Judging the Sustainability of Czech Public Finances

Jan Zápal[1],[2]

Budgets cannot be left adrift in the sea of democratic politics. They must be constructed within constraints that impose external form and coherence on the particular decisions about size and distribution which an annual budget reflects.

James M. Buchanan, Richard E. Wagner
Democracy in Deficit: The Political Legacy of Lord Keynes

Abstract:

The position of Czech public finances has been pronounced unsustainable by economists, while politicians claim more or less the opposite. Correct judgment is complicated by the purposeful use of arguments by the two groups in disagreement, by use of different methodology to collect the data and above all, by the fact that there is no precise benchmark for measuring the sustainability.

My work attempts to surpass those complications. It attempts to shed more light on Czech public finances sustainability and to present further arguments, presenting Czech public finances in widest international context possible and using comparable, same-methodology based data, as well as different approaches and angles public sector can be looked upon.

Despite my believe that careful reader should be allowed to arrive to his own conclusion, the analysis suggests that concerns of economists about the future development of Czech public finances are legitimate.

Keywords:

public finances, sustainability index, budget processes, fiscal illusion, deficit bias, factor analysis, open-ended expenditures

JEL codes:

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1. Introduction

Recent accession of Czech republic into European Union (EU), along with perspective of Euro adoption after which Czech republic will be obliged to comply with requirements of Stability and Growth pact (SGP) raises the concerns among economists as well as among politicians about long term sustainability of Czech public finances.

Correct judgment is complicated by at least four things. First, since politicians are much less concerned with Czech public finance, they tend to derogate the arguments of economists. Even more, since they are considered to be responsible or are being blamed for seeming unsustainability they tend to use facts selectively, not providing all the information necessary for independent judgment one would like to arrive at by himself.

Second, quite the opposite applies for economists who, overconcerned with Czech public finance sustainability and with keen assistance of sensation searching journalists tend to use worst statistical data available and present them from the most implausible angles.

Third, correct judgment is complicated by use of different statistical methodologies. While ESA95 methodology is used in the European context, Czech statistical office along with Ministry of finance uses GFS methodology. Furthermore, Czech statistical office published last year exceptional revision of yearly national accounts, which is available only so far for years 2000 through 2002 and complicates judgments based on relevant variable to GDP ratios. Therefore, one besides being confused by politicians contra economists debate has to figure out, whether the numbers in every particular table are based on Czech or European methodology[3].

Fourth, even if one had at hand relevant data, it is hard to judge about long-term sustainability of public finances without prior knowledge about the composition of public expenditures, whether the changes in deficits are the result of one time measures or the result of long term trend or without prior knowledge about what level of public debt (deficit) is sustainable. Unfortunately enough, there is no benchmark above which public finances can be pronounced unsustainable[4].

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[3] In order to avoid further confusion, this study uses only data based on ESA95 methodology, taken predominantly from Statistical Annex of European Economy - SPRING 2004 published by European Commission, which is available on
http://europa.eu.int/comm/economy_finance/publications/european_economy/statisticalannex_en.htm
unless otherwise indicated.

[4] See the discussion of Balassone and Franco (2000) for survey of concepts and definitions used for assessing fiscal sustainability as well as for the discussion of their advantages and shortcomings.

In order to make the first-look judgment, one needs only a handful of relevant economic aggregates, which are included in the following table.

Czech general government main aggregates													
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Budget deficit	-2,5	-23,4	-3,4	-12,3	-1,9	-2,4	-4,7	-3,7	-4,5	-6,4	-6,4	-12,9	-5,9	-5,1
Consolidated gross debt	:	:	:	:	:	12,9	13,7	14,3	18,2	25,2	28,9	37,6	40,6	42,4
Total expenditure	51,3	74,9	54,1	63,6	55,5	49	51,1	50,1	47,3	50,6	52	57,9	50,9	49,2
Total revenue	48,9	51,5	50,7	51,3	53,6	46,6	46,4	46,5	42,8	44,1	45,6	45	45	44,1
Budget deficit (based on GFS methodology)	:	0,3	-0,3	-1,2	-1,5	-0,6	-3,1	-2,4	-0,5	-5,6	-5,5	:		
Consolidated gross debt (based on GFS methodology)	:	15,3	13,2	12,9	13,0	14,5	16,7	18,6	19,5	23,0	27,3	:		

Note: % of GDP at market prices, based on 95 ESA (except for last two rows) definition, year 2003 values are preliminary and 2004/2005 values are predicted ones.

While GFS methodology based numbers are in general more favorable to Czech public finances, raising tendency for deficit financing is apparent from both rows expressing budget deficits. As a result, Czech public debt more than tripled (in ESA95 methodology) in the period between years 1997 and 2003 for which reliable data are available. Despite the fact that it does not reaches levels experienced by for example Belgium (more than 100 % of GDP throughout the 1990's), its dynamics might raise some concerns.

In order to decide about the nature of deficits (i.e. if they are more result of one-off measures connected with for example transition expenses or are result of trend development) it is accurate to look at the medium term averages expressed in the following table.

Five year averages (1996 through 2000 and 2001 through 2005)		
Total expenditures	50,6	52,1
Total revenues	47,2	44,8
Note: based on ESA95 methodology.		

The conclusion one would arrive at based on this table is that growing deficits are not likely to be the result of one-off expenses, rather, they seem to be the result of growing disparity between increasing expenditures of Czech government and its decreasing revenues.

So on the first look Czech public finances seem to have a tendency towards growing deficits and debt and towards growing spending, not fully matched by growing revenues. Even political representation realized lately this fact and proposed set of measures designed as

to be the solution of this problem. Main moves of what has become to known as "Reform of public finances" are embodied in Government's decision (2003a).

Are the measures envisioned able to solve the problem of growing deficits? Is the sustainability of Czech public deficits really threatened? Is the development Czech-specific or is it a problem of EU acceding countries in general? How to measure sustainability of public finances? What determines the behavior of deficits and debt levels in the European context?

