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Articles

PUBLIC DEBT SERVICE, INTEREST RATES AND FISCAL VARIABLES IN TRANSITION COUNTRIES

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Abstract:
The prevailing view in the literature is that the cost of debt servicing depends on the variables that determine the debt dynamics: primary balance, outstanding debt, economic growth and inflation. Several papers devoted to advanced market economies show that a stronger primary balance is associated with a lower cost of debt servicing. The interest cost of servicing the public debt is key both to its sustainability and to the burden it places on the public finances and the economy. A panel of four transition economies: the Czech Republic, Hungary, Poland and Slovakia in the time period 1994 – 2002 has been analyzed. The question is if also in these countries much of the variation in the costs of servicing public debt can be explained in terms of fundamentals that determine the debt dynamics. Last but not least country-specific effects are discussed.

Keywords: public debt, interest rates, fiscal variables

JEL Classification: E62, H63

1. Introduction

The agreement reached at the Copenhagen summit in December 2002 paved the way for enlargement of the European Union in May 2004, as it has been confirmed by polls at spring 2003 in all Visegrad countries (the Czech Republic, Hungary, Poland, Slovakia).

As it is often said, the need for fiscal restraint is to remain a central focus of policy, not only owing to spending pressures from complying with the EU environmental standards and absorbing development funds, but also because of a range of

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country-specific factors including the deterioration in fiscal variables in the last years (see World Economic Outlook, April 2003).

Also for the Visegrad countries the timing of entry into ERM II is to be a driving force for fiscal adjustment going forward. One of the key risks to the growth outlook relates to fiscal policy, where lack of progress in lowering excessive deficits could undercut economic activity in countries with large external deficits.

The fiscal deficit in the greatest Visegrad country – Poland, continues to pose risks for future development. With general government debt to increase again, fiscal restraint is essential to stop increasing the debt burden. The key policy challenge in Hungary is to rein in a widening fiscal deficit and an associated external imbalance (the same was valid for Poland especially at the beginning of 1990's), which is mostly debt financed. Sharply deteriorating situation has been noted in the Czech Republic, where the ratio of the general government debt to gross domestic product (GDP) has been until now surprisingly low. Due to the encouraging fiscal reform in Slovakia the significant tightening of the fiscal stance has been initiated.

One cannot forget mentioning that in the previous command-type economies many "fiscal" functions, as defined in market economies, were carried out not by government but by state enterprises. As the shift toward the full-fledged market economies takes place, spending by the enterprises falls and spending by the government naturally rises (see Tanzi, 1993). This was especially valid at the beginning of transition in the first half of nineties.

The transfer of these functions to the general government budget increases budgetary expenditure and unless revenue is raised correspondingly, also increases the budget deficit and therefore the debt burden. Delaying the transfer of these social functions from the enterprises to the budget would have slown the process of transformation (compare e. g. the timing of transformation in Hungary and the Czech Republic) and would have postponed the required transformation of previously state-owned enterprises.

Budget deficit consists of two main parts – interest payments and primary balance. Interest payments represent a separate component of the overall public spending. According to the division of components of public spending they negatively affect growth and employment as these resources could be used for more productive purposes and are therefore the least desirable item of public spending.

In the early 1990s they were 6 per cent of GDP and in the late 1990s 4.3 per cent of GDP (un-weighted average of Member States of the EU) with Belgium and Italy on the top (11.8 per cent, resp. 10.5 per cent in the early 1990s and 7 per cent and 6.7 per cent in the late 1990s (see European Economy – Public Finances in EMU, 2002, p.101).

In the EU the Maastricht convergence criteria led to a general reduction of interest payments and the same should be expected from the Visegrad countries. The reduction of interest payments in many EU countries has contributed to a better allocation of available resources and represent a defy for the mentioned transition economies.

Especially for the Czech Republic it is valid that policy makers had an incentive to show a smaller budget deficit even when this action conflicted with the speed of transition to a market economy. The partial conclusion is that the debt ratios in the Visegrad countries do not tell exactly the same story as in advanced market economies.

In the paper I present some empirical evidence for a sample Visegrad countries on the relationship between the cost of debt burden and some explanatory variables in the period 1994(1995) – 2001(2002). Due to a very limited data set a panel analysis has been chosen in order to distinguish between the impact of common fac-

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tors and that of country-specific factors. The comparison with the results for a bigger sample of OECD countries (see Caselli, Giovannini and Lane, 1998) has been made.

