Debt, Deficits, and the Accession of the New Member States to the Euro

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Abstract

Price and output level convergence between new member states and the existing EU economies necessarily implies inflation and growth divergence for many years to come. That complicates the conditions for accession to the Euro. In this paper, we focus on debt dynamics for the eight new member states from Central and Eastern Europe. We find that the nominal Maastricht criteria are at best irrelevant, and may be damaging for the duration of this catch-up process and well past any likely dates for Eurozone entry. There are also strong *indirect* effects of nominal criteria, which make it more difficult to achieve the fiscal criteria. Our results therefore suggest all countries would find it harder to restrain debt growth under the Maastrict criteria. However, this effect varies substantially across countries. If the nominal criteria are suspended, the policy instruments required to achieve Euro convergence are in the hands of the individual member states. This implies that the *principle of subsidiarity* could be applied to Euro membership.

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1. Introduction

May 1st 2004 saw the largest single expansion of the European Union so far, when 10 new countries were admitted. Eight of these ten countries are formerly Communist Central and Eastern Europe countries (henceforth CEEC-8) - namely the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia.

For all 10 new members, participation in the Eurozone is compulsory under the terms of membership. The final decision on admission is then subject to the European Commission's determination that the convergence criteria have been fulfilled[1]. The convergence criteria are codified in the Maastricht Treaty. Three of these criteria are concerned with nominal convergence. Inflation must be within 1.5 percentage points of the average of the three lowest in the EU countries. Long-term nominal interest rates (defined as the rate on 10 year government debt) must be within 2 percentage points of the average of the nations with the three lowest inflation rates. Finally, the exchange rate criteria, as currently interpreted, requires the EMU candidate countries to have stayed in an ERM-II system within fluctuation bands of ±15% vis-a-vis the Euro, without realignment, for two years.

In this paper, we focus on the two criteria which govern the fiscal aspects of accession to the Euro. Since the Euro started, concerns that fiscal policy might jeopardize the stability of the currency have been paramount. That rationale is well documented elsewhere (see for example Beetsma 2001, Fatas et al 2003, or Artis and Winkler 1997). The two fiscal criteria state that debt ratios must be below 60% (or converging to that level at a satisfactory pace), and that deficit ratios must be below 3% of GDP.

The three nominal criteria, however, have been widely criticized as an inappropriate yardstick for assessing suitability for joining the Euro. Buiter (2004), for example, points out that rigid adherence to the inflation criterion is incompatible with price level convergence. Likewise the requirement to participate in EMS-II is at best unnecessary and at worse harmful; and would in any case be inconsistent with the Balassa-Samuelson effect which, as we note below, is likely to be operating in each of the new entrants for a considerable period of time yet. Hence, having analysed the nominal criteria, he reaches the conclusion that the only relevant yardstick for joining is a fiscal one:

[1] The decision itself will be taken by the Council of Ministers, subject to the Commission's advice.

> *"…achieving fiscal sustainability prior to adopting the Euro is essential. It is the only truly* necessary *condition for Euro adoption"* – Buiter 2004, p5

In this paper, our starting point is the contention that the Maastricht criteria may be a poor means of assessing fiscal health, since they were formulated to deal with a currency union between a group of Western European countries many of whom had relatively high debt ratios. Indeed, whereas the original 60% debt criterion would have required a consolidation for all but three of 12 Eurozone economies in 1998, *all* of the CEEC-8 countries are currently below the 60% level and many of them comfortably so. That implies that some of them could follow an explosive debt path for many years without formally violating the debt criterion. Therefore, it is particularly important that any assessment of fiscal sustainability be *forward looking*, rather than simply confined to an analysis of the current figures. In what follows, and in keeping with the bulk of the literature, our discussion is conducted in terms of the possible *evolution* of debt ratios.

The paper is organised as follows: Section 2 derives the key identities governing debt dynamics and the conditions for debt stability. Section 3 then analyses fiscal policy on the basis of 2004 (the latest definitive) figures, and quantifies the relative contributions of economic growth, interest payments and the primary deficit. In the longer term, when convergence has been achieved, sustainability will require that the latter two do most of the adjustment. In section 4 we focus on sustainability during the catch-up phase, when prices and output converge towards EU-15 levels, and consider the effect of the slowdown in growth and inflation which that convergence might imply. Lastly we consider fiscal policy in relation to the 60% debt rule - and assess the prospects for compliance at different test dates in section 5.

2. Growth and debt dynamics

2.1 The catch-up process in the CEEC-8

Our starting point is to note that the rate of economic growth affects not only the debt ratio, but also the sustainability of a given deficit ratio. Here the accession countries are quite different from the first wave of Euro participants. Each accession country has started the transition with a level of GDP per capita much below the EU-15 average, and they are consequently engaged in a "catch-up" process as output per head begins to converge towards EU levels. With improving productivity, lower labour

costs, and productivity growth faster in the traded sector than in the non-traded sector, the relative price of non-traded goods will rise faster than the prices of those goods traded on the European or World markets; and also faster than the price of non-traded goods elsewhere in the Union. Hence, at any given exchange rate, including that chosen to satisfy the Maastricht exchange rate criterion, any country in this catch up phase will have a higher rate of inflation than in the Eurozone and consequently a rising real exchange rate.

Table 1 presents a comparison of growth rates between the existing and candidate EMU members. They demonstrate the gap in economic growth between current EMU members and the new member states, and also highlight the dispersion of growth across CEEC countries.

Table 1: Current Rates of Economic Growth in EU-25 countries, 2004.

