proxy for fiscal balance based on accrual principles. The results are summarised in Charts 4 and 6.

$$CAPB = PB - CB, \text{ where} \quad (9)$$

CAPB stands for the cyclically adjusted (structural) primary balance,

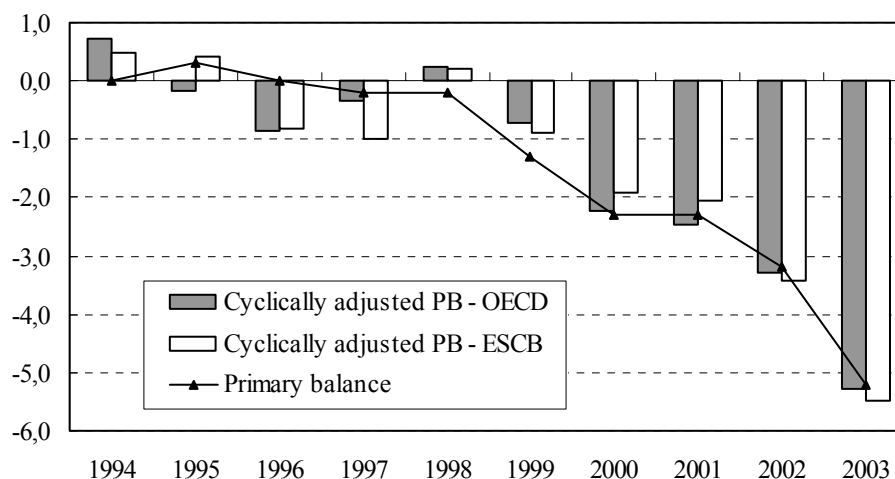
PB means the actual primary fiscal balance (adjusted for net lending and subsidies to transformation institutions), and

CB captures the cyclical fiscal balance.

4.1 Cyclical analysis of the “official” fiscal policy

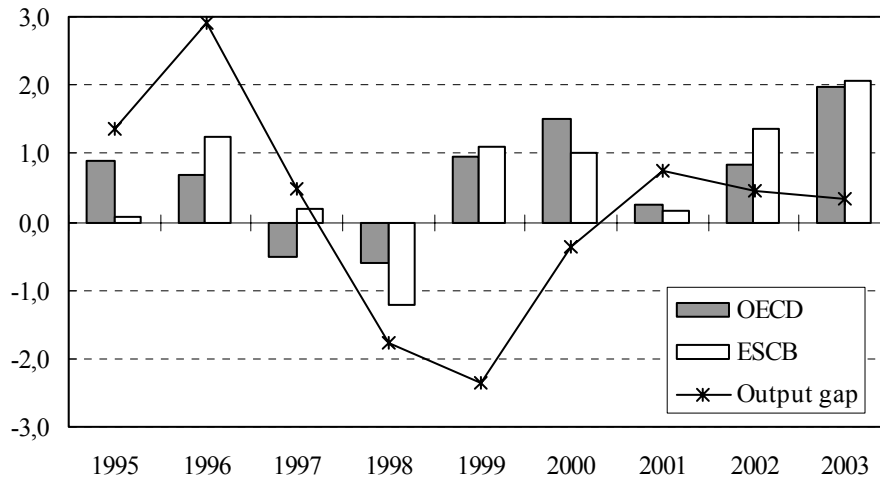
It is evident from Chart 4 that the Czech fiscal position has been sharply deteriorating since 1998. Whereas in 1998 the fiscal authorities could report a structural primary surplus, four years later the cyclically adjusted primary balance was in deficit by over 3% of GDP. The budget programme for 2003 indicates a further deterioration of the structural deficit to over 5% of GDP. When taking into account interest payments, the structural deficit approached the level of 4% of GDP in 2002 and 6% in 2003. The two methods, as documented by the chart below, give us quite stable estimates of the structural deficit for the Czech Republic. The only exceptions seem to be 1995 and 1997, which will be discussed later in more detail.

Chart 4: The primary fiscal balance in the Czech Republic from 1994 to 2003 (as % of GDP) and the structural primary balance extracted by the OECD and ESCB methods



Source: Authors' own calculations.

⁵⁷ More details about transformation institutions can be found in the first section of this fiscal research project (“The Effect of Off-Budget Transactions on Czech Fiscal Policy”).

Chart 5: The fiscal stance and the output gap (%; % of potential GDP)⁵⁸

Source: Authors' own calculations.

From the point of view of economic policy it is interesting to investigate to what extent fiscal policy was counter- or pro-cyclical. Based on Chart 5 we can argue that in the past fiscal policy did not fulfil its stabilisation role, at least when viewed from a Keynesian perspective.

Chart 5 shows the fiscal stance and output gaps. Expansionary, discretionary fiscal policy is characterised by a deteriorating primary structural balance, which is reflected by positive signs for the fiscal stance. If the bar plotting the fiscal stance is located above the zero line, the government pursued expansionary fiscal policy. On the contrary, if the fiscal stance turns out to be negative, discretionary fiscal policy was restrictive. It can be observed from the chart that there have been only two episodes of restrictive fiscal policy during the last eight years. The restrictive fiscal policies of 1997 and 1998 coincided with the beginning of the 1997 recession.⁵⁹ The sign of the output gap indicates the phase of the economic cycle. In 1994, after a recession related to the economic transformation, the Czech economy entered a cyclical upswing lasting until 1997. Mounting external imbalances – specifically a current account deficit and outflow of foreign capital – triggered the 1997 recession. Economic growth recovered in 1999, but it took the Czech economy another two years to get to the path of potential output.

A comparison of the fiscal stance and output gaps enables us to judge to what extent the government aimed at stabilising the economy. If the fiscal stance is of the opposite sign as the output gap, the fiscal authorities pursued a counter-cyclical fiscal policy and discretionary fiscal policy strengthened the effects of the automatic fiscal stabilisers. On the basis of the OECD methodology, it can be claimed that fiscal policy in the Czech Republic was pro-cyclical in all but two years. In 1995 and 1996, the fiscal authorities pursued an expansionary policy in spite of the fact that the Czech economy was growing, output exceeded its potential level and the current

⁵⁸ The output gap is based on the OECD production function approach.

⁵⁹ The ESCB method detects fiscal restriction only in 1998, but this is much stronger than that found using the OECD approach.

account deficit was deteriorating. Cyclical surpluses were put back into the economy, and discretionary policy measures destabilised economic development. After the external imbalances pushed the economy into recession, the government introduced strict budgetary saving measures. Nevertheless, these measures came too late. Instead of having slowed down the economy before the external imbalances started to jeopardise economic growth, these measures contributed to deepening the recession in the wake of currency crises. From 1999 on, fiscal policy has changed and has been aimed at expanding aggregate demand in a period with a negative output gap. As a result, fiscal policy in 1999 and 2000 was counter-cyclical and stabilised the economy. Despite relatively strong economic growth, fiscal policy continued to expand aggregate demand even after 2001. Fiscal policy again became pro-cyclical.

Given the results of the OECD and ESCB methods, we can conclude that the estimated fiscal stance seems to be generally quite stable and independent of the preferred approach. Nevertheless, we can identify two episodes with slightly different results. The first one is 1995. The OECD estimate signals that fiscal policy in 1995 was strongly expansionary and worsened the structural primary deficit, which was clearly unwarranted given the (autonomously) strong economic performance at that time. Fiscal policy in 1995 was, therefore, previously assessed as pro-cyclical. The ESCB approach, on the other hand, points to an almost neutral assessment, since it states that in 1995 we experienced only a slight increase in the structural primary deficit. The reason for such a difference stems, of course, from the different estimation of the cyclical balance. The OECD method, based on the overall output gap, expected a cyclical surplus of 0.5% of GDP, because the economy seemed to be far above potential output. Contrary to that, in the case of the ESCB approach, the two most important macroeconomic bases (e.g. private consumption and the private wage bill) were still below their trend levels in 1995, and that is why this method allowed for an overall cyclical deficit of 0.1% of GDP.

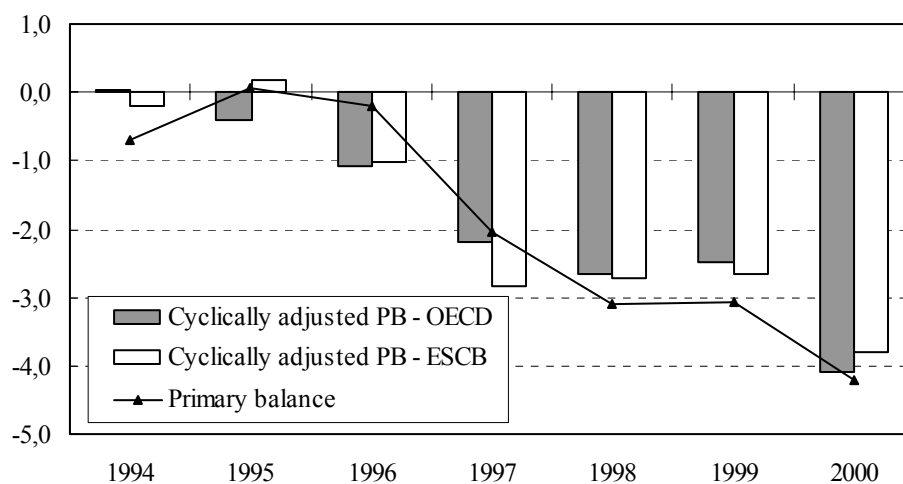
Another interesting year is 1997. This is the only year when the two methods resulted in estimates with opposite signs. According to the OECD approach, fiscal policy started relatively strong restriction as a result of two budgetary cuts implemented in spring 1997. Due to the onset of the recession, we again started speaking about pro-cyclical fiscal policy. However, the ESCB method suggests that the fiscal stance was rather neutral. The difference can be explained by the composition effect again. In 1997, both private consumption and the private wage bill still quite strongly exceeded their trend levels (by 2–3%), and by much more than was the overall positive output gap (about 0.5%). Therefore, according to the ESCB method, the cyclical fiscal surplus should have reached 0.8% of GDP. The OECD approach, however, led to a surplus of “only” 0.1% of GDP. The positive fiscal stance (the ESCB approach) in 1997 was fully compensated for a year later when discretionary fiscal restriction was much stronger based on the ESCB technique than on the OECD approach.

4.2 Cyclical analysis of fiscal policy including the indirect fiscal deficit

The Czech fiscal system suffers, *inter alia*, from low transparency. This is a consequence of the existence of “transformation institutions” (the most important of which being the Czech Consolidation Agency, Česká finanční and Česká inkasní), which have been used by the

government for fiscal and quasi-fiscal purposes,⁶⁰ reflecting especially banking sector stabilisation and corporate sector restructuring. This sub-section aims to put the “official” and indirect deficits together and analyse the overall fiscal stance, reflecting the full range of budgetary and off-budgetary government policy. Nevertheless, we have to mention that the estimate of the indirect deficit is surrounded by significant margins of uncertainty. As a result, we present the following paragraphs to complement the above results rather than to substitute for them.⁶¹ The following chart shows the primary fiscal balance including the off-budget costs and its structural component based on the OECD and ESCB methods.

Chart 6: Primary fiscal balance including the indirect deficit and its structural component according to the OECD and ESCB methods (as % of GDP)



Source: Authors' own calculations.

Adding the indirect deficit to the “official” primary fiscal balance turns the overall primary balance into deficits in all years but 1995. The effect of off-budget transactions has been quite significant since 1997. From 1997 to 2000, it amounted to about 2% of GDP per year on average, whereas from 1994 to 1996 it was less than half a percentage point per year. The following chart presents the fiscal stance based on these estimates of the structural deficits. The output gap is the same as in Chart 5 and is based on the production function approach.

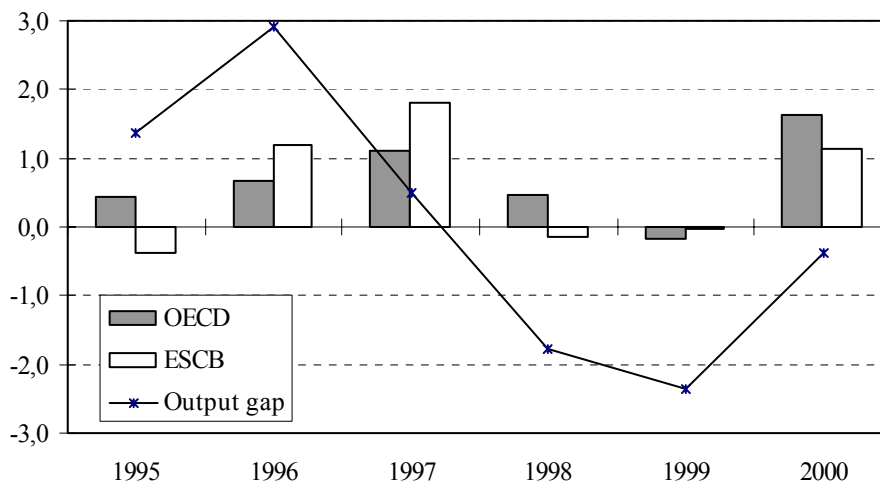
The fiscal stance is clearly affected by our decision also to reflect the estimation of the off-budgetary deficit. First of all, in 1995, the extent of discretionary fiscal policy is definitely lower when compared to that in Chart 5, and fiscal policy may even have pursued an active counter-cyclical path, as is signalled by the ESCB approach. Another change is apparent in 1997, when the costs of the banking sector crisis, in particular, pushed the overall fiscal deficit up and fiscal policy therefore had an expansionary character instead of being restrictive or neutral as was the

⁶⁰ More details about transformation institutions can be found in the first section of this fiscal research project (“The Effect of Off-Budget Transactions on Czech Fiscal Policy”).

⁶¹ Moreover, due to limited data availability we are able to estimate the indirect deficit from 1994 to 2000 only.

case in Chart 5. Also in 1998, the banking sector restructuring outlays overrode the fiscal restriction in the “official” parts of the general government, which was detected above. Contrary to our previous analysis, the off-budget costs indicate that the fiscal expansion was delayed by one year and started in 2000 instead of 1999. It is beyond the timeframe of this chart, but we can assume that the fiscal expansion continued after 2000, because both the “official” and indirect components of the overall fiscal deficit continued to grow.

Chart 7: Fiscal stance including off-budget outlays and the output gap (%; % of potential GDP)



Source: Authors' own calculations.

One can argue that adding the indirect deficits to our analysis created a more favourable picture of the macroeconomic management of fiscal policy. It seems that fiscal policy really lost most of its pro-cyclical character in 1995 and 1998 when compared to our previous conclusions. On the other hand, we have identified more pro-cyclical features in 1997 and no counter-cyclical properties in 1999, when the economic crisis bottomed out. Therefore, in a nutshell, we lack enough empirical support not to accuse fiscal policy of overall macroeconomic mismanagement. Moreover, the analysis of the indirect deficit reveals that the overall level of fiscal deficits has been much higher than the officially reported figures, on average by about 2% of GDP in the past few years. This large total fiscal imbalance (more than 5% of GDP in 2000 and probably 6%–7% of GDP in 2001 and 2002⁶²) will prevent the government from pursuing an active counter-cyclical fiscal policy in the event of a future economic slowdown, when it might be generally accepted and most needed. On the contrary, if the government does not immediately start a comprehensive fiscal overhaul of both the “official” and off-budget fiscal sectors, the risk of unwarranted pro-cyclical fiscal policy in a time of weak economic performance, reinforced by the financial markets, will sharply rise.

⁶² This is a kind of “rule of thumb” estimate, since data enabling calculation of the indirect deficit are not available.