In Section 2 basic descriptive statistics is presented for the average (implicit) interest rate, primary balance, debt-ratio, inflation rate and the growth rate. Section 3 displays empirical results for a panel of the above mentioned four Visegrad countries. The results show that the inflation rate and the growth rate of real GDP have a significant effect on borrowing costs, whereas the impact of fiscal variables – primary fiscal balance and outstanding debt is weaker and sometimes even with bad sign. As expected, country-specific factors, some of them cannot be formally modelled, have played a very important role, first of all in Poland (Section 4). Section 5 offers some tentative conclusions.

2. Basic Descriptive Statistics

Abstracting from monetary financing that is forbidden in both the EU and Visegrad countries the government budget deficit is the sum of the primary deficit (the excess of purchases G over net tax receipts T) and of debt service (the real rate of interest r times the existing debt stock B). To finance the deficit the government must borrow and issue new debt ΔB:

$$\Delta B = G - T + rB \tag{1}$$

Dividing both sides of (1) by real GDP Y:

$$\Delta B/Y = G/Y - T/Y + (B/Y)\, r \tag{2}$$

A bit of algebra:

$$\Delta(B/Y) = (Y\,\Delta B - B\,\Delta Y)/Y^2 = (Y\,\Delta B)/Y^2 - (B\,\Delta Y)/Y^2 = (\Delta B/Y) - (\Delta Y/Y)(B/Y)$$

therefore $\Delta B/Y = \Delta(B/Y) + (\Delta Y/Y)(B/Y)$

Taking into account that $\Delta Y/Y = g$ and inserting for $\Delta B/Y$ into (2) we obtain:

$$\Delta(B/Y) + g\,(B/Y) = (G\text{-}T)/Y + (B/Y)\, r \tag{3}$$

and rearranging:

$$\Delta(B/Y) = (G\text{-}T)/Y + r(B/Y) - g\,(B/Y) \tag{4}$$

The change in the debt-GDP ratio (left side) equals to the primary budget deficit-GDP ratio (the first item on the right side) and the debt service-GDP ratio (the second item) adjusted for GDP growth rate (the third item). Isolating the debt service on the left side:

$$r(B/Y) = \Delta(B/Y) + (T\text{-}G)/Y + g(B/Y) \tag{5}$$

To stabilize the debt-GDP ratio[1)] $[\Delta(B/Y) = 0]$ the primary balance and the growth rate times the debt-GDP ratio must be able to finance the debt service. Last but not least the debt service in nominal terms:

1) Blanchard (1990) sets $\Delta(B/Y) = 0$ and solves for the debt-stabilizing tax rate t^*. When the actual tax rate, t, is below the tax rate necessary to stabilize debt, the debt ratio will rise and vice versa. The gap between t^* and t is thus a measure of debt sustainability. What seems like a tax gap is in fact a primary deficit gap; either spending or taxes can be equally well adjusted to make the gap zero. So-called "good quality" fiscal adjustments have been marked by a strong emphasis on expenditure cuts rather than increased revenues (see Budgetary Consolidation in EMU, 2001).

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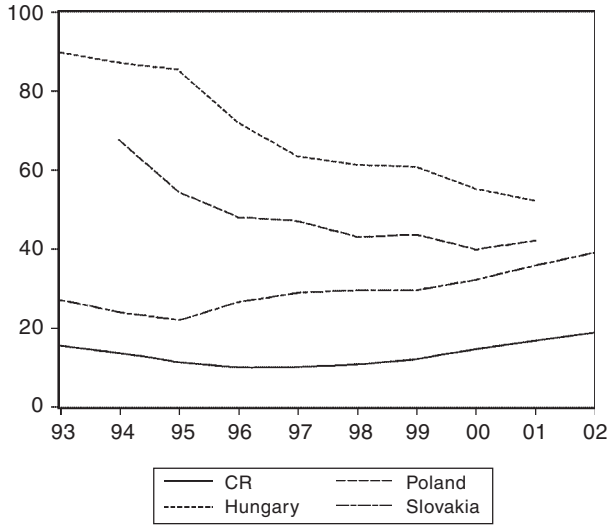
$$i(B/Y) = (T\text{-}G)/Y + g(B/Y) + p(B/Y) + \Delta(B/Y) \quad (6)$$

The factors influencing the debt service in nominal terms are the primary balance, the growth rate, the inflation rate and the change in debt (all as shares of GDP).

