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The Economics of Convergence Towards Monetary Union in Europe

PAUL DE GRAUWE

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The Economics of Convergence

Towards Monetary Union in Europe

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1. INTRODUCTION

The Maastricht Treaty strategy for moving towards monetary union in Europe is based on two principles. First, the transition towards monetary union in Europe is seen as a gradual one, extending over a period of many years. Second, the entry into the union is made conditional on satisfying convergence criteria. In this paper we concentrate our attention on these convergence criteria enshrined in the Maastricht Treaty.

The most characteristic feature of the Maastricht strategy is the stringency of the convergence requirements. Today, in 1995 only two countries (Luxembourg and German) satisfy these conditions. There is a risk that in 1996 and in 1999 a relatively small number of countries will satisfy them. As a result, there is a great likelihood that, if maintained, these convergence requirements will have the effect of keeping the monetary union small.

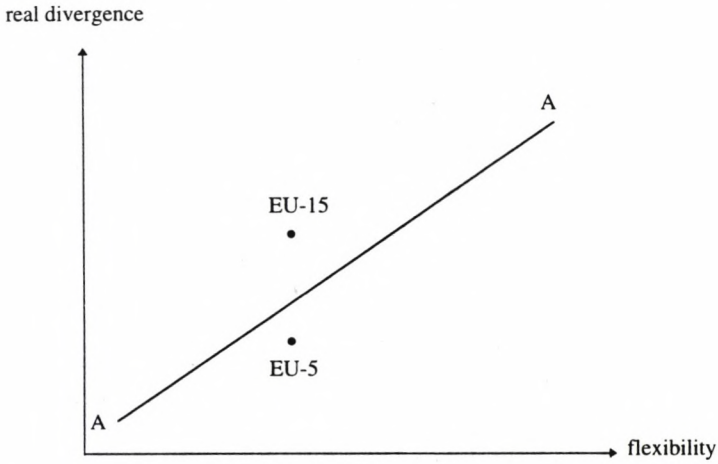
Why were these severe entry conditions made the cornerstone of the Maastricht strategy? Let us first analyse the theory of monetary integration. Does this theory give us any basis for imposing the convergence criteria as those that are specified in the Maastricht Treaty? We first discuss the traditional theory of optimum currency areas (OCA), and then the more recent "new view" based on credibility issues (see Tavlas (1994)).

2. THE TRADITIONAL OCA LITERATURE

The most striking aspect of the theory of optimum currency areas is that it is completely silent on the need for *prior* convergence in inflation rates, interest rates, budget deficits or the levels of government debt. In contrast, this theory stresses the need for real wage flexibility, mobility of labour, and fiscal integration as preconditions for a successful monetary union. The main insight of this theory can be represented graphically as follows (see figure 1). On the vertical axis we set out the degree of "real" divergence between regions (countries) who are candidates to form a union. With real divergence is meant here the degree to which the growth rates of output and employment

tend to diverge as a result of asymmetric shocks. Such a real divergence can also occur as a result of symmetric shocks to which countries react differently because of different economic structures. On the horizontal axis we have the degree of flexibility of the labour markets in these regions (countries). The flexibility here relates to real wage flexibility and interregional (international) mobility of labour.

Figure 1: The theory of optimum currency areas



The central insight of the OCA-theory is that countries or regions that experience a high divergence in output and employment trends need a lot of flexibility in their labour markets if they want to form a monetary union, and if they wish to avoid major adjustment problems. The larger is the degree of real divergence the greater is the need for flexibility in the labour markets to make a smoothly functioning monetary union possible. This relationship between real divergence and flexibility is represented by the upward sloping line AA. Countries or regions located below the AA-line can form a union without "excessive" adjustment costs. In the jargon of the OCA-theory, they form an optimum currency area. Countries above the AA-line will experience a lot of adjustment costs if they form a monetary union. In other words, these countries have too low a degree of flexibility in the labour market (given the level of real divergence). They do not form an optimum currency area. They