5. Conclusion

The aim of this paper was to apply two different approaches to the cyclical adjustment of the Czech fiscal balance and to compare and discuss the results obtained. The OECD approach was presented as a theoretically sound method that should become a part of economists' toolkit for assessing fiscal policy. In the past, the Czech National Bank and the Czech Ministry of Finance based their approach to cyclical adjustment on an approach similar to the one used by the European Commission – potential output extracted by statistical filters and tax elasticities derived directly from time series analysis. In the meantime, the EC has changed its approach and now uses a method that is much closer to the OECD methodology.

The novelty of the OECD approach rests on the consistent decomposition of the aggregate output elasticity of individual taxes. This approach is more theoretically appealing than the direct derivation of GDP elasticities from time series. Moreover, in the latter approach, pursued in the past by both the Czech National Bank and the Ministry of Finance, nominal budget variables are regressed on nominal GDP, implying an implicit assumption of the same price and output elasticity. In theory, there is no reason to assume identical price and output elasticity of the tax base. There are only a few taxes where this assumption can be maintained (e.g. VAT).

Recently, another “competing” approach to cyclical adjustment has been developed within the ESCB (ECB 2001). The OECD and ESCB methodologies are relatively comparable, because both of them explicitly incorporate the elasticities of the individual tax categories with respect to their (macroeconomic) tax bases. In principle, the same set of elasticities can be used in the approaches of the ESCB and the OECD. Nevertheless, there are two major differences between the aforementioned approaches. First, the ESCB approach puts more emphasis on econometric techniques in deriving the elasticity of the individual tax categories with respect to their tax bases. Second, the ESCB approach does not require the establishing of a relationship between the tax base and output. Instead of calculating the output elasticity of taxes and expenditure, the trend component of the macroeconomic bases is extracted from time series and the estimated elasticity is applied directly to the cyclical component of the base. Thus, the ESCB approach is capable of taking into account the composition of economic growth and its impact on tax revenues, but at the cost of relying on statistical filters to determine the trend component of the base rather than on economic theory.⁶³ Moreover, the ESCB method strictly adjusts budgetary revenues for the influence of government expenditures.

There are two crucial messages resulting from this paper. Firstly, the fact that applying even a philosophically somewhat different methodology does not change the basic assessment of Czech fiscal policy is of particular importance: the sharply deteriorating fiscal position that we have been witnessing for the past few years is structural in nature (i.e. independent of the business cycle). Contemporary Czech fiscal policy is, therefore, following an unsustainable path over the long run.

⁶³ However, it is apparent from Appendix 1 that the OECD approach to estimating potential output is not protected from the use of statistical filters. An HP filter was used to derive the trend total factor productivity, trend participation rate and filtered NAWRU.

Also, another hypothesis was strongly confirmed: Czech fiscal policy has been exhibiting mainly pro-cyclical features.

The composition effect did not change the overall results, but played an important role in the short run, especially in 1995 and 1997, which are characterised, according to the ESCB technique, by a lower level of fiscal discretion than is estimated within the OECD analytical framework. The ESCB method suggests that in 1995 fiscal policy was almost neutral instead of being strongly expansionary, and in 1997 it was neutral instead of being restrictive. The role of the composition effect was extremely important in both years, since it reversed the sign of the fiscal stance. In spring 1997, the government adopted two fiscal consolidation packages that, besides public investment outlays, were targeted mainly at government consumption expenditure and the public sector wage bill. The OECD approach accounted for this restriction already in 1997. However, according to the ESCB approach, the cyclical balance is only estimated for the part of budgetary revenues and expenditures which relates to private sector economic development. The real effects of that fiscal restriction on the private segment of the economy were, in fact, delayed by several quarters.

Including the estimates of indirect fiscal deficits in our analysis has partially modified our thoughts about the level and timing of the fiscal stance. What is particularly striking is the fact that accounting for quasi-fiscal operations would completely “erase” the fiscal restriction of 1997–1998 identified in the “official” part of the public budgets. Nevertheless, we argue that even in this case fiscal policy would keep its unwarranted pro-cyclical features. Moreover, assessing the “full range” of fiscal policy leads us to think that Czech fiscal policy faces much deeper and more dangerous structural problems and without significant systematic consolidation will clearly follow an unsustainable path in the medium and long term.

When reading the paper and interpreting the results, it should be remembered that a standard approach was applied to non-standard time series. Time series in the Czech Republic are very short, which requires working with quarterly data. But quarterly data are subject to many methodological changes (and even to changing seasonality, for reasons unrelated to underlying economic processes). The unavailability of some time series, namely the division of quarterly data into the government and business sector, prevented us from following the OECD methodology as closely as we originally intended. Similar problems were identified in the case of the ESCB approach, and we sometimes had to use proxy variables or accept certain simplifying assumptions.⁶⁴ On top of that, quarterly fiscal data are not published by the Czech statistical authority, and cash data had to be used instead of accruals when checking the consistency of the theoretical assumptions on tax elasticities with the data. As a result, it goes without saying that our estimates are surrounded by significant margins of uncertainty and are likely to be subject to future revisions and refinement.

⁶⁴ This was especially the case with wage bill data and the adjustment of tax receipts for government expenditures.

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Appendix 1

The production function approach to estimating the output gap

The OECD approach to potential output estimation rests on a production function framework. The main advantage of the production function framework is a clear link to economic theory, which allows an understanding of the driving forces behind the path of potential output. From the different types of production function, a Cobb-Douglas production function was chosen owing to its reasonable simplicity and transparency. In a production function framework, the potential output of an economy depends on its endowment with factors of production (i.e. capital and labour) and the efficiency and utilisation of the factors of production summarised by total factor productivity.

A two-factor Cobb-Douglas production function for the whole economy was used (OECD 1995), taking the form:

$$Y = TFP \cdot L^{\alpha} \cdot K^{(1-\alpha)} \quad (10)$$

where:

Y	=	value added
L	=	actual labour input
K	=	actual capital stock
TFP	=	total factor productivity
α	=	average labour share

Or in natural logarithms:

$$\ln Y = \ln TFP + \alpha \ln L + (1 - \alpha) \ln K \quad (11)$$

However, it should be noted that in the OECD approach, the Cobb-Douglas production function is strictly applied to the business sector only. Due to data availability, such a distinction cannot be made in the Czech Republic.

Equation 11 (or 10) is used to derive total factor productivity in the whole economy by substituting observable variables into the equation and calculating *TFP* as a residual. The short time series in the Czech Republic do not make it possible to work with yearly data, which is why the estimation was carried out on seasonally adjusted quarterly data. In some cases, the quarterly data published by the Czech statistical authority are not sufficient. As a result, some variables in the production function, namely the capital stock, had to be replaced by proxy variables. A time series of the capital stock, *K*, was derived as total fixed assets reported at the end of 1995 plus gross fixed capital formation minus depreciation. The labour share, α , was set equal to 0.52, which corresponds to the average labour share in output measured by the ratio of compensation of employees to the sum of compensation of employees and gross operating surplus.⁶⁵

⁶⁵ Thus, the profit share (measured by gross operating surplus) amounts to 0.48, which differs from the corresponding number in Table 1 (0.43). The difference results from another variable used in the denominator (GDP vis-à-vis the sum of gross operating profit and compensation of employees).

Potential output is calculated by combining trend total factor productivity with the actual capital stock and an estimate of potential employment, using the same production function.

$$\ln Y^{POT} = \ln TFP^{POT} + \alpha \ln L^{POT} + (1 - \alpha) \ln K \quad (12)$$

Trend factor productivity (TFP^{POT}) was obtained by smoothing total factor productivity (TFP). The Hodrick-Prescott filter was used to smooth the TFP time series. The level of potential employment (L^{POT}) can be calculated as:

$$L^{POT} = PART^{POT} \cdot POP \cdot (1 - NAWRU) \quad (13)$$

where:

$PART^{POT}$	=	trend participation rate
POP	=	working age population
$NAWRU$	=	estimated non-accelerating wage rate of unemployment

The identification of an appropriate measure of NAWRU under the conditions of a transforming economy is a very difficult task. The OECD approach identifies the NAWRU by assuming that the change in money wage growth is proportional to the gap between actual unemployment and the NAWRU, thus:

$$\Delta wg = -a \cdot (U - NAWRU), \quad a > 0 \quad (14)$$

where $wg = \Delta w$ denotes money wage growth. The equation states that money wage growth rises if and only if unemployment is below its equilibrium level. Further assuming that the NAWRU is unchanged between two consecutive observations, the above equation can be differentiated, and setting $\Delta NAWRU = 0$ yields:

$$a = -\frac{\Delta^2 wg}{\Delta U} \quad (15)$$

Substituting a back into the original equation (14), the NAWRU can be calculated as a function of observables:

$$NAWRU = U - \frac{\Delta U}{\Delta^2 wg} \cdot \Delta wg \quad (16)$$

The NAWRU estimates obtained from equation 16 are usually very volatile, so published NAWRUs are based on Hodrick-Prescott filtering of these raw NAWRU estimates. These NAWRU estimates are then interpreted as a short-run concept of the equilibrium rate of unemployment, aimed at measuring the rate of unemployment at which the money wage growth rate is stable. However, an empirical investigation reveals that such NAWRUs have very little power in predicting money wage growth, as they neglect other explanatory variables, e.g. formation of inflation expectations, the level of labour share in output and the development of labour productivity (Holden and Nymoen, 2002). To make the NAWRU concept more realistic

for the conditions in a transition economy where labour productivity has been undergoing rapid change, the following specification is assumed (Haksar, 1999):

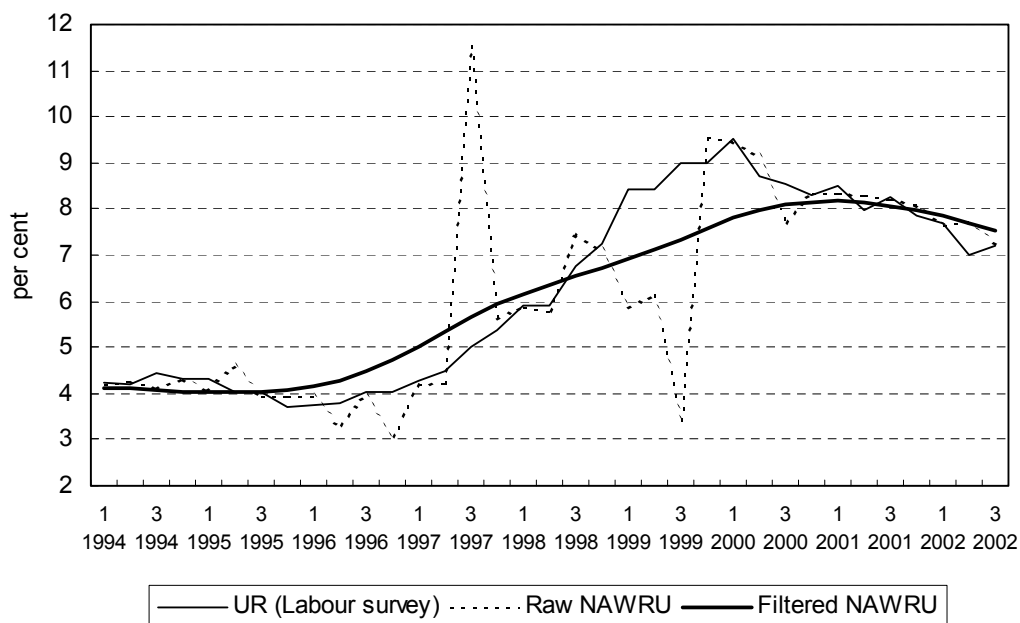
$$wg - \pi^e - lp^e = -c \cdot (U - NAWRU), c > 0 \quad (17)$$

where π^e is expected inflation and lp^e is expected labour productivity growth. Equation 8 states that real wage growth in excess of productivity growth is the result of a tight labour market ($U < NAWRU$). Assuming simple adaptive expectations such that $\pi^e = \pi_{t-1}$, $lp^e = lp_{t-1}$ and that the NAWRU is unchanged between two consecutive observations, the NAWRU can be expressed as:

$$NAWRU = U - \frac{\Delta U}{\Delta(wg - \pi_{t-1} - lp_{t-1})} \cdot (wg - \pi_{t-1} - lp_{t-1}) \quad (18)$$

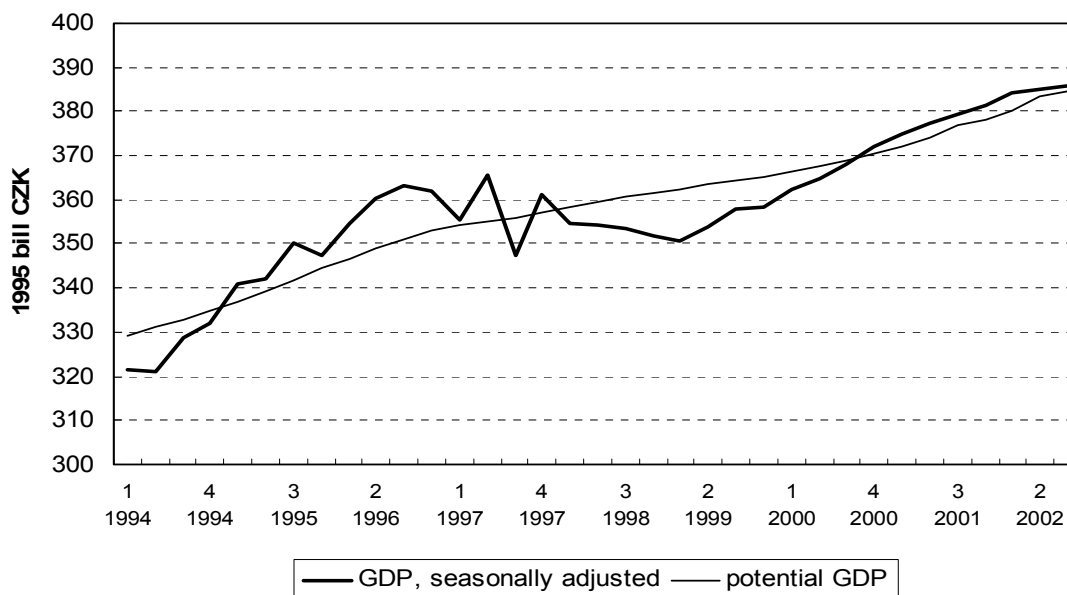
All variables are growth rates over a quarter to the same quarter of the previous year. As in the previous specification, the NAWRU estimates are subject to large fluctuations, and smoothed values are substituted in the production function. For smoothing the NAWRU series, the HP filter was applied with λ set equal to 100. The choice of a lower λ was governed by the effort to obtain values that are closer to raw NAWRU estimates (and underlying wage setting behaviour). The results are summarised in the following chart.

Chart 8: Unemployment rate, NAWRU and raw NAWRU



Source: Authors' own calculations.

To obtain an estimate of potential output, all that remains is to substitute trend total factor productivity (TFP^{POT}), the non-accelerating wage rate of unemployment ($NAWRU$) and the actual capital stock (K) into the production function. The path of potential output as compared to actual seasonally adjusted real GDP is plotted in Chart 9.

Chart 9: Potential output and seasonally adjusted GDP

Source: Authors' own calculations.

The output gap⁶⁶ was calculated as the deviation of actual GDP from potential GDP in per cent of potential GDP. A comparison of the output gap and the unemployment gap (*NAWRU* minus *UR*) is shown in Chart 10.

Chart 10: The output gap and unemployment gap

Source: Authors' own calculations.