EUR-12	**Economic Growth %**	**CEEC-8**	**Economic Growth %**	**25 year catch-up**	**50 year catch-up**	**Years to catch-up, at current growth**
Austria	*2.2*	Czech Rep	*4.4*	*3.89*	*2.93*	*22.0*
Belgium	*2.9*	Estonia	*7.8*	*5.26*	*3.60*	*14.5*
Spain	*3.1*	Hungary	*4.2*	*4.50*	*3.23*	*32.0*
Finland	*3.7*	Latvia	*8.5*	*5.90*	*3.90*	*15.1*
France	*2.3*	Lithuania	*6.7*	*5.61*	*3.77*	*20.0*
Germany	*1.6*	Poland	*5.3*	*5.63*	*3.77*	*28.7*
Greece	*4.2*	Slovakia	*5.5*	*5.16*	*3.54*	*24.0*
Ireland	*4.9*	Slovenia	*4.6*	*3.38*	*2.68*	*15.0*
Italy	*1.2*					
Luxembourg	*4.5*					
Portugal	*1.0*					
Netherlands	*1.7*					
Ave EUR-12	**2.00**	***CEEC-8***	***4.8***	***4.90***	***3.43***	**--**

Source: European Commission (2005); Catch-up figures calculated by authors

The last two columns in Table 1 also show the annual *average* rate of growth required of each CEEC-8 country, if it is to reach the EU average level of GDP per capita in 25 and 50 years respectively,

assuming unchanged relative populations and that the EU average rate of growth is 2%.[2] These figures demonstrate that, for convergence to take place, the current high growth period will have to be sustained for some considerable time to come. Indeed, even with 2004 growth, the Baltics and Slovenia will take another 14-15 years to catch up; Slovakia and the Czech Republic 20-25; while Hungary and Poland will need 30 years or more to do so. Equally, however, these rates of economic growth cannot be expected to persist indefinitely. Therefore any longer term view of sustainability must take into account the possibility of a growth slowdown.

Our task now is to analyse how changes in the rates of economic growth and inflation could affect the sustainability of each country's debt position, in order to discover both the sustainable level of deficits in each period, and how sensitive these calculations might be to changes in the rates of growth, inflation and interest rates.

2.2 Debt Dynamics

We now lay out the basic analytical framework for the dynamics of debt in relation to economic growth following Hughes Hallett (2002). First, we assume that governments in the EU are not able to use inflation to alter the real value of debt.[3] We also assume that government liabilities are denominated in domestic currency – and, as a result, are not affected by exchange rate movements.[4]

Our starting point is the government's budget constraint at time t, expressed in nominal terms:

$$G_t + (1 + i_t)B_{t-1} \leq T_t + B_t \qquad (1)$$

Suppose the government debt takes the form of one period bonds. Debt may be rolled over if the government does not have sufficient tax revenues to pay off all of its national debt at time t. Equation (1) says that, in any given period, government spending *G* plus the costs of servicing the stock of debt accumulated in previous periods, B, must be less than or equal to the sum of tax revenue, T, plus the current period's debt.

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[2] These figures are consistent with the results of Levine and Renelt (2002), Barro and Sala-i-Martin (1992).

[3] This approach is consistent with the institutional structures required for entry into the single currency, and with the conduct of the ECB once inside the Euro. In both cases, monetary policy is in the hands of an independent central bank which may not act to underwrite fiscal solvency.

[4] This assumption is plausible, given that the overwhelming majority of debt issues in the CEEC-8 have been made in domestic currency. Of those not in ERM-II (the potential floaters), foreign currency debt is 0, 24%, 0 and 30% for the Czech Republic, Hungary, Poland and Slovakia. Of the ERM-II countries, only Latvia has non-Eurozone debt. But at 15% of the total, her foreign exposure is small. Hence, if there is significant foreign currency debt, it is in the private sector.

Dividing both sides by output, Y_t, enables us to carry out analysis with all variables expressed as ratios to GDP. Equation (1) then becomes:

$$g_t + \frac{(1+i_t)}{(1+x_t)} b_{t-1} \leq t_t + b_t \qquad (2)$$

where x is the growth rate of *nominal* GDP, and we have used $Y_t = (1+x_t)Y_{t-1}$. This then yields the following equation for the dynamics of the debt burden[5]:

$$\Delta b = (g - t) + (i - x)b \qquad (3)$$

But *x* can be decomposed into the sum of real GDP growth, γ, and the rate of inflation, π. Similarly, nominal interest rates can be decomposed into the sum of the real interest rate, *r*, and the rate of inflation. Making those substitutions, eq (3) can be written in real terms:

$$\Delta b = (g - t) + (r - \gamma)b \qquad (4)$$

Sustainability of a given fiscal position requires that all national debt is eventually repaid.

In other words, the government cannot run a *Ponzi Game* scheme where it simply issues ever more debt to cover maturing debt plus interest payments. In terms of the dynamic debt equation, this means that the debt ratio must be non-explosive and must ultimately converge on some finite limit. That in turn implies Δb, the change in the debt ratio per unit time, must become less than or equal to zero at some point. Inserting $\Delta b = 0$ into equation (4) and rearranging, gives the following condition for stability:

$$(t - g) = (r - \gamma)b \qquad (5)$$

This expression gives the primary surplus (or deficit) that the government must run if it is to keep the public sector debt ratio constant. We treat it as a benchmark figure. It says that, at some point, the government must ensure that the excess of taxation over spending is equal to difference between the rate of interest and economic growth, multiplied by the current level of debt.

This has several important implications. First, it shows that economic growth serves to reduce the debt burden, by virtue of the fact that it increases the denominator in the ratio of debt to GDP. Second, for new member states in their catch-up phase, higher growth and inflation (output and price level

convergence) may mean $\gamma > r$. Their governments can then run primary deficits up to a certain size and still hold the debt ratio constant.[6] This becomes possible if economic growth is strong enough to reduce the debt ratio at a faster pace than the interest payments increase it. At that point, the maximum primary deficit consistent with a non-increasing burden of debt is (γ – r)b.

Third, the size of this effect is governed by the size of the outstanding debt stock. For countries with a high initial debt level, the effect is bigger since economic growth is acting on a larger stock of outstanding debt, and hence is "paying off" a larger amount. In the limit, a country with no debt whatsoever does not benefit from this effect, since there is no debt to pay off. On the other hand, if (as is the case in many countries) economic growth is less than the real interest rate, then a higher level of debt requires a higher surplus to service it if debt burdens are not to continue expanding. Combining these two observations, we can see that countries with a higher debt burden will be much more sensitive to growth effects. Hence the key point for the countries in this paper is that those with significant debt but fast growth are far more vulnerable to slowdowns in growth. They are also vulnerable to monetary policies that reduce inflation successfully.