This work hopes to shed some light on those questions. It tries to evaluate Czech public finances in the international context, based on comparable (same methodology based) data if available. Since European Monetary Union (EMU) accession process of original EU members during 1990's might be seen as a mirror position of current new EU members, it tries to deduce some conclusions from fiscal behavior of those countries during this period.

The paper is structured as follows. In second part, I construct so called sustainability index of public finances for Czech republic as well as for some old and new EU member countries. In the third part, I try to answer the question whether change of budget process envisioned in the reform of public finances is able to solve the Czech problem of growing deficits. Fourth part will try to answer the question whether past Czech fiscal development is given by country specific or European wide factors and hopefully draw conclusions for the future. Fifth part will try to look at the composition of Czech government's budget and draw conclusion based on its international comparison while sixth part will conclude the paper.

2. Sustainability index of public finances

As von Hagen and Harden (1994) note, judging about sustainability is quite easy in theory. Imagine each period's t government's budget constraint in form of

$$G_t - T_t + i_t b_t - 1 = \Delta B_t + \Delta M_t \tag{1}$$

where G_t and T_t are government's expenditures and revenues in relevant time period, B_t and M_t are the stocks of government debt and base money at the end of the period t and i_t is the current interest rate on public debt. Deflating this expression by nominal GDP yields

$$d_t + \rho_t b_{t-1} = \Delta b_t \tag{2}$$

where d_t is the primary government deficit expressed as the ration of GDP, b_t is the debt to GDP ratio and $\rho_t = i_t - \pi_t - \Delta \ln y_t$ is the real interest rate corrected for real GDP growth.

Expressing this equation for n future periods yields

$$E_t \sigma_{t,n} b_{t+n} = b_t + E_t \sum_{j=1}^{n} \sigma_{t,j} d_{t+j} \tag{3}$$

where

$$\sigma_{t,k} = \prod_{j=1}^{k} \frac{1}{1+\rho_j} \tag{4}.$$

Here $\sigma_{t,k}$ is k-periods ahead discount factor, which can be used to calculate present value of assets and liabilities in period $t+k$ for period t and $E_t x_{t+k}$ denotes expectation of variable in period $t+k$ given the information available at period t.

Thus equation (3) expresses the expected present value of government debt in period $t+n$ relative to GDP in that period as a sum of current debt to GDP ratio and sum of all discounted deficits to GDP ratios between period t and $t+n$. Theoretical requirement for sustainable position of public finances or in other words, in order for intertemporal budget constraint to be satisfied, is that LHS of equation (3) must be equal or lower than zero as n becomes very large.

However, practical use of this condition is rather limited. Sustainability requires that government debt cannot grow faster than growth adjusted real interest rate but it does not preclude the periods of much higher growth of debt than that.

To translate expression (3) into practically usable form, one may consider intertemporal government budget constraint for limited period of time and add a condition that present value of debt to GDP ratio at the end of this period should not exceed the current one. This implies that public policy during that period of time can be maintained further without a need for adjustment on government spending or revenue collection.

To judge about sustainability of Czech public finances I calculate a measure of sustainability as a difference between current debt ratio and discounted debt ratio for fixed period of time n^*, using actual data instead of expected debt ratio and using ex post real interest rate. The measure of sustainability than becomes

$$S_t(n^*) = b_t - \sigma_{t,t+n^*} b_{t+n^*} \tag{5}$$

where $\sigma_{t,t+n^*}$ is the ex post discount factor calculated from actual interest rates, inflation rates and real GDP growth rates. The second part of RHS in (5) expresses the present value of public debt to GDP ratio n^* periods ahead and therefore public policy can be said unsustainable whenever $S_t(n^*) < 0$.

Note that equation (5) includes a trade-off between choosing longer time horizon (n^* large), which captures long-term orientation of the concept and choosing shorter time horizon (n^* small), which allows one to judge about the sustainability changes over time. Therefore, for period for which relevant and internationally comparable data are available (1996 through 2003 plus 2004 and 2005 based on predicted values) I choose $n^* = 3$. Development of sustainability index over time for Czech republic as well as for selected new and old EU members is given in the following graph.

Sustainability index

Bold lines for Central European countries. From 2000 on based on predicted data
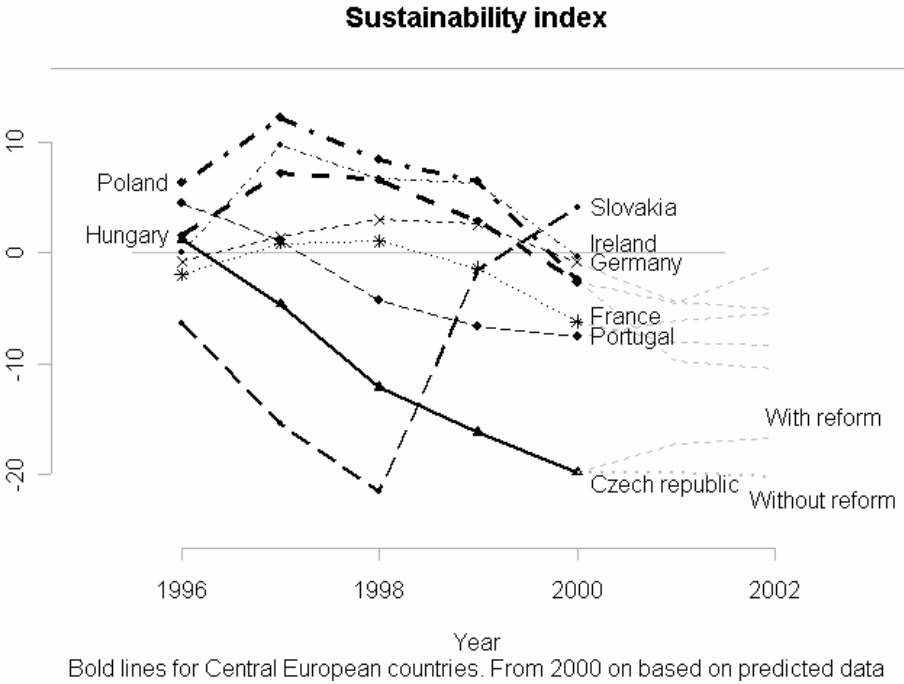
Pattern of development of Czech public finances towards unsustainable position, especially when compared to neighboring new EU member states is quite clear based on this picture. Czech public debt develops even in a worse fashion than debt of recent SGP sinners - France, Portugal and Germany.

