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WHO NEEDS AN EXTERNAL ANCHOR?

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Abstract

This paper argues that there might be non-monotonic relationship between the strength of the domestic framework for fiscal policy and the interest of a country to use an external anchor to achieve price stability. Countries with a strong domestic framework, e.g. low public debt, little pressure for excessive expenditure and an efficient tax system, would anyway enjoy low inflation rates and therefore have little need for an external anchor. Countries with high debt or very weak institutions would greatly benefit from an external anchor to save them from the extreme inflation rates they would otherwise have to endure because the market knows that the temptation for them to inflate public debt away is so strong. By contrast, countries with moderately weaknesses might be in a situation where they need some inflation to supplement government revenues with seigniorage, but the inflation resulting from the interaction with the market, which knows about this, is still moderate.

Applied to the enlargement process this implies that both countries with very strong and those with very weak institutions might have an interest in joining the euro area quickly. The choices of Estonia (very strong) and Bulgaria (very weak), to adopt the euro/DM via currency boards, seem to reflect these considerations.

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I. Introduction

It is well known that highly indebted countries, or countries with weak fiscal institutions, can fall into a low credibility trap. This occurs when a government loses credibility in the eyes of the financial markets and is forced to pay a risk premium in the form of higher interest rates. The higher debt-service burden that results, if inflation is kept low, makes it even more likely that the authorities will abandon efforts to stabilise the situation and attempt to reduce the real value of the debt through a surprise inflation. This further increases the risk premium demanded by financial markets and can lead to a spiral of increasing interest rates until the government caves in and produces the inflation the market expects.

A country in such a situation has an interest in using an external anchor. For the Central and Eastern European countries the obvious candidate to be such an anchor would be the euro given that mot of their external trade is with the euro area. Some countries have already de facto joined the euro area by linking their money via a currency board to the DM (e.g. Estonia, Bulgaria). For all the others, which are also candidates for membership in the EU, a key question that remains on the table is when to enter the euro area as well. The orthodox approach to the issue of EMU membership is that countries should converge gradually first and can join the euro area only once they satisfy the Maastricht criteria on inflation and public finance. However, this approach misses the point that the weaker countries would actually gain more from joining EMU than countries that have already achieved price stability on their own. Fulfilment of the Maastricht criteria can be reasonably required of countries that want to have a seat on the Governing Council of the ECB. Nevertheless this should not prevent weaker countries from considering to adopt the euro unilaterally, either via a currency board (as in Estonia and Bulgaria) of via full euro-isation under which the domestic currency is fully substituted by euro notes and coins (which becomes feasible in 2002) as discussed in Emerson and Gros (1999).

The purpose of this note is to show that the standard model that is used to explain why a country with a credibility problem might benefit from an external anchor, can actually lead to the result that the relationship between the strength of fiscal institutions (in the sense of their ability to sustain price

stability) and the interest in joining the euro area is not monotonic. The very strong might benefit (as assumed under the orthodox convergence approach), but the very weak would also benefit and should thus contemplate a different, unilateral approach.

The remainder of this paper is structured as usual: the next section presents the model. This is followed in section III by an examination of the relationship between the interest in an external anchor and the level of public debt. Section IV describes briefly how an inefficient fiscal policy, which allows special interest groups to gain at the expense of society can lead to excessive inflation and shows how the degree of inefficiency influences the interest of the country in adopting the euro. Section V concludes.

II. The Model

The model used here is entirely conventional. The starting point is a standard social loss function, L_t, given by:

(1) $L_t = [\alpha q_t^2 + p_t^2] \qquad \alpha \geq 0$

where p_t stands for the inflation rate and q_t stands for tax revenues as a percentage of GDP, which is equivalent to the average tax rate. High taxes and high inflation create distortions and are thus socially costly. The parameter α indicates the *relative* weight of taxes in the social loss function. A high α could be interpreted to mean that the tax collection system is not efficient, i.e. that it causes high distortion costs for a given revenue. The experience in Central and Eastern Europe has shown that there are indeed great differences in the ability of different countries to raise taxes. In Russia, to take an extreme example, the government is not even able to raise 15% of GDP, whereas in Estonia government revenues amount to over 30 % of GDP.[1] At this point it is assumed that the government reflects accurately the preferences of society in setting taxes and inflation. Section IV below will show why this might not be the case, and what the consequences of relaxing this assumption are.