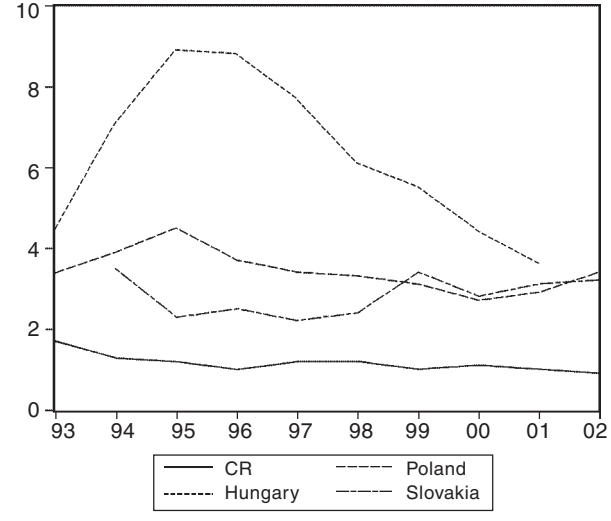
Let us look at the evolution of basic factors. Graph 1 displays the public debt to GDP ratio for all four countries.

Graph 1
Public Debt (in % of GDP)



At the beginning of transition the debt level to GDP was quite different between Hungary and Poland on the one side and the Czech Republic and Slovakia (previous Federal Republic) on the other side. The evolution shows the diverging tenden-

Graph 2
Interest Payments (in % of GDP)



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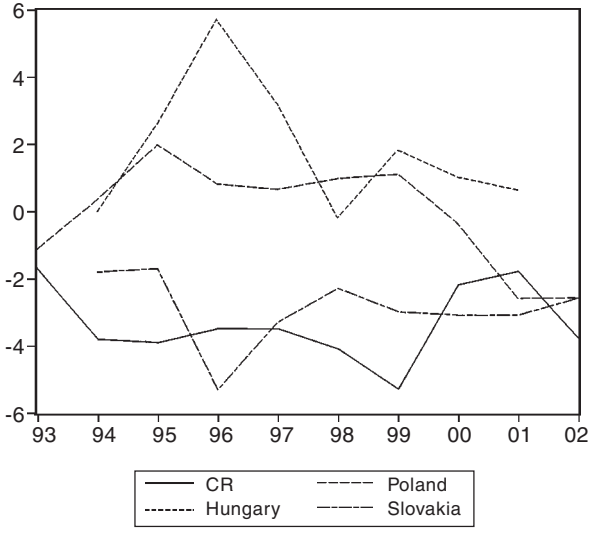
cies. Whereas the debt ratio in highly indebted Hungary and Poland has been declining since the very high level, in both succession states of Czechoslovakia, after a certain period of stagnation, the ratio has begun steadily increase in the last years with a disquieting growth tendency. The public debt ratios in all four countries are coming together. Graph 2 exhibits the interest payments.

The interest payments represented during the 1990s the greatest burden for Hungary, even approaching the Italian level in 1995 and the lowest burden for the Czech Republic. The ratio of interest payments on the GDP has been coming together with the exception of the Czech Republic, where the ratio has been practically unchanged for many years but it is expected to increase in the near future.

The question frequently asked in advanced market economies is the following: Is a stronger primary deficit[2)] a part of the story behind the accumulation of public debt? Are large primary deficits a part of the story behind the accumulation of public debts? Graph 3 tries to suggest a tentative answer.

Graph 3
General Government Primary Balance (in % of GDP)



Only in Hungary positive primary balance has been contributing to the decrease of huge debt for practically most of the examined period. In Poland the primary balance has been deteriorating since 2000 only with the caveat that the debt ratio was the highest in the mid of the 1990s.

More clear picture can be revealed if we display the relations between the primary balance and debt outstanding for the individual countries (see Graph 4).