To be fair, measures envisioned in concept of Czech fiscal reform can, in case they are fully implemented, improve the development of sustainability index. Adding the amount of public resources reform aims to save to currently predicted development of debt to GDP ratio (i.e. calculating development of debt to GDP ratio without reform measures) gives bit worse picture than without it. Sad to say, what fiscal reform, even if fully and ideally implemented that is in itself a doubtful case, does not bring is the significant improvement of sustainability index towards above zero values.

To compare the position of Czech republic's public finances in the wider international context I include following table, expressing the three-year sustainability index for current EU member states (except Luxembourg due to lack of comparable data).

Three year sustainability index in year 2000, $S_{2000}\left(n^* = 3\right)$											
Czech republic	Cyprus	Malta	Greece	Portugal	France	Latvia	Hungary	Poland	Finland	Estonia	Slovenia
-19,8	-12,1	-10,8	-10,7	-7,5	-6,2	-4,8	-2,6	-2,5	-2,4	-1,9	-1,4
Germany	Ireland	Lithuania	Netherlands	Sweden	United Kingdom	Austria	Italy	Slovakia	Denmark	Spain	Belgium
-0,8	-0,4	0,0	0,8	1,0	2,9	3,2	3,9	4,1	5,8	6,6	10,1

Based on this comparison, Czech public finances are in far worst position than public finances of other EU member states and this fact cannot be downgraded by the argument that Czech public debt is not as high as a debt of some European countries. Calculating ordinary and Spearman's correlation indexes of presented sustainability index with the level of public debt to GDP ratio in year 2003 (year 2003 has been chosen because debt to GDP ratio in year 2003 is used for calculation of sustainability index for year 2000) does not reveal any relation between debt to GDP ratio and sustainability index.

Correlation between sustainability index for year 2000 and debt to GDP ratio for year 2003	
Standard correlation index	0,037
Spearman's rank correlation index	0,039
Note: correlation for 24 EU members from previous table, critical value for rejection of hypothesis of independence is 0,41.	

Therefore, judging the sustainability of Czech public finances, based on the sustainability index presented above affirms concerns of many economists about future development of deficits and public debt in Czech republic, with fiscal reform hopefully solving only half of the problem.

Concept of Czech fiscal reform is by my opinion based on two key elements. First one consists of measures aiming to cut public expenditures (cuts in social spending or cuts in public wage bill among other). This is in full accord with the conclusions presented for example in McDermott and Wescott (1996) that successful fiscal consolidation should be based predominantly on expenditure cuts, rather than on rising tax burden. Exactly the same conclusion follows from the empirical appraisal of fiscal consolidations in European context in European Commission (2003). Fiscal consolidation is found to be more likely to be successful if it is based on expenditure cuts rather than on tax increases and more credible it

is, higher the probability that it can have so called non-Keynesian effects[5]. Higher credibility can be achieved for example by notable cuts in public wage bill expenditure, which signals government's commitment to lower public spending, even if it is connected with unpopular measures.

Second key element of Czech fiscal reform consists of change in budget creation process rules, which aims to solve the problems often found in political economy literature to be connected with decisions about concrete allocation of public funds[6]. With the evaluation of this change from sustainability perspective deals the next section.

3. Quality of Czech budget process

Sustainability or unsustainability of public finances is in the end given by composition and size of every year's budget of every given country as well as by decisions about the way in which public funds are acquired, whether through tax revenues or deficit financing, which are also part of every year's budget. Every budget must provide relevant decisions covering three following broad areas. First, it has to decide about the overall size of the budget, in other words, it has to define the degree in which government is involved in economic activity of given country relative to private sector. Second, it has to decide who will be receivers and beneficiaries of public spending and what programs should be financed from public resources. And third, it has to specify how the public resources will be raised, who will bear the burden of financing government activities and when.

Given the fact that public funds beneficiaries are typically distinct from those who bear the burden of financing government activities, process of budget creation can be seen as a process of conflict resolution. Corroborated by two basic facts of human condition, scarcity and limited altruism, such a conflict of interests is inevitable.

Effective use of public resources (i.e. efficient answer to the three questions outlined above) is given by at least three conditions. First efficiency condition requires that social benefits of public money spent should be equal to the social costs of raising this extra money in margin. Second efficiency condition requires that present social costs and benefits of current government spending should be properly weighted against future costs and benefits associated with it. And third condition requires that current government spending, taxation

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[5] Standard Keynesian economic theory (IS-LM framework) predicts economic downturn to be connected with decrease in government's spending. Non-Keynesian effects of fiscal consolidations refer to the events when fiscal consolidation led to the increased economic activity.

[6] For brief but enlightening discussion about the problems connected with decisions about the allocation of public funds (i.e. problems often found in process of budget creation) see von Hagen and Harden (1995).

and borrowing is consistent with its intertemporal budget constraint, in other words, it is sustainable.

In the political economy literature, three reasons are often cited that cause inefficient use of public resources[7]. *Fiscal illusion* refers to the tendency of government to be involved more than appropriate in economic activity and is given by the fact that those who decide about what programs will be publicly provided do not weight full social costs of those programs. *Deficit bias* is caused by under-presentation of interests of future taxpayers in today's decisions and leads to more than appropriate deficit financing of public activities. *Misuse of public funds* stems from principal-agent nature of political process and refers to the use of public resources for private benefits on the part of politicians-agents caused by incomplete control by voters-principals.