The aim of the authorities (as usual, no distinction is made between the central bank and the Ministry of Finance) is to minimise this loss, subject to the budget constraint:

(2) $d(b_t) = g_t + b_t(i_t - p_t) - q_t - p_t\sigma$

[1] An alternative interpretation would be that society and/or the politicians in power dislike high taxes (for example, because their marginal voter is a household with a high marginal tax rate).

where b_t is the public debt/GDP ratio and g represents (non-interest) expenditure relative to GDP. The last term in this budget constraint represents seigniorage revenues under the assumption of a constant velocity money demand function with the cash (or rather monetary base) to GDP ratio constant and denoted by σ. The constant velocity assumption implies that seigniorage increases linearly with inflation. This is not realistic, but this assumption was chosen in order to show that the results do not depend on a 'Laffer curve' for seigniorage revenues under which the revenues from the inflation tax fall with very high inflation rates as money demand goes towards zero. In countries with moderate inflation seigniorage revenues are usually around 2-3 % of GDP, or, between 5 and 10 % of overall public sector revenues. Seigniorage is thus significant, but usually not the most important source of revenue. However, a number of the countries in Central and Eastern Europe had episodes in the recent past, when seigniorage revenues were much more important, amounting up to 10 % of GDP. For an analysis of the importance of seigniorage revenues in transition countries and the relative stability of money demand even under hyperinflation see Gros and Steinherr (1995) or Gros and Vandille (1995).

It is implicitly assumed that the monetary base consists only of cash. Introducing required reserves on commercial banks (which could be remunerated) would not change the thrust of the analysis. If required reserves are not remunerated (which is usually the case) the value of σ would just be somewhat higher.

For the sake of simplicity, real growth is assumed to be zero. Government expenditure could be made endogenous, as in a number of other contributions on the optimal choice of taxes and inflation. This has not been done here however as it would not affect the main results of the paper, which concentrate on the incentive to use surprise inflation to reduce the real value of the public debt.[2]

The crucial point about the budget constraint (2) is that *ex-post* real interest payments, given by $b_t(i_t - p_t)$, are a function of the difference between the nominal interest rate and inflation. This formulation assumes implicitly that all government debt has the same maturity, equal to the length of the period of this model. Another interpretation would be that b represents only the government debt that matures in this period. Interest payments on other government debt would then be subsumed under general government expenditure. This is not a serious limitation of the model since most transition countries

[2] See, for example, Mankiw (1987).

have a relative short average duration of debt (and the little long-term debt that exists is indexed on short-term interest rates).

The nominal interest rate, ¡, can be written as the sum of the real interest rate, ρ, and expected inflation, $E_{t-1}(p_t)$. The real interest rate demanded by financial markets is here assumed (as usual) to be constant. The budget constraint can then be rewritten as:

(2)' $d(b_t) = g_t + b_t(\rho + E_{t-1}(p_t) - p_t) - q_t - p_t\sigma$

The authorities determine inflation after financial markets have formed expectations and set the interest rate.

The F.O.C. for a minimum of the loss (1), subject to the constraint (2)' are :

(3) $\partial L_t/\partial q_t = O = 2\ \alpha q_t - \lambda_t$

(4) $\partial L_t/\partial p_t = O = 2\ p_t - \lambda_t(b_t + \sigma)$

Where $_t$ is the shadow price associated with the budget constraint (2)'.