⁶⁶ It is necessary to emphasise that the output gap derived in this paper is different from the output gap that has been used in the Czech National Bank for the purposes of inflation forecasts. While in this paper we have followed closely the OECD methodology for potential output estimation (based on the Cobb-Douglas production function), the CNB's official model forecasting apparatus relies on a multivariate filter system (Kalman filter). For more details on the CNB's method, see CNB (2003).

Appendix 2

Derivation of elasticities

a) The OECD approach

Seasonally adjusted quarterly data were used to estimate all the regression equations. The estimation period covers 1995:1 to 2002:3, which amounts to 31 observations. In most cases, the OLS estimator was applied to obtain the parameter values. In all but a few cases, the DW statistic indicates significant positive serial correlation in the residuals. This results from the omission of the lag structure, the quarterly frequency of the time series, the small sample and from the fact that the seasonally adjusted data exhibit volatility while the potential values (of output and employment) are “trend” values of the underlying variables without any major fluctuations. Except for the output elasticity of employment, no attempt was made to remove the residual correlation bias. To account for simultaneity in the consumption and import equations, two-stage least squares were applied, with instruments given under the relevant regression equations.

Output elasticity of employment

Budget sensitivity with respect to output is very much dependent on the output elasticity of employment. Both the output elasticity of social security contributions and the output elasticities of personal income tax and corporate income tax are affected by the employment-output relationship. At the same time, these taxes account for more than two thirds of all tax revenues. On the other hand, a positive relation between the elasticity of labour taxation (social security contributions, personal income tax) and the output elasticity of employment is in part offset by the negative relation between the elasticity of capital taxation (corporate income tax) and the output elasticity of employment.

The OLS estimate of the output elasticity of employment (0.243) is biased by positive serial correlation in the residuals. To check the robustness of the parameter estimate, a lagged endogenous variable was introduced into the equation, assuming a geometric lag structure. Using a Koyck transformation, the long-run output elasticity of employment amounts to 0.460 ($0.099/(1 - 0.785)$). For the purposes of cyclical adjustment, the impact of higher output on employment within a year (i.e. within four quarters) is of crucial importance. Following an increase in output by 1%, employment increases by 0.286% within four quarters.

$$\ln(ZAM_SA/ZAM_POT) = - 0.002 + 0.243 \cdot \ln(Y_SA/Y_POT)$$

(-1.94) (4.45)

$$R^2 = 0.423; DW = 0.756$$

$$\ln(ZAM_SA/ZAM_POT) = - 0.0003 + 0.099 \cdot \ln(Y_SA/Y_POT) + 0.785 \cdot \ln(ZAM_SA_{-1}/ZAM_POT_{-1})$$

(-0.63) (3.48) (10.30)

$$R^2 = 0.887; DW = 2.419$$

Employment elasticity of wages

$$\ln((W_R_SA \cdot 3 \cdot ZAM_POT / 1000000) / Y_POT) = -0.718 + 0.003 \cdot TIME + 1.111 \cdot \ln(ZAM_SA / ZAM_POT)$$

(-67.45) (6.28) (1.97)

$R^2 = 0.584$; $DW = 0.675$

Output elasticity of private consumption

$$\ln(CNI_SA / Y_POT) = -0.682 + 0.003 \cdot TIME + 1.019 \cdot \ln(Y_SA / Y_POT)$$

(-72.38) (6.97) (4.71)

Instrument list: C, TIME, $\ln(G_SA / Y_POT)$, $\ln(I_SA / Y_POT)$

$R^2 = 0.620$; $DW = 0.452$

Output elasticity of import of goods

$$\ln(IMP_G_SA / Y_POT) = -0.964 + 0.023 \cdot TIME + 1.495 \cdot \ln(Y_SA / Y_POT)$$

(-51.54) (29.79) (3.23)

Instrument list: C, TIME, $\ln(CNI_SA / Y_POT)$, $\ln(I_SA / Y_POT)$

$R^2 = 0.973$; $DW = 1.326$

Employment elasticity of labour supply

$$\ln(LF_SA / ZAM_POT) = 0.030 + 0.002 \cdot TIME - 0.662 \cdot \ln(ZAM_SA / ZAM_POT)$$

(17.79) (22.41) (-7.51)

$R^2 = 0.963$; $DW = 0.940$

$$\Delta \ln(LF_SA) = 0.0003 + 0.171 \cdot \Delta \ln(ZAM_SA)$$

(0.85) (1.71)

$R^2 = 0.091$; $DW = 1.528$

List of abbreviations:

Y – real GDP; CNI – real private consumption; G – real government consumption; I – real gross fixed capital formation; IMP_G – import of goods (real); $CNIP$ – nominal private consumption; ZAM – employment; LF – labour force; W_R – real wage rate; SA – seasonally adjusted variable; POT – potential level of variable.

b) The ESCB approach

Seasonally adjusted quarterly data were used to estimate budgetary elasticities. The data sample covers the period from 1994:1 to 2002:3 – 35 observations in all. Most elasticity coefficients are significant at a confidence level of 95%. The excise tax elasticity parameter is significant at 90% only, and the CIT elasticity with respect to gross operating surplus is not significant at all. The lag

specification in the case of the CIT equation was calibrated. The time trend was employed in all regression equations. The revenue and expenditure fiscal data used in this paper (in both the OECD and ESCB methods) are reported on a cash basis, since there are no accrual (ESA95) fiscal quarterly figures/estimates available in the Czech Republic.

VAT elasticity on private real consumption

$$\ln(\text{VAT_SA}) = -1.250 + 0.770 * \ln(\text{C_SA}) + 0.017 * \text{TIME}$$

(-0.75) (2.38) (7.03)

$$R^2 = 0.942; DW = 1.318$$

The elasticity of excise proceeds on private real consumption

$$\ln(\text{EX_SA}) = -2.831 + 0.976 * \ln(\text{C_SA}) + 0.009 * \text{TIME}$$

(-1.069) (1.893) (2.489)

$$R^2 = 0.804; DW = 1.548$$

The elasticity of social security and health care contributions on the private real wage bill

$$\ln(\text{SSC_SA}) = -0.915 + 1.029 * \ln(\text{W_SA}) + 0.016 * \text{TIME}$$

(-1.48) (7.42) (16.13)

$$R^2 = 0.980; DW = 1.437$$

The elasticity of corporate income tax on gross operating surplus

$$\ln(\text{CIT}) = 0.267 + 0.444 * \ln(0.4 * \text{GOS}_{t-1_SA} + 0.3 * \text{GOS}_{t-4_SA} + 0.15 * \text{GOS}_{t-2_SA} + 0.15 * \text{GOS}_{t-3_SA}) + 0.012 * \text{TIME}$$

(-0.02) (0.15) (0.61)

$$R^2 = 0.245; DW = 2.309$$

The elasticity of unemployment-related benefits on the number of unemployed persons

$$\ln(\text{EXP_SA}) = -4.548 + 0.784 * \ln(\text{U_SA}) + 0.020 * \text{TIME}$$

(-15.24) (12.84) (6.63)

$$R^2 = 0.989; DW = 1.781$$

Part III.

Fiscal Implications of Population Ageing

1. Introduction

Population ageing has a serious impact on future public spending and is considered an important challenge for fiscal policy. The recent demographic developments and trends have predetermined the age profile of the population for the upcoming decades. Low fertility rates and a rising life expectancy rate will significantly increase the number of elderly people. As a result, the old-age dependency ratio will rise rapidly. The Czech Republic belongs to the group of countries faced with the most pronounced ageing of the population (OECD, 2002), and its fiscal position will be strongly affected by increasing age-related spending.

Long-term projections have become an important instrument indicating the order of magnitude of future fiscal imbalances associated with public pension schemes. However, expenditure projections focusing on the impact of ageing populations have often been limited to pension spending and have not taken into account other budgetary items. The changing age structure will have an impact on many other spending categories, mainly health care and education expenditure and child/family benefits. Thus, the projection of pension spending, taken by itself, is likely to provide an incomplete view of the overall impact of ageing on public expenditure.

Although the long-term projections are subject to wide margins of uncertainty, they indicate the degree of future fiscal pressures stemming from population ageing and form a basis for the assessment of the long-term sustainability of public finances. The European Commission requires member countries to include a specific section on the budgetary impact of population ageing in their stability and convergence programmes. Long-term budgetary projections make it possible to assess whether the current budgetary position and medium-term targets are sufficiently ambitious to avoid the risk of large future budgetary imbalances.

The aim of this paper is to present long-term projections of the fiscal impact of population ageing on the main age-related spending items, budgetary balances and public debt in the Czech Republic. The projection exercise consists of three interrelated components – (i) demographic projection, (ii) labour market and macroeconomic projection and (iii) fiscal projection. Common macroeconomic assumptions as proposed by the OECD (2001) will be used to project labour market development and the macroeconomic aggregates of interest. A large part of this paper is an updated and extended version of work carried out at the Czech Ministry of Finance on this issue.¹

¹ The Ministry of Finance participated in the OECD project “Fiscal Implications of Ageing” in 2000, and in the project “Projections of Health Care to 2050” in 2002. The current paper draws on the calculations submitted as part of both projects. The authors cooperated intensively with other staff members of the Department of Financial Policies and used many of their results. The paper would not have been written without the previous work of F. Cvengroš, L. Havlíček and K. Dybczak. The authors are grateful for their valuable input and helpful comments.

The approach applied in the projection exercise can be considered a standard methodology for long-term projections focused on the impact of population ageing on public finances. The same approach has been adopted in many papers, especially those published by the OECD (2001) and EC (2001). However, the “current policy” (or baseline) scenario presented in this paper is not the most likely scenario. The baseline scenario shows the increase in public spending, deficit and debt under the assumption of unchanged policies² and the absence of feedback mechanisms from public finances to the rest of the economy and it neglects the likely reaction of the financial markets. The increase in age-related spending will result in a significant deterioration of the fiscal deficit and public debt. The government is likely to respond to such fiscal imbalances by cutting spending, increasing taxes and/or reforming the pension and health care systems. These measures will have an impact on the labour market and the growth path of the economy. If the government does not react fast enough, it will face financial difficulties, as the financial markets will punish it for unsustainable public finances. In any case, the government will not avoid undertaking fiscal consolidation. The more profound is the projected impact of population ageing on the public deficit and debt, the lower is the probability that the baseline scenario will actually materialise. As such, the baseline scenario is highly unrealistic. Nevertheless, its importance rests on the fact that it provides a measure of future spending pressures and sends a clear message to policy-makers.

Another model has been included in subsection 4.3 of this paper on pension system analysis. This projection technique has its origins in Bezděk (2000) and was updated and further improved for the purposes of this paper. The model represents a slightly different projection style. It relies on more simplified assumptions and does not work with the same comprehensive, subtle apparatus. However, as many data inputs as possible were unified for the two models, and thus we can compare the main results of both projection methods in the area of the Czech public pension scheme. Such a comparison can also serve as an indirect consistency check of the main model outcomes.

As was already mentioned, the main aim of this paper is to analyse the likely impact of the process of population ageing on public budgets in the Czech Republic and in that way provide a pioneering study (to the best of the authors’ knowledge) and complex input into the mounting debate on the long-term sustainability of Czech fiscal policy. In this paper, we do not attempt to deliver any fiscal reform suggestions (i.e. pension system, health care spending, etc.), which are, of course, unavoidable in the future. Although some proposals have already been formulated (inter alia by Krejdl (1997), Schneider (1998a, 1998b) and Bezděk (2000)), this area remains open for further detailed research.

2. Demographic projections

The demographic projection corresponds to the middle variant of the population projection produced by the Czech Statistical Office (CZSO) in January 2000. The CZSO had projected demographic development until 2030. The CZSO’s projection was extended up to 2050, assuming

² The assumption of unchanged policies was relaxed on a few occasions (e.g. labour productivity catch-up, reflecting convergence to EU countries, and rise in share of students involved in tertiary education, capturing the trend observed in the last 25 years in EU countries).

the same parameter values as for 2030. In 2000, the United Nations published its own demographic projections for all countries, including the Czech Republic. As compared to the CZSO's middle variant, the Czech population will be ageing even more rapidly, and the Czech Republic will have one of the oldest populations in the world. The more pessimistic outlook results from the different assumptions applied by the UN. The UN projection is an extrapolation of the current situation and assumes that the current extremely low fertility rate will be maintained in the future. The CZSO projection, taking into account likely changes in the main demographic parameters, was preferred in the exercise.

The population profile over time depends on assumptions about fertility, mortality and net immigration flows. In 2000, the Czech Republic reported a fertility rate of 1.14, the lowest among the OECD countries (OECD average: 1.46). Although fertility is assumed to increase from 1.14 to 1.50 by 2030 and to remain at a higher level thereafter, it will probably not reach the OECD average (1.60 in 2030 and 1.61 in 2050). A fertility rate lower than 2.0 implies a long-run decline in the total population. Life expectancy at birth, reflecting mortality over the whole lifespan of a particular cohort, is expected to increase for both males and females, but the increases are smaller for women than for men. Life expectancy for males is assumed to rise from 71.5 to 75.2 years and for females from 78.4 to 81.5 years. Net immigration is difficult to predict, since it depends on the economic situation of the country, the situation on the labour market and immigration policy. The projection is based on the assumption of an increasing active migration balance. From 2030 on, net immigration will add roughly 15,000 persons to the Czech population. The assumptions and results of the demographic projection are summarised in Table 1 and Chart 1.

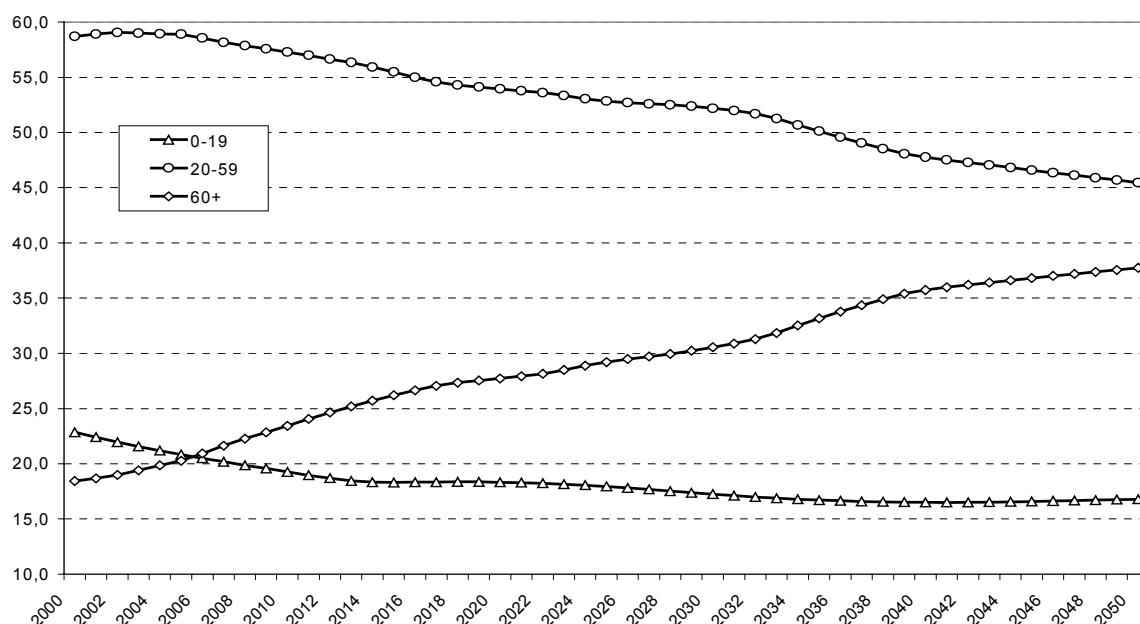
Table 1: Assumptions and results

	2000	2010	2020	2030	2040	2050
Assumptions						
Total fertility rate	1,14	1,32	1,44	1,50	1,50	1,50
Life expectancy of men (years)	71,5	73,7	74,5	75,2	75,2	75,2
Life expectancy of women (years)	78,4	80,5	81,0	81,5	81,5	81,5
Active migration balance (thousands)	9,5	11,3	13,2	15,0	15,0	15,0
Results						
Population (thousands)	10 268	10 244	10 098	9 691	9 047	8 367
Average age of population (years)	38,2	40,9	43,4	45,7	46,7	47,3
Old-age dependency ratio	31,4	40,9	51,4	58,6	74,8	83,0
<i>Age structure (%)</i>						
Men						
0–19	24,1	20,3	19,3	18,2	17,4	17,7
20–54	54,5	52,0	49,4	45,6	42,1	40,3
55–64	10,5	14,4	12,6	15,1	16,2	14,4
65+	10,9	13,3	18,7	21,2	24,4	27,6
Women						
0–19	21,7	18,3	17,4	16,4	15,7	16,0
20–54	50,6	47,9	45,7	42,0	38,8	37,0
55–64	11,1	14,9	12,5	14,8	16,0	14,0
65+	16,6	18,9	24,4	26,9	29,5	33,0

Source: Czech Statistical Office, Ministry of Finance, author's calculations.

