Debt, Deficits and the Entry of the Accession Countries into the Euro

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Abstract:

Price and output level convergence between new member states and existing EU members necessarily imply inflation and growth divergence for many years to come. In this paper, we analyse the debt dynamics for the eight new member states from central and Eastern Europe, in a scenario which is markedly different from that of the first wave of EMU participants. We find that the nominal Maastricht criteria are rendered at best irrelevant, and at worst damaging for the duration of the catchup process- well past any plausible test date for Eurozone entry. Moreover there are strong *indirect* effects of nominal criteria, which make it harder to achieve the fiscal criteria. Our results suggests all countries would find it harder to restrain debt growth within the Euro, but that the magnitude of this effect varies substantially across countries, as do the debt dynamics outside of the Euro. If nominal criteria are suspended, the policy instruments required to achieve Euro convergence are in the hands of the individual states and are only affected by external policies to the extent that there are growth, inflation or monetary spillovers from the Eurozone. This suggests that the *principle of subsidiarity* should apply to Euro membership, placing the decision over timing of entry in the hands of individual member states.

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1. Introduction

May 1st 2004 sees the largest single expansion of the European Union in its history, when 10 new countries are 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 and Slovenia.

For all 10 new members, participation in the Eurozone is compulsory under the terms of membership. From day one, each country will be members of EMU, on the road towards full adoption of the Euro. [1] However, no specific date for adoption has been fixed for any country; on the contrary, the precise adoption date and entry strategy are to be decided by national governments and the European Commission.

Membership is formally subject to the convergence criteria laid down in the Maastricht Treaty. Three of these criteria are concerned with nominal convergence: Long-term nominal interest rates (defined as the rate on 10 year government debt) must be within 2 percent of the average in the three countries with lowest interest rates. Inflation must be within 1.5 percentage points of the average prevailing in the lowest 3 EU countries.[2] 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, and without realignment, for 2 years.

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[1] Theoretically, it is possible for a member state to remain indefinitely outside the Eurozone by choosing not fulfil the exchange rate criteria- as is currently the case with Sweden, who joined in 1995, without obtaining a *de jure* "opt out" similar to the one enjoyed by the UK and Denmark. However, given the stated intentions of the governments of the CEEC-8 countries, it is reasonable to conclude that none of them wish to exercise such a *de facto* opt-out.

[2] On current figures, the lowest 3 interest rates in an expanded EU are in Estonia, Lithuania and Sweden, all of whom are outside the single currency. It is likely that the rules will be revised to remove this anomalous situation, by framing the benchmark in terms of the three best performers who are existing members of the Euro.

In this paper, we focus on the fiscal aspects of accession to the Euro. Since the Euro's inception, concerns over fiscal policy jeopardizing the stability of the currency have been paramount. That rationale is well documented elsewhere (see for example Beetsma 2001, Fatas et al 2003, Artis and Winkler 1997), and it underpins the twin fiscal requirements of a debt ratio of less than 60% of GDP, and deficit ratio limit of 3% which was later given a permanent existence in the Stability and Growth Pact.

The three nominal criteria have been widely criticized as inappropriate as a yardstick for assessing suitability for joining the Euro. Buiter (2004), for example, points out that rigid adherence to the inflation criteria is incompatible with price level convergence if the Balassa-Samuelson effect is in operation. Likewise, the requirement to participate in EMS-II is at best unnecessary and at worse harmful, and it would in any case be inconsistent with the Belassa-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 of the nominal criteria he reaches the conclusion that the only relevant yardstick for joining is a fiscal one:

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

This opens up the possibility that a *derogation* from certain of the nominal Maastricht criteria might in fact be granted to member states, as it was to Greece in 1999. In that case the emphasis will shift once again to the two fiscal criteria:- the requirement that the debt to GDP ratio be less than 60% in each economy, and that the total government deficit should not exceed 3% of GDP.

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. Whereas the original 60% debt criterion would have required a consolidation for all but three of Eurozone economies in 1998, *all* of the CEEC-8 countries are

currently below the 60% level, and many of them comfortably so, implying that some member states 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 principally in terms of the evolution of debt ratios. However, since the debt ratio is simply the sum of previous years' nominal primary budget balances divided by nominal GDP, we are able to pinpoint annual deficits, real economic growth, interest payments and inflation as the proximate determinants of a countries debt burden over time. On the other hand, the primary budget balance in any year will have an importance, beyond that of its being greater or less than 3%, since it is the principle policy instrument which a government can use to hit a given debt target.

The paper is organised as follows: Section 2 lays out the basic analytical framework, and derives the key identities governing debt dynamics, and the conditions for debt stability.

In section 3 we analyse fiscal policy on the basis of 2002 figures, and quantify the relative contributions of economic growth, inflation in interest payments and the primary deficit to the current position. In the longer term, sustainability requires that it is the latter two which do most of the work.

In section 4 we focus on the sustainability during the catch-up phase, when prices and output converge towards EU-15 levels, and consider the effect of the speed of convergence on fiscal positions. In section 5, we consider the post convergence scenario in which inflation and output have converged to EU average levels. Lastly in section 6, we consider fiscal policy in relation to the 60% debt rule- and assess the prospects for compliance at different test dates in the next decade under the alternative catch-up scenarios considered. Our conclusions are presented in section 7.

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 primary deficit ratio. Here the accession countries are quite different from the fist 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" phase as output per head begins to converge towards average 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. 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 the Eurozone, and hence a rising real exchange rate.

This phenomenon is well known as the Belassa-Samuelson effect. But it will inevitably come to an end as the new entrants finally converge on the growth and productivity levels of the existing Euro-zone members, and as the common monetary policy starts to restrict these inflation differentials. The key question therefore is, when will this growth catch up and pattern of inflation differentials come to an end? Those factors are likely to have a crucial effect on the evolution of public debt, as we shall see. But because the growth and inflation experiences have been rather different in different counties, the effects of joining on their fiscal positions will be rather different.