In other words, the accession countries are potentially vulnerable (in terms of fiscal convergence) to falls in γ, falls in π, or rises in r. The figures in table 1 suggest that many are enjoying high rates of growth. That permits larger fiscal deficits without too much debt accumulation. It also allows the possibility that even under a credible currency peg, the Balassa-Samuelson effect will create higher inflation and thus lower real interest rates than in the Eurozone. And that we see too. But, as the economies converge to enter the Euro, growth will slow and inflation will fall. The fall in γ and increase in r will then require fiscal tightening and debt reductions.

Since the accession countries are starting from lower debt levels than their counterparts in Western Europe, and since many are undertaking additional expenditures to comply with the *acquis communitaire*, it is difficult to extrapolate current trends in government spending and taxation forward over time. Moreover, as Buiter (2004) and our discussion here point out, large observed deficits now

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[5] From here on, the time subscripts are suppressed.

[6] It must be stressed that the case examined here, $\gamma > r$, is a purely temporary phenomenon. If $\gamma < r$, the implications are quite different: see section 4. But if $\gamma > r$ were to hold for all future periods, then the debt ratio would go to some finite limit - zero if the primary budget deficit is smaller than the deficit defined by (5); or to some positive limit, if that deficit equals (γ - r)b. Thus, allowing b to expand to (t – g)/(r -γ) but no further, *any* non-increasing deficit ratio can be made compatible with fiscal solvency so long as γ > r.

may be consistent with fiscal solvency in the long term. Accordingly, we must be careful in drawing conclusions regarding the *solvency* of current debt paths. We focus instead on the issue of how the debt ratios might evolve over shorter time horizon, particularly with regard to the Maastricht convergence criteria. Will these countries be in a position to join the Euro?

3. Fiscal policy on current figures

Our debt dynamics equation, (5), provides a simple way of examining fiscal sustainability in any given period. Although such calculations ignore cyclical factors, structural reforms and the possibility that governments maintain a medium term budgetary target, they do provide a simple yardstick for evaluating what is happening to fiscal discipline in the context of a growing economy, where borrowing might be justified purely on the basis of higher future national income or anticipated future surpluses.

Table 2 presents calculations of appropriate primary surplus figures for all the CEEC-8 countries on the basis of 2004 data. Interest rates are those implicit in the interest payments actually made, and so may not match figures published in the markets. They depend on the composition and maturity of the debt. It is important to use these implied rates since governments do not always finance at market rates, or refinance older debt when those market rates change.[7] The remaining data however, are straightforward. Table 2's penultimate column gives the benchmark primary surplus (or deficit if the sign is negative), that a country would need to run in order to maintain the debt ratio at its current level. By way of contrast, the last column gives the primary surplus or deficit each country actually ran in 2004.

These figures make it very clear that fiscal burdens vary considerably over the accession countries, as do the fiscal strategies that they have adopted. Not only do actual deficits vary from a surplus of 2.0% of GDP in Estonia, to deficits of 2.2% in Poland and 1.8% in the Czech Republic. The primary deficits/surpluses that would stabilize debt vary almost as much – with Estonia and Slovenia effectively needing to balance their budgets, while Slovakia can afford to run deficits up to 2.2% of GDP, and most of the others deficits in the 1%-1.5% of GDP range. Prognoses for the future therefore vary just as much. As things stand, the Czech Republic, Lithuania and Poland all face rising debt

burdens. But the Czech Republic and Slovenia have roughly neutral policies (in terms of stabilizing debt); while Hungary and Slovakia have slowly declining debt ratios, and Estonia a strongly declining one.

Table 2: Effect on Deficit Ratios of Current Fiscal Policy, 2004

	i	π	r	γ	b	Benchmark Surplus (t-g)	**Actual t-g**
Czech Rep	*3.40*	*3.0*	*0.40*	*4.4*	*37.4*	*-1.49*	***-1.8***
Estonia	*5.29*	*3.1*	*2.19*	*7.8*	*4.9*	*-0.27*	***2.0***
Hungary	*7.42*	*6.0*	*1.42*	*4.2*	*57.6*	*-1.60*	***-0.2***
Latvia	*5.42*	*7.3*	*-1.88*	*8.5*	*14.4*	*-1.50*	***-0.0***
Lithuania	*5.22*	*3.3*	*1.92*	*6.7*	*19.7*	*-0.94*	***-1.5***
Poland	*6.04*	*2.9*	*3.14*	*5.3*	*43.6*	*-0.94*	***-2.2***
Slovakia	*5.05*	*4.6*	*0.45*	*5.5*	*43.6*	*-2.20*	***-1.1***
Slovenia	*6.31*	*3.0*	*3.31*	*4.6*	*29.4*	*-0.38*	***0.0***

Source: European Commission, Statistical Annex to *European Economy,* Summer 2005
Notes: [1] Nominal interest rate is the (imputed) long term interest rate payable on government bonds. [2] Inflation is measured using the GDP deflator.

That said, large primary balances are only one reason why debt dynamics may differ. The underlying economic performance also differs between these countries, and that has implications for debt accumulation. Table 2 shows that, for some countries, inflation has been high enough to render real interest rates negative – at least on newly issued debt.[8] That is true in Latvia, and it is nearly true in Slovenia and the Czech Republic. But others have strongly positive real interest rates (Estonia and Slovenia). Similarly growth and interest rates have varied. To see which of these variations has had the largest impact on debt levels, we decompose the effects of changes in nominal interest rates, inflation and economic growth on the debt ratio using equation (3). The results are given in Table 3.

For Estonia, the inflation/interest rate effect is of no great importance since the stock of outstanding debt is very low; and similarly for the Czech Republic and Slovakia where real interest rates are only