The projection results in a gradual decline in the population from 10.3 million in 2000 to 9.7 million in 2030 and 8.4 million in 2050. In the medium and long term, the Czech Republic will face the effects of an ageing population. The age profile of the population is deteriorating and generating serious concerns from the point of view of the labour market and fiscal perspectives. By the end of the projection period, the share of the elderly (defined as those over 60) in the total population will more than double from 18% in 2000 to 38%. The share of the working-age population (20–59) will drop from 59% to 45%, and the share of the young population (0–19) will shrink from 23% to 17%. The average age of the population will be almost 10 years higher (38 vis-à-vis 47). The old-age dependency ratio – defined as the elderly population of 60 years and over to the working-age population – will rise steeply from 31.4 to 83.0.

Chart 1: Age structure – per cent of total population



Source: Czech Statistical Office, author's own calculations.

Demographic projections covering time horizons over several decades are generally very uncertain, as they are conditional on the assumptions applied with respect to the fertility rate, life expectancy and migration flows. These uncertainties may be even higher in the context of the Czech Republic. The extremely low fertility rate reported in the Czech Republic is a result of the transformation period, but it is difficult to judge how fast and to what level it will eventually rise. Moreover, the free movement of workers following EU accession will affect migration flows, but the magnitude of those migration flows is subject to considerable uncertainties. Leaving these uncertainties aside, an international comparison (Table 2) indicates that the Czech Republic ranks as a rapidly ageing country, as measured by the old-age dependency ratio (behind Italy, Spain, Austria and Poland). The increasing number of elderly people and the shrinking working-age population will have a major impact on the labour market and social and health care systems.

Table 2: International comparison of population ageing – old-age dependency ratio

<i>Selected OECD countries</i>	2000	2050	Change in p. points
Austria	25,2	58,2	33,0
Belgium	28,1	49,5	21,4
Czech Republic	21,9	57,5	35,6
Finland	25,9	50,6	24,7
France	27,2	50,8	23,6
Germany	26,6	53,2	26,6
Hungary	23,7	47,2	23,5
Italy	28,8	66,8	38,0
Netherlands	21,9	44,9	23,0
Norway	25,6	41,2	15,6
Poland	20,4	55,2	34,8
Portugal	26,7	50,9	24,2
Spain	27,1	65,7	38,6
Sweden	29,4	46,3	16,9
United Kingdom	26,6	45,3	18,7
OECD average	23,8	49,9	26,1

Note: The old-age dependency ratio is here defined as the number of persons aged 65 and over divided by the number of persons aged 20–64. Such a definition is common in international studies on ageing. The definition used in Table 1 drew the line between the working age population and the old-age population at the age of 60, which is closer to the effective retirement age in the Czech Republic.

Source: OECD (2001).

3. The labour market and macroeconomic projections

Labour market trends and macroeconomic indicators will be affected by the changing age profile of the population. In order to project the main labour market and macroeconomic variables, a population projection was combined with macroeconomic assumptions on participation rates, the unemployment rate and labour productivity. The common assumptions proposed by the OECD (2001) were applied in all cases (participation rates, the unemployment rate) unless the transition nature of the Czech economy made the common assumptions unrealistic (labour productivity). Attention was paid to real variables only, because price development is hard to project and over longer time periods revenues and expenditures are influenced by price increases to a similar extent. As a result, economic performance is of utmost importance for long-term budgetary projections. All variables have been calculated at constant 1995 prices.

The labour market projection depends to a large extent on the underlying assumptions on participation rates. It is assumed that for the whole projection period the participation rate will stay constant at the 2001 level for men in all cohorts (15–19, 20–54, 65–79) but one (55–64). The participation rate for men aged 55 to 64 is expected to increase by 6 percentage points by 2007, reflecting the effects of the Act on Extending the Retirement Age, and to remain at a higher level thereafter. The participation rates reported for women in 2001 are kept constant up to 2007 except for women aged 55 to 64, who are likely to withdraw from the labour market later as the

retirement age³ gradually increases up to 2007. From 2007 on, the participation rates for women aged 20 to 54 and 55 to 64 were allowed to rise⁴ towards a predefined threshold at the end of the period. The threshold for women aged 20 to 54 was set equal to 5 percentage points below that of men in the same cohort, and for women aged 55 to 64, 10 percentage points below that of men.

Table 3: Participation rates for men and women

Participation rate	2000	2010	2020	2030	2040	2050
<i>Men</i>						
0-14	0,0	0,0	0,0	0,0	0,0	0,0
15-19	16,2	13,0	13,0	13,0	13,0	13,0
20-54	92,3	92,3	92,3	92,3	92,3	92,3
55-64	53,6	59,5	59,5	59,5	59,5	59,5
65-79	7,9	8,0	8,0	8,0	8,0	8,0
80+	0,0	0,0	0,0	0,0	0,0	0,0
<i>Women</i>						
0-14	0,0	0,0	0,0	0,0	0,0	0,0
15-19	14,1	10,2	10,2	10,2	10,2	10,2
20-54	78,6	80,3	82,1	83,8	85,6	87,3
55-64	23,3	36,0	39,4	42,8	46,1	49,5
65-79	3,0	2,8	2,8	2,8	2,8	2,8
80+	0,0	0,0	0,0	0,0	0,0	0,0

Source: OECD (2001), author's own calculations.

From 2002 to 2006, the unemployment rate (measured by labour force survey data) corresponds to the medium-term projection of the Ministry of Finance. Starting in 2007, the unemployment rate is assumed to gradually decrease, converging towards its structural level in 2015. Beyond 2015, the unemployment rate is held constant at the structural level for the rest of the projection period. The structural unemployment rate was set at 6.5%, a common assumption proposed by the OECD.

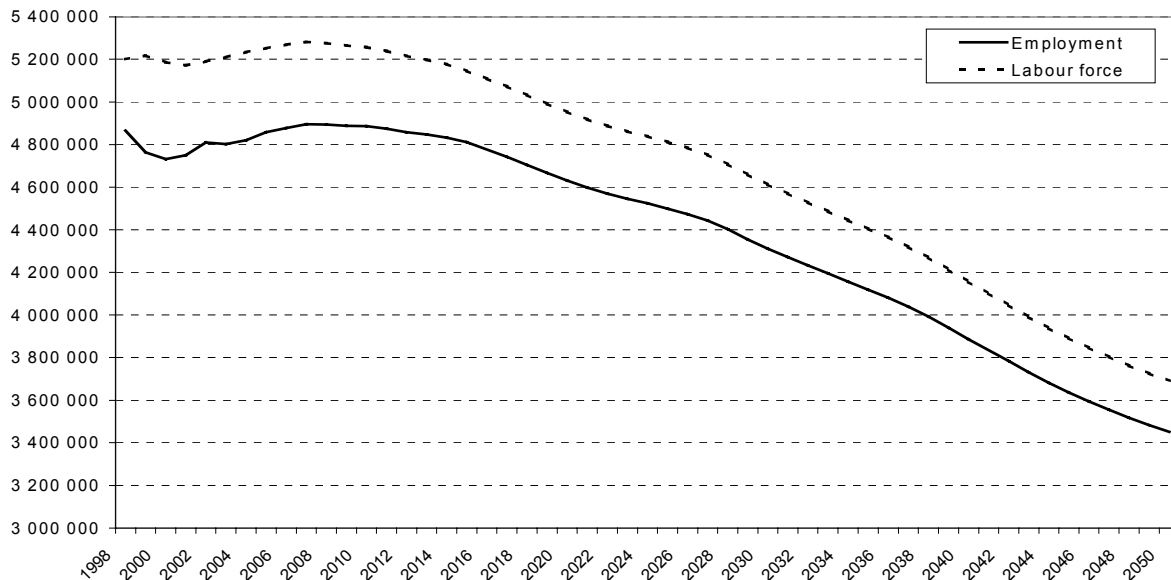
The participation rates determine the proportion of the population active on the labour market (i.e. the labour force), and the unemployment rate was used to calculate employment. Employment in 2007 will be higher than in 2001 and will amount to 4.9 million persons. The increase in employment results from higher participation rates for men and women aged 55 to 64 and a reduction in the unemployment rate. From 2007, employment will experience a declining trend, falling to 4.3 million persons by 2030 and 3.5 million by 2050. The rising participation rate for

³ The participation rate for women is expected to increase by 11 percentage points from 2001 to 2007. The rise in the participation rate for women, reflecting the later statutory retirement age, is considerably higher than for men. While the retirement age will be extended by another year for men (from 61 to 62), women will have to work two years longer to reach the statutory retirement age (the age of retirement for a woman with two children will increase from 57 to 59 between 2001 and 2007). The rise in the participation rate is based on the assumption of almost full efficiency of the increasing statutory retirement age, i.e. men and women will stay in the labour force longer and will not rely on early retirement or disability schemes to a large extent.

⁴ The same assumption was applied by the OECD (2001) and EC (2001). The assumed increases in female participation rates stem from the higher participation of younger female age-cohorts in the labour market as compared with earlier generations.

women will not come close to offsetting the unfavourable demographic trends. Between 2010 and 2015, the numerous cohorts of those born after World War II will retire, but the largest fall in the working-age population will occur around 2035 when the baby boom generation of the 1970s withdraws from the labour market.

Chart 2: Employment and the labour force



Source: Authors' own calculations.

The assumption on labour productivity growth is of crucial importance for the projection exercise. The OECD wants labour productivity growth to converge towards an annual rate of 1.75% between 2020 and 2030. Labour productivity in the Czech Republic is significantly lower than average EU labour productivity, and convergence in levels is likely to appear. As a result, labour productivity growth is assumed to significantly outstrip the labour productivity growth in EU countries, so that the Czech Republic will have reached over 80% of the EU average by 2030. Labour productivity growth is projected to be at 4.0% in 2008 and to decline to 1.75% in 2030.⁵ Labour productivity growth before 2007 was derived from the medium-term forecast of the Ministry of Finance.

The GDP projection is a product of labour productivity and employment. Under the given assumptions, GDP growth will reach 3.7% on average in the first decade of the projection period and decline in further decades as labour productivity growth recedes and the decline in employment accelerates. Due to negative employment growth, GDP growth is substantially lower than growth in GDP per capita, reflecting population ageing and the parameters of the labour market.

⁵ Assuming productivity growth rates that deviate from historical patterns can create an additional margin of uncertainty. In one of the sensitivity tests we present an impact of lower productivity growth on the fiscal projection.

The wage bill is an important variable for the fiscal module. The wage bill, a product of the average wage and employment, is an input for the estimation of social security contributions. The average wage was not differentiated by sex, and its growth was assumed to follow labour productivity growth. As a result, the growth rate of the wage bill is equal to GDP growth.

Table 4: Assumptions and results

		2000	2010	2020	2030	2040	2050
Assumptions							
Participation rate (20-64)	%	77,3	77,5	79,3	78,7	78,7	80,3
Unemployment rate	%	8,8	7,0	6,5	6,5	6,5	6,5
Labour productivity	<i>growth rate (%)</i>	2,2	3,4	3,4	1,9	1,8	1,8
Results							
Employment	<i>growth rate (%)</i>	-0,9	0,3	-0,5	-0,7	-1,0	-1,2
Wage rate	<i>growth rate (%)</i>	1,6	3,3	3,4	1,9	1,8	1,8
Wage bill	<i>growth rate (%)</i>	0,7	3,6	2,8	1,2	0,7	0,5
GDP	<i>growth rate (%)</i>	1,2	3,7	2,8	1,2	0,7	0,5
GDP per capita	<i>growth rate (%)</i>	1,3	3,7	3,0	1,6	1,4	1,3

Note: Growth rates are average growth rates in the given period (2010 is the average growth rate projected between 2001 and 2010), except for 2000 (average growth rate from 1995 to 2000).

4. Fiscal projections

This section presents projections for the impact of an ageing population on public expenditures. Many public expenditure programmes are affected by demographic shifts. In the projection exercise, public expenditures were divided into two subgroups – age-related expenditures and other expenditures. The main spending items included in age-related expenditures are pensions, health care, education and child/family benefits. These expenditures account for 53% of the overall public spending in the Czech Republic. While ageing populations are likely to drive up pension spending and health care costs, the shrinking youth age group may offset this rise by providing reductions in education expenditures and child/family benefits. As a result, it is necessary to analyse all age-related spending to have a complete picture of how population ageing impacts future public spending. However, projections of spending on health care and education are considerably more uncertain than for pension expenditures. Pension legislation provides a framework for estimating future benefits. No equivalent set of rules is available for projecting the supply and demand of health care and education.

The projections were based on an assumption of unchanged policy, and as such, they only take into account the legislative acts in force (e.g. the Act on Extending the Retirement Age). However, in some cases, the fiscal projections rest on assumptions anticipating the likely measures in the legislative framework (i.e. systematic adjustments of reduction bands for derivation of pensions, and wage indexation of child/family benefits).

All fiscal data are reported in the IMF's Government Financial Statistics methodology (GFS), i.e. on a cash basis. Transformation costs were excluded from public spending because they are of a

transitory nature and are likely to disappear within several years. Thus, the deficit corresponds to the deficit excluding financial operations (i.e. net lending in the GFS methodology) and transformation costs. While 2003 (i.e. the budget programme) is the base year for the projection of revenues, total expenditures and public debt, the projection of age-related expenditures starts off with the 2001 figures. All fiscal data were deflated by the GDP deflator, and subsequent calculations were carried out in real terms.⁶

4.1 Basic characteristics of the Czech pension system

The pension system in the Czech Republic consists of two pillars. The first pillar is represented by a mandatory state-operated PAYG defined benefit scheme. The second pillar covers voluntary private pension funds. The private scheme has been supplementing the public component of the pension system since 1994, i.e. it is still a very immature system. Due to this fact, the private pension pillar is negligible in financial terms,⁷ and in the next paragraphs we will concentrate entirely on the state pension scheme. From the financial point of view, the system has accumulated a deficit amounting to about 1% of GDP every year. While the revenue side seems to be quite stable in terms of its share in GDP, the overall spending increased by 1.6 p.p. during the last six years.