Table 1 and presents a comparison of growth rates between existing and future EMU members

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

EUR-12	**Economic Growth 2002 %**	**AC-8**	**Economic Growth 2002 %**	**25 year catchup**	**50 year catchup**	**Years to catch up oncurrent growth**
Austria	*1.4*	Czech Rep	*2.0*	*4.04*	*3.02*	∞
Belgium	*0.7*	Estonia	*6.0*	*5.63*	*3.80*	*22.7*
Spain	*2*	Hungary	*3.3*	*4.51*	*3.25*	*48.0*
Finland	*2.2*	Latvia	*6.1*	*6.34*	*4.15*	*26.4*
France	*1.2*	Lithuania	*6.7*	*5.76*	*3.86*	*20.9*
Germany	*0.2*	Poland	*1.4*	*5.18*	*3.58*	∞
Greece	*3.8*	Slovakia	*4.4*	*4.96*	*3.47*	*30.7*
Ireland	*6.9*	Slovenia	*2.9*	*3.30*	*2.70*	*36.0*
Italy	*0.4*					
Luxembourg	*1.3*					
Netherlands	*0.2*					
Ave EUR-12	**1.73**	***CEEC-8***	***4.1***			

Source: European Commission (2003); Catch-up figures calculated by authors

Note: Average growth rates for the CEEC-8 were actually lower than the 2002 figures for all but Hungary, Poland and Slovenia. Catch up times for those three, at average 1996-2003 growth, would be reduced to at least 33, 39 and 17 years respectively.

These figures demonstrate the wide gap in economic growth between current EU-members and new member states, and also highlight the dispersion across accession countries. The slowest growing, Poland, has a growth rate of just 1.4%, whereas Lithuania is growing at almost five times as fast. Similarly inflation and interest rates have been rather different: see Table 2.

These 2002 growth figures can be considered broadly representative of the average long-run growth rates experienced by the CEEC-8 countries. A full table of growth rates is

presented in the appendix. With the exception of Poland, all countries are within 1.1 percentage points of their 1996-2002 average,

The last two columns show the annual 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, on the assumption that the EU average rate of growth is 2%.[3] These figures demonstrate clearly that for convergence to take place, the current high growth period will have to be sustained for some considerable time to come. [4] Indeed as things stand, the Baltics and Slovakia will take 20-30 years to catch up; Slovenia and Hungary 35-50; while Poland and the Czech Republic never will. 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.

Accordingly, the key task is to analyse how changes in the rate of economic growth affect the sustainability of each countries debt position, to discover both the sustainable level of deficit in each period, and to evaluate how sensitive these calculations are to changes in the rate of economic 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). In our analysis all variables will be

[3] These figures are broadly consistent with the empirical research on convergence rates. See Levine and Renelt (2002); Barro and Sala-i-Martin (1992)

[4] See Cresop-Cuaresma et al (2002) for evidence that accession may provide a further boost to the growth rates of these states.

expressed in real terms, and we assume that governments in the EU are not able to use inflation to alter the real value of debt.[5]

Our starting point is the government's budget constraint at time t, expressed in real 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, *B*, accumulated in previous periods must be less than or equal to the sum of tax revenue, T, plus the current period's debt.

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[6]:

$$\dot{b} = (g - t) + (i - x)b \qquad (3)$$

But *x* can be decomposed into the sum of real GDP growth, γ, and the rate of inflation, π. Similarly, the nominal interest rate can be decomposed into the sum of the real interest

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[5] This approach is consistent with the institutional structures required for entry into the single currency, and 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 ensure fiscal solvency.

[6] From here on, time subscripts are suppressed for simplicity

rate, *r*, and the rate of inflation. Making those substitutions, equation (3) can be re-written in real terms.

$$\dot{b} = (g - t) + (r - \gamma)b \qquad (4)$$

Sustainability of a given fiscal position requires that eventually all the national debt is repaid. In other words, the government cannot run a *Ponzi Game,* where it simply issues ever more debt to cover current debt plus interest payments. In terms of the dynamic debt equation, this means that the debt ratio must be non explosive and must eventually converge on some finite limit. That in turn implies $\dot{b}$, the rate of change of the debt ratio, must ultimately become less than or equal to zero. Inserting $\dot{b} = 0$ into equation (4) and re-arranging, gives the following condition for stability:

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

This expression gives the primary surplus that the government must run, in order to keep the budget ratio constant. 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. Indeed, if economic growth is fast enough, so that $\gamma > r$, the government can actually run a primary deficit up to a certain size and still hold the debt ratio constant. This is because the economic growth effect is so strong that it reduces the debt at a faster rate 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. Second, 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 at all, since there is no debt to pay off. On the other hand, if (as is the case for many developed economies) 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 thus say that countries with a higher debt burden will be much more sensitive to growth effects. The key point for the countries considered in this paper, is those that have significant debt but fast growth are far more vulnerable to slowdowns in growth. Similarly, they are also vulnerable to more restrictive monetary policies that reduce inflation successfully. In either case, the reductions in the *real* value of their debt burdens that they may have relied upon in their current policies, would become smaller.

In other words the accession countries are potentially vulnerable, in terms of fiscal convergence, to falls in γ and 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 creates the possibility that under a credible currency peg, the Balassa-Samuelson effect[7] allows higher inflation and lower real interest rates. But, as the economies converge, growth will slow and inflation will fall. The fall in γ and increase in r will require fiscal tightening and a consolidation of debt.

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. As Buiter (2004) and other have pointed out, large observed deficits now 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. Rather the focus is on a shorter time horizon, in order to uncover how debt ratios are likely to evolve in the future, particularly with regard to the Maastricht convergence criteria. Will these countries be in a position to join the Euro?

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[7] See Balassa (1964) and Samuelson (1964)

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 2002 data. Interest rates are those implicit in the actual interest payments actually made, and so may not match figures published in the markets: they depend on the composition and maturity structure of debt. It is important to use these implied rates since governments do not always finance at market rates, or refinance older debt when market rates change. The remaining data however, is 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 chose to run in 2002.

Table 2 makes it very clear that the fiscal burdens vary considerably over the accession countries, as do the fiscal strategies that they have adopted. Not only do the actual deficits vary from a surplus of 1.2% of GDP in Estonia, to deficits of 5.2% in Hungary and 5.7% in the Czech Republic; but the primary deficits/surpluses that would stabilize debt vary by almost as much – with Poland needing a surplus of 1.9%, while Hungary can allow herself deficits of up to 3.9%, and most of the others are in the 0%-1% range. Prognoses for the future therefore vary. The Czech Republic, Slovakia, Latvia, Hungary and Poland (in that order) all face rising debt burdens. But Lithuania has a neutral policy (in terms of stabilizing debt); while Slovenia has a mildly declining debt ratio and Estonia a strongly declining one.

That said, large primary deficits vs. prudent surpluses are only one reason why the fiscal burdens differ and will continue to differ. The underlying economic performances also differ between these countries, and that has implications for debt accumulation. Table 2.