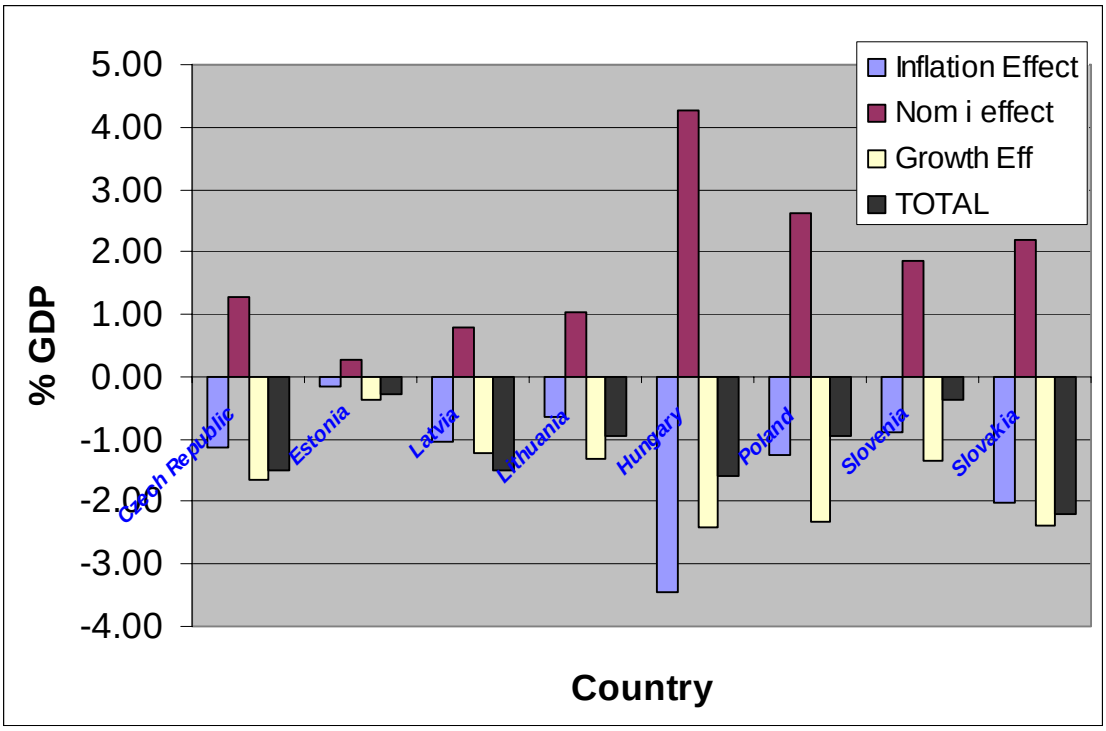
[7] We use figures for interest rates and debts constructed according to the ESA95 standard measure. This *imputes* an interest rate in situations such as short-term treasury bills where there is no coupon value.
[8] The picture is more complex for outstanding debt because it is typically subject to varying interest rates. But calculations which use average nominal interest rates on existing debt differ by no more than 1 percentage point from those derived using the listed long-term interest rates employed in these calculations.

marginally positive. But for Latvia, the negative real interest rate has had a significant impact. At minus 1.9% it means that, even in the absence of any

Table 3: Decomposition of inflation, growth and real interest effects, 2004.

Country	Inflation effect	Interest rate effect, nominal	Growth rate effect	Total (sum)
Czech Rep	*-1.12*	*1.27*	*-1.65*	*-1.50*
Estonia	*-0.15*	*0.26*	*-0.38*	*-0.27*
Hungary	*-3.46*	*4.27*	*-2.42*	*-1.60*
Latvia	*-1.05*	*0.78*	*-1.22*	*-1.50*
Lithuania	*-0.65*	*1.03*	*-1.32*	*-0.94*
Poland	*-1.26*	*2.63*	*-2.31*	*-0.94*
Slovakia	*-2.01*	*2.20*	*-2.40*	*-2.20*
Slovenia	*-0.88*	*1.86*	*-1.35*	*-0.38*

Figure 1: Inflation, interest rate and growth rate contributions to debt in 2004



economic growth, the real burden of debt is dropping by a little over 0.27 percentage points of GDP per year, simply due to inflation. It is unlikely that a negative real interest rate will survive

indefinitely – and especially not if joining the Euro requires inflation convergence with the EU-12. This suggests that Latvia's fiscal position could well deteriorate once real interest rates become positive again. That would have a significant implication for the choice of entry strategy into the Euro, since aggressively targeting inflation could worsen Hungary's fiscal position, whereas a focus on exchange rate convergence (with inflation differentials persisting to allow a real exchange rate appreciation) might actually improve the debt dynamics and real convergence.

On the other hand, Poland appears to be suffering from a high real interest rate combined with its existing high debt burden. Hungary appears to have a similar problem, if less severe. Comparing Poland with Hungary is instructive- since both countries have broadly similar debt ratios. But once growth and inflation are taken into account, there is an annual difference of 0.6% of GDP in the development of their debt ratios. This implies that to keep her debt ratio stable, Poland must run a primary surplus which is 0.6 percentage points larger (a deficit 0.6% points smaller) than Hungary at the same growth rate.

At this juncture it is important to note several key qualifiers. First, a stable debt ratio takes no account of the cyclical state of the economy. *Ceteris paribus* a higher level of economic growth allows a more lax fiscal policy under a constant debt ratio rule, but requires tightening under low or negative growth. However, strict adherence to this rule would result in a pro-cyclical policy. On the other hand, prudent governments can still choose to run more expansionary fiscal policies during downturns, and contractionary policies during an upturn, without getting into difficulty. In fact, so long as the *average* fiscal stance over the cycle was compatible with debt sustainability, the debt ratio in any one year might not be of any great concern. Second, our calculations need to be thought of in terms of long run parameter values, particularly when considering the role of economic growth. Therefore it is difficult to extrapolate forward simply on the basis of one year's growth – although these countries have had consistently high rates of growth for a decade. The issue is instead: what happens to the debt burden when that period of higher growth comes to an end? The next section addresses that question.

A third point, not addressed in this paper, is that current levels of spending may not persist into the future, since new entrants are currently having to make extra expenditures in order to comply with the *acquis communitaire.* Similarly, the possibility that public expenditures may generate a future return (higher growth in the future) is not allowed for.

4 Fiscal sustainability over the longer term

Our next step is to perform the same set of calculations when growth and inflation rates may vary. These calculations illustrate the sensitivity of the new member states' fiscal positions under alternative hypothetical futures. We start with data for 2004. The scenario we analyse is a stylized accession or entry path into the Eurozone. However, in our case, a full adoption of the Euro, a currency board and a credible peg against the Euro, are all equivalent in terms of their effects on the parameters. Therefore we need not worry about the precise exchange rate arrangements selected by a country, or about their exact date of entry into the single currency.

Our choice of parameter values is determined as follows:

Economic Growth: The first two figures

define the growth rate required by each country in order to converge to the EU-15 average in 25 and 50 years respectively; on the basis that the current members grow at a trend rate of 2% per annum *ad infinitum.* We also consider the case where accession countries themselves only grow at 2% per annum, post-entry.