Therefore, exact nature of budget creation process to a certain degree determines effectiveness of use of public funds, a necessary condition for sustainability of public resources. There are in general two solutions to the problems outlined. First one envisions the establishment of numerical rule, government imposes on its expenditure, annual deficits, debt level or tax burden. Second solution is proper institutional setup guiding the budget creation process, institutional setup that ensures that resulting budget will be as much as possible an efficient answer to the questions mentioned earlier.

To be able to judge about the quality of budget process, it is helpful first to divide it into the four stages. First stage consists of creation of budget draft at the cabinet level, draft that is afterwards submitted to the parliament, which decides whether to accept it or not in the second stage. Third stage consists of actual implementation of the budget and the fourth stage consists of its ex post evaluation.

Appropriate institutional arrangement of budget process in its each stage can limit the problems outlined above and help to ensure that resulting budget will be as efficient as possible. At a cabinet level, fiscal illusion can be limited by assignment of special rights to finance minister, by requirement to agree on overall budget parameters at the initial stage of budget creation, by requirement that budget draft submitted to parliament explicitly states government loans to non-government entities and government guaranties or by requiring

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[7] It must be added that those problems refer only to supply side of market with public goods, i.e. to politicians' side. I do not tackle here the question of inefficiency on demand side, i.e. I do not consider such questions why citizens vote for irresponsible politicians repeatedly. Therefore, terms fiscal illusion and deficit bias are used in sense of von Hagen and Harden (1992) not in the sense of Buchanan (1968) who uses the terms referring rather to fiscal illusion and bias towards deficit on behalf of citizens, i.e. he refers to the demand side of market with public goods.

spending ministers to propose offsetting measures whenever requiring more public funds from the budget.

Proper institutional setup at the parliamentary stage includes initial voting on the overall budget parameters along with requirement for all subsequent amendments to be offsetting (i.e. amendments that result in higher government expenditure must either specify which expenditures should be cut instead or in what way extra funds are to be raised).

Concerning execution of the budget, such an institutional setup is suitable for sustainability of public finances that ensures that approved budget is taken seriously by spending ministries. In this respect proper overseeing and control over public funds usually by finance ministry, cash limits imposed on spending ministries, limited transfer of expenditures between budget chapters, limited carry-over of unused funds into subsequent year or stringent rules for amending the budget during its execution might be helpful.

Ex post evaluation of budget from this perspective should include strict and ex ante specified penalties for non-compliance as well as ex ante specified rules whether those entities that overspend are required to give back the amount by which they exceed their budgets.

Provision that should improve budget process in general (especially first two stages) is recourse to the overall numerical limit, government specifies ex ante to be applicable over the medium term. Government expenditures, deficits, taxation or public debt, either in level or rate of growth form and nominal or real expression, can be subject to such a numerical constraint. The more binding this constraint is, the more can it be conducive to the sustainability of public finances.

Czech reform of public finances includes also measures that envision change of institutional arrangement of budget process and aim at bringing future budgets closer to the mentioned efficiency requirements. It touches several areas. First, it envisions introduction of medium-term expenditure limits. Every budget law in future should thus include limits on government expenditure in three subsequent years, limits to be followed during the cabinet negotiations about the budget in those years and be mirrored in subsequent budget drafts submitted to the parliament. Second change aims at higher transparency of budget draft through putting more emphasis on the government loans to non-government entities and through dealing with government guarantees. Third change aims at higher transparency and ex post control of the budget through the requirement to publish yearly financial report levied on all public funds receivers. Lastly, new rules for carry-over of unused funds into the subsequent years are to be specified.

Are the changes mentioned conducive to the sustainability of Czech public finances or not? In order to be able to answer this question I construct two indexes of quality of budget process originally used by von Hagen and Harden (1992), based on professional evaluation of budget process. It is important to mention that this evaluation is based on current practices, not simply on relevant legal norms. High values of either of the index indicates that budget process should in fact ensure long term sustainability of public finances or should at least be helpful to it.

High value of *structural index* signals strong position of finance minister relative to spending ministers during budget negotiations in cabinet, parliament process with limited amending possibility and initial voting on overall budget size, limited flexibility of budget implementation with great authority of finance ministry, strict ex post control of budget and high transparency of budget.

High value of *constraint index* signals the presence of medium term numerical rule on some budget parameter along with its binding nature and strong commitment of all agents present in budget process to it. Values of the two parameters before and after the Czech reform of public finances[8], along with values for selected European countries taken from original study of budget processes of von Hagen and Harden (1992) are included in the following table.

Indexes of quality of budget process							
	Czech republic		Belgium	France	Germany	Greece	Denmark
	before reform	after reform					
Structural index	35,9	34,6	72,5	51,6	25,9	51,6	48,1
Constraint index	21,9	31,6	45,5	46,6	27,9	46,6	35,7
	Ireland	Italy	Portugal	Spain	UK	Spain	Luxembourg
Structural index	27,0	19,7	32,2	30,8	58,4	30,8	35,2
Constraint index	32,0	20,0	19,6	26,8	44,4	26,8	22,2

Note: values of indexes for EU-12 countries taken from von Hagen and Harden (1992), average of EU-12 structural index is 39,9 and average of EU-12 constraint index is 31,6.

As expected changes induced by reform of public finances increased constraint index through introduction of medium-term expenditure limits but sadly enough other measures present a decrease in structural index.

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[8] All the measures touching the institutional arrangement of budget process that are part of Czech reform of public finances has been embodied into the amendment of law specifying budget process in Czech republic that will become effective since the next year.

The study from where values of indexes for European countries are taken arrives to two conclusions that are quite relevant for the subject investigated in this work. First one follows from empirical investigation whether higher value of structural index leads to a lower debt and deficit level. The answer authors propose is yes. Second follows from empirical investigation about the same effects of constraint index. Here, the answer is no.

This conclusion is supported by the experience of Czech republic with the preparation of its budget for year 2004. Original expenditure limits set as a part of Government's decision (2003a) were eventually adjusted by 33 mld. Kč by Government's decision (2003b) and government expenditures in state budget for year 2004 exceeded the original expenditure limits by more than 15 mld. Kč (1,7 % of the budget).