Table 2: Effect on Deficit Ratios of Current Fiscal Policy

	i	π	r	γ	b	Benchmark surplus (t-g)	**Actual t-g**
Czech Rep	*4.9*	*2.6*	*2.3*	*2.0*	*27.1*	*0.08*	***-5.7***
Estonia	*3.4*	*4.1*	*-0.7*	*6.0*	*5.7*	*-0.38*	***1.2***
Hungary	*7.1*	*10.7*	*-3.6*	*3.3*	*56.3*	*-3.88*	***-5.2***
Latvia	*3.3*	*1.8*	*1.5*	*6.1*	*15.2*	*-0.70*	***-2.1***
Lithuania	*6.0*	*0*	*6.0*	*6.7*	*22.7*	*-0.16*	***-0.1***
Poland	*7.3*	*1.4*	*5.9*	*1.4*	*41.6*	*1.87*	***-0.8***
Slovakia	*6.9*	*1.8*	*5.1*	*4.4*	*44.3*	*0.31*	***-3.7***
Slovenia	*8.0*	*8.1*	*-0.1*	*2.9*	*27.0*	*-0.81*	***-0.7***

Source: European Commission, Statistical Annex to *European Economy,* Autumn 2002

Notes: [1] Nominal interest rate is the long term nominal interest rate payable on government bonds

[2] Inflation is measured using the GDP deflator

shows that for many countries, inflation has been high enough to render real interest rates negative, at least on newly issued debt.[8] That happens in Hungary, Slovenia and Estonia. Similarly growth and interest rates have varied. To see which of these variations has

[8] The picture is more complex for outstanding debt, because it is typically of varying interest rates. Calculations by the author on average nominal interest rate on existing debt do not differ by more than 1 percentage point from the listed long-term interest rate used in these calculations.

proved most important for the accumulation of debt, 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 not of great importance since the stock of outstanding debt is very low; and similarly for Slovenia where the real interest rate is only marginally negative. But for Hungary, the negative real interest rate has a significant impact. At minus 3.6% it means that, even in the absence of any economic growth, the real burden of debt is dropping by a little over 2 percentage points of GDP per year, simply due to inflation.[9] It is unlikely that a negative real interest rate will survive indefinitely – and especially not after joining the Euro, or in obtaining inflation convergence to be in a position to do so -- suggesting that Hungary's fiscal position may well worsen once real interest rates become positive again. This might have profound implications 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 ensure real exchange rate appreciation) might improve the debt dynamics.

On the other hand, Poland appears to be suffering particularly from a high real interest rate combined with its high existing debt burden. Without any growth, or additional primary deficits, this will increase the debt burden by nearly 2.5% of GDP each year. Lithuania appears to have a similar problem if less severe. Comparing Poland with Hungary is instructive- since both countries have broadly similar debt ratios. Yet once growth and inflation are taken into account, there is an annual difference of 4.5% 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 4.5 percentage points larger than Hungary.

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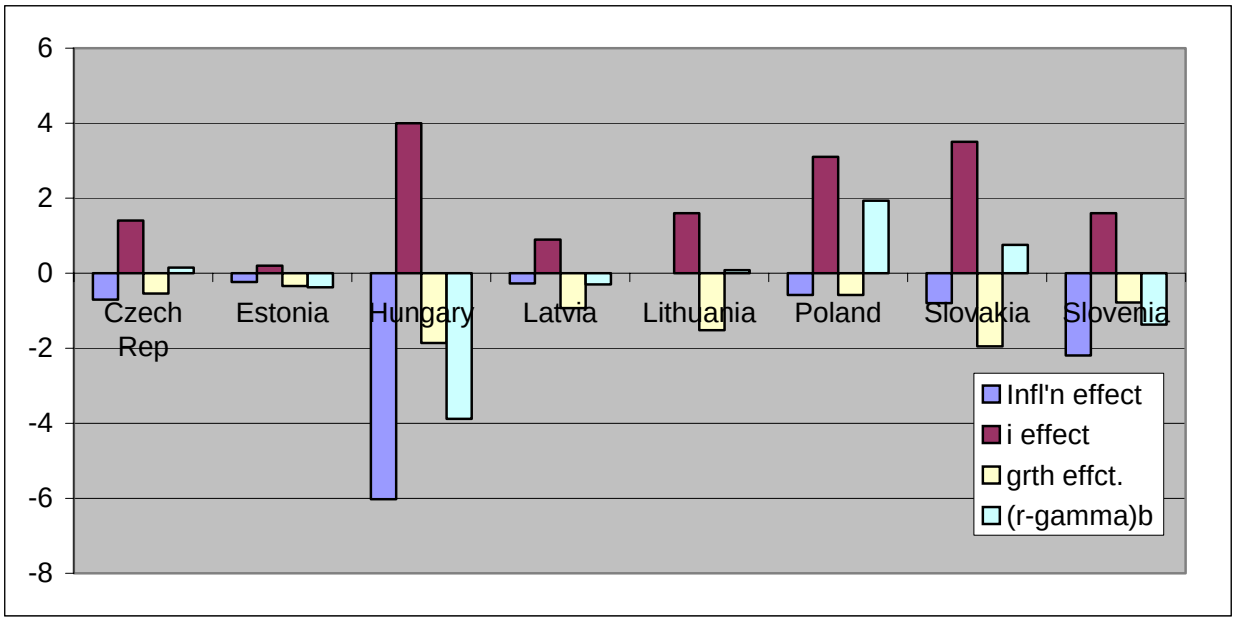
[9] This effect is calculated by multiplying the debt ratio by the real interest rate. The exact figure is 0.036 times 0.563 which equals 0.0203.

This effect can be seen in more detail in Table 3 and Figure 1, which graphs the data:

Table 3: Decomposition of Inflation, Growth and Real Interest Effects, 2002.