In order to simplify the notation only the steady state will be considered with a constant debt/GDP ratio, denoted b.[3] Conditions (3) and (4) then yield a simple relationship between inflation and tax revenues (as a percentage of GDP):

(5) $p_t = (b + \sigma)\ \alpha q_t$

This can be substituted into the budget constraint (2)' to obtain an expression for the steady state "tax rate". If one assumes that the public anticipates inflation correctly (i.e. that the public knows the incentives of the government and has rational expectations), the debt-to-GDP ratio remains constant only if:

(6) $O = g_t + b\rho - q_t - \sigma(b + \sigma)\alpha g_t$

If expenditure is constant at g, the optimal tax ratio also becomes a constant given by :

(7) $q_d = [g + b\rho] / [1 + \sigma(b + \sigma)\alpha]$

The loss under discretion L_d would then be given by:

(8) $L_d = \{[g + b\rho] / [1 + \sigma(b + \sigma)\alpha]\}^2 \quad \{\alpha + [(b + \sigma)\alpha]^2\}$

As usual the discretionary equilibrium is not the first best for the country. The social optimum, if there were no constraints on credibility, can be calculated by using the first order conditions (3) and (4),

but without the effect of surprise inflation on debt service in equation (4). This means that in the social optimum the relationship between taxes and inflation would be given by:

(9) $p_t = \sigma \alpha q_t$

Which differs from the corresponding relationship (5) in that only seigniorage is a valid argument for having inflation. The optimum tax rate is then given by substituting this expression into the budget constraint (and setting the debt to GDP ratio constant), which yields:

(10) $q_{s\,o} = [g + b\rho] / [1 + \sigma^2 \alpha]$

The loss under the social optimum, $L_{\text{social optimum}}$, would then be equal to:

(11) $L_{\text{social optimum}} = \{[g + b\rho] / [1 + \sigma^2 \alpha]\}^2 \ [\alpha + (\alpha\sigma)^2]$

which is lower than the loss under discretion. However, in this set-up there is no way the country could reach this bliss point. Without an external anchor the country would be stuck at the discretionary equilibrium.

III. Welfare effects of the euro

The alternative to the discretionary equilibrium might be to join the euro area. This would eliminate the credibility problem and would not be subject to the problems of speculative attacks that arise in fixed exchange rate systems.[4] In the EMU area prices would be determined via purchasing power parity through the monetary policy of the ECB. It will be assumed that the ECB maintains perfect price stability. Its independence is not in doubt and it has a clear mandate to maintain price stability. Moreover, seigniorage is not an important source of revenue for most EU member countries, which implies that the social optimum for the EU is anyway to set inflation to zero.

The loss under EMU membership would then be:

(12) $L_{\text{euro}} = \alpha \ (g + b\rho)^2$

Joining the euro area would thus be advantageous if this loss is lower than the one under discretion, i.e. when the country does not have an external anchor for expectations. As usual it is assumed that adopting the euro does not affect the fiscal institutions and the equilibrium real interest rate that has to

[3] In a similar model, Gros (1990) shows that this should not affect the conclusions.

[4] Creating an independent central bank and giving it the task to maintain price stability would in principle be equivalent. Almost all CEECs now have independent central banks. However, experience has shown that their independence is not strongly enough anchored in either the constitution or the political reality to allow them to really achieve price stability.

be paid on public debt. While this is not realistic, it is convenient in order not to bias the result in favour of the external anchor.

The difference between the losses under EMU and the discretionary equilibrium can be written as:

$$(13) \quad L_{euro} - L_d = \alpha\ (g + b\rho)^2 - \alpha\ \{[g + b\rho] / [1 + \sigma(b + \sigma)\alpha]\}^2 - \{[g + b\rho]\ [(b + \sigma)\alpha] / [1 + \sigma(b + \sigma)\alpha]\}^2$$

$$(13)' \quad = \alpha\ (g + b\rho)^2\ [1 + \sigma(b + \sigma)\alpha]^{-2}\ \{[1 + \sigma(b + \sigma)\alpha]^2 - 1 - (b + \sigma)^2\alpha\ \}$$

After simplifying the terms in the curly brackets the difference in the losses can be written as:[5]

$$(14) \quad L_{euro} - L_d = \alpha^2\ (g + b\rho)^2\ [1 + \sigma(b + \sigma)\alpha]^{-2}\ (b + \sigma)\ \{(\sigma - b) + \sigma^2\ (b + \sigma)\alpha\}$$

Inspection of this equation, in particular, of the expression in curly brackets, shows immediately that the difference in welfare loss can be negative or positive depending on the sign of. $(\sigma - b)$. Since the ratio of monetary base to GDP is usually much smaller than one this expression should be negative. The tax basis for seigniorage is the monetary base, which in most transition countries is around 10% of GDP. There is no country in the world where the monetary base, or cash to GDP ratio exceeds 1; values much below the average of 0.1 for the transition countries can be found in LDCs with chronic high inflation problems, but even the most stability oriented countries never have a cash to GDP ratio much in excess of this value. By contrast, the debt/GDP ratio, b, shows much more variability (in absolute terms) and is sometimes close to 100%.[6] Estonia might be one of the few countries without any significant public debt so that in this case σ - b might actually be positive.