Thus judging whether procedural reform of budget process is able to ensure future sustainability of Czech public finances, remembering that structural index plays much more important role in this respect, one has to conclude that the changes proposed will not probably deliver results they are expected to.

Comparison of Czech budget process with other European countries does not give very nice picture either. More specifically, value of both indexes, irrespective whether before or after reform, is below the average of twelve European countries presented in the table above. One may object that comparing the index for Czech republic with more than decade old data is not a proper thing to do. But realizing that European countries in 1992 were in a similar position as Czech republic is today, as regards perspective of euro adoption, makes by my opinion this comparison more relevant than would be the comparison with the up-to-date data.

Recent experience of most European countries with compliance with rules of SGP, and the fact that most of them were forced to adopt some form of national level expenditure rule as noted in European Commission (2003) suggests that they found the quality of the budget process as present in 1992 not sufficient enough in order to comply with fiscal rules of the Community.

Given the fact that value of structural index of quality of budget process in Czech republic is insufficient to ensure long-term public finance sustainability as well as compliance with SGP rules, where are the main deficiencies and thus main directions in which budget process can be improved? Structural index can be decomposed into the four items listed in the following table along with their evaluation for Czech republic.

Decomposition of structural index for Czech republic		
	Percentage of maximum points attained by Czech republic	
	before reform	after reform
Item 1: Structure of negotiations within government	31,3 %	31,3 %
Item 2: Structure of parliamentary process	50,0 %	50,0 %
Item 3: Informativeness of the budget draft	75,0 %	75,0 %
Item 4: Flexibility of budget execution	24,7 %	19,2 %

This decomposition suggests that where the budget process is to be improved mainly is at the cabinet stage of its creation. Low value of item 1 mirrors the fact that finance minister in Czech republic does not have any special authority over spending ministers as regards the preparation of the budget. This also translates into relatively low control of finance ministry over the execution of the budget and leads to low value of item 4, which is even expected to drop if the new budget process legislature is approved as a result of possibility to carry-over of unused funds into the subsequent years that further complicates the controlling position and ability of finance ministry.

Therefore, possible recommendations how to improve the quality of the budget process basically duplicates the recommendations of Alesina and Perotti (1996) that state that increasing the authority of finance ministry along with adopting so called "closed rules" of budget creation (procedural rules which give the authority to set the agenda of budget negotiations at the cabinet stage to the finance minister and limit the scope for amendments) might ensure that resulting budgets will be as efficient as possible and will respect sustainability principles for public finances. Those authors also recommend measures that should improve the transparency of budget draft, which however, as is evident from the table, does not need to be improved significantly.

4. Development of Czech public finances in European context

This part will try to answer the question whether development of Czech public finances in past was given by country specific or by European wide factors and hopefully try to draw relevant conclusions for the future development, in particular as regards the behavior of deficits and public debt when subject to SGP rules after euro adoption.

To answer whether the behavior of budget deficits in the European countries is given by country specific or European wide factors, one may find suitable to use factor analysis[9]. To illustrate this statistical procedure, consider following model.

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[9] For introduction to factor analysis see Härdle and Simar (2003).

$$y_{i,t} = \beta_{1,i}x_{1,t} + \beta_{2,i}x_{2,t} + u_{i,t} \tag{6}$$

$$y_{j,t} = \beta_{1,j}x_{1,t} + \beta_{2,j}x_{2,t} + u_{j,t} \tag{7}$$

$$\text{cov}(u_{i,t}; u_{j,t}) = 0$$

where $y_{i,t}$ is country i's budget deficit in year t, $x_{1,t}$ and $x_{2,t}$ are unobservable, underlying shock common to all investigated countries, the coefficients β are country specific reactions coefficients to those two shocks and $u_{i,t}$ is country i's specific disturbance term.
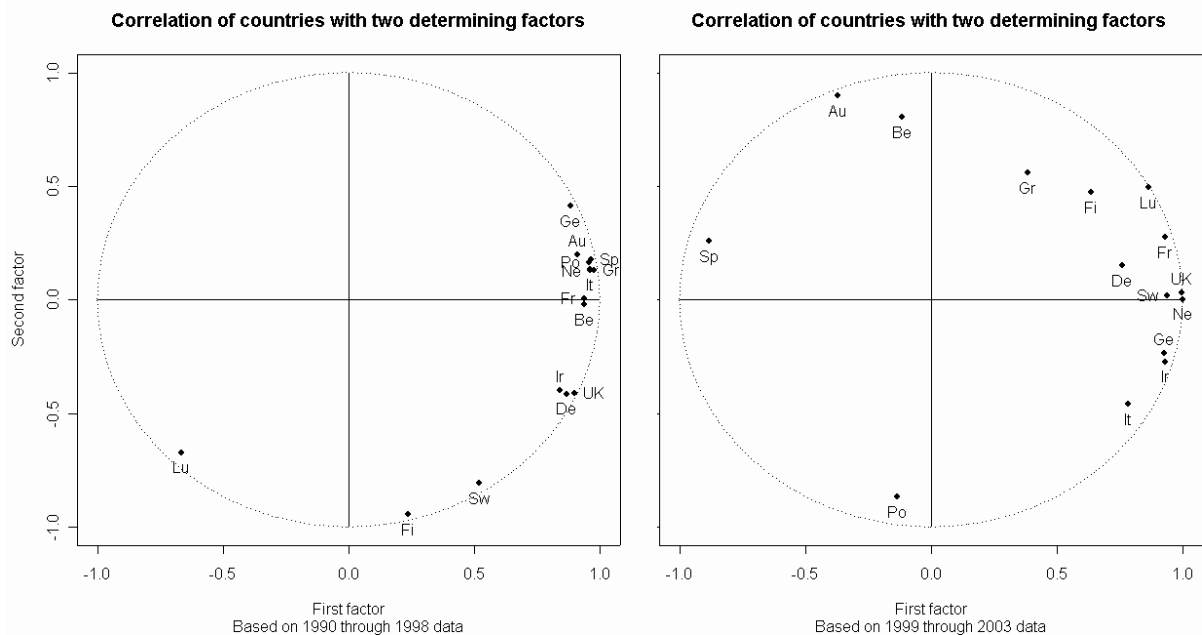
If the behavior of deficits is given by country specific shocks only, $x_{1,t} = x_{2,t} = 0$ and behavior of deficits in the different countries is uncorrelated. If the behavior of deficits is given by unobservable common shock, $u_{i,t} = u_{j,t} = 0$ and differences are given by country specific β_i's and β_j's.