Country	Inflation Effect	Interest Rate Effect,nominal	Growth Rate Effect	Total (sum)
Czech Rep	*-0.70*	*1.33*	*-0.54*	*0.15*
Estonia	*-0.23*	*0.19*	*-0.34*	*-0.38*
Hungary	*-6.02*	*4.00*	*-1.86*	*-3.88*
Latvia	*-0.27*	*0.50*	*-0.93*	*-0.30*
Lithuania	*0*	*1.36*	*-1.52*	*0.08*
Poland	*-0.58*	*3.04*	*-0.58*	*1.93*
Slovakia	*-0.79*	*3.06*	*-1.95*	*0.75*
Slovenia	*-2.18*	*2.16*	*-0.78*	*-1.37*

Figure 1: Contributions of Inflation, Interest Rates and Growth Rate to Debt Dynamics, 2002



The last column in each case shows the total effect, and the other lines show the individual contributions. We see that for the Czech Republic, Estonia, Hungary and Slovenia the combined effect is approximately zero. In the case of the Czech Republic this is mainly due to the fact that inflation minus interest rates minus economic growth is approximately zero. But in the case of Estonia, the low debt ratio (at 5% of GDP) is the key factor. Comparing Hungary and Slovenia reveals another distinction- Hungary is largely dependent on fast growth and high inflation to compensate for high interest payments, whereas Slovenia has low interest payments and lower growth.

Of the countries with worsening debt ratios -- the Czech Republic, Poland and Slovakia, we see that slow growth, combined with higher interest rate payments and low inflation are worsening the debt position. Lithuania's position is similar: high interest payments and high growth, but no inflation. Table 3 therefore suggests that, with the exception of Estonia, most accession countries are running an underlying policy of debt expansion.

At this juncture it is important to note several qualifiers on any policy conclusions advanced on the basis of these calculations. First, a stable debt ratio takes no account of the cyclical state of the economy. *Ceteris paribus* a higher level of economic growth allows for a more lax fiscal policy under the constant debt ratio rule, and requires tightening under low or negative growth. However, strict adherence to this rule would result in a pro-cyclical policy. Prudent governments might choose to run more expansionary fiscal policies during downturns, and contractionary policies during the upturn. So long as the *average* fiscal stance over the cycle was compatible with debt sustainability, the role of the debt ratio in any one year might not be of any great concern.

Second, calculations need to be thought of in terms of long run values of parameters, 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, what happens to the debt burden when that comes to an end?

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 temporary expenditures to comply with the *acquis communitaire.* Fourthly, the possibility that public expenditures may generate a future return (higher growth in the future) is not accounted for.

However, the figures in table 3 are valuable because they provide us with a useful benchmark for when we consider alternative long term growth and inflation scenarios; and it shows which factors might threaten the accession countries with rising debt and hence difficulties with the convergence criteria when they come to join the Euro. In particular they provide an indication of the room for manouvre that each country has.

4 Fiscal Sustainability over the Longer Term

Accordingly, our next step is to perform the same set of calculations under a different set of assumptions. In particular we are interested in a longer time frame- roughly corresponding to the next 5 or 10 years. The scenario which we analyse is a stylized accession into the Eurozone, and entry path into the single currency. In terms of our analysis, full adoption of the Euro, a currency board and a credible peg against the Euro, are equivalent in terms of their effects on 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: We take three different values for each country. The first two figures define the growth rate required by each country in order to converge with 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.

Nominal Interest Rate = 5%: Assuming interest rate convergence is 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: We assume that the ECB keeps Eurozone inflation at the top of its 0%-2% target range. That is the ECB's declared target. 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 calculate it for 25 year catch up, 50 year catch up, or at the Eurozone average (post catch up) rates.

Previous work (for instance, Buiter and Grafe, 2002) focuses specifically on the strength of the Balassa-Samuelson effect. Empirical work tends to produce widely differing numerical results. A comparison presented by Mihaljek and Klau (2003) suggests additional price rises ranging from 0 (i.e. insignificant in econometric tests) to 4% annually across different studies. Work by Kovács on behalf of the central banks of the Czech Republic, Hungary, Poland, Slovakia and Slovenia suggested figures of between 1% and 2%. Buiter (2004) likewise suggests 1.5%-2.5% compared to the EU average.

However, some of these evaluations of the Belassa-Samuelson effect would, if sustained over a 25 or 50 year convergence period, imply a final price level in excess of that in the EU-15. That is neither plausible, nor consistent with Eurozone membership at some point. Consequently we choose just one figure for each calculation, that which is consistent with output level convergence in each of the two scenarios defined above.

Debt: We take the European Commissions estimated values for 2004. This gives us an indication of the likely debt levels upon joining the EU.

Interest Payments: In what follows, we assume that debt can be re-financed at Euro area interest rates. For transparency, we conduct our analysis in terms of primary surpluses-thus the level of current interest payments on this years 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. By expressing our calculations in terms of primary surpluses, the comparison between the current, and a sustainable fiscal

position is made clearer, and the aggregation bias of having bonds with different interest rates can be eliminated.

4.1 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 yr catch-up

Country	***i***	**π**	**r**	**γ**	**b**	**Benchmark surplus t-g**	**Actual surplus t-g**
Czech Rep	*5.17*	*4.78*	*0.38*	*4.04*	*34.5*	*-1.95*	***-5.20***
Estonia	*3.51*	*4.62*	*-1.11*	*5.63*	*5.3*	*-0.19*	***-0.10***
Hungary	*7.10*	*4.62*	*2.48*	*4.51*	*56.9*	*0.50*	***-1.30***
Latvia	*5.92*	*5.22*	*0.70*	*6.34*	*18.2*	*-1.30*	***-1.90***
Lithuania	*7.05*	*5.31*	*1.74*	*5.76*	*23.6*	*-0.80*	***-1.70***
Poland	*7.45*	*4.62*	*2.83*	*5.18*	*49.2*	*-1.45*	***-2.80***
Slovakia	*7.90*	*5.60*	*2.30*	*4.96*	*45.2*	*-2.17*	***-1.40***
Slovenia	*5.93*	*3.47*	*2.46*	*3.22*	*27*	*-0.11*	***-0.90***

On the basis of this table, debt ratios for the group of countries as a whole appear more sustainable. The fact that every country may run a benchmark (primary) deficit, Hungary excepted, indicates that growth is outstripping interest payments. As a result, balanced primary budgets will result in declining debt ratios, and that a stable the debt ratio can be achieved with g>t.

In terms of actual performance, Estonia, Lithuania and Poland are inside the benchmark deficits required for debt sustainability. A second group, Slovenia and Latvia, emerge within approximately one percentage point of the benchmark- implying that debt ratios

will rise, but relatively slowly. A third group comprising Slovakia, Hungary and the Czech Republic face much faster rises in debt ratios (up to 5% points each year).