are, therefore, well advised to maintain some degree of exchange rate flexibility. Of course, these countries are still free to form a monetary union. The theory, however, predicts that they will suffer economically from this decision. In addition, this theory suggests that when countries, that fail to satisfy the flexibility requirement, decide to form a monetary union, problems of macroeconomic management will arise in the union as a whole. For example, when a negative demand shock hits one or more countries while leaving the other members intact, the pressure on the central bank of the union to accommodate with a more expansionary monetary policy will be strong. This pressure will be all the more intense as the countries negatively affected by the demand shock lack the flexibility (wages, prices, labour mobility) to adjust. The countries not affected by the negative demand shock, however, are likely to resist this pressure to accommodate by monetary expansion. As a result, the asymmetric shock will most likely lead to intense conflicts about the appropriate stance of monetary policies in the union. With each asymmetric shock, these conflicts will arise and will have to be resolved. The upshot of all this is that the monetary policies of the union are likely to be very unstable and unpredictable as countries try to form coalitions in order to push their views about the appropriate monetary policy. This analysis then leads to the conclusion that stable and predictable monetary policies of the union are only possible if the union-members satisfy the conditions as summarised by figure 1.

Where should the European Union be located in figure 1? There is now a broad consensus among economists, who have tried to implement the theory empirically, that European Union of 15 members is not an optimum currency area (See Eichengreen (1990), Bayoumi and Eichengreen (1991), von Hagen and Neumann (1994), De Grauwe and Vanhaverbeke (1991), De Grauwe and Heens (1993))[1]. Thus, the EU as a whole is located above the AA-line. As a result, from an economic point of view, a monetary union involving all EU-member countries is a bad idea. In addition, a monetary union involving all these countries is likely to put unbearable pressure on the European central bank making it extremely improbable that stable and predictable monetary policies can be implemented.

[1] A dissenting view is presented in European Commission (1990). See also Gros and Thygesen (1992).

Whereas there is a strong consensus among economists that the EU-15 should not form a monetary union, there is an equally strong conviction that there is a subset of EU-countries which form an optimum currency area. The minimum set of countries that could form a monetary union is generally believed to include Germany, the Benelux and possibly France (EU-5). This conclusion is buttressed by the same empirical studies as those quoted earlier. Beyond this group of countries there does not seem to be much agreement on whether or not other countries should profit from a monetary union. In figure 1 we have put the EU-5 below the AA-line. Note that within these countries the degree of labour market flexibility is not higher than among the member countries of EU-15. The empirical evidence seems to indicate that the degree of real divergence is lower.
The economic analysis based on the OCA-theory, therefore, strongly suggests that a two-speed approach is desirable in the monetary unification in Europe. In other words, it would be optimal today to start a monetary union with a limited number of countries, and to think about enlargement at a later stage when other countries are ready to join.

The traditional OCA-theory also implies that prior convergence of inflation rates, of interest rates and of budgetary policies is not necessary, nor is it sufficient, to form a successful monetary union. It is not *necessary* because countries with, say, different inflation rates prior to the union may still be very similar in economic structure, so that they do not face large asymmetric shocks. The difference in inflation rates may reflect different institutional features in monetary policy-making. In one country, the central bank may have a lot of independence in the other it may be dependent on the Minister of Finance. In a monetary union, these institutional differences will disappear, so that the prior differences in inflation become irrelevant. Conversely, prior convergence of inflation rates is not *sufficient* to form a monetary union. Two countries may have the same rates of inflation (Japan and Germany for example) and yet be structurally so different that a monetary union between them would be suboptimal. Or take the example of Belgium and Germany. Belgium certainly satisfies the inflation convergence criterion. At the same time, however, Belgium has a full wage indexing system, whereas Germany does not have one. As a result, when an oil price shock occurs in the future monetary union, the wage price spiral in Belgium is likely to quickly lead to competitiveness problems of the Belgian industry.

The fact that Belgium has been able to keep inflation low during the 1990s (in the absence of an oil price shock) will not help this country in the future. What will matter is that Belgium changes its wage indexing mechanism.

Similar arguments can be developed for the other Maastricht "nominal" convergence criteria (interest rate convergence and no devaluation two years before entry in the union). According to the traditional OCA-literature, they are not necessary nor sufficient to form a successful monetary union. In the case of fiscal policies, the OCA-theory in fact goes one step further. If the monetary union does not at the same time involve some degree of centralisation of national budgets (which is the likely scenario in the European monetary integration), the imposition of budgetary convergence requirements is going to make matters worse for the management of the union. When asymmetric shocks occur, the requirement to keep budgetary policies in line with the other members, will rob countries of the last instrument to absorb these shocks. As a result, the pressure on the European central bank to change its monetary policy stance will be more pronounced. Thus, according to the traditional OCA-theory, the Maastricht convergence requirement not only are unnecessary and insufficient. They are also dangerous for the smooth functioning of a future monetary union in Europe (see Bayoumi and Masson (1994)).