Factor analysis allows one to estimate the two underlying, unobservable common factors that determine the behavior of deficits, x, country specific responses to those factors, β, correlation of deficits, y, with the unobservable common factors as well as overall percentage of variability of deficits that is caused by the underlying common factors.

Following picture plots the correlation of deficits of original EU members with the two most important common factors. Correlation with the first factor is on the horizontal axis and the correlation with the second factor is on the vertical axis. Available data range from 1990 through 2003 and has been divided in the in year 1998 that present the last year before the final decision about which countries will be allowed to enter the EMU. Since the correlation ranges from minus to plus one values, position of country on unity circle suggests that behavior of deficit in given country is fully explained by the two unobservable factors common to all European countries[10].

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[10] In other word, if the behavior of deficits through the given period in all countries was given by purely country specific factors, all the countries would be located in the middle of the picture.

Correlation of countries with two determining factors	Correlation of countries with two determining factors

First factor
Based on 1990 through 1998 data

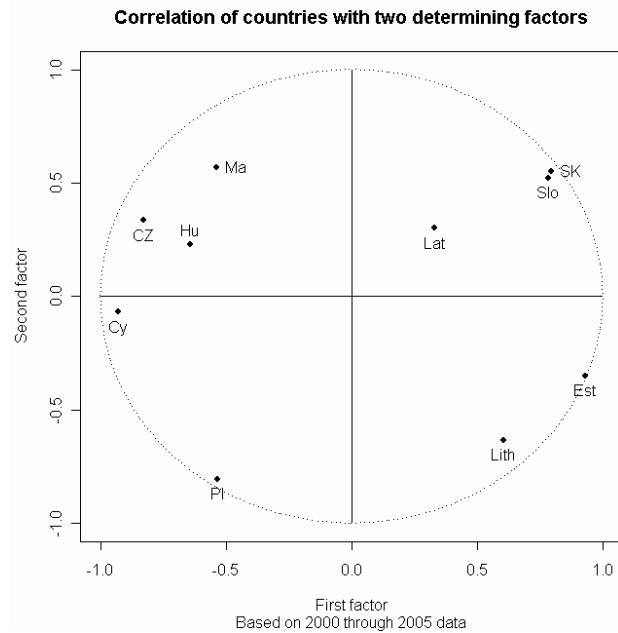First factor
Based on 1999 through 2003 data

Note: abbreviations for countries are as follows: Au - Austria, Be - Belgium, De - Denmark, Ge - Germany, Gr - Greece, Fi - Finland, Fr - France, It - Italy, Ir - Ireland, Lu - Luxembourg, Ne - Netherlands, Po - Portugal, Sp - Spain, Sw - Sweden, UK - United Kingdom.

One immediate conclusion that follows from the picture is that deficit behavior in European countries prior to euro adoption was determined predominantly by one underlying factor - attractive interpretation is that this factor was perspective of not being allowed to adopt common European currency. After fulfilling the requirement for being allowed to do so, European countries seem to spread out again, not seeing the sanction of SGP as really binding. Note also that three out of six outlying countries on the left picture are those who did not yet adopted common European currency (Sweden, Denmark and United Kingdom) and another two outlying countries are those with the lowest deficit averages for 1990 through 1998 period (Ireland and Luxembourg), in other word those countries that did not needed to cut their deficits significantly in order for to be allowed to adopt the common currency.

Since position of new EU member states today can be seen as a mirror position of old EU members more than a decade ago with respect to euro adoption, it is interesting to look at the similar picture which illustrates the correlation of deficits in new EU member states for 2000 through 2005[11] period with two underlying factors.

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[11] Data for years 2004 and 2005, in order to extend the data sample, were taken from convergence program's submitted by each country and are hence expected or predicted only.

Correlation of countries with two determining factors

Second factor

1.0

0.5

0.0

-0.5

-1.0

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Pl

-1.0   -0.5   0.0   0.5   1.0
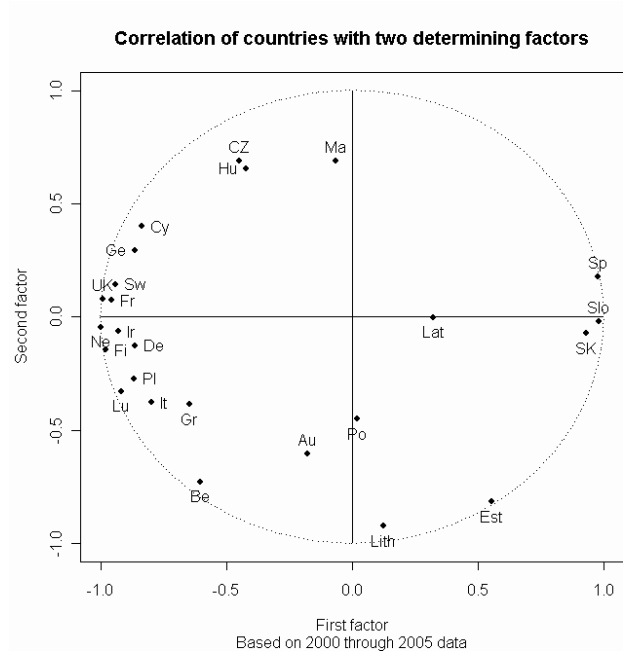
First factor
Based on 2000 through 2005 data

Note: abbreviations for countries are as follows: Cy - Cyprus, CZ - Czech republic, Est - Estonia, Hu - Hungary, Ma - Malta, Lat - Latvia, Lith - Lithuania, Pl - Poland, SK - Slovakia, Slo - Slovenia.