We can draw out a number of contrasts between these longer term figures, and the calculations based on actual values of economic growth and interest rates for 2002. First, Poland's position improves considerably- from having a primary budget deficit 2.7% adrift from that required for debt ratio stability in Table 2, it moves to being 0.8 percentage points and inside the benchmark needed for debt stability. This is because 2002 was a period of low growth, low inflation and high nominal interest rates for Poland, so the prognosis improves substantially when we take longer term values. More generally, this case provides a clear demonstration of the sensitivity of calculations to growth, and the real interest rate, when the debt ratio is relatively high.

Second, the improvement in Lithuania is due to a significant fall in the real interest rate, brought about chiefly 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.

Third, the exact opposite holds for Hungary, whose position worsens by virtue of the fact that, in 2002, implied real interest rates were –3.6%, compared to 2.5% in the catch up calculations. Earlier, we suggested that inflation was largely responsible for Hungary's restrained debt accumulation; and these calculations support this observation since they suggest that, under more plausible values for sustained growth and convergence, the current primary deficits cannot be maintained.

The lesson here is that debt burdens are not only potentially sensitive to a slow down in growth; they are also sensitive to the inflation slow downs which will be required (for some) in order to join the Euro. The Maastricht convergence criteria therefore remain important for their *indirect* effects on performance, despite the ease with which those criteria can probably be satisfied when the moment comes. This conclusion contrasts with that reached by Buiter (2004) when considering the *direct* application of those criteria. The point made here is that these convergence criteria are not independent: they interact.

4.2 The slow convergence scenario

We now consider the same set of results, but under the more modest growth assumption that output convergence takes 50 rather than 25 years. Table 5 presents the results:

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

Country	***i***	**π**	**r**	**γ**	**b**	**Benchmark surplus t-g**	**Actual surplus t-g**
Czech Rep	*5.17*	*3.38*	*1.78*	*3.02*	*34.5*	*-1.11*	***-5.20***
Estonia	*3.51*	*3.30*	*0.21*	*3.80*	*5.3*	*-0.02*	***-0.10***
Hungary	*7.10*	*3.30*	*3.80*	*3.25*	*56.9*	*1.97*	***-1.30***
Latvia	*5.92*	*3.60*	*2.32*	*4.15*	*18.2*	*-0.61*	***-1.90***
Lithuania	*7.05*	*3.64*	*3.41*	*3.86*	*23.6*	*0.04*	***-1.70***
Poland	*7.45*	*3.30*	*4.15*	*3.58*	*49.2*	*-0.01*	***-2.80***
Slovakia	*7.90*	*3.79*	*4.12*	*3.47*	*45.2*	*-0.68*	***-1.40***
Slovenia	*5.93*	*2.73*	*3.20*	*2.61*	*27*	*0.26*	***-0.90***

On these figures, Lithuania remains inside the benchmark deficit even with slower convergence. Estonia is marginally outside the benchmark; Poland and Estonia however, now falls into the intermediate category because the combination of slower growth and lower inflation adds an extra 3% points to $\dot{b}$.

Slovenia also remains in the intermediate group. Neither is particularly sensitive to the change of convergence speed. This is primarily because Slovenia is already quite close to full convergence, so variations in the inflation and output growth needed to secure full convergence are relatively small and make little difference to the accumulation of debt. But, as before, the Czech Republic, Slovakia, Hungary – and now Latvia – all face rapid rises in their debt ratios. In fact, the growth rate in debt burdens is 1% larger in each case.

5. The Post Convergence Scenario

What happens after each country converges to the Eurozone averages? In this section, we assume that output and price level convergence has been achieved, and so both real GDP and the price level are increasing at 2% per annum, whilst the nominal interest rate remains unchanged at 5%.

5.1 Debt under lower growth

Case A: *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 is primary budget balance to $(t\text{-}g)^*$ regardless of its initial level of debt.

To see this, recall from (6) that $\dot{b} = (t-g)^* + (r-\gamma)b = 0$ if b = b*. Now suppose both b and b* are positive numbers, that $r<\gamma$, and that b<b*. Then, by definition, we have $(r-\gamma)b > (r-\gamma)b^*$. But conversely, if b>b*, then $(r-\gamma)b < (r-\gamma)b^*$ since $r-\gamma < 0$. Hence it follows that:

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

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

Thus running a constant primary budget position (g-t)* will, in the long run, lead debt levels to converge on some constant, finite value b* which is 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 a somewhat startling implication: namely 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 be converging to a higher level. As a result, there are only transitory effects as we converge to new long-run levels of debt.[10]

This situation may appear perverse, but it only holds so long as real interest rates are lower than the rate of economic growth. While currently true for the accession countries, this cannot be the case for ever. We must also consider what happens when growth slows enough to be less than the real interest rate -- as in the Eurozone.

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

If real output growth is less than the real interest rate, then our analysis changes. Again the analysis starts from (6): $\dot{b} = (t - g)^* + (r - \gamma)b > 0$. But now (r-γ)>0. Hence:

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

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

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

This switch between these two different worlds is of crucial importance for managing debt. For as long as real economic growth exceeds the real interest rate, the issue is what

[10] We ignored the case of b<0 here. However b<0 would reverse the results given at (7) and (8), and in the companion case (8) and (9) which follows. Thus, if the government becomes a net creditor (b<0), the ownership level will implode if γ > r; but it will converge to some constant level of assets if γ < r. Hence slow growth/high interest rates will be the sustainable case if the government becomes a net creditor. But if growth then speeds up, the government will increase its ownership of assets and eventually own the whole economy.

level debt is converging to. But if growth slows down and becomes less than the real interest rate, *sustainability* becomes the issue.

5.2 Debt Sustainability after Accession to the Euro

With this analysis in place, we can now compute the appropriate benchmark surpluses required to hold the debt ratio constant. These surpluses are shown in table 6, where debt starts at 2004 levels and post-convergence means having Eurozone inflation, growth and inflation rates.

Table 6: Debt Ratio Stabilising Balances: Post Convergence

Country	***i***	**π**	**r**	**γ**	**b**	**benchmark t-g**	**Actual t-g**
Czech Rep	*5*	*2*	*3*	*2*	*34.5*	***0.35***	***-5.20***
Estonia	*5*	*2*	*3*	*2*	*5.3*	***0.05***	***-0.10***
Hungary	*5*	*2*	*3*	*2*	*56.9*	***0.57***	***-1.30***
Latvia	*5*	*2*	*3*	*2*	*18.2*	***0.18***	***-1.90***
Lithuania	*5*	*2*	*3*	*2*	*23.6*	***0.24***	***-0.70***
Poland	*5*	*2*	*3*	*2*	*49.2*	***0.49***	***-2.80***
Slovakia	*5*	*2*	*3*	*2*	*45.2*	***0.45***	***-1.40***
Slovenia	*5*	*2*	*3*	*2*	*27.0*	***0.27***	***-0.90***

To ensure stability here, everyone has to run a primary surplus. Contrast that with the earlier results of Tables 4 and 5 where most were allowed deficits. In fact not even Estonia's current position lies within the benchmark, implying that, if the 2004 fiscal policies were maintained indefinitely, the debt ratios of all the CEEC-8 countries would prove explosive. Thus the implied slowdown in economic growth, once inside the Eurozone, will ultimately require fiscal consolidation just to preserve sustainability – although more for some than others.