To discuss the role of the debt ratio it is convenient to re-write equation (14) slightly as:

$$(15) \quad L_{euro} - L_d = \alpha^2\ (g + b\rho)^2\ [1 + \sigma(b + \sigma)\alpha]^{-2}\ (b + \sigma)\ \{\sigma(1 + \alpha\sigma^2) - b(1 - \alpha\sigma^2)\}$$

Inspection of equation (15) shows that the term in curly brackets can change sign as b increases from zero since the term $(1 - \alpha\sigma^2)$ is likely to be negative. This suggests that the relationship between the interest in joining the euro area and the debt to GDP ratio could also be non monotonic.

[5] The term in curly brackets can be written as: $\{1 + 2\sigma(b + \sigma)\alpha + [\sigma(b + \sigma)\alpha]^2 - 1 - (b + \sigma)^2\alpha\} = (b + \sigma)a\ \{2\ \sigma + (\sigma^2 - 1)(b + \sigma)\alpha\}$.

[6] In order to highlight the role played by the interest burden on public debt, Gros (1996) assumes that $\sigma = 0$. This elimination of seigniorage from that model was justified by the fact that seigniorage has not played a significant role in EU public finances in recent years, as shown by Gros and Vandille (1995).

However, as the debt ratio appears also in other terms of equation (15) this is not straightforward to prove.

However, one point is clear from general considerations: When there is no public debt staying outside the euro area is clearly better because the discretionary equilibrium would then be equal to the social optimum and by staying outside the country can use inflation to earn some seigniorage. There is one value of b for which the term in the curly brackets in equation (14) is equal to zero and hence the country is indifferent between joining the euro and staying outside.

This is at: $b = \sigma(1 + \alpha\sigma^2) / (1 - \alpha\sigma^2)$, which is larger than the cash to GDP ratio, and thus a realistic value.