In the Czech Republic negative primary balance has been contributing to the increasing debt ratio in the last years only (correlation coefficient 0.47), whereas in Hungary very strong correlation is evident in the time period 1996 – 2001 (0.83) but

2) "The primary balance in a sense excludes the fiscal inheritance. However, fiscal difficulties may be inherited but that does not make them go away and they must be dealt with. The appropriate primary balance therefore is very closely connected with the debt dynamics and cannot be interpreted particularly usefully on its own" (Leibfritz, Roseveare, van den Noord, 1994, p. 67).

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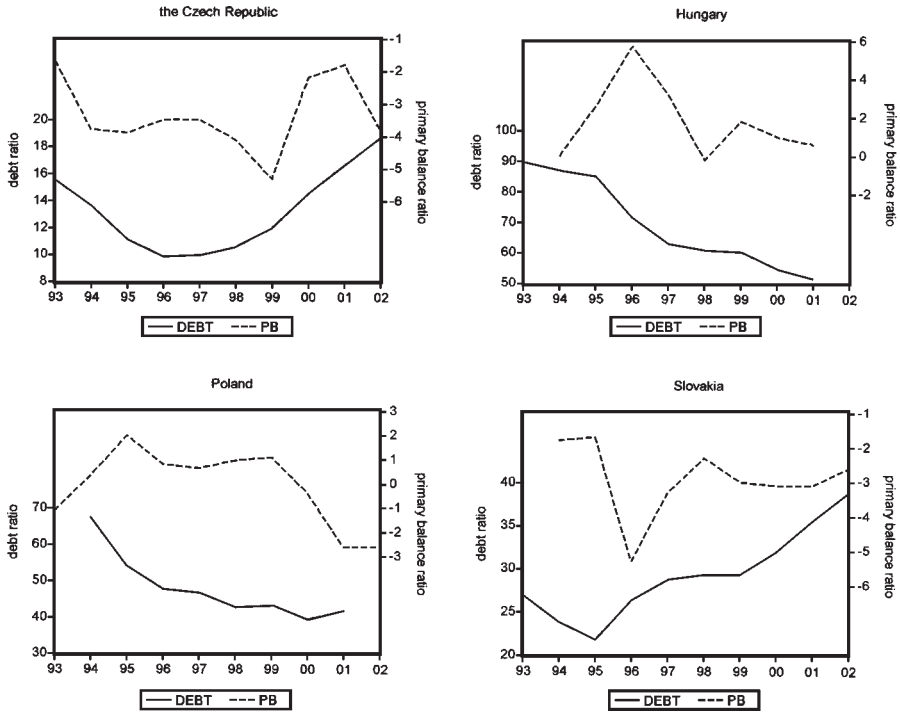
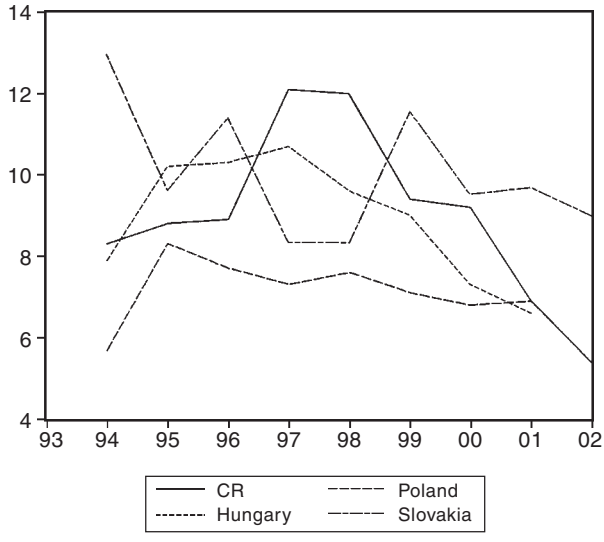
Graph 4
Debt and Primary Balance



Graph 5
Implicit Interest Cost (in % of public debt)



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in the whole period 1994 – 2001 only 0.17. Also for Slovakia the close association has been valid since 1996 (in the period 1996 – 2002 the correlation is 0.54), but for the whole period the correlation is even slightly negative. The picture for highly indebted Poland is similar to the Hungarian case. In the period 1995 – 2001 the correlation is 0.84.