3. THE "NEW" VIEW OF MONETARY INTEGRATION AND INFLATION CONVERGENCE

The "new" view of monetary integration stresses issues of credibility. More particularly, it analyses how countries can gain (or loose) credibility by joining a monetary union, and how this may affect their welfare. This analysis has been very much influenced by the Barro-Gordon model[2]. The central insights of this theory is presented graphically in figure 2. We show the short-run Phillips curves of two countries, Germany and Italy. The two countries are assumed to be identical except for the preferences of the authorities. The German authorities give a high weight to reducing inflation, the Italian authorities a low weight. This is shown by flat indifference curves

[2] Barro and Gordon (1983). For a discussion in the context of monetary union, see Alesina and Grilli (1993) and De Grauwe (1994).

for the German authorities and steep ones for the Italian authorities. The natural unemployment rate, u_N, is the same in the two countries, and so is the target unemployment rate of the authorities, u*. Inflation equilibrium is achieved in E_G in Germany and E_I in Italy. Thus, inflation is on average higher in Italy than in Germany without any gain in unemployment for Italy. Italy, however, has a lower variance of unemployment. This is shown by the fact that the same shocks in the short-term Phillips curves lead Italy to accommodate more for these shocks. As a result, in Italy the unemployment varies between the points F and G, whereas in Germany the unemployment rate varies between F' and G'.

A monetary union between the two countries implies that a common central bank takes over, so that the preferences of the authorities become identical. Two propositions can now easily be established. First, the low inflation country (Germany) always reduces its welfare by forming a monetary union with the high inflation country[3]. This is so because the union central bank will reflect the average preferences of the participating countries[4]. As a result, the union inflation rate increases and will be located between E_G and E_I. Note that the lower variance of unemployment in the union (compared to the German one) does not compensate Germany, given the fact that this country attaches a low weight to fluctuations in unemployment. The high inflation country, Italy, may gain or loose. The gain comes from the fact that the union inflation rate is lower than the Italian one. The loss is the result of an increase in the variance of unemployment in the union (compared to the Italian one).

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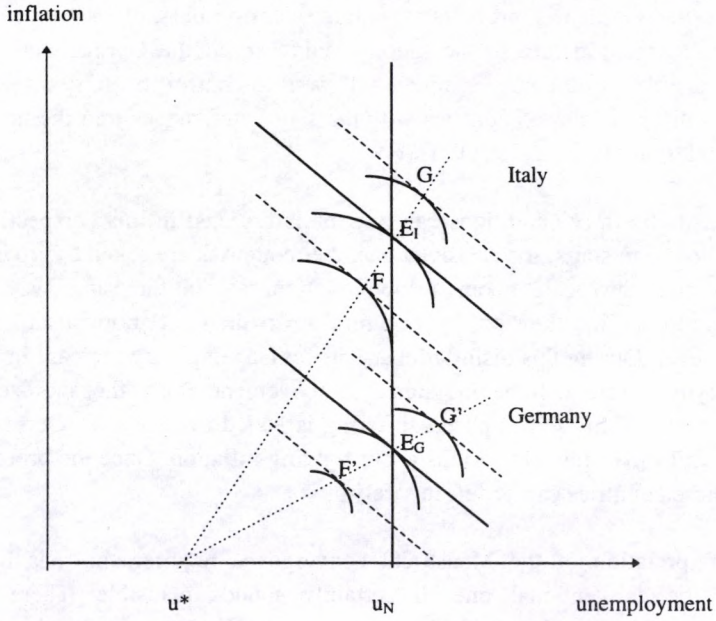
[3] There are of course other sources of gains of a monetary union, e.g. lower transactions costs, lower risk, etc. These efficency gains must then be compared with the welfare losses resulting from a higher inflation.

[4] In principle the statutes of the ECB require the central bank to pursue price stability. One cannot exclude the possibility, however, that the representatives of different countries with different inflation exeperiences maintain their own preferences.

Figure 2: The "new" view of monetary integration



The second proposition follows from the first one: since the low inflation country, Germany, loses when it joins the union, it will not want to do so except if it can impose conditions. It follows