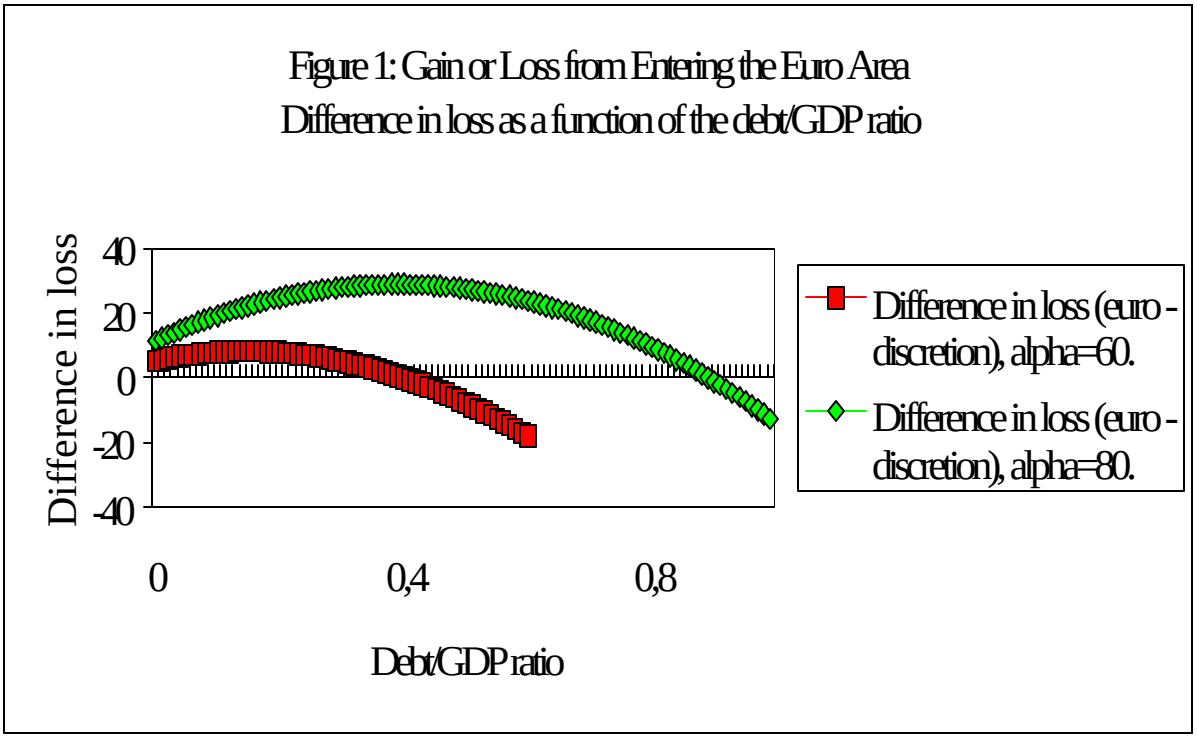

Figure 1 shows the difference in welfare loss as a function of b (for the following set of parameter values g (the ratio of non-interest expenditure to GDP) = 0.3, σ (monetary base to GDP ratio) = 0.1 and two values for α). It is apparent that there is an inverted U-form relationship between the interest in joining the euro area and the debt to GDP ratio. For countries with low debt the loss in the euro area is larger than that from going it alone. They have an interest in staying outside, whereas very weak countries have a larger loss outside and should thus gain from joining the euro area.

The intuition behind this result is clear: for low levels of debt the incentive to use surprise inflation is low. The market knows this and therefore expects only low inflation. It is thus possible to have an equilibrium with inflation only little above what would be needed to get some seigniorage. However, in countries with high levels of debt the inflation rate would be much higher than the one that would be justified for optimum seigniorage because the market knows that the government has an overwhelming incentive to use surprise inflation.

IV. Inefficient fiscal policy institutions

This section introduces the concept of an inefficient fiscal policy process into the model. It has so far been assumed that the government takes its decision in terms of the overall level of taxation needed to finance expenditure. However, there are always special interest groups that plead for exemptions. Any tax exemption that is granted must be paid for somehow. In this set-up the only alternative source of revenues is inflationary finance. Using inflation also causes a welfare loss to the special interest group that obtains a tax exemption. However, as the part of any group in the overall budget will be small, this cost cannot fully offset the direct gain from the tax cut. Each special interest group thus behaves as if the shadow price of a tax benefit were only $\phi\lambda$, where ϕ is a fraction, between zero and one, which indicates the overall inflationary impact any tax benefit has on the special interest group concerned. This fraction should be a function of various elements, for example the share of the interest group in the overall budget, the extent to which benefits have to be shared with other groups (a tax exemption for one specific enterprise might not be possible, an exemption for all enterprises of a certain category might be acceptable) and the extent to which fiscal policy decisions are centralised so that demands by competing interest groups neutralise each other (see von Hagen and Harden (1994) for an analysis of EU member countries in this respect). Velasco, (1998) uses a similar approach with two symmetric interest groups whereas Drazen, (2000) presents (in chapter 10) a model with a large number of competing groups, which try to extract transfers from the government.

If the influence of special interest groups is the same throughout all areas of fiscal policy and if all interest groups are identical in terms of their size and influence this leads to a modified first order condition, see equation (3), for the setting of the overall average tax rate:

$$(16) \qquad \partial L_t/\partial q_t = O = 2 [\alpha q_t - \phi\lambda_t]$$

Setting the inflation rate hits all interest groups in the same way; the first order condition (4) is thus not affected. However, the resulting trade-off between taxes and inflation is different:

(17) $p_t = (b + \sigma)(\alpha/\phi)\, q_t$

This implies that, ceteris paribus, inflation will be higher as all interest group push the government to finance their benefits through inflation. As nothing changes in the remainder of the model (i.e. essentially the budget constraint) the resulting tax rate under the discretionary equilibrium is given by an equation that is identical to equation (7) above, except that α is substituted by α/ϕ. This implies that the welfare loss under discretion is given by:

(18) $L_{d,\,if} = \{[g + b\rho] / [1 + \sigma(b + \sigma)(\alpha/\phi)]\}^2 \quad \{\alpha + [(b + \sigma)(\alpha/\phi)]^2\}$

where the subscript stands for inefficient fiscal policy.