Two conclusions follow from the factor analysis of deficits behavior of new EU member states. First, behavior of deficits in those countries is much less given by the two common factors and is more determined by purely country specific developments, quite the opposite picture to that for original EU member states. Second, despite the fact that today's position of new EU members should be seen with respect to euro adoption similar to that of original EU members more than a decade ago, new member states did not yet seem to have realized this. Behavior of deficits in those countries is far from united by one underlying factor, the situation we have seen with the original EU members.

What this implies for the sustainability of Czech public finances? If one accepts that the sustainability of public finances in general is given by the responsible behavior of politicians, the picture above can be seen to illustrate the fact that politicians in the new acceding countries did not realized yet that they should behave in the responsible manner. In other words, they consider the European fiscal rules to be too distant and question of future to be perceived as a real threat.

The overall picture even worsens if one applies factor analysis on both groups of countries simultaneously. The following picture can be thus seen as one on which one can base the answer to the question whether one-size-fits-all nature of European fiscal rules is in fact appropriate or not.

Correlation of countries with two determining factors

First factor
Based on 2000 through 2005 data

Note: abbreviations for countries are the same as for preceding pictures, source of data for years 2004 and 2005 are the same as for previous picture.

Note that behavior of deficits in all European countries is far from being united. Therefore, common European monetary policy might not be appropriate for all countries. I suspect that it will be determined or influenced mainly by countries that are located in the middle-left part of the picture. Immediate implication for Czech public finances is that it might not be appropriate since the behavior of budget deficit in Czech republic seems to be determined or influenced more by second than first unobservable common factor. Nevertheless, the position of Czech republic is still bit more perspective than position of countries such as Slovakia or Slovenia, with their deficits behaving in direct opposition to the deficits of the main group of countries.

Factor analysis can be used further and let the data to reveal even more. Having estimated the two underlying common factors, one can plug those into the regression model in order to estimate how sensitive is the response of budget deficit in given country when it is hit by one of those factors[12]. In other word, estimate the country specific β_i's and β_j's from equations (6) and (7).

Consider now that any given country is hit simultaneously by the two underlying factors going in the same direction, then the deficit raises by the sum of estimated regression coefficients. If on the other hand country is hit by the two underlying factors going in the

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[12] I add for interested readers that R^2 of such a regression model (with intercept) is equal to the distance of given country on above pictures from the origin and estimates of regression coefficients are equal to the first two eigen vectors of correlation matrix of original data.

opposite direction, then the deficit raises by the difference between the estimated regression estimates. Overall, responsibility of public finances to the underlying common factors can be important, especially once the country is expected to comply with SGP rules. For new EU member states, responsibility of budget deficits can be important from the perspective that those countries are expected to fulfill Maastricht criteria for euro adoption. Following table includes the sums and differences of the two regression estimates for new EU member states, expressed as the percentage of the highest value.

Response of budget deficit when hit by the underlying common factors										
Response when hit by the two factors going in the	Cyprus	Czech republic	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Slovenia	Slovakia
same direction	24%	3%	9%	32%	5%	1%	23%	41%	16%	100%
opposite direction	28%	100%	30%	12%	3%	11%	63%	13%	0%	3%
sum of the two rows	52%	103%	39%	44%	8%	12%	86%	54%	16%	103%

Note: sum/difference of each country's regression estimates as a percentage of highest sum/difference, based on data for years 2000 through 2005, regression estimates respond to the factor analysis underlying picture for new EU member states presented above.

Since the factor analysis does not allow to judge whether the two common factors are more likely to hit going in the same or opposite direction, probably most revealing is the last row of the preceding table which illustrates the fact that Czech budget deficits are much more volatile (along with deficits in Slovakia) than deficits of other countries in the sample.

To sum the conclusions that follow from factor analysis of government budget deficits of EU member states, I tried to show that the behavior of deficits in the new EU member states is far from united, as opposed to behavior of deficits in original EU member states prior to common currency establishment. This fact can be interpreted as that politicians and governments in new EU member states still do not consider common European fiscal rules as a real threat.

From the perspective of future development, the two things can threaten Czech public finances. First, with the perspective of euro adoption that will require Czech republic to comply with Maastricht criteria and subsequently with SGP rules, high volatility of deficits in Czech republic should be at least alarming, especially given the second fact that behavior of Czech deficits is determined by different factors that determine the behavior of deficits in the main group of European countries and that will probably influence most common monetary policy of European central bank.

5. Composition of the budget

This part will try to look closer at the composition of the Czech general government budget and compare it from the sustainability of public finances perspective with the budget of other European countries.

Composition of the budget can reveal something about the sustainability of public finance. More specifically, if the large share of public expenditures consists of items that are not under the direct control of politicians, budget document subsequently becomes a mere list of expenditures and possible ways how to raise the public funds needed to finance them. Its fulfillment than becomes a function of quality of prediction about general economic conditions on which it is based.

State expenditure can from this perspective be divided into those under the direct control of politicians and those, which are more or less given by the factors outside of their control, to which economic literature usually refers as to an *open-ended* expenditure. Open-endness refers to the fact, that exact amount of public funds needed to finance this expenditure is not known by the time the commitment about them is made.

Three types of government expenditures are usually mentioned in this context. First type consists of social transfers and social welfare benefits, expenditures, which are usually dependent on the stage of economic cycle and are hard to predict during the volatile periods. Second type consists of government interest payments on public debt since those payments are given by the monetary conditions, composition of government debt and its maturity structure, which cannot be directly influenced by the government. Third type consists of government employees wage bill since governments often find it hard to resist to pressures for its increases.