The partial conclusion that can be drawn at this moment is that following the mid of the 1990s first of all Hungary and Poland have been forced to achieve a positive primary balance in order to steadily diminish huge public debt on the eve of the EU accession.

The primary measure of a country's average interest cost of public debt is the ratio of general government interest expenditure to the stock of debt outstanding at the end of previous year. These implicit interest costs are shown in Graph 5.

The trend is declining since 1999 for all countries with the contingent rise in the first half of nineties. Striking into eyes is the low implicit interest cost for Poland, the highly indebted country since the very beginning of transition. Table 1 with descriptive statistics for the above mentioned time series completes the picture.

Table 1
Descriptive Statistics (1994 – 2001)

	CR	Hungary	Poland	Slovakia
Interest cost (% of the debt)				
mean	9.5	8.9	7.2	10.2
max	12.1	10.7	8.3	13.0
min	6.9	6.6	5.7	8.3
st. dev.	1.8	1.5	0.8	1.7
Debt ratio (% of GDP)				
mean	12.3	67.0	48.1	28.4
max	16.7	87.1	67.6	35.6
min	9.9	51.9	39.6	21.9
st.dev.	2.4	13.2	9.1	4.4
Interest payments (% of GDP)				
mean	1.1	6.5	3.4	2.8
max	1.3	8.9	4.5	3.5
min	1.0	3.6	2.7	2.2
st. dev.	0.1	1.2	0.6	0.5
Primary balance (% of GDP)				
mean	-3.5	1.8	0.4	-3.0
max	-1.8	5.7	2.0	-1.7
min	-5.3	-0.2	-2.6	-5.3
st. dev.	1.1	2.0	1.4	1.1
Inflation rate (deflator GDP)				
mean	6.7	14.8	14.4	6.8
max	11.0	25.6	37.3	13.7
min	1.1	8.4	1.9	3.0
st. dev.	3.8	6.5	11.7	3.2
Growth rate (real GDP)				
mean	2.3	3.5	4.5	4.2
max	5.9	5.2	7.0	6.5
min	-1.0	1.3	1.0	1.3
st. dev.	2.3	1.4	2.2	1.3

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Having looked at the preceding graphs one can see that in some cases the year 1994 represents an outlier. We have calculated correlation coefficients between the interest cost on one side and explanatory variables (inflation rate, growth rate, primary balance, outstanding debt) on the other side for the time periods since 1994 and 1995. The correlations for a shorter time span are more robust so we have decided to limit our calculations on the period 1995 – 2001. Correlations for individual countries are as follows.

Table 2
Correlations for Individual Countries

	π	*g*	*f*	*b*
i (Czech Republic)	0.52	-0.60	-0.27	-0.84*
i (Hungary)	0.76	-0.41	0.60*	0.72
i (Poland)	0.95	0.72*	0.73*	0.90
i (Slovakia)	0.00*	-0.27	-0.53	-0.24*

Note: *i* – interest cost; π – rate of inflation; *g* – growth rate; *f* – primary balance; *b* – debt level. * denotes economically perverse sign. The growth of inflation should mainly increase the average interest cost; the growth of real GDP should decrease the average interest cost; the increase of primary balance should decrease the average interest cost and the increase of debt should increase the average interest cost.

3. Empirical Analysis

The average interest cost of the debt may be hypothesized to depend on the variables affecting the debt dynamics (see above and in this formulation Caselli, Giovannini, Lane, 1998):

$$i_{it} = a_{oi} + a_1 f_{it} + a_2 \pi_{it} + a_3 b_{it} + a_4 g_{it} \qquad (7)$$

where the a_j 's are coefficients (including a country-specific dummy a_{oi}); *i* indices countries ($i = 1,2,3,4$) and *t* time. The annual data are from IMF statistics or OECD Economic Outlook database.

Each country has its own base level of the average interest cost of public debt so that the equation should have a different intercept for each country (fixed effect). Specific intercepts can absorb any permanent differences across countries. A full set of time dummies is impossible to introduce due to a small number of observations (near singular matrix). A time trend has also been introduced in some cases. Both cross section weights and (slightly better results) seemingly unrelated regression have been utilised (E Views,1998).