Nominal Interest Rate = 5%: Assuming interest rate convergence is eventually reached, then nominal interest rates should be equal to the rate of all others in the Eurozone. Hence, we take the current average long term interest rate payable on public debt in the Eurozone, which is currently 5%.

Inflation = 2% + Price Convergence Effect over 25 or 50 years: We assume that the ECB keeps Eurozone inflation at 2%. In addition, we add a term capturing a possible price convergence effect in accession countries. This inflation rate is consistent with either a credible currency peg, or a currency board. Once new countries join the Eurozone, this scenario is equivalent to assuming that the ECB continues to target inflation only in existing members only. That is not inaccurate as the accession countries amount to less than 5% of Eurozone GDP.

The price convergence effect is calculated by assuming that price convergence takes the same time span as output convergence. We use this instead of estimates for the Balassa Samuelson effect since mpirical work tends to produce widely differing numerical results (see for example, Mihaljek and Klau, 2003) suggests additional price rises ranging from 0 (i.e. insignificant in econometric tests) to 4% annually across different studies.

Debt: We start from the European Commission's estimated values for 2004.

Interest payments: For transparency, we conduct our analysis in terms of primary surpluses - thus the level of current interest payments on the current year's debt is excluded from our comparison. In reality, many states are currently paying higher interest rates on long-term debt, which generates higher deficit figures. But by expressing our calculations in terms of primary surpluses and actual interest payments, the comparison between the current and a sustainable fiscal position is made clear, and the aggregation bias of having bonds with different interest rates can be eliminated.

4.1 Benchmark deficits for sustainable public finances

We now calculate the benchmark deficit required to stabilise debt ratios under given circumstances. The dynamics of debts vary depending on the sign of γ-*r,* so we briefly outline the different cases below:

CASE A: Debt Dynamics if real output growth exceeds the real interest rate

Suppose that the government wishes, in the long run, to hit some target level for the debt ratio *b**. Once that target has been reached, debt can be held at its target by running a primary budget balance (t-g)* which is given by

$$(t-g)^* = (r-\gamma)b^* \qquad (6)$$

It is then relatively simple to show that to hit *b**, all the government has to do is set its primary budget balance to *(t-g)** regardless of its initial level of debt.

To see this, recall from (4) that $\Delta b = (g-t)^* + (r-\gamma)b = 0$ if b = b*. Now suppose that both b and b* are positive numbers, that $r<\gamma$, and that b<b*. Then, by definition, we have (r-γ)b > (r-γ)b*. But conversely, if b>b*, then (r-γ)b < (r-γ)b* since r-γ < 0. Hence:

$$\text{if } b>b^* \text{ then } \quad \Delta b = (g-t)^* + (r-\gamma)b < 0 : \text{but} \qquad (7)$$

$$\text{if } b<b^* \text{ then } \quad \Delta b = (g-t)^* + (r-\gamma)b > 0 . \qquad (8)$$

Thus running a constant primary budget position (g-t)* will, in the long run, lead debt levels to converge on some constant but finite value b*, defined by (6) for the current values of r and γ. In other

words, the government can control the level of its debt ratio in this scenario. In terms of fiscal discipline, this has an unconventional implication: namely that, if the government allows its primary deficit to rise to a new level that increases the debt ratio, and then holds it there, the debt path will not be explosive -- it will simply converge to some new higher level. As a result, there are only transitory effects as we converge to the new long-run level of debt.

CASE B: If real output growth is less than the real interest rate

If real output growth is less than the real interest rate, the analysis changes. We start again from (6): $\Delta b = (g - t)^* + (r - \gamma)b = 0$ if $b = b^*$. But now $(r-\gamma) > 0$. Hence:

$$\text{if } b > b^* \quad \text{then} \quad \Delta b = (g - t)^* + (r - \gamma)b > 0\,; \quad \text{but} \tag{9}$$

$$\text{if } b < b^*, \quad \text{then} \quad \Delta b = (g - t)^* + (r - \gamma)b < 0 \tag{10}$$

This means that we are back to familiar results. If the debt ratio exceeds its target level, then a more restrictive fiscal policy will be required to hold it constant or bring it back to the target level. But if the debt level *is* allowed to rise, it will do so for as long as interest rates remain above the growth rate.

The importance of these results is that the switch between these two worlds is crucial for managing debt. For as long as real economic growth exceeds the real interest rate, the key long term issue is what *level* debt is converging to. But if growth slows down and becomes less than the real interest rate, debt *sustainability* becomes the issue.

4.2 Results: The fast convergence scenario

Here we assume that, on accession to the EU, full output convergence per head takes only 25 years. The results obtained in this case are given in Table 4.

Table 4: Debt Ratio Stabilising Balances with B-S effects: 25 year catch-up

Country	***i***	**π**	**r**	**γ**	**b**	**Benchmark surplus (t-g)***	**Actual surplus t-g**	**Net Interest payments**
Czech Rep	*3.40*	*4.74*	*-1.34*	*3.89*	*37.4*	*-1.93*	***-1.80***	*-1.30*
Estonia	*5.29*	*4.39*	*0.90*	*5.26*	*4.9*	*-0.21*	***2.00***	*-0.30*
Hungary	*7.42*	*4.39*	*3.03*	*4.50*	*57.6*	*-0.81*	***-0.20***	*-4.30*
Latvia	*5.42*	*5.11*	*0.31*	*5.90*	*14.4*	*-0.79*	***-0.00***	*-0.80*
Lithuania	*5.22*	*5.17*	*0.04*	*5.61*	*19.7*	*-1.07*	***-1.50***	*-1.00*
Poland	*6.04*	*5.15*	*0.89*	*5.63*	*43.6*	*-2.02*	***-2.20***	*-2.60*
Slovakia	*5.05*	*4.83*	*0.22*	*5.16*	*43.6*	*-2.11*	***-1.10***	*-2.20*
Slovenia	*6.31*	*3.41*	*2.91*	*3.38*	*29.4*	*-0.13*	***0.00***	*-1.90*

We can draw out a number of contrasts between these longer term figures and the calculations based on actual values for economic growth and interest rates in 2004. First, Poland's position improves considerably -Similarly Hungary improves from being 1.4% adrift to 0.6% adrift; Lithuania from 0.6% to 0.4%; and the Czech Republic is now just inside her allowable deficit. These results are a demonstration of the sensitivity of the calculations to growth and real interest rate changes, when the debt ratio has already reached a significant level.