Table 5: Financial performance of the state pension system

	Revenue (CZK bn)	Expend. (CZK bn)	Balance (CZK bn)	Revenue (% GDP)	Expend. (% GDP)	Balance (% GDP)
1996	133.9	129.5	+4.4	8.5	8.3	+0.3
1997	146.3	152.8	-6.5	8.7	9.1	-0.4
1998	156.3	168.8	-12.5	8.5	9.2	-0.7
1999	161.8	181.3	-19.4	8.5	9.5	-1.0
2000	170.5	186.8	-16.4	8.6	9.4	-0.8
2001	186.0	201.0	-15.0	8.6	9.3	-0.7
2002	197.7	217.3	-19.7	8.7	9.6	-0.9

Source: Czech Ministry of Finance.

The public pension system is universal for the whole population, and there are no differences according to the economic sectors in the Czech Republic.⁸ The system is mandatory for both employees and self-employed persons. There is a linear contribution rate in the system at the level of 26% of the gross wage. In the case of employees, a part of it (19.5%) is paid by the employer and the rest (6.5%) is paid directly by employees. The official statutory retirement age has been gradually rising since 1996 (at a speed of 2 months per calendar year for men and 4 months per year for women) and will reach 62 years for men and 57 to 61 years (depending on the number of children) for women by 2007. The system also provides early retirement vehicles allowing

⁶ In view of the uncertainties associated with the long-term inflation profile and the fact that, over a sufficient period of time, inflation influences the revenue and expenditure side of general government budgets in the same way, all figures were calculated at constant 1995 prices. All past budgetary variables were deflated by the GDP deflator as a universal indicator of price development.

⁷ At the end of 2001, the total assets of private pension funds were as low as 2.5% of GDP.

⁸ Certain exceptions to this rule are the pensions of the armed forces (military, police and customs officers). However, those expenditures represent only a very small proportion of the total pension spending (about 2.5%).

withdrawal from the labour market up to three years before reaching the statutory retirement age. The public pension pillar provides four kinds of benefits – old-age (which represents the bulk of the spending), disability, survivors’ and children’s pensions. The average old-age replacement ratio (defined as the ratio of the average old-age pension to the average wage) has been approximately stable around 44% in relation to the gross average wage, or 57% with respect to the net average wage. Further details on the Czech pension system, as well as a discussion of its weaknesses, are provided in, for example, Bezděk (2000).

4.2 Pensions – the baseline model

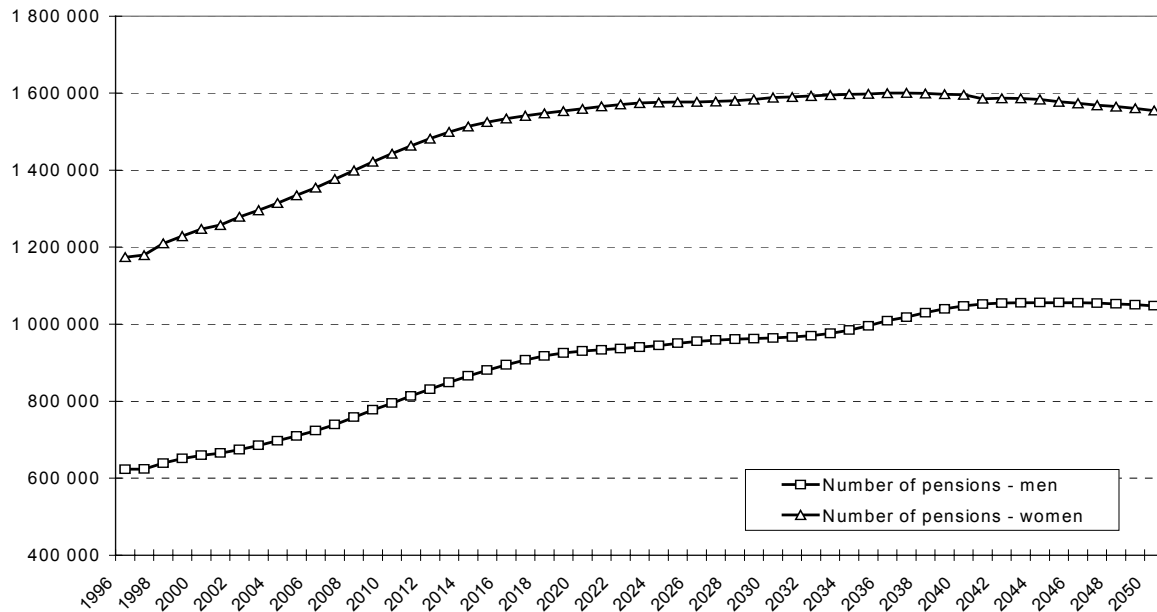
The pension projection exercise covers several schemes including old-age pensions, survivors’ and children’s pensions and disability pensions. Old-age pensions account for 72% of total pension spending, and the rest is made up of disability pensions, survivors’ pensions and children’s pensions. Up to 2001, all data (the total number of pensions, the average pension, the number of new pensions and the average new pension) were taken from the CSSZ⁹ Statistical Yearbook.

Major attention was paid to old-age pensions, due to their relative importance and share in total pension spending. The old-age pension projection estimates the flow of new pensions and the average pension. The current stock of pensions is treated separately. The flow of new pensions was projected separately for men and women on the basis of participation rates, which were used to calibrate the number of new pensions as a percentage of the total number of men and women in a particular cohort. It has been assumed that the average pension at the time of retirement is a fixed proportion of the average wage, i.e. the replacement ratio is kept stable at the 2001 level of 60.2% for men and 51.3% for women.¹⁰

The following chart shows the number of pensions for men and women from 1996 to 2050. As can be observed, the number of old-age pensions will rise as the population ages and the old-age dependency ratio increases. The highest increase is likely to appear between 2010 and 2020, when the large post-war cohorts reach the age of retirement. As of 2020, the number of old-age pensions will be flat for both men and women, but it will start rising again in 2030 for women and 2033 for men. The rise is more pronounced for men than for women. The number of pensions will stabilise and subsequently fall after 2040.

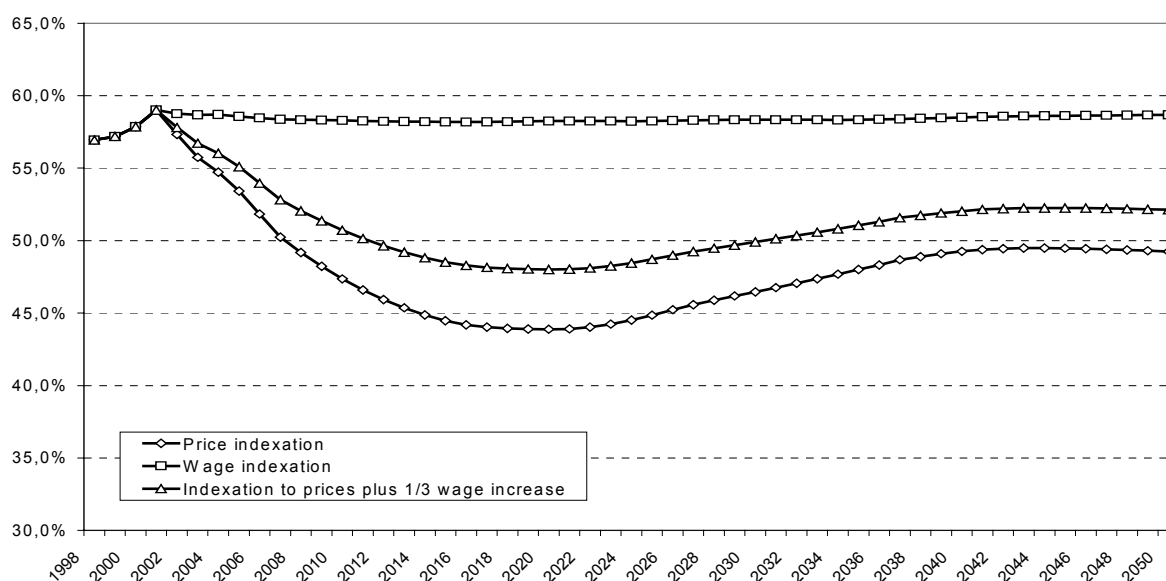
⁹ CSSZ denotes the Czech Social Security Office, an institution in charge of social security administration.

¹⁰ The replacement ratio refers here to the ratio of the average pension at the time of retirement as reported in 2001 by the CSSZ to the average gross macroeconomic wage. The gross macroeconomic wage is defined here as the ratio of the gross wage bill to employment (sum of employees and the self-employed). Due to the inclusion of the self-employed in the denominator, the macroeconomic wage is considerably lower than the average wage reported by the Czech Statistical Office (CZSO). As a result, the replacement ratio applied in the projection exercise is higher than that reported by the Ministry of Labour and Social Affairs. If the gross average wage reported by the CZSO were applied, the replacement ratio would amount to 51.9% for men, 41.1% for women and 44.9% for all new old-age pensions originated in 2001. Moreover, the replacement ratio presented in the main text does not contain old-age pensions drawn before the statutory retirement age (the respective replacement ratios for temporary and permanently reduced old-age pensions applied in the projection exercise amount to 50.3% and 51.0% for men and 39.8% and 41.4% for women).

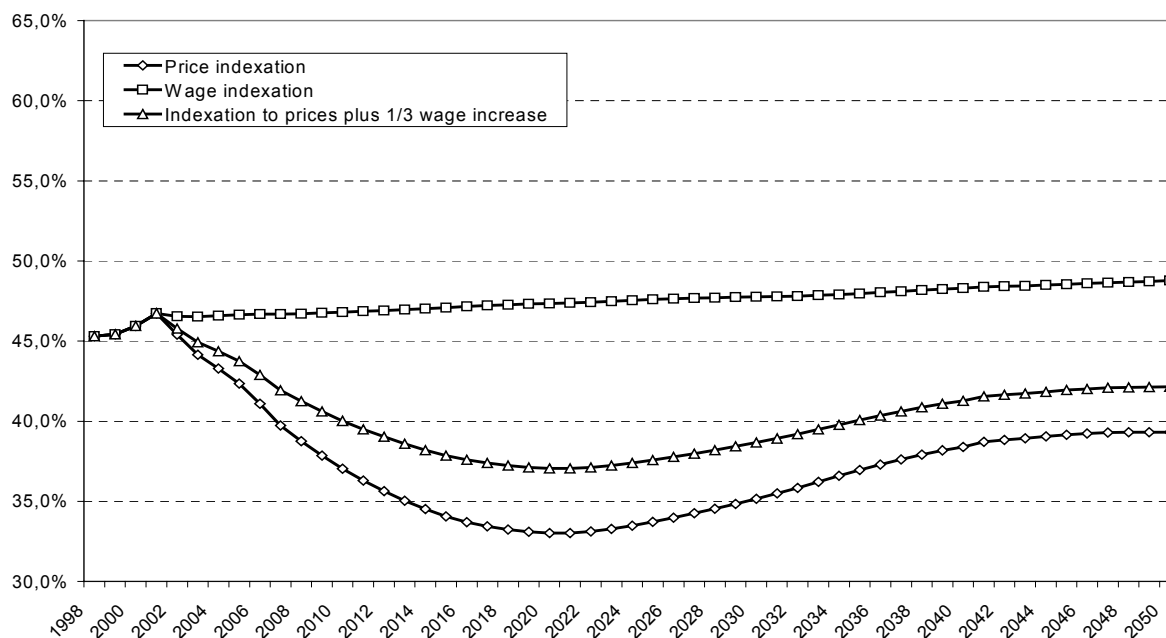
Chart 3: Number of old-age pensions for men and women up to 2050

Source: Authors' own calculations.

The evolution of the ratio of the average pension to the average wage over time depends on the indexation mechanism, the relative weights of ordinary old-age pensions, temporary and permanently reduced old-age pensions, and on the relation between the flow of new pensions and the stock of pensions. The Czech government has substantial discretion in setting the indexation formulae, as the law stipulates the minimum indexation requirements only. In the past indexation, the aim was to stabilise or even raise the average pension to average wage ratio. In the projection exercise, three indexation mechanisms were assumed: (i) price indexation (i.e. a constant pension in real terms), (ii) wage indexation and (iii) indexation to prices plus 1/3 of real wage increases. Full indexing to wages after retirement exists in only a few countries. However, because retirement benefits are based on past earnings in the Czech Republic, earnings-related pensions grow with earnings and productivity even if pensions are not indexed to wages for those in retirement. Under earnings-related schemes with price indexing of pensions, the ratio of the average pension to the average wage does not fall indefinitely as the cohorts of new pensioners whose pensions were derived from their earnings replace the cohorts of old pensioners receiving pensions indexed to prices. Charts 4 and 5 compare the evolution of the average pension to average wage ratio up to 2050 for men and women under the aforementioned indexation mechanisms, and Chart 6 shows total old-age pension spending under the various indexation mechanisms.

Chart 4: Evolution of the average pension to average wage ratio for men under various indexation mechanisms

Source: Authors' own calculations.

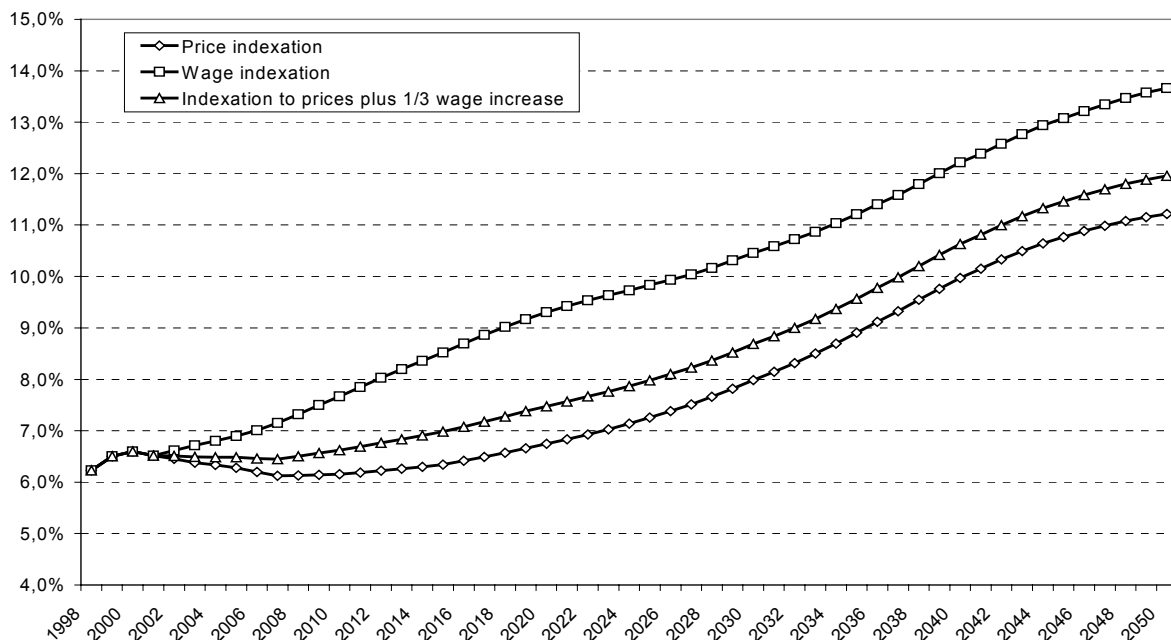
Chart 5: Evolution of the average pension to average wage ratio for women under various indexation mechanisms

Source: Authors' own calculations.