The loss under the euro is not affected by the inefficient policy as special interest groups are no longer able to have their tax benefits finance by inflationary finance. The difference in the loss between the euro regime and the discretionary equilibrium thus becomes:

(19) $L_{euro} - L_d = \alpha\ (g + b\rho)^2 - \{[g + b\rho] / [1 + \sigma(b + \sigma)(\alpha/\phi)]\}^2 \quad \{\alpha + [(b + \sigma)(\alpha/\phi)]^2\}$

which can be re-written as:

(19)' $L_{euro} - L_d = \{(g+b\rho) / [1+\sigma(b + \sigma)(\alpha/\phi)]\}^2 \ \{\alpha\,[1+\sigma(b + \sigma)(\alpha/\phi)]^2 - \alpha - [(b + \sigma)(\alpha/\phi)]^2\}$

or

(19)'' $L_{euro}-L_d=\{(g+b\rho)/[1+\sigma(b+\sigma)(\alpha/\phi)]\}^2\{2\,\alpha\sigma(b+\sigma)(\alpha/\phi) + \alpha[\sigma(b+\sigma)(\alpha/\phi)]^2 - [(b+\sigma)(\alpha/\phi)]^2\}$

or

(20) $L_{euro}-L_d=\{(g+b\rho)/[1+\sigma(b+\sigma)(\alpha/\phi)]\}^2 (\alpha/\phi)\ (b+\sigma)\alpha\{2\sigma + (\sigma^2\alpha-1)(b+\sigma)(1/\phi)\}$

This solution collapses, of course, to the corresponding expression for the standard case, see equations (14) or (15) if ϕ equals one.

How does the difference in the loss expressed in equation (20) vary with the key parameter that describe the strength of the fiscal framework of a country, i.e. ϕ? As the inverse of ϕ can vary between 1 and infinity, it will be convenient to analyse equation (20) in this way. A high value of ϕ^{-1} indicates a weak fiscal framework.

Inspection of equation (20) shows immediately that there is one value of ϕ^{-1} for which the country will just be indifferent between joining the euro or staying out in the cold:

$\phi^{-1}_{ind.} = -2\sigma / (b + \sigma)(\sigma^2\alpha - 1)$ (> 0 under the assumptions used so far). For values of ϕ^{-1} above this threshold the loss of staying outside would exceed that of joining the euro area. At this threshold the country is just indifferent between joining and going it alone because two effects just offset each other: if the country joins the euro area its inflation rate would be too low (zero inflation would not be optimal since the country needs some seigniorage revenues), outside the euro area its inflation rate would be too high (because of the inefficiency in the fiscal process, which magnifies the usual time inconsistency problems).

Inspection of equation (20) also shows that as ϕ^{-1} tends towards infinity the difference between the welfare losses tends towards minus infinity (i. e. $[\alpha^2 (\alpha\sigma^2 - 1) / \sigma] (g + b\rho)^2$. Basket cases would thus have a very strong interest in using an external anchor.

The general picture is determined by the fact that equation (20) contains a quadratic expression in the inverse of ϕ and as long as the expression $(\sigma^2\alpha - 1)$ is negative, which is likely given that σ is much smaller than one, this will result in a inverted parabola.

Figure 2: Gain or Loss from Entering the Euro Area
Difference in social welfare loss as a function of alpha