At present, Slovenia and Lithuania would only require a modest contraction of around 1 percentage point of GDP; and Estonia 0.2%. 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, Latvia and Slovakia need to shed 2% of GDP from their current deficits, Poland 3.5% and the Czech Republic 5.5%, to ensure debt stability. 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 because their benchmark primary surpluses are different. 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.

6. Fiscal Policy and the 60% Debt Rule

Any accession country will be concerned about how the evolution of its debt ratio will compare to the 60% benchmark required by the Maastricht criteria when it comes to entry into the single currency. The key issue will be whether or not the current fiscal policy is compatible with a debt ratio of 60% or less of GDP in the longer term. Comparing the current debt ratio with the 60% benchmark (or the current deficit to its 3% limit) is of little use since it provides a snapshot of the present, not an assessment of the future.

6.1 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 purpose 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 (3): $\dot{b} = (g - t) + (r - \gamma)b$. Following the analysis in section 5.1, imposing $\dot{b} = 0$ 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

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

In this case, it will be a primary deficit since r < γ. Now suppose that the initial debt to GDP ratio is below 60%, as is the case for all 8 countries in this paper. For them, the primary deficit required to stabilise debt at those lower levels (i.e at less than 60%), 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 higher than 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 catch up to Eurozone output levels. 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 current interest payments being made (final column), all bar Slovenia 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. However, if growth were to slow to the 50 year catch up rate, the results are not so good. Only the Czech Republic and the Baltics would be able to run primary deficits; and none would have reasonable grounds for arguing for dispensation from the Stability Pact during their catch up.

Table 7: Benchmark Primary Surpluses required for a 60% long-run debt GDP ratio and Actual Surpluses

	25yr catchup (t-g)*	50yr catchup (t-g)*	Current (t-g)	Current (2004) Interest payments
Czech Rep	*-2.20*	*-0.74*	*-5.20*	*1.00*
Estonia	*-4.05*	*-2.16*	*-0.10*	*0.30*
Hungary	*-1.22*	*0.33*	*-1.30*	*3.20*
Latvia	*-3.38*	*-1.09*	*-1.90*	*0.80*
Lithuania	*-2.41*	*-0.27*	*-0.70*	*1.40*
Poland	*-1.41*	*0.34*	*-2.80*	*3.00*
Slovakia	*-1.60*	*0.39*	*-1.40*	*2.60*
Slovenia	*-0.46*	*0.35*	*-0.90*	*1.80*

In practice, things are not quite so easy. Given the actual deficits/surpluses, these countries fall into three groups. Estonia stands out as the only country which has a primary surpluses larger (or a deficit smaller) than that required to stabilise debt at less than 60% of GDP in the long run under either growth scenario.

There is the a second group consisting of Latvia, Lithuania, and Slovakia (but only just) who are also on course for debt ratios of less than 60% in the fast growth scenario, but who would face debt ratios above 60% if growth slows down to 50 year catch up rate. For Latvia, and Lithuania, this qualification under the slow growth scenario is perhaps of limited importance, since they are commencing from debt ratios of between 18% and 23% of GDP, and so could therefore run quite large budget deficits and still qualify for EMU entry in a few years time. But for Slovakia, starting from a debt ratio of 45%, it is important. Deficits will have to be limited early on.

The third group: Czech Republic, Hungary, Slovenia and Poland fail to hit the benchmark budget balances for either growth scenario. They can therefore expect debt ratios of

more than 60% in the near future; and, in section 6.3 below, we show how quickly that could happen. These are the economies that will face a problem in gaining entry to the Euro, unless the convergence tests are conducted almost immediately (see Tables 9 and 10 below).

6.2 A Debt Rule Criterion

Table 7 made the point that, at current growth rates, the deficit criterion may be largely irrelevant for joining the Euro. Meanwhile several commentators have recommended that governments should achieve debt to GDP ratios of 50% or less in order to have some safety margin which allows them to run deficits, in bad times, without violating the Eurozone fiscal criteria. Proposals of this kind, and how they could be used to modify the Stability Pact, will be found in Pisani-Ferry (2002), Calmfors and Corsetti (2002). or Fatas et al (2003). We are not concerned with the Stability Pact here of course. But would a 50% rule make any difference to ability of these economies to join the Euro?

Table 8 reproduces Table 7 with a 50% rule. There is little change: Estonia is on course

Table 8: The Primary Surpluses Required To Reach a 50% Debt Ratio in Long Run

	25yr catchup (t-g)*	**50yr catchup (t-g)***	**Actual (t-g)**	**CurrentInterest payments**
Czech Rep	*-1.83*	*-0.62*	*-5.20*	*1.00*
Estonia	*-3.38*	*-1.80*	*-0.10*	*0.30*
Hungary	*-1.02*	*0.28*	*-1.30*	*3.20*
Latvia	*-2.82*	*-0.91*	*-1.90*	*0.80*
Lithuania	*-2.01*	*-0.23*	*-0.70*	*1.40*
Poland	*-1.18*	*0.28*	*-2.80*	*3.00*
Slovakia	*-1.33*	*0.33*	*-1.40*	*2.60*
Slovenia	*-0.38*	*0.29*	*-0.90*	*1.80*

to satisfy such a rule under fast or slow growth. Latvia and Lithuania would violate it in the slow growth case, as would the remainder (Hungary, Slovenia, the Czech Republic, Poland and Slovakia) even with fast growth.

The lesson here is that different debt rules would make rather little difference to our assessment of the fiscal health of these countries. This supports the conclusion in Fatas et al (2003). A second observation is that each of these "tests" has separated the accession countries into different groups, but the membership of these groups has varied each time. This underlines the fact that it is not straight forward to predict the effects of a certain policy or regime on the fiscal state of an economy. It is therefore important to assess the effects of joining the Euro on the fiscal balances of each country, in a way which is not so important for inflation or monetary convergence.