In the pilot estimate all four explanatory variables are common coefficient, they have to receive the same coefficient accross all countries of the pool. As the option for weights general least squares using estimated cross-section residual covariance matrix (SUR) have been selected (the average number of years used in the estimation is larger than the number of countries). The results for time periods excluding and including the year 1994 are as follows.

The results confirm the expectations (for the time period 1995 – 2002) as concerns the sign for the inflation rate, growth rate and even for primary balance. Bad sign for debt ratio is in both time periods.

The result for inflation says that a 1 percentage point increase in inflation is associated with a 0.17 percentage point increase in average interest cost. This is in the range of results of Caselli, Giovannini and Lane (hovering around 0.13 in seve-

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Table 3
Pilot Estimate

Explanatory variables	1995 – 2002	1994 – 2002
Inflation	0.1720 (6.62)	0.1389 (4.35)
Growth	-0.3693 (-6.40)	-0.3644 (-4.02)
Primary balance	-0.1158 (-1.72)	0.0578 (0.40)
Debt	-0.0767 (-2.70)	-0.1171 (-4.06)
Adjusted R^2	0.4577	0.4405
Observations	30	34

Note: *t*-values are in the brackets.

ral specifications). The effect of higher inflation on borrowing cost has been stronger than the effect on debt dynamics (inflation worsens the debt dynamics in advanced market economies by necessitating higher nominal interest rates to provide investors a given real rate of return and improves it by raising the rate of growth of nominal GDP).

The result for growth says that an one percentage point increase in growth is associated with a 0.37 percentage point decrease in average interest cost. This is much stronger impact than OECD countries due to fast growth of the Visegrad countries.

The expected effect of positive primary balance on borrowing cost is statistically weak (*P* value is 0.0993) and valid in the shorter time period only. An one percentage point increase in primary balance is associated with a 0.12 percentage point decrease in borrowing cost (this is incidentally in the range of OECD estimates). The debt has exhibited a bad sign but the results for debt are a bit puzzling for OECD countries also (bad sign in two from four specifications).

Table 4
Additional Estimate

Explanatory variables		Explanatory variables	
Inflation	0.0578 (2.45)	Debt Czech Republic	-0.4704 (-6.55)
Growth	-0.3000 (-6.29)	Debt Hungary	0.0406 (0.94)
Primary balance Czech Republic	0.2669 (1.35)	Debt Poland	0.0400 (1.23)
Primary balance Hungary	0.1631 (0.67)	Debt Slovakia	-0.0833 (-2.12)
Primary balance Poland	0.3285 (5.17)	Adjusted R^2	0.6111
Primary balance Slovakia	-0.6253 (-4.52)	Observations	30

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In the second specification only inflation and growth are common coefficients and the remaining two variables – primary balance and debt are country-specific coefficients. There are again separate intercepts estimated for each country. The time period is 1995 – 2002.

Look at country-specific coefficients does not reveal too much. Only the coefficient for primary balance in Slovakia has a required sign and is statistically significant. The specific coefficients for three remaining countries exhibit a positive sign. As concerns country-specific coefficients for debt in both Hungary and Poland they show a positive sign which can be explained due to huge debt and therefore an enormous burden in these two countries. Results are, however, not statistically significant.

The use of time dummies consumes too much degrees of freedom and is in this case unapplicable. The experimentation with a time trend has not enriched our understanding. Mixed results, having been achieved during the calculations, force us to devote our attention to the step by step analysis in individual countries.

4. Country-specific Effects

The economic literature devoted to the problems of transition from a command-type to a full-fledged market economy has stressed that the appropriate fiscal deficit and the level of the debt can be a function of several factors, e.g. the mode and speed of privatization, the timing of structural reform, the rate of economic growth, the extent of real convergence, etc. The different transition strategies (first of all the Czech Republic versus Hungary) can lead to different levels of officially displayed deficits and debt (putting aside measurement problems, off-budget items, contingent liabilities, composition of general government).

A certain convergence of decisive fiscal variables is worth of noticing (see Section 2). In spite of it is clear that the countries in our sample followed not the similar ways on the road towards a full-fledged market economy including the fiscal stance.

Socialist Czechoslovakia was characterised by the absence of serious macroeconomic imbalances which have plagued especially Poland and to a lesser degree also Hungary. Hard currency debt was almost negligible and the government budget had been close to balance (see Izák, 1996). Inherited government debt was less than one per cent of GDP. This level has been officially declared almost unchanged for twelve years and even the estimate for 2003 (see Table 10, OECD Economic Surveys, the Czech Republic, March 2003) counts with figure.