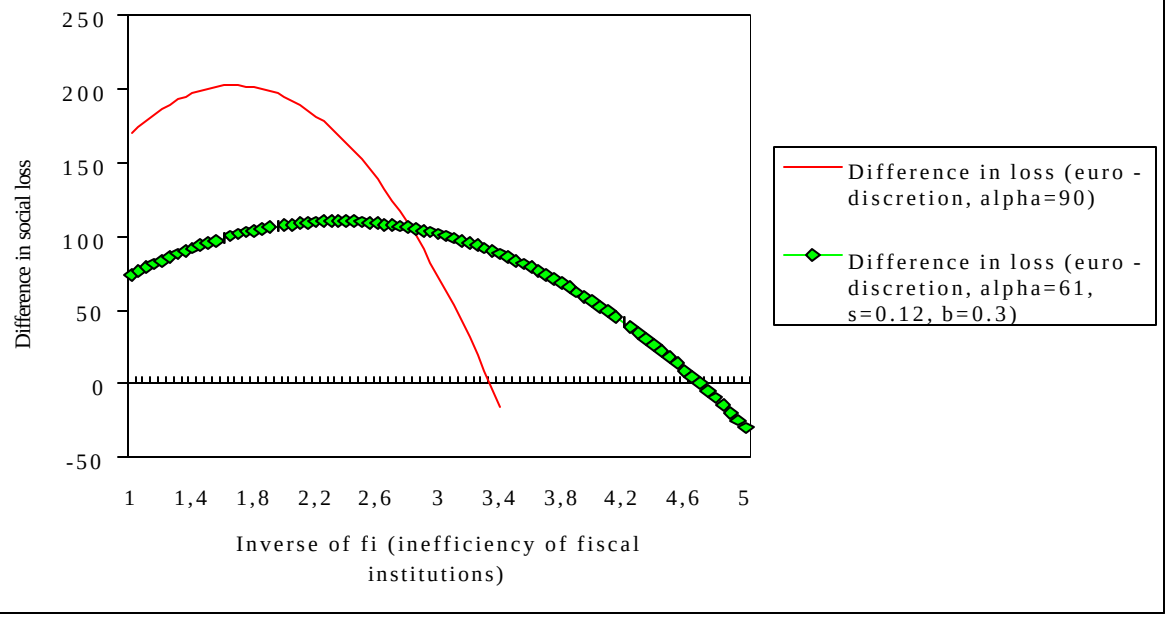

Figure 2 shows the difference in welfare loss as a function of ϕ^{-1} for two values of g (the ratio of non-interest expenditure to GDP) assuming the monetary base to GDP ratio is equal to 0.1 and the debt to GDP ratio is a Maastricht conform 0.6. Although the function is not strictly convex, it is apparent

that there is an inverted U-form relationship between the interest in joining the euro area and the strength of domestic fiscal institutions. For countries with strong, but not perfect, fiscal systems the loss in the euro area is larger that from going it alone. They have an interest in staying outside, whereas very weak countries have a larger loss outside and should thus gain from joining the euro area.

V. Concluding remarks

This paper has used on purpose a standard model to derive a result that is intuitively plausible, but has not been recognised so far, namely that both very strong and very weak countries might have an interest in adopting an external anchor. For the Central and Eastern European countries this would imply joining the euro area.

The paper has left aside the usual optimum currency area approach. It is clear that the likelihood of experiencing an asymmetric shock, and the gains from transactions costs will be further elements in the choice of the exchange rate regime. However, these considerations are likely to be independent of the aspects discussed here. Moreover, the main difference between Estonia and Bulgaria is not that the latter is much more exposed to asymmetric shocks à la Mundell (1961), i.e. shocks to export earnings or terms of trade. Both countries are vulnerable in this respect since they have a narrow industrial base. The really important difference lies in the strength of the domestic fiscal framework: in Estonia the government has so far been usually able to balance its budget. The tax service works reasonably well, tax rates are low, but the tax base is broad and the (uncomplicated) tax code is actually enforced. By contrast in Bulgaria the government has had always difficulties in finding enough revenues to finance its expenditure and large state owned enterprises were a constant drain on the budget.

The purpose of this note was just to point out that in an entirely conventional model the relationship between debt levels and the need for an external anchor is non-monotonic. The same applies for the degree of inefficiency of the domestic fiscal policy process. However, debt levels are likely to be linked to the nature of the fiscal policy institutions. The difference in the debt ratios (practically zero in Estonia, very high in Bulgaria) surely reflects at least partially the difference in the respective national fiscal institutions. The Bulgarian debt was accumulated after all by successive governments working within a weak fiscal framework in which large state owned enterprises obtained subsidies that had to

be financed partially through inflation and partially through higher debt. A next step should thus be to show how the two are linked and interact.

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