6.3 Euro Entry by 2008 or 2010?

A key consideration for the second and third groups of countries above, 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[11]. But later than that, some debt ratios will be near or beyond 60% even at current growth rates.

To illustrate this question, 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.

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[11] Both the ECB and the European Commission have recommended caution in setting target dates for adopting the Euro (Solbes 2004, ECB 2003) – so late 2006 might be rather optimistic. However, as Buiter (2004) says, few would oppose caution here unless it lead to a course of action which turned out to increase the risks associated with membership. But that is exactly what we are testing here: would caution worsen the debt burden later? The answer is evidently yes in most cases, although entry to the Euro is not likely to do anything to solve that difficulty.

Table 9: Paths of Debt Ratios under 25 year convergence scenario

Country	γ	Debt Ratio				Year when
		2002	2007	2012	2017	b>60%
Czech Rep	*4.04*	*27.1*	*48.69*	*69.62*	*86.17*	***2010***
Estonia	*5.63*	*5.7*	*-1.05*	*-7.08*	*-11.44*	*never*
Hungary	*4.51*	*56.3*	*69.51*	*82.09*	*91.85*	***2004***
Latvia	*6.34*	*15.2*	*20.04*	*23.12*	*26.72*	***2039***
Lithuania	*5.76*	*22.7*	*17.04*	*12.23*	*8.91*	*never*
Poland	*5.18*	*41.6*	*36.15*	*31.17*	*27.45*	*never*
Slovakia	*4.96*	*44.3*	*49.83*	*54.68*	*58.12*	***2019***
Slovenia	*3.22*	*27.0*	*28.18*	*29.46*	*30.63*	***2098***

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

a) *Fast Growth*. Under these calculations, only the Czech Republic and Hungary would exceed 60% within 10 years. In the case of the Czech Republic, this is primarily due large primary deficits. Hungary's debt grows more slowly, but begins from a level much closer to 60% -- which means that any primary deficit in excess of the debt stabilising value, will lead to a violation of the 60% limit very quickly. On the other hand, Slovenia, Latvia and Slovakia would see relatively slow increases in their debt ratios. Any entry date within the next 14 years would not pose a problem for them. Finally, Estonia, Lithuania and Poland all face declining debt ratios, and would face no problems at all.

Table 10: Paths of Debt Ratios under 50 year convergence scenario

Country	γ	Debt Ratio				Year when
		2002	2007	2012	2017	b>60%
Czech Rep	*3.02*	*27.1*	*52.97*	*81.70*	*103.85*	***2009***
Estonia	*3.80*	*5.7*	*-0.63*	*-7.38*	*-12.39*	*never*
Hungary	*3.25*	*56.3*	*77.27*	*100.35*	*118.01*	***2003***

Latvia	*4.15*	*15.2*	*23.17*	*31.37*	*37.24*	***2025***
Lithuania	*3.86*	*22.7*	*20.47*	*18.15*	*16.46*	*never*
Poland	*3.58*	*41.6*	*41.68*	*41.77*	*41.84*	***2916***
Slovakia	*3.47*	*44.3*	*57.21*	*70.88*	*80.92*	***2009***
Slovenia	*2.61*	*27.0*	*30.02*	*33.58*	*36.48*	***2040***

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

b) *Slow Growth.* The outlook is less optimistic in this scenario. Hungary's violation is brought forward by one year to 2003, as is the Czech Republic's violation. Slovakia, on the other hand, now sees her position worsen quite dramatically and faces a violation by 2009.

Poland, by contrast, faces a debt ratio which is now rising slowly, but which still falls some way short of 60% for any foreseeable future. Slovenia also has a modestly rising debt ratio, but starts from a low base and so is comfortably within the 60% limit for 35 years. Finally, Estonia and Lithuania face declining debt ratios.

Thus, if accession to the Eurozone is likely after 2010, then both Hungary and the Czech Republic are likely to 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 Hungary only is likely to have a problem. Interestingly, Poland (the laggard at present) and the smaller countries do not risk failure in the foreseeable future. But what might happen *after* entry is another matter.

6.4 Would Fiscal Restraint be Easier in the Eurozone?

Finally, we relax the constraint that growth is larger than interest rates, which has conditioned all the calculations so far. An interesting way to do this is to examine whether joining the Euro would make it easier or more difficult to restrain any increases in the debt ratios.

One answer to this question might be "yes". If membership of the Euro means a Stability Pact which is enforced, then the Czech Republic, Hungary, Poland and Slovakia would all have to reduce their budget deficits.[12] Consequently, their debt accumulation would be slower from that source. However, that presupposes that the Stability Pact" limit of deficits would be enforced. In the current climate, where the Stability Pact has been lifted for France, Germany and Portugal, and maybe for the next in line (Italy, Greece and the Netherlands), it is not clear that it would in fact be enforced. And even if it were, it is possible that changes elsewhere in the system would have the effect of altering the speed of debt accumulation.

Table 11 sets out the sources of growth in the debt ratios, in and out of the Euro in the manner of table 3, assuming similar primary deficits in either case. This allows us to pinpoint the factors that are most likely to cause an increase in the debt ratios in each case, and hence what changes in performance each country's fiscal strength is most sensitive to. In order to give a long run picture, we take a post-convergence scenario. That means, in the Euro, growth is assumed to have converged on the Eurozone average (2%), real interest rates likewise (3%; i=5%, π=2%, see table 6). Table 11 therefore starts from the 2004 debt ratios and computes the likely *post-convergence* increases in the Euro vs. those out of the Euro, assuming that the higher inflation, growth and interest rates that come with no convergence on the Eurozone continue. We suppose that the latter would remain as in tables 1-3 for the foreseeable future.

Table 11: Sources of Expansion in Debt Burdens, in and out of the Euro, Net of Primary Deficits, as % of GDP

	Out of the Euro	**In the Euro**

[12] See table 7: the sum of their primary deficit ratios and interest payments exceeds 3% of GDP in each case. Estonia, Latvia Lithuania, and Slovenia would not be affected on this score.