While open-endness of first two types of expenditures is usually given by the fact that they are specified in legislature and given by the necessity for government to fulfill its commitments concerning the interest payments, open-endness of employees wage bill is given by the fact that politicians usually choose to treat this type of expenditure in such a way. Therefore, open-endness is more political than economic category.

From the sustainability of public finances perspective, high share of open-ended expenditure should be positively correlated with the high public debt and/or higher deficits, since the development of both is given more by autonomous trends rather than by the decisions of politicians. This autonomous trend usually shows through snowballing effects working through three channels. First, generous social transfers and social welfare programs

imply high share of population benefiting from them, which in turn implies stronger pressure of general public for their even greater generosity. Second, high level of public debt implies high interest payments that might add up to this debt and lead to even higher interest payments. Third, high public employees' wage bill usually stems from the fact that there is too many of them and can therefore extend stronger pressure for their salary increases.

Following table depicts the share of open-ended expenditure as a percentage either of GDP or government expenditure. Because the methodology used by the European Commision differs from the methodology used by the OECD, table depicts the data computed from both sources.

Open-ended expenditure

	Ireland	Czech republic	Slovakia	Latvia	Lithuania	Estonia	United Kingdom	Spain	Netherlands	Luxembourg	Germany
% of GDP, European Commission data, 2003	19 %	22 %	23 %	23 %	23 %	24 %	24 %	25 %	26 %	26 %	31 %
% of general government expenditure, European Commission data, 2003	55 %	38 %	44 %	53 %	64 %	63 %	56 %	64 %	54 %	56 %	63 %
% of GDP, OECD data, 2001	20 %	28 %	:	:	:	:	24 %	28 %	33 %	27 %	38 %
% of general government expenditure, OECD data, 2000	60 %	60 %	44 %	:	:	:	59 %	72 %	73 %	:	83 %

	Hungary	Poland	Austria	Portugal	Finland	Belgium	Italy	France	Greece	Sweden	Denmark
% of GDP, European Commission data, 2003	31 %	32 %	32 %	32 %	33 %	34 %	34 %	35 %	35 %	38 %	39 %
% of general government expenditure, European Commission data, 2003	59 %	71 %	63 %	67 %	65 %	66 %	69 %	65 %	74 %	64 %	69 %
% of GDP, OECD data, 2001	11 %	:	38 %	33 %	34 %	40 %	36 %	40 %	34 %	39 %	40 %
% of general government expenditure, OECD data, 2000	:	:	73 %	72 %	70 %	80 %	77 %	76 %	73 %	69 %	73 %

Note: open-ended expenditure is a sum of public employees' wage bill, social transfers other than in kind and interest payments on government debt, countries in the table are ranked by the first row (European Commission data).

Based on the table, Czech public finances do not seem to be directly threatened by high share of open-ended expenditure. Based on European Commission data, Czech republic has the second lowest share of open-ended expenditure, expressed as a percentage of GDP, in the data sample. But three comments have to be added before the conclusion is made.

First, countries in the data sample are mostly original EU members, countries with much higher GDP per capita, in other words, countries that in general can afford to have generous welfare systems or reward generously its employees.

Second, Czech republic is the only country among new EU member states that have not yet reformed its pension system from pay-as-you-go form, despite the recommendations to do so coming from many directions, lastly from European Commission (2004a). Therefore, as Bezděk, Dybczak and Krejdl (2003) note, impact of future demographic changes on Czech public finances is expected to be considerable and every postponement of decision concerning reform of Czech pension system even worsens this situation. This threat is even worse since predicted degradation of Czech public finances stemming from population ageing is likely to be gradual, which implies that future policy makers might be reluctant to introduce the painful changes.

Third, high level of public expenditure is often needed in transition countries since they need to invest more than developed countries into infrastructure and related projects. This need is likely to prevail in the near future and will put the Czech public finances under even bigger pressure.

Thus, based on the share of open-ended expenditure expressed as a share of GDP in the composition of general government budget, position of Czech public finances in not the worst one but is not very positive either.

6. Conclusion

As noted at the beginning, judging about the sustainability of public finances in not an easy task. Basic problem, besides the use of different methodologies for computing relevant data, is that there is no generally accepted definition of sustainability or similarly, there is no benchmark that can be used as a measuring rod.

Therefore I tried to put down some arguments about the Czech public finances, where available based on comparable data and in widest international context possible, letting interested and careful reader to decide for himself.

Previous analysis revealed four facts. First, based on sustainability index, Czech public finances deteriorated recently at a higher pace than public finances of other EU member states and further, measures envisioned in Czech fiscal reform, even when fully implemented, are not likely to considerably improve this situation.

Second, although the quality of budget process in Czech republic is not exceptionally poor, it is not likely to ensure the fulfillment of European fiscal rules and recently proposed institutional changes do not change this fact.

Third, behavior of deficits in the European context seems to be in general determined by the two underlying common factors. Behavior of deficits in old EU member states is from this perspective much more united than behavior of deficits in new EU member states. This can be interpreted as that politicians in the latter group of countries do not consider European fiscal rules to be really binding. Furthermore, monetary policy of ECB, if determined by the needs of majority of European countries might not be fully appropriate for Czech republic. Besides this, deficits in Czech republic seem to respond more sensitively to the estimated underlying common factors than deficits in other new EU member states.

Fourth, judging the sustainability of Czech public finances by the composition of the general government budget gives somewhat more positive picture, which however worsens when accompanied by the fact that Czech republic is the only country among new EU members that has not yet reformed its pension system and is thus more prone to be hit considerably by the future demographic changes.

Based on those four facts, I suspect that rising or at least unreasonably high deficits are most likely to be the main problem of future Czech governments, problems that might considerably complicate the adoption of common European currency. Given the circumstance that one of the most cited critique of SGP is the lack of its enforcement, is suspect that first fiscally misbehaving country among the new EU members will by punished exceptionally harshly as an attempt of European Commission to send the clear signal that European fiscal rules should not be treated frivolously. In other words, first fiscally misbehaving new EU member state is likely to be treated as a deterrent example. I hope it is not to be the case of Czech Republic.

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