A new challenge is represented by the deterioration of the fiscal situation in last years. Fiscal policy becomes increasingly incompatible with EU fiscal rules and public indebtedness is a growing area of concern. Interest payments belong among the so-called mandatory spending so the repayment cannot naturally be avoided.

In Hungary in the first half of the 1990s the real interest rate on public debt exceeded the growth rate of real GDP, which led to the continuous increase of the debt ratio (slightly under 90 % of GDP). The major element in the reduction of this ratio in the following years was the devotion of privatization revenues to retire the debt. Further, a structural primary surplus was required (see the exhibited primary surplus especially in the period 1995 – 1997).

Securitization began in both Czechoslovakia and Hungary since 1992. Since then the budget deficit is financed exclusively through the market by issuing government securities (treasury bills and bonds). In accordance with the EU norms any direct financing by the central bank is prohibited. The budget must pay market interest rates on the new issues of government securities.

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The real cost of the debt was not evident in Hungary immediately, because "in the beginning of the 1990s when repayment of the accumulated external debt meant a serious problem, the budget was not affected directly, because foreign exchange debt was in the books of the central bank, and the government paid preferential interest rates on long-term credit from the National Bank of Hungary" (Barabas, Hamecz, Neményi, 1998, p. 15).

Falling inflation and the growth of Hungarian economy helped interest expenditure come down in subsequent years. Both Hungarian and Czech fiscal authorities have been taking advantage of the longer maturities to reduce the sensitivity of overall interest bill to short-term interest rate fluctuations. Hungarian public debt keeps on decreasing (see OECD Economic Surveys, Hungary, 2002). The currency appreciation reduced the amount of debt expressed in Hungarian forints (approximately one-third of public debt is denominated in foreign currencies). Due to falling interest rates, government interest payments have been falling in the last years.

Poland is a bit special case due to the inheritance of a very large external debt from the times of a command-type economy. In 1991 Poland started a debt-restructuring programme (debt service charges achieved 58 per cent of exports in goods and services and public debt almost 90 per cent of GDP, of which foreign debt accounted for 64 per cent).

Two separate deals served to substantially reduce the debt servicing and current account burdens represented by these liabilities (see Burns, Kwang-Yeol, 2002). The first, the "Paris Club" deal saw the net present value of the debt owed to Poland´s official creditors reduced by 50 per cent, principally by lowering from 7 per cent to 1.9 per cent the interest rate payable on this debt. A similar deal was struck in 1994 with the "London Club" of some 500 commercial banks, which resulted both in a reduction in the principal of some debt and the issuance of a wide-range of low-interest rate "Brady bonds".

What is important with regard to our study is the difference between artificially lowered interest rates (as from December 2001 the average nominal interest rate on outstanding Paris and London Club debt was 2.3 and 5.4 per cent respectively) and the true cost of the debt. To the extent that the debt is rolled over, the interest charges associated with Poland's debt will increase significantly. The coming to maturity of the London and Paris Clubs' debt over the next several years will place pressures on the public purse, increasing expenditures without improving services. A comparison of implicit interest rates used in our calculations and official treasury bill rates (for Slovakia only the series of long-term interest rate is at the disposal) is offered by the Graph 6.

In the Czech Republic the differences between treasury bills rate and implicit interest rate are not significant and the correlation between them is quite high (0.76). The same is not valid for both Hungary and Poland, where the differences are significant and from the reasons mentioned above the implicit interest rate has been significantly higher till the year 2002. Since then the things turn to "the normal" and the episode of the subsidised interest payments seems to be overcome.