Due to the unfavourable demographic trends, old-age pension spending will rise steeply in the coming decades. The government decision on the indexation formulae will affect the level of pension spending. Under wage indexation, old-age pension expenditure will rise monotonically, reaching almost 14% of GDP by 2050. If wage indexation is abandoned and pensions are indexed

to prices only, old-age pension spending will be contained between 6 and 7% of GDP up to 2020. Between 2010 and 2020, large cohorts will retire and the effect of the falling ratio of the average pension to the average wage for those in retirement will diminish. This will result in rising pension spending as a percentage of GDP, but old-age pension spending will be 2.5 percentage points lower in 2050 as compared to the full wage indexation variant. Indexation to prices and 1/3 wage increases lead to similar results and patterns of pension spending. But the average pension to average wage ratio will not decline to such an extent, and pension spending will be 1 percentage point higher than in the price indexation variant. To sum up, future old-age pension spending is to a large extent dependent on the indexation formulae applied. In the projection of the fiscal deficit and debt, the “middle variant” will be used, i.e. indexation to prices plus 1/3 wage increases.

Chart 6: Old-age pension spending in per cent of GDP



Source: Authors' own calculations.

In addition to old-age pensions, the other pension expenditures (survivors' and children's pensions and disability pensions) were analysed. Disability pensions account for 18% of total pension spending, while children's pensions amount to 1.2% and survivors' pensions to 8.7% of total pension expenditures. It was assumed that the number of disabled persons depends on the size and age profile of the population. The number of survivors' pensions was derived from the number of old-age pensions and the number of children's pensions was related to the number of children. The projection of total pension spending is shown in Table 6.

Table 6: Total pension spending as a percentage of GDP

	2000	2010	2020	2030	2040	2050
<i>Wage indexation:</i>						
Old-age pensions	6,6	8,0	9,5	10,5	12,2	13,7
Other pensions	2,7	2,8	3,0	3,2	3,4	3,7
Total pension spending	9,3	10,8	12,5	13,7	15,7	17,3
<i>Price indexation:</i>						
Old-age pensions	6,6	6,4	6,8	8,0	10,0	11,2
Other pensions	2,7	2,3	2,3	2,5	2,9	3,1
Total pension spending	9,3	8,7	9,1	10,5	12,8	14,3
<i>Indexation to prices and 1/3 wage increases:</i>						
Old-age pensions	6,6	6,9	7,6	8,7	10,6	12,0
Other pensions	2,7	2,5	2,5	2,7	3,0	3,3
Total pension spending	9,3	9,4	10,1	11,4	13,7	15,2

Source: Authors' own calculations.

Under the assumption of the real wage bill growing at the same pace as real GDP and proportionality between pension contributions and the wage bill, pension contributions will equal 8.8% of GDP and the ratio will be constant for the whole projection period. Keeping in mind the steep rise in pension spending as a percentage of GDP under full indexation to wages, there will be a considerable rise in the pension system deficit throughout the period. Under indexation to prices and 1/3 wage increases, the deficit of the pension system will be stabilised until 2015, but in subsequent decades it will start to rise rapidly as the age profile of the population shifts towards a larger and larger share of the elderly. Price indexation of pensions leads to similar results, with the pension system deficit a further 1% of GDP lower.

4.3 Pensions – alternative model

Public pension spending in the Czech Republic amounts to almost 10% of GDP, which is equal to only slightly less than one quarter of all general government expenditure. Any analysis of the sensitivity of the fiscal position to the process of population ageing is, therefore, crucially dependent on the public pension outlay projections. Keeping this factor in mind, we have decided to include another pension model in this paper to test the robustness of our baseline pension projection introduced in the previous section.

This alternative model was developed in Bezděk (2000). For the purposes of this paper, we have further improved the structure of the model and updated its data inputs. From a technical point of view, the alternative pension model is of a less detailed structure than the baseline model. In particular, it does not allow us to work with the participation rates of the individual age cohorts, since the model structure relies on more aggregated data. On the other hand, the alternative model introduces some new parameters that have not been considered in the baseline pension projections. On the revenue side, the model takes into account the differences between employees and the self-employed,¹¹ and the model also assumes that a certain part of the contributions will

¹¹ Under Czech law, the self-employed are allowed to pay relatively lower contributions than the average employee. The contribution rate is equal in both cases, but the way of calculating the contribution base is different. Moreover, in the case of the self-employed, Czech law introduces a ceiling on the contribution

not in fact be collected, due to tax arrears. On the expenditure side, the alternative model assumes, besides pension benefits themselves, the existence of administrative costs in the public pension system. It also takes into account the pension outlays of the armed forces. The values of all these parameters have been calibrated with respect to reality in the second half of the 1990s.

All other parameters and data inputs have been unified in line with the assumptions of the baseline pension model. In particular, both models use the same demographic database, and the macroeconomic scenario is also identical (i.e. GDP growth, rate of unemployment, real interest rates on government debt, labour productivity growth and wage growth). Both models reflect the gradual shifting of the statutory retirement age up to 2007. Similarly to the baseline model, the alternative model also assumes that the relation of “non-old-age” average pension benefits with respect to the average old-age pension will remain stable over time. The number of disabled people will correspond to the size and age profile of the population. The number of survivors’ beneficiaries goes hand in hand with the number of old-age pensions and the number of children’s pensions is a function of the number of youths. Thus, all data inputs for both models were unified and these differ only in terms of their in-built structure. This makes it possible to check both pension models for robustness of the projections. The results of the alternative model are summarised in Table 7.

Table 7: Total pension spending as a percentage of GDP – alternative model

	2000	2010	2020	2030	2040	2050
<i>Wage indexation:</i>						
Old-age pensions	6.8	7.6	9.3	10.6	12.7	14.0
Other pensions	2.8	3.1	3.5	3.7	4.1	4.2
Total pension spending	9.6	10.8	12.8	14.3	16.8	18.2
<i>Price indexation:</i>						
Old-age pensions	6.8	6.1	6.8	8.3	10.7	11.9
Other pensions	2.8	2.5	2.6	2.9	3.4	3.6
Total pension spending	9.6	8.7	9.4	11.2	14.1	15.5
<i>Indexation to prices and 1/3 wage increases:</i>						
Old-age pensions	6.8	6.6	7.6	9.0	11.4	12.7
Other pensions	2.8	2.7	2.8	3.1	3.7	3.9
Total pension spending	9.6	9.3	10.4	12.1	15.0	16.6

Note: *Contrary to the baseline pension model, the old-age pension projection accounts for armed forces benefits, which amounted to 0.2% of GDP in 2000 (and may reach about 0.4% GDP in 2050). “Other pensions” in the alternative model assume, moreover, the administrative costs of the public pension scheme (0.1%–0.2% of GDP), which are not included in the baseline pension model.*

Source: *Authors’ own calculations.*

It is quite obvious that the alternative model delivers very similar projections when compared to the baseline pension model estimates. The difference between the two models in total pension spending over a 50 year period is only about 1% of GDP, depending on the indexation mechanism. This is rather negligible given the enormous margins of error surrounding this kind of long-term projection exercise. Moreover, almost half of that discrepancy stems from the different approach to the expenditure side in the two models, which was discussed earlier. In other words, the alternative pension projections seem to confirm the robustness of the results of the baseline

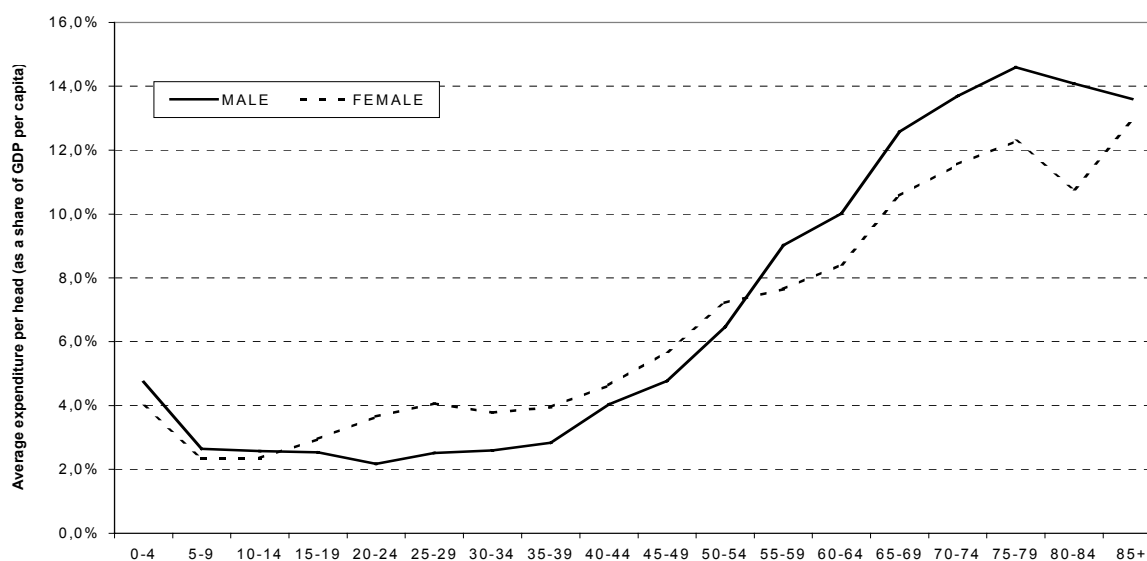
premium, whereas in the case of employees, the contribution rate is applied to the total gross wage without any limitations.

pension model. This is definitely a welcome conclusion for the purposes of testing the expected impact of ageing on the overall fiscal position.

4.4 Health care

Health care spending is another expenditure category that is likely to be unfavourably affected by population ageing. Total health care outlays in the Czech Republic amount to about 7% of GDP and are almost entirely of a public nature.¹² Thus, public health care spending represents almost one sixth of all general government expenditure. Projections of health care spending (partly including the costs of caring for the frail elderly) are considerably more uncertain than for pension expenditure, due to the absence of legislation providing a framework for estimating future benefits. Furthermore, there is a great deal of uncertainty on what demographic features are actually important for driving health care spending up – in particular, whether or not it is important having more people who are relatively old or having more people in the final years of their lives (OECD, 2001). The health care projection was based on per capita health care spending in each age group multiplied by the number of people in that age group. Chart 7 shows average expenditure per head as a share of GDP per capita.

Chart 7: Average health care expenditure per head as a share of GDP per capita



Source: GHIC, author's calculations.

Data on the age and sex profiles of health care costs were provided by the General Health Insurance Company of the Czech Republic (GHIC) and cover about 70% of the population. The GHIC calculated the age and sex profiles for 2000, and the data were further broken down by acute and long-term care. The average health care expenditure per head in the chart contains both acute and long-term care. The chart clearly shows that expenditure per head rises progressively with the age of the person, reaching the peak in the final years of life. As a result, health care

¹² Private health care payments as a share in GDP are very low in the Czech Republic from an international point of view. More information on the Czech health care system from the international perspective can be found in Bezděk (2002).

spending will significantly raise public expenditure, as the largest increase in population size is projected to take place amongst the very old (population aged 80 and above).

Health care spending in the projection exercise includes all public health care expenditure for both acute and long-term care. Thus, spending on the elderly is reflected in the long-term health care costs, but another part of the care for the frail elderly is financed through social programmes. Due to a lack of data on social spending on care for the frail elderly, part of this expenditure has been neglected.

The health care projection was carried out separately for acute and long-term care and for men and women. Acute and long-term care was projected as a product of average expenditure per head in a particular cohort, the size of the cohort and the trend growth rate of health expenditure per head. The trend growth rate of health expenditure per head was set equal to the growth rate of GDP per capita. This assumption may underestimate the future health care costs, as health expenditures per head tend to rise faster than GDP per capita.¹³ The rise will be further reinforced by convergence of health care spending (especially its wage component) towards EU levels. On the other hand, health care costs per capita depend on age and rise steeply in the final years of life. Increasing longevity will shift the curve plotting per capita spending as a function of age to the right, which may offset the higher-than-assumed growth rate of per capita spending. The age profile of the health expenditure (as shown in Chart 7) underestimates the total health care spending as reported in the functional classification of expenditures in the Government Finance Statistics. As a result, the age profiles have been calibrated so that they generate estimates of health expenditure in line with estimates of health care from macro sources for the year 2000.¹⁴

Table 8: Health care spending as a percentage of GDP

	2000	2010	2020	2030	2040	2050
Acute care	5,7	6,1	6,6	6,9	7,2	7,3
Long-term care	0,8	0,9	1,0	1,1	1,2	1,3
Total health care spending	6,6	7,0	7,6	8,0	8,4	8,5

Source: Authors' own calculations.

Table 8 indicates that health care spending will become another source of future expenditure pressures resulting from population ageing. Total health care spending will increase by almost 2% of GDP by 2050. The rise in health care spending is driven by the rapidly increasing number of the elderly, who consume the largest portion of health services. The rise in health care spending may even be higher, because it has been assumed that the growth of average health expenditure per head will be equal to the growth rate of GDP per capita. As the quality (and financial requirements) of health services is increasing rapidly, the assumption may lie on the optimistic side.

¹³ The ratio of health care expenditure to GDP increased from 6.5% in 1996 to 6.7% in 2001. While GDP per capita increased by 1.1% on average, real health care expenditure adjusted for demographic changes rose by 1.2% in the same period. The difference is relatively small, but it has to be emphasised that the comparison was made over a very short period and the figures are biased by the economic recession of 1997–1999 and the 1997/1998 spending cuts.

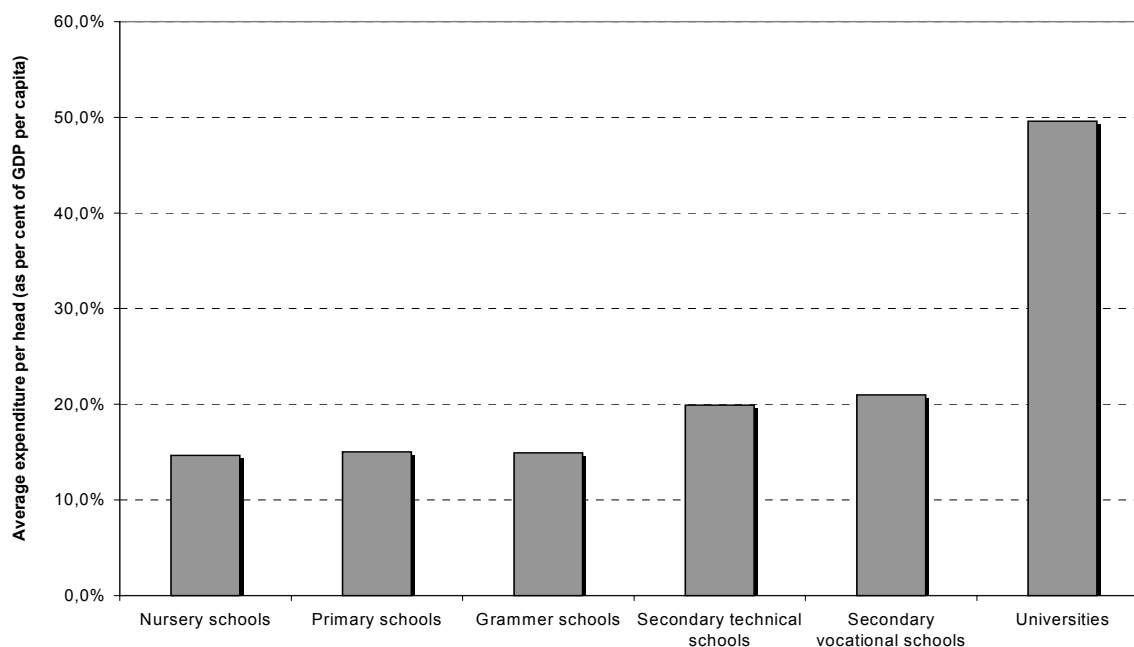
¹⁴ The value of the adjustment coefficient (or scaling factor) was equal to 1.217 for acute care and 1.056 for long-term care.