Second, the improvements in the Czech Republic, Poland and Lithuania are due to a significant fall in real interest rates, brought about by a rise in the inflation rate that can be allowed if convergence to the EU per capita output levels is to take 25 years. Growth is not the critical factor here.

Third, the exact opposite holds for Hungary, whose position visibly worsens by virtue of the fact that, in 2004, real interest rates were 1.4% compared to 3.0% in these catch up calculations. The same happens in Latvia where real interest rates rise from -1.88% to 0.31%. Earlier, we suggested that inflation was largely responsible for Hungary's (and Lithuania's) success in restraining debt accumulation; and these calculations support that observation. Under plausible medium term values for sustained growth and convergence, the current fiscal programmes could not be maintained.

The lesson here is that debt burdens are not only sensitive to a slow down in growth; they are also sensitive to the *inflation* slowdowns which will be required to join the Euro. The Maastricht

convergence criteria therefore remain important for their *indirect* effects on performance, despite the ease with which those criteria could perhaps be satisfied when the moment comes.

4.3 The slow convergence scenario

To show the effects of a growth slowdown, we now consider the same scenario but under the more modest assumption that output convergence takes 50 rather than 25 years.

Table 5: Debt Ratio Stabilising Balances with B-S effects: 50 year catch-up

Country	***i***	**π**	**r**	**γ**	**b**	**Benchmark surplus (t-g)***	**Actual surplus t-g**
Czech Rep	*3.40*	*3.36*	*0.04*	*2.93*	*37.4*	*-1.07*	***-1.80***
Estonia	*5.29*	*3.19*	*2.10*	*3.60*	*4.9*	*-0.07*	***+2.00***
Hungary	*7.42*	*3.19*	*4.23*	*3.23*	*57.6*	*+0.58*	***-0.20***
Latvia	*5.42*	*3.54*	*1.87*	*3.90*	*14.4*	*-0.29*	***-0.00***
Lithuania	*5.22*	*3.57*	*1.64*	*3.77*	*19.7*	*-0.41*	***-1.50***
Poland	*6.04*	*3.57*	*2.47*	*3.77*	*43.6*	*-0.55*	***-2.20***
Slovakia	*5.05*	*3.41*	*1.65*	*3.54*	*43.6*	*-0.82*	***-1.10***
Slovenia	*6.31*	*2.70*	*3.61*	*2.68*	*29.4*	*0.27*	***0.00***

On these figures, no-one is inside the benchmark deficit for slow convergence – Estonia excepted, and Latvia just. Poland and Slovakia fall outside their benchmark deficits because the combination of slow growth and lower inflation adds an extra 3% points to their Δb values; and they fall outside by most in this table. Slovenia and Slovakia, by contrast, form the slow debt increase group. On the other hand, none of these countries are particularly sensitive to the change of convergence speed because they are already close to their final convergence point, so the variations in the inflation and output growth needed to secure convergence are small and make little difference to the accumulation of debt. By contrast, Poland, Hungary and Lithuania – and now the Czech Republic – all now face rapid rises in their debt ratios. In fact, their growth rate in debt ratios is 1%-1.5% larger per year in each case.

4.4 A post convergence scenario

What would happen if each country were to converge on the Eurozone average for growth and inflation? Would debt control become easier? In this section, we suppose that convergence has been achieved, so that real GDP and the price level are increasing at 2% per annum, while nominal interest

rates are held at 5%. Table 6 computes the benchmark deficits required to hold debt ratios constant in such a case, starting from 2004.

Table 6: Debt Ratio Stabilising Budget Balances: Post Convergence

Country	***i***	**π**	**r**	**γ**	**b**	**benchmark (t-g)***	**Actual t-g**
Czech Rep	*5*	*2*	*3*	*2*	*37.4*	***0.37***	***-1.80***
Estonia	*5*	*2*	*3*	*2*	*4.9*	***0.05***	***+2.00***
Hungary	*5*	*2*	*3*	*2*	*57.6*	***0.58***	***-0.20***
Latvia	*5*	*2*	*3*	*2*	*14.4*	***0.14***	***-0.00***
Lithuania	*5*	*2*	*3*	*2*	*19.7*	***0.20***	***-1.50***
Poland	*5*	*2*	*3*	*2*	*43.6*	***0.44***	***-2.20***
Slovakia	*5*	*2*	*3*	*2*	*43.6*	***0.44***	***-1.10***
Slovenia	*5*	*2*	*3*	*2*	*29.4*	***0.30***	***0.00***

To ensure stability here, everyone has to run a primary surplus. Contrast that with the results in Tables 4 and 5 where most were allowed deficits. Indeed, only Estonia's current position lies within the benchmark. Thus the implied slowdown in economic growth, if convergence on current Eurozone averages were imposed, would ultimately require fiscal consolidation just to preserve sustainability – although more for some than others.

At present, Slovenia and Latvia would require only a modest contraction of less than ⅓ of a percentage point of GDP; and Estonia none. That should be manageable. It reflects the fact that these countries are currently running relatively modest primary deficits and do not require large corrections in order to hit the benchmark targets.

But Hungary, Lithuania and Slovakia need to shed 1% to 1¾% of GDP from their current deficits, the Czech Republic 2.2% and Poland 2.7% to ensure debt stability after convergence. That may be much more difficult to achieve, and arises because their actual (primary) budget deficits are significantly higher than in the first group. It is not clear if these countries would accept such radical surgery to their budgets, but they will be in regular violation of the Stability Pact (or its successors) if they don't.

The difference in the allowable deficits under our three scenarios, and the ease with which countries slip into debt accumulation, is an illustration of the sensitivity of public finances to variations in growth and inflation rates. Relatively small changes (1%-2% points) in either can have an effect on a

country's debt position. However, the growth rates which underlie tables 4 and 5 span the average growth rates for 1996-2004 (Czech Republic and Poland excepted). Hence variations in actual growth rates as large as those between the two tables are comparatively unlikely. That shows that the vulnerability to an inflation slowdown, in order to satisfy the inflation convergence criterion, is likely to be the greater problem.