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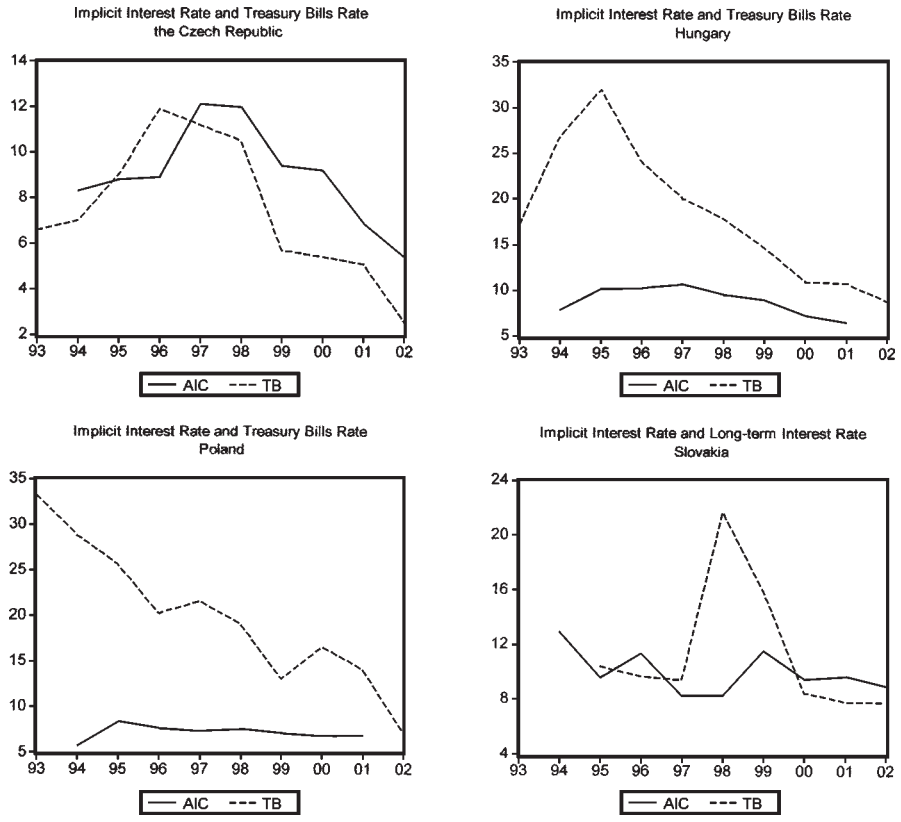
Graph 6
Implicit Interest Rates and Official Interest Rates (in %)



5. Conclusion

In the transition economies the level of fiscal variables tells only a part of the story thanks to a different timing of the transformation process. The factors influencing the debt service in nominal terms and analyzed in this paper are primary balance, growth rate of real GDP, inflation rate and the debt level.

At the very beginning of transition the debt-GDP ratio was very high in Poland and Hungary and quite low in Czechoslovakia. After an elapse of almost one decade the debt ratios in all four countries are coming together. A corollary of this were the lowest interest payments in the Czech Republic and highest in Hungary. The interest burden in Poland has been until now artificially low thanks to the special treatment of Polish external debt since 1991.

The positive primary balance has been contributing to the decrease of huge debt only in Hungary. In Poland primary balance has been deteriorating since 2000, whereas the Czech Republic and Slovakia have exhibited negative primary balance during the whole examined period. The primary measure of a country's average interest cost of public debt is the ratio of general government interest expenditure to

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the stock of debt outstanding at the end of previous year. The trend of these costs is declining since 1999 for all four countries.

Econometric analysis has been limited on time period 1995 – 2002 (yearly data, OECD Economic Outlook database, IMF statistics). In the pilot estimate all four explanatory variables are common coefficient. The result for inflation says that an one percentage point increase in inflation is associated with a 0.17 percentage point increase in average interest cost. This is in the range of results of Caselli, Giovannini and Lane (1998) for OECD countries. The result for growth says that an one percentage point increase in growth is associated with a 0.37 percentage point decrease in average interest cost. This is much stronger impact than in OECD countries due to a faster growth of the Visegrad countries. The expected effect of positive primary balance on borrowing cost is statistically weak (*P* value is 0.0993). An one percentage point increase in primary balance is associated with a 0.12 percentage point decrease in borrowing cost (this is incidentally in the range of OECD estimates). The debt has exhibited a bad sign but the results are a bit puzzling for OECD countries also (bad sign in two from four specifications).

Country-specific effects have logically played a very important role (the absence of serious macroeconomic imbalances in socialist Czechoslovakia, separate deals agreed to serve the Polish debt at lowered interest rates) but their impact has been tapering off in the last years and common problems of countries on the eve of EU entrance prevail.

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