4.5 Education

Education expenditures are a spending category that is likely to offset, to some extent, the spending pressures stemming from increasing pension and health care spending. Education expenditures are related to the number of school-aged youths, who will account for a declining proportion of the Czech population. The size of the population aged 0 to 26 will fall by 46% from 2000 to 2050. Such a rapid decline in the youth population indicates a potential area for substantial spending containment. However, the scope for spending containment may be reduced by lower efficiency (smaller average class sizes) and improvements in quality (implementation of new technologies, etc.).

Education expenditures were projected in a similar way as health care spending. Education expenditures are expressed as a product of average expenditure per head in each particular school cohort, the size of the cohort and the trend growth rate of expenditure per head. Education expenditure per head was derived from the data given in the Statistical Yearbook of the Czech Republic (CZSO, 1999–2002), which contains the number of children and students in various education facilities (nursery schools, primary schools, grammar schools, other secondary schools and universities) and total expenditure for the particular form of education. Chart 8 shows the average education expenditure per head derived as the ratio of expenditure for education in 2001 to the average number of children and students in the school years 2000/2001 and 2001/2002.

Chart 8: Average education expenditure per head as a share of GDP per capita



Source: *Statistical Yearbook of the Czech Republic (2001, 2002), author's calculations.*

The projection divided education expenditure into four categories – nursery schools, primary schools, secondary schools and universities, i.e. grammar schools, secondary technical schools and secondary vocational schools were aggregated, and average expenditure per head was calculated as a weighted average. It was assumed that the share of university students will

double¹⁵ by 2050, reaching 30% of those aged 19 to 26. The number of primary and secondary school pupils is not expected to change. Furthermore, the growth rate of education expenditure per head is projected to equal the growth rate of GDP per capita, reflecting the improving quality of education.

Education expenditure as a percentage of GDP will decline by 0.6 percentage points. The decline is considerably lower than the declining school population indicates. It results from the fact that average expenditure per head rises with GDP per capita and the share of university students is assumed to rise over time.

4.6 Child/family benefits

Child/family benefits encompass a wide range of benefits directed to families with children. Some of the benefits are means tested, while others are paid irrespective of the income of the family. The benefits included under child/family benefits in the projection exercise are child allowances, social allowances, transportation allowances, parental allowances, maternity grants and maternity benefits. Except for maternity benefits, which are part of the social security system based on the insurance principle, the other benefits are provided within the system of state social support. As the number of children will decline, spending on child/family benefits is likely to be affected by these demographic shifts.

The number of benefits was derived from the number of children entitled to receive the benefits. In principle, entitlement to each of the benefits is governed by different parameters (age of the child, income of the family and other conditions, as in the case of schools transportation allowance). It was assumed that the shares of those entitled in the size of the respective cohort will not change. The shares (in the case of means-tested benefits) were calibrated on the basis of the average benefit and data from the household survey. Another assumption was that the average benefit to average wage ratio would be maintained.

Table 9: Education expenditure and child/family benefits as a percentage of GDP

	2000	2010	2020	2030	2040	2050
Education expenditure	4.1	3.9	3.6	3.6	3.5	3.5
Child family benefits	1.6	1.3	1.3	1.2	1.3	1.3

Source: Authors' own calculations.

¹⁵ In the period of 1998 to 2001, the share of university students increased by one percentage point a year. According to international statistics, students enrolled in tertiary education account for 12% of all pupils and students enrolled in the Czech education system (EC, 2002; chapter F, page 5). The corresponding number for EU countries is 15%, with fairly large differences across countries (12% in Germany and 21% in Greece, Spain and Finland). In the EU, on average, the number of students in tertiary education has more than doubled over the last 25 years. The assumption used in the projection exercise, although not directly comparable to the international statistics mentioned, seems to be reasonable, as the trend of higher enrolment in tertiary education is likely to persist into the future.

Under these assumptions, child/family benefits will decrease by 0.3% of GDP by 2050, with a somewhat larger decline in the middle of the projection period. Child/family benefits do not fall significantly, as the average benefit is indexed to wages and the drop in the number of children is offset by an increasing eligibility ratio with regard to child benefit and transport benefit resulting from the increasing share of university students.

4.7 Other spending and public revenues

Non-age-related spending and taxes were kept constant as a share of GDP at the 2003 level (budget programme). The ratio of primary non-age-related expenditures to GDP will remain unchanged at the 2003 level of 21.5%. Due to an assumed decline in the unemployment rate, the number of unemployment benefit entitlements was allowed to drop. Unemployment benefits account for a very small proportion of total expenditures and are expected to amount to 0.3% of GDP in the 2003 budget programme, fall to 0.2% of GDP in 2006 and remain at a lower level thereafter.

Social security contributions in the Czech Republic are related to the wage bill. As the wage bill grows proportionally to GDP growth in the projection exercise, social security contributions¹⁶ make up a constant proportion of GDP (14.9%). The ratio of other taxes and revenues to GDP was fixed at the 2003 level.¹⁷ As a result, total general government revenues remain at the 2003 level of 39.8% of GDP.

The assumption of constant revenue and other expenditure as a percentage of GDP is convenient for evaluating the impact of population ageing on the public deficit and debt. It allows age-related spending to fully affect the primary deficit/surplus and debt with second-round effects through interest payments. The real interest rate applied for computation of interest payments was set at 4%.

4.8 Results

In this subsection, the projections of age-related spending, other spending and revenues will be put together, and the impact of population ageing on the primary balance and debt will be examined. The strongest pressure on public expenditure stems from pension spending and health care. These two spending items will raise public spending by 7.8% of GDP up to 2050. The rise in public spending will be somewhat mitigated by a drop in education expenditure and child/family benefits. The results of the projection exercise are summarised in Table 10.

¹⁶ In the GFS 86 methodology, social security contributions are consolidated and account for a lower share in GDP as compared to the National Accounts (ESA 95). This results from the fact that contributions paid by the government for its employees are part of both compensation to employees on the expenditure side and social security contributions on the revenue side. When assessing the pension system deficit, gross contributions should be considered an income to the system. In 2003, gross pension contributions are expected to amount to 8.8% of GDP, and all social security contributions to 16.1% of GDP.

¹⁷ Public pensions are not subject to taxation in the Czech Republic, and the importance of the private pension pillar is negligible for the time being.

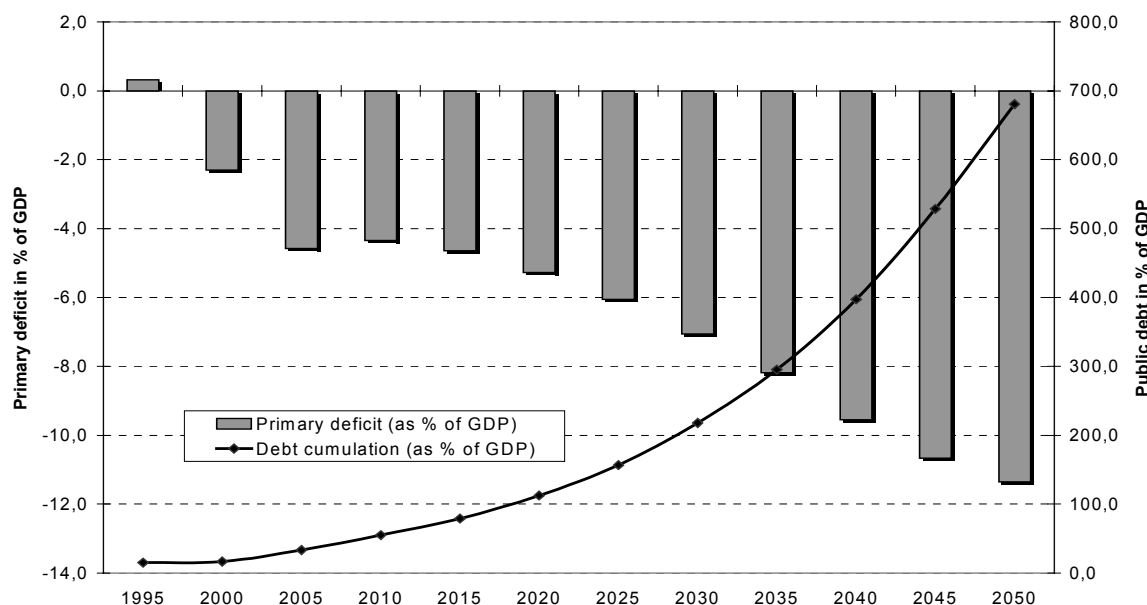
Table 9: Impact of population ageing on public spending, revenues, the balance and debt in per cent of GDP

	2000	2005	2010	2020	2030	2040	2050
Pension spending							
Old-age pensions	6,6	6,9	6,9	7,6	8,7	10,6	12,0
Other pensions	2,7	2,6	2,5	2,5	2,7	3,0	3,3
Total pension spending	9,3	9,5	9,4	10,1	11,4	13,7	15,2
Other age-related expenditure							
Health care	6,6	6,8	7,0	7,6	8,0	8,4	8,5
Education expenditure	4,1	4,1	3,9	3,6	3,6	3,5	3,5
Child family benefits	1,6	1,4	1,3	1,3	1,2	1,3	1,3
Total other age-related spending	12,3	12,3	12,3	12,5	12,9	13,2	13,4
Total age-related spending	21,5	21,8	21,6	22,6	24,3	26,8	28,6
Other gen. government spending	20,1	22,6	22,6	22,5	22,5	22,5	22,5
Total spending	41,6	44,4	44,2	45,1	46,9	49,4	51,2
Revenues							
Social security contributions	14,5	14,9	14,9	14,9	14,9	14,9	14,9
Other gen. government revenue	24,9	24,9	24,9	24,9	24,9	24,9	24,9
Total revenue	39,3	39,8	39,8	39,8	39,8	39,8	39,8
Primary balance	-2,3	-4,6	-4,3	-5,3	-7,1	-9,6	-11,3
Debt interest payments	1,1	1,1	1,9	4,1	8,1	14,9	25,7
Debt	16,7	33,5	55,0	112,5	217,8	397,3	680,6

Source: Authors' own calculations.

The impact of population ageing on the budget position is significantly affected by the starting position, in particular for the primary deficit. For countries with a primary deficit, like the Czech Republic, as opposed to countries with primary surpluses, rising age-related spending leads to a further rise in deficits and debt. Thus, early increases in government savings can significantly attenuate the coming demographic shock (OECD, 2001). Unfortunately, the opposite has happened in the Czech Republic. The primary balance has further deteriorated since 2000 and is expected to reach 4.8% in 2003, the base year for the projection exercise.

In the first decade of the projection, the primary balance improves, as education expenditure and child/family benefits decline in per cent of GDP and the impact of population ageing on pension spending is not yet that apparent. From 2010, the primary deficit starts rising from the level of 4.3% of GDP, reaching 7.1% of GDP in 2030 and 11.3% of GDP in 2050. The highest increase in primary deficit is likely to occur between 2030 and 2040. The primary deficit stabilises at the very end of the projection period. A permanent primary deficit of large magnitude results in a ballooning debt, which is projected to reach 50% of GDP in 2009, 100% in 2018 and 300% in 2035. In 2050, the public debt would be close to 700% of GDP. It is obvious that such an explosive rise in public debt (Chart 9) cannot be sustained.

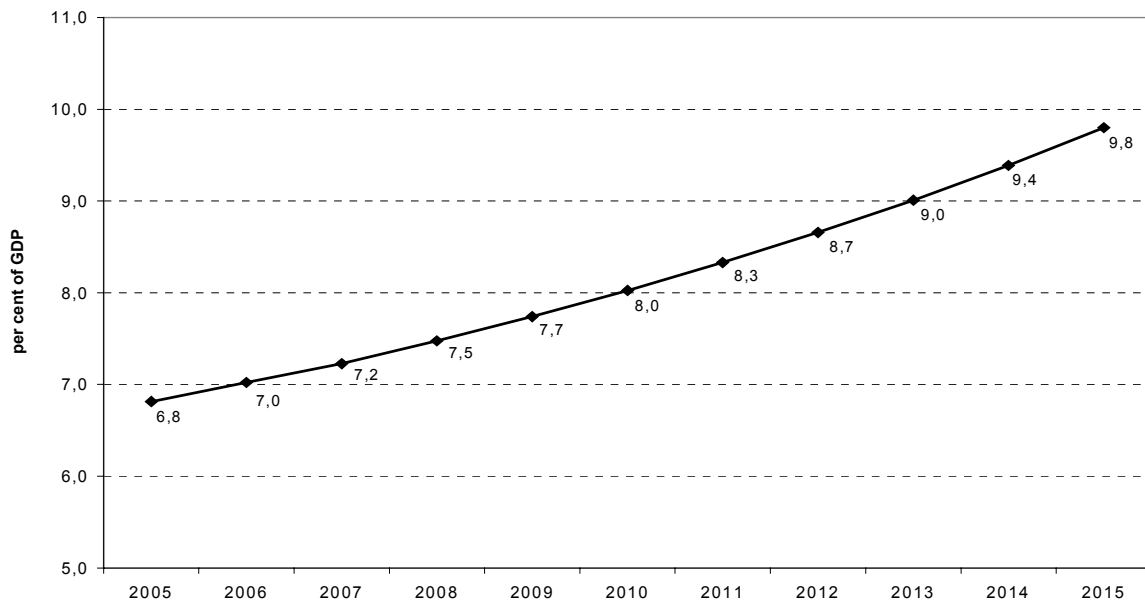
Chart 9: Public deficit and debt as a percentage of GDP from 1995 to 2050

Source: Authors' own calculations.

It should be made explicit that the rapid accumulation of debt is not the result of population ageing only, but results from a poor starting position. If the primary deficit were removed by 2007,¹⁸ the public debt would be 60% lower in 2050, i.e. 280% of GDP, which may better represent the impact of population ageing on the primary deficit and debt. On the other hand, this sensitivity test indicates that even a considerably more favourable level of the primary deficit is not enough to prevent the debt from rising steeply.

Another way of analysing the long-term sustainability of public finances is to compute synthetic indicators of the budgetary adjustment needed to stabilise the debt level. The most widely used synthetic indicator is the tax gap. The tax gap measures the difference between the current tax-to-GDP ratio and the constant tax-to-GDP ratio ensuring that public debt will not exceed a predetermined level. As the projection was carried out up to 2050 and extending the projection beyond 2050 requires additional assumptions on the evolution of age-related expenditures, the calculation of the tax gap was restricted to the requirement that the public debt will not exceed a predetermined level at 2050. The target debt level was arbitrarily set equal to 60% of GDP, i.e. the Maastricht criterion on public debt. Should the government adjust the tax-to-GDP ratio in 2005, they would have to raise taxes by 6.8% of GDP not to break the Maastricht debt level in 2050. If the decision is postponed till 2015, the fiscal adjustment needed is considerably higher and amounts to 9.8% of GDP. The tax gap would further increase beyond 2015. Clearly, the current fiscal policy setting is unsustainable in the long run. To reverse the unfavourable trend would require an enormous increase in the tax-to-GDP ratio, which would undermine the potential for growth.

¹⁸ The reduction can be achieved through tax increases or, preferably, through a reduction in other expenditures.

Chart 10: The tax gap

Source: Authors' own calculations.