	Interest Paym'ts	Inflation Effect	Growth Effect	Total	Interest Paym'ts	Inflation Effect	Growth Effect	Total
Czech R	*1.10*	*-0.93*	*-0.90*	***-0.73***	*1.73*	*-0.69*	*-0.69*	**+0.35**
Estonia	*0.35*	*-0.23*	*-0.27*	***-0.14***	*0.27*	*-0.11*	*-0.11*	**+0.05**
Hungary	*5.70*	*-4.27*	*-1.82*	***-0.39***	*2.85*	*-1.14*	*-1.14*	**+0.57**
Latvia	*0.80*	*-0.47*	*-0.95*	***-0.62***	*0.91*	*-0.36*	*-0.36*	**+0.19**
Lithuania	*1.82*	*-0.57*	*-1.35*	***-0.10***	*1.18*	*-0.47*	*-0.47*	**+0.24**
Poland	*3.37*	*-0.79*	*-2.07*	***+ 0.52***	*2.46*	*-0.98*	*-0.98*	**+0.50**
Slovakia	*2.60*	*-2.31*	*-1.85*	***-1.56***	*2.26*	*-0.90*	*-0.90*	**+0.46**
Slovenia	*1.70*	*-1.51*	*-0.84*	***-0.65***	*1.35*	*-0.54*	*-0.54*	**+0.27**

As things stand, given the actual primary deficits reported in tables 7 and 8, the policy makers themselves pose the greatest threat to fiscal restraint in the Czech Republic, Latvia and Slovakia. But this is not the case in Hungary or Poland. An inflation slow-down would cause problems in Hungary, Slovakia and Slovenia (but falling interest rates would provide some compensation in Hungary). A growth slowdown would do the most damage in Latvia, Lithuania and Poland. But Estonia and especially Poland are actually more sensitive to high interest rates outside the Euro, and would therefore benefit most from joining.

If these countries were to join the Euro, this classification would not change. But the cost and the likelihood of continued fiscal discipline would. Only Poland would find it (slightly) easier to restrain debt accumulation. All the other accession countries would find that their debt ratios would climb faster than before, and they would come under renewed and additional pressure to reduce their budget deficits in order to offset this tendency for debt to rise – Stability Pact or no Stability Pact. Those worst hit by more difficult conditions in the Eurozone would be Slovakia in the first place (debt rising 2% of GDP a year faster than she might have experienced outside); then Slovenia, Hungary and the Czech Republic (1%), and then Latvia, Lithuania and Estonia (0.3%). These changes are mainly coming from the slowdown in inflation in Hungary, Slovakia and

Slovenia; in growth in Poland, Lithuania and Latvia; and from both in the Czech Republic. So, although this worsening of debt could always be offset by forcing smaller primary deficits, the scope for doing so inside EMU may be relatively limited. On the other hand it may be the only way for Hungary, Slovakia, Slovenia and the Czech Republic to control their debt after converging on the EU average. Policy makers are therefore likely come under strong pressure to reduce their deficits. But their ability to arrest the growth in debt in this way may be limited; and it may not be possible to generate the budget cuts necessary, given the amount of restructuring to be done.

7. Conclusions

Our results lead to five main conclusions:

a) The three nominal convergence criteria contained in the Maastricht Treaty are at best irrelevant in this context, and inappropriate (if not damaging) at worst because of the operation of the Belassa-Samuelson effect as part of the natural catch up to Eurozone levels of output per head. This has been argued powerfully by Buiter (2004). What we have added is that this catch up process is likely to last 20 to 50 years or more (on current and average performances), depending on the country. So the irrelevance of the nominal convergence criteria is likely to last two decades[13] – well past any plausible test date for Eurozone entry.

b) That said, the situation is more complicated than Buiter's analysis allows. The nominal convergence criteria are not totally irrelevant because they interact with the fiscal (real) criteria, making the latter more difficult to achieve in the long term. We found these *indirect* effects to be important in practice.

c) If these conclusions suggest that the nominal criteria 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, as Buiter (2004) has argued. In that regime, all decision variables which affect entry remain in the hands of the joining country and are not affected by (policy) decisions made elsewhere – except to the extent that there are growth, inflation or monetary spillovers from the Eurozone. At this point such spillovers have done little damage to the fiscal ratios in those countries.

d) Despite being more similar to each other than to the current Eurozone at present, the prognosis for the fiscal ratios in CEEC countries is very varied. Currently, Poland and the Czech Republic run quite large primary deficits. Hungary and Slovakia would also violate the 3% deficit criterion at present. But none of them would exceed the 60% debt criterion – in contrast to the existing Euro members. However the key concern is how fast they might approach that limit. Assuming fast growth continues, Hungary and the Czech

[13] The alternative presumably would be to delay entry for 20-30 years, so the conventional criteria can be satisfied without damage to the accession economies.

Republic will pass that limit in the next 3-5 years; Slovakia within 15 years. If growth slows, also passes that limit in 5 years. Given the capacity to squeeze deficits opportunistically, if debt is taken as a more realistic indicator of who may safely be admitted,[14] these results suggest the other 5 countries will have no trouble in becoming eligible at any time within the next 20 years – even if growth slows down. But for the first three, the window of opportunity is rather short. Entry dates beyond 2005 would be a problem for Hungary; and beyond 2008 for the Czech Republic and Slovakia (possibly). The earliest date is late 2006.

e) That said, all 8 countries will find it more difficult to constrain the growth in debt once inside EMU. They will certainly come under additional pressure to reduce their deficits then, if not before entry. That may be difficult politically, but they all (Estonia excepted) will be in regular violation of the Stability Pact or its successors if they do not. That might prove more difficult politically.

[14] There is, as we point out elsewhere (Hughes Hallett and Jensen,2003), always an issue of the incentive to be joined, as well as to join.

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Appendix A

Economic Growth in CEEC-8 countries 1994-2002

	CZ	EE	HU	LV	LT	PL	SK	SI
1996	*4.3*	*3.9*	*1.3*	*3.7*	*4.7*	*6*	*5.8*	*3.8*
1997	*0.8*	*9.8*	*4.6*	*8.4*	*7*	*6.8*	*5.6*	*4.4*
1998	*-1*	*4.6*	*4.9*	*4.8*	*7.3*	*4.8*	*4*	*3.7*
1999	*0.5*	*-0.6*	*4.2*	*2.8*	*-1.8*	*4.1*	*1.3*	*5.9*
2000	*3.3*	*7.3*	*5.2*	*6.8*	*4*	*4*	*2.2*	*4.1*
2001	*3.1*	*6.5*	*3.8*	*7.9*	*6.5*	*1*	*3.3*	*2.9*
2002	*2*	*6*	*3.3*	*6.1*	*6.7*	*1.4*	*4.4*	*2.9*
Average	***1.86***	***5.36***	***3.90***	***5.79***	***4.91***	***4.01***	***3.80***	***3.96***