5. Fiscal policy and the 60% debt rule

5.1 The run-up to joining the Euro

In this section, we calculate the budget balances which would be compatible with a debt to GDP ratio of 60% in the long run. This gives an indication of the room for fiscal maneuver that each country has in the longer term. For the purposes of illustration, we first restrict our analysis to the case where economic growth exceeds the real interest rate. In that case, a given primary deficit, maintained year on year, will lead to convergence on a constant debt ratio. But the evolution of that debt ratio before then will be given by (4): $\Delta b = (g - t) + (r - \gamma)b$. Following the analysis in section 2, imposing $\Delta b = 0$ and b = 0.6 allows us to determine the value of *(t-g)**, the size of primary surplus/deficit needed to maintain the debt to GDP ratio at 60% in the long term, as

$$(t - g)^* = 0.6(r - \gamma) \qquad (11)$$

At present it will be a primary deficit in the CEEC-8, since $r < \gamma$. Now suppose that the initial debt to GDP ratio is below 60%. For those countries, the primary deficit required to stabilise debt at *less* than 60% will be smaller than that indicated in equation (11). Hence, if one of their governments were actually to run a primary deficit equal to *(t-g)**, its debt ratio would rise. But it would still converge on 60% of GDP in the long run. The same argument applies, *mutates mutandis,* for a debt ratio which begins from a level above 60% of GDP: it would fall, but converge on 60% if the deficit were held at (t-g)*. Or more than that if the primary deficit were larger than (t-g)*; but less than that if it were smaller.

This value of *(t-g)** can therefore be thought of as a primary deficit ratio consistent with a debt ratio of 60% in the long run. Moreover, it is independent of the initial level of the debt in the country in question. The minimum primary surplus/maximum deficits for our 8 accession countries to converge

on debt ratios of 60% or less are given in Table 7, assuming growth and inflation rates appropriate for either a 25 year catch up or a 50 year catch up respectively. Their actual primary surpluses/deficits, as they stand at the moment, are given in the third column.

These figures are independent of existing debt and show that running a primary deficit is consistent with the 60% debt limit in every case whilst growth remains high. Moreover, given the interest payments currently being made (column 4), all bar Slovenia and Estonia would be able to run a measured deficit that exceeds the Stability Pact's 3% deficit limit and still converge on a debt ratio of less than 60%. In that sense, the deficit criterion for joining the Euro is essentially irrelevant at current growth rates.

Table 7: Benchmark primary surpluses required for a 60% long-run debt GDP ratio and actual deficits/surpluses

	(1) 25 year catch-up (t-g)*	**(2) 50 year catch-up (t-g)***	**(3) Current (t-g)**	**(4) Net interest payments**	**(1)+(4) Gross deficit (25 yr)**	**(2)+(4) Gross deficit (50yr)**
Czech Rep	*-3.10*	*-1.72*	*-1.80*	*-1.30*	***-4.40***	***-3.03***
Estonia	*-2.57*	*-0.89*	*+2.00*	*-0.30*	*-2.87*	*-1.19*
Hungary	*-0.85*	*+0.61*	*-0.20*	*-4.30*	***-5.15***	***-3.69***
Latvia	*-3.28*	*-1.20*	*-0.00*	*-0.80*	***-4.08***	*-2.00*
Lithuania	*-3.27*	*-1.26*	*-1.50*	*-1.00*	***-4.27***	*-2.26*
Poland	*-2.78*	*-0.76*	*-2.20*	*-2.60*	***-5.38***	***-3.36***
Slovakia	*-2.91*	*-1.13*	*-1.10*	*-2.20*	***-5.11***	***-3.33***
Slovenia	*-0.27*	*+0.56*	*0.00*	*-1.90*	*-2.17*	*-1.34*

However, if growth were to slow to the 50 year catch up rate, the results are not so good. Only the Czech Republic, Hungary, Slovakia and the Baltics would be able to run primary deficits; and only Hungary, Poland and Slovakia would have any grounds for arguing for a release from the Stability Pact's deficit limit during their catch up. Even then the dispensation could only be small (no more than ½% on the deficit ratio), and the Baltics and Slovenia would need to be kept within stricter deficit limits: 1%-2% of GDP. In reality, things are not quite so straightforward. Given the actual deficits/surpluses, these countries fall into three groups. Estonia and Latvia stand out as the only

countries which have a primary surpluses larger (or a deficit smaller) than that required to stabilise debt at less than 60% of GDP under either growth scenario in the long run.

There is the a second group consisting of the remaining six countries who are also on course for debt ratios of less than 60% in the fast growth scenario, but who would face debt ratios at or above 60% if growth slows down to 50 year catch up rate. For Slovenia and Lithuania, this qualification under the slow growth scenario is perhaps of limited importance since they are starting from debt ratios of 29% and 20% of GDP respectively, and could therefore run quite large budget deficits and still qualify for EMU entry in a few years time. But for Hungary and Poland, starting from debt ratios of 58% and 44%, the outcomes could be very different. Deficits will have to be limited early on.

Third, there is a distinction to be made within the second group: between Slovakia and the Czech Republic on one side, and Hungary, Poland, Lithuania and Slovenia on the other. Slovakia is on the margin of being able to sustain a 60% debt ratio under slow growth, and the Czech Republic is likely to converge on a level only just above 60%. But the remaining countries would have rising debt ratios. They would therefore expect debt ratios of significantly more than 60% in the near future; and in section 5.3 we show how quickly that can happen. These are the economies that will face a problem in gaining entry to the Euro, unless the convergence tests are conducted almost immediately (tables 8 and 9 in section 5.3).

5.2 Euro entry by 2008 or by 2010?

A key consideration for the second group of countries is how quickly their debt ratios will climb towards 60%. Specifically, it matters whether the debt ratio will be at or near 60% at the time at which a decision on entry to the single currency is taken by the European Commission. If the decisions are taken earlier, they will find it easier to get in. For some, the window of opportunity is small: the earliest date, given the exchange rate and inflation criteria now in place, is late 2006. But soon after that, and earlier in the case of Hungary, some debt ratios will be near or beyond 60% even at current growth rates.

To illustrate this point, tables 8 and 9 show how many years it would take for debt to exceed 60% of GDP, under both fast and slow convergence assumptions.

a) ***Given Fast Growth (table 8)***. Under these calculations, only Hungary and Poland would exceed 60% within the next 5 years. By contrast, Slovenia, Lithuania and Slovakia would see slow increases in their debt ratios. Any entry date within the next 12-14 years would not pose a problem. Finally, Estonia and Latvia face declining debt ratios and would face no problems at all.

Table 8: Paths of debt ratios under 25 year convergence scenario

Country	γ	Debt ratio					Year when b>60%
		2004	**2006**	**2008**	**2010**	**2015**	
Czech Rep	*3.89*	*37.4*	*40.69*	*43.94*	*47.18*	*55.14*	***2017***
Estonia	*5.26*	*4.9*	*0.91*	*<0*	*<0*	*<0*	*never*
Hungary	*4.50*	*57.6*	***61.34***	***65.29***	***69.48***	***81.20***	***2005***
Latvia	*5.90*	*14.4*	*14.30*	*14.20*	*14.10*	*13.86*	*never*
Lithuania	*5.61*	*19.7*	*22.59*	*25.96*	*28.32*	*35.40*	***2024***
Poland	*5.63*	*43.6*	*48.44*	*53.33*	*58.27*	***70.83***	***2011***
Slovakia	*5.16*	*43.6*	*45.78*	*47.97*	*50.15*	*55.61*	***2018***
Slovenia	*3.38*	*29.4*	*31.50*	*32.91*	*34.87*	*40.08*	***2029***

Note: "never" means the debt ratio is declining year on year, or converging to a level of less than 60%.

b) *Given Slow Growth (table 9).* The outlook is less optimistic in this scenario. Hungary's violation is brought forward within 2005, as is Poland's violation to 2009. The Czech Republic also violates the 60% debt limit within 10 years. Slovakia, likewise, sees her position worsen quite sharply and faces a violation by 2013. By contrast, Latvia now faces a debt ratio which is rising very slowly and which falls some way short of 60% for any foreseeable future. Slovenia and Lithuania similarly have modestly rising debt ratios. Finally, Estonia continues to enjoy declining debt ratios.

Table 9: Paths of debt ratios under 50 year convergence scenario

Country	γ	Debt ratio					Year when b>60%
		2004	2006	2008	2010	2015	
Czech Rep	*2.93*	*37.4*	*41.37*	*45.30*	*49.40*	*59.70*	***2015***
Estonia	*3.60*	*4.9*	*1.03*	*<0*	*<0*	*<0*	*never*
Hungary	*3.28*	*57.6*	***62.80***	***68.43***	***74.53***	***92.09***	***2005***
Latvia	*3.90*	*14.4*	*14.83*	*15.27*	*15.73*	*16.94*	***2101***
Lithuania	*3.77*	*19.7*	*23.28*	*26.98*	*30.78*	*40.75*	***2021***
Poland	*3.77*	*43.6*	*50.60*	*56.68*	***63.67***	***82.53***	***2009***
Slovakia	*3.54*	*43.6*	*47.11*	*50.73*	*54.46*	***64.27***	***2013***
Slovenia	*2.68*	*29.4*	*31.51*	*33.79*	*36.22*	*43.11*	***2024***

Note: "never" means the debt ratio is declining year on year or converging to a level of less than 60%.

Thus if accession to the Euro is delayed until after 2010, as anticipated in the Kok report, then both Hungary and Poland will fail the fiscal criteria whichever growth scenario applies. Slovakia would also have a problem if growth rates remain slow. However if entry is to be attempted in 2007 or 2008 say, then only Hungary (and possibly Poland) is likely to have a problem. But if the decision is delayed much beyond 2008, then Slovakia and the Czech Republic are also likely to face difficulties in qualifying. Thus, it is only the smaller countries (the Baltics and Slovenia) which do not risk disqualification in the near future. However, what might happen *after* entry is another matter altogether.

6. Conclusions

Our results provide four conclusions:

a) In contrast to the existing literature, which argues that price level convergence renders the nominal Maastricht critera irrevelant, we argue they are not totally irrelevant because they interact with the fiscal criteria, making the latter more difficult to achieve in the long term. We found these *indirect* effects to be important in practice.

b) We also found the deficit criterion to be irrelevant on current performance, except as a device for preventing the better performers from starting to accumulate debt. On the other hand, since inflation slowdowns are more of a danger than growth slowdowns, exchange rate convergence (which allows

inflation differentials to persist) may be a better entry strategy than aggressive inflation targeting which worsens the fiscal criteria.

c) If these arguments allow the nominal criteria to be suspended, focusing almost entirely on the fiscal criteria would have the important political economy advantage of maximizing the *principle of subsidiarity* in each decision about entry. In that regime, all decision variables affecting entry remain in the hands of the joining country and are not affected by policy decisions made elsewhere – except in so far as there are growth, inflation or monetary spillovers for other reasons from the Eurozone.

d) The prognosis for the fiscal ratios in CEEC countries is varied.

- Currently, Poland, Lithuania and the Czech Republic run quite large primary deficits, although no country violates the 3% deficit criterion at present. Similarly none exceeds the 60% debt criterion although Hungary and Poland are coming close. The key concern therefore is how fast they might approach that limit. Assuming fast growth, Hungary and Poland will pass the 60% limit within 1 to 5 years; and Slovakia within 10 years. If growth slows, Poland passes that limit in less than 5 years, and Slovakia in 8.
- Given the capacity to squeeze deficits opportunistically, and if debt is a more realistic indicator of who may safely be admitted, these results suggest those countries that have already joined ERM-II (Estonia, Slovenia, Latvia and Lithuania) will have no trouble in becoming eligible at any time within the next 20 years – even if growth does slow down.
- But Hungary, Poland, the Czech Republic and Slovakia have less leeway. Entry dates beyond 2005 would be a problem for Hungary; and beyond 2008 for Poland. For the remainder, the timetable envisaged in the Kok report should be manageable although Slovakia and the Czech Republic may find it restrictive.

The irony here is that those countries who are aiming for early entry in 2007 or 2008 are those who would not struggle to meet the fiscal criteria anyway. But those who have a slower entry strategy are precisely those whose debt dynamics imply a shorter window of opportunity.

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