It is interesting to compare the impact of population ageing on age-related expenditures with other European countries. The European Commission published its most up-to-date long-term projections in 2001 (EC, 2001). The EC co-operated closely with the OECD and used identical or very similar demographic and macroeconomic assumptions. Moreover, the same methodology was applied, which further contributes to the international comparability of our results and those presented by the EC. It was documented that the Czech Republic belongs to the group of fast ageing countries. This has consequences for the evolution of pension and health care spending, which are the major items driving public expenditure up. It is apparent from Table 11 that the Czech pension system will be severely hit by population ageing and pension spending will rise rapidly even in comparison with other countries facing unfavourable demographic development. This result can be partly attributed to the fact that pension spending continues rising even beyond 2030, while spending increases are contained or even turn negative in other European countries. Dampening demographic pressures in EU countries beyond 2030 and the introduction of pension reforms in many European countries can explain the difference in the pattern of pension spending. In the Czech Republic, a consensus over pension reform has not yet been reached; the reform has been postponed and only minor parametric changes have been phased in. On the other hand, the increase in health care spending can be considered average vis-à-vis EU countries.

Table 10: International comparison of fiscal projections – per cent of GDP

Selected EU countries	2000		2030		2050		Change in p. points	
	Pensions	Health-care	Pensions	Health-care	Pensions	Health-care	Pensions	Health-care
Austria	14,5	5,8	18,1	7,5	17,0	8,5	2,5	2,7
Belgium	10,0	6,1	13,3	7,6	13,3	8,1	3,3	2,0
Finland	11,3	6,2	14,9	8,3	15,9	9,0	4,6	2,8
France	12,1	6,9	16,0	8,1	15,8	8,5	3,7	1,6
Germany*	11,8	5,7	15,5	6,7	16,9	7,1	5,1	1,4
Italy	13,8	5,5	15,7	6,9	14,1	7,5	0,3	2,0
Netherlands	7,9	7,2	13,1	9,1	13,6	10,3	5,7	3,1
Portugal*	9,8	5,4	13,6	5,8	13,2	6,1	3,4	0,7
Spain*	9,4	5,5	12,6	6,5	17,3	7,2	7,9	1,7
Sweden	9,0	8,8	11,4	10,6	10,7	11,8	1,7	3,0
United Kingdom	5,5	6,3	5,2	7,3	4,4	8,2	-1,1	1,9
Czech Republic	9,3	6,6	11,4	8,0	15,2	8,5	5,9	1,9

Note: Results for public spending on long-term care are not available for all countries. Countries denoted by an asterisk publish projections for health care (excluding long-term care) only. Coverage of both pension and health care spending is not fully comparable across countries.

Source: EC (2001).

4.9 Sensitivity analysis and policy simulations

Sensitivity analysis is an important part of long-term projections, as the final outcome is very much dependent on the assumptions applied. To check the robustness and the degree of uncertainty of the projection results, several sensitivity tests were performed. These tests were focused on the macroeconomic assumptions, and an isolated change in a given parameter only was considered. The following sensitivity tests were undertaken:

- Lower productivity: Productivity growth was set 0.5 percentage points lower than in the baseline starting in 2008.
- Lower unemployment rate: The structural unemployment rate was lowered from 6.5% to 4.0%, which was the unemployment rate observed in 1996/1997. The fall in the unemployment rate is assumed to be slow. It converges from 6.5% towards 4.0% at the end of the projection period.
- Lower participation rate: It was assumed that the convergence of female participation rates towards those of men will not occur, unlike in the baseline. As a result, the female participation rate (20–64) is over 10 percentage points lower as compared to the baseline and the total participation rate (20–64) is 5 percentage points lower at the end of the projection period.

The lower productivity growth results directly in lower GDP growth but at the same time in slower growth of the average wage, as productivity growth determines the growth rate of the average wage. The evolution of the average wage is an important determinant of the average pension at the time of retirement. While the lower level of GDP will tend to raise pension spending as a percentage of GDP, the lower average wage will cause a fall in the average pension and consequently in the volume of pension spending. However, the final outcome will be negative and pension spending will increase as a percentage of GDP. The explanation rests on the fact that

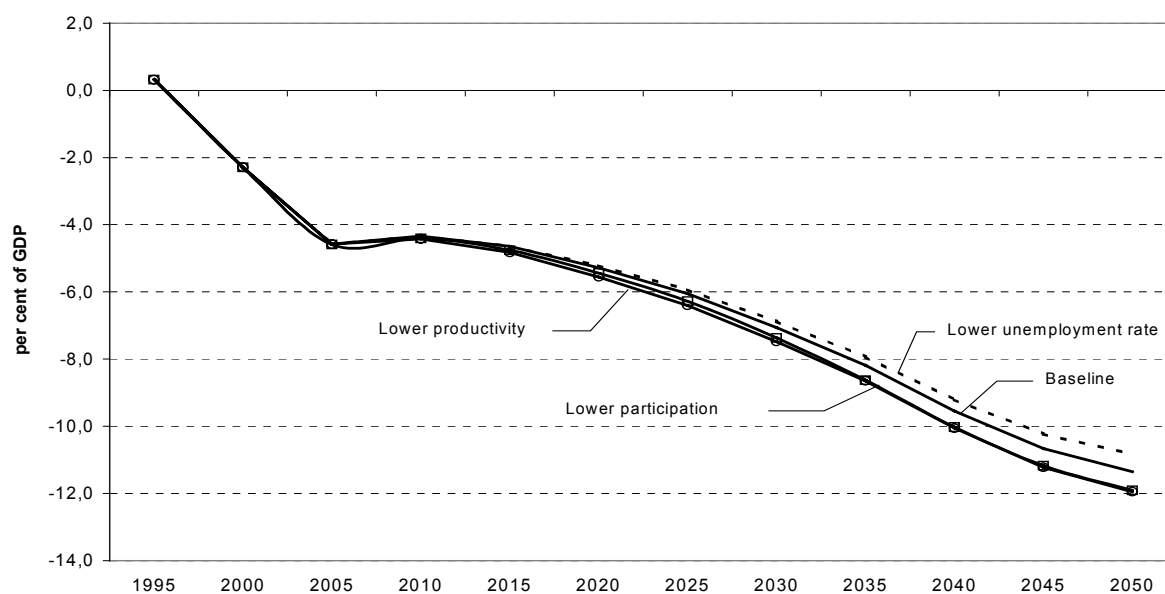
the stock of pensions in the sensitivity scenario consists of both “new” lower average pensions from the period of lower productivity growth (as compared to the baseline), but also of “old” pensions at the same average level as those in the baseline (from the period before productivity growth was lowered). When compared to the baseline, the “old” pensions are higher in relation to the “new” pensions, which drives pension spending up as a percentage of GDP. Other spending items are not significantly affected by lower productivity growth, as the trend growth of spending per head (health care and education) is related to GDP growth. Thus, the fall in GDP (denominator) is offset by the drop in the given spending item (nominator). The total impact of lower productivity growth on public expenditure and the primary deficit is limited to 0.6% of GDP as compared to the baseline.

Another sensitivity test was focused on the impact of a lower unemployment rate on the public deficit. The falling unemployment rate raises employment and GDP growth vis-à-vis the baseline. There is no direct effect of the lower unemployment rate on pension spending, but it drops as a percentage of GDP due to the higher GDP growth. The lower unemployment leads to a fall in the number of unemployment benefits and child/family benefits. In this scenario, the public deficit is lower by 0.5% of GDP.

The last sensitivity test was aimed at investigating the impact of a lower (female) participation rate. Unlike the fall in the unemployment rate, the lower participation rate reduces employment through a smaller workforce. As labour productivity is fixed, the lower employment brings about a decrease in GDP as compared to the baseline. The lower GDP is compensated to some extent by a smaller number of (female) pensions and unemployment benefits. But the negative effect of the lower participation rate on GDP outweighs the fall in the pension eligibility ratio and the number of unemployment benefits. In this scenario, the primary deficit is higher by 0.6% of GDP.

The results of the sensitivity tests are summarised in Chart 11. We prefer to present the impact of the sensitivity tests on the primary deficit, as the debt level reflects the cumulative impact of the changes over several years or decades and we want to see the impact on public spending at a given point in time. Moreover, we have emphasised that the high end-period debt level is a result of the currently high primary deficit, which is not related to population ageing. On the basis of Chart 11 we can conclude that the impact of the sensitivity test on the primary balance is fairly limited and surprisingly¹⁹ similar in magnitude.

¹⁹ No *a priori* attempt was made to calibrate the parameter changes so as to generate similar deviations from the baseline.

Chart 11: Sensitivity tests – impact on primary deficit

Source: Authors' own calculations.

Besides the sensitivity tests, several policy simulations were undertaken. Policy-makers have several options for containing the future spending pressures stemming from population ageing. Leaving aside fundamental pension and health care reforms requiring a broad policy consensus, substantial savings can be achieved through parametric changes to the current systems, and early primary deficit reductions can provide room for future fiscal manoeuvre. Four options were examined:

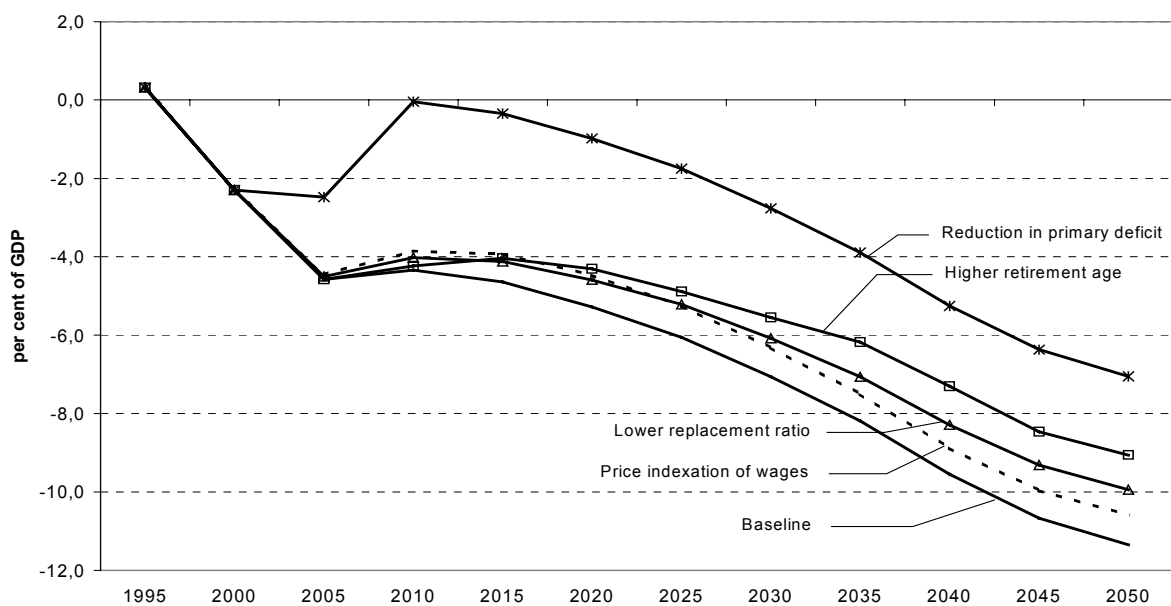
- **Primary deficit reduction:** At present the Czech Republic reports a high primary deficit, which is leading to a rapid accumulation of debt irrespective of the future rise in age related-spending. It was assumed that the primary deficit is removed in 2007.²⁰
- **Indexation of pensions to prices:** In this policy scenario pensions were indexed to prices rather than to prices plus one third of real wage growth as in the baseline.
- **Lower replacement ratio:** The ratio of the average pension to the average wage at the time of retirement was reduced by 5 percentage points.
- **Extension of the retirement age:** Beyond 2007 an extension of the retirement age was phased in with the aim of increasing the retirement age to 65 years for both men and women. The retirement age was lengthened by 3 months a year for men and 4 months for women. Under this assumption men will retire at 65 from 2019 on and women (with two children) from 2025 on.

²⁰ We referred to this option in subsection 4.8 as we tried to show the isolated impact of population ageing on public finance sustainability.

Chart 12 shows the results of the policy simulations. It is apparent that an early fiscal adjustment reducing the primary deficit makes it possible to better face the future fiscal pressures. Fiscal consolidation is a precondition for fiscal sustainability. Indexation of pensions to prices and a reduction in the replacement ratio help contain pension spending. The simulations indicate that the lower replacement ratio and indexation to prices reduce pension spending and the primary deficit by 1.4% and 0.7% of GDP respectively. On the other hand, these measures could impair the welfare of the elderly. In such a case, the reduction in the primary deficit may be lower as some pensioners may become dependent on social assistance and state social support programmes.

The extension of the retirement age is the most efficient measure for generating budgetary savings. The higher retirement age leads to a fall in the primary deficit by 2.2% of GDP. We have to point out that the reduction in the primary deficit is achieved through a fall in pension spending only. In reality, the extension of the retirement age not only contains pension spending, but also results in a higher participation rate, which has a favourable impact on employment and GDP growth. Higher employment will raise the wage bill and bring in additional revenues for the government. In our simulation, the positive effect of the higher retirement age on the labour market was switched off, as we were trying to demonstrate the isolated impact on pension spending.²¹

Chart 12: Policy simulations – impact on the primary deficit



Source: Authors' own calculations.

²¹ An additional argument for not increasing the participation rate is the fact that in international terms the participation rates in the Czech Republic are already fairly high.

5 Conclusion

Long-term projections have become an important instrument for assessing public finance sustainability, and their importance has been further strengthened by the challenges posed by population ageing. Population ageing will have serious consequences for fiscal policy formulation in most developed countries. The Czech Republic will be strongly hit by a demographic shock, as its population will be ageing rapidly. A comparison with other OECD countries shows that the Czech Republic ranks as one of the fastest ageing countries. To examine the likely impact of population ageing on future fiscal imbalances under the current policy settings, projections of the main age-related expenditures have been carried out. The projection exercise is an extension of similar exercises focusing on pension spending only. It covers projection of health care costs, education expenditure and child/family benefits.

All long-term projections are very uncertain, as small changes in starting values or in key parameters and assumptions can have a large impact on the projections, in particular the further out the projection goes. However, an alternative model of the public pension system confirmed the relative robustness of the baseline model's pension projections. Each of the calculations should be regarded not as a forecast, but rather as a projection of the possible outcome under explicit assumptions. The projection indicates that the cumulative effect of population ageing on the labour market and public finances will be profound. However, from the point of view of policy-making, the fact that these changes will become apparent only gradually may be dangerous. As a result, policy-makers may be tempted to postpone hard policy decisions and essential reforms.

Although the exercise was only a spreadsheet projection omitting many important links and effects, it still sheds some light on the effects of population ageing on public expenditures and raises many questions relevant for policy-makers. Given the unfavourable demographic trends, policy-makers will have to contemplate how to address the pressures on public expenditures stemming from population ageing. Although some of the expenditures may attenuate the impact of population ageing on the pension system and health care spending, they are unlikely to reverse the unfavourable trends of the deteriorating primary deficit and exploding public debt. However, in addition to population ageing, the path of public debt is to a large extent determined by the poor starting position of Czech public finances.

Three conclusions can be drawn from the projection exercise. Firstly, full indexation to wages should be avoided, as it leads to a mounting imbalance between the incomes and outlays of the pension system. Less generous indexation formulae and other parametric changes (especially extension of the retirement age) could stabilise the system in the next decade and provide time for implementing pension reform. Secondly, the starting position of the Czech Republic is very poor, in spite of its low debt level and debt interest payments. The high primary deficit is fostering a rapid rise in the debt irrespective of population ageing. A consolidation strategy aimed at primary deficit reduction will have to be introduced. Thirdly, the results of the projection exercise call for a thorough analysis of the systems most affected by population ageing, namely the pension system and health care system. Profound reforms of the pension and health care systems will have to be drawn up and introduced, so that the impact of population ageing on public spending can be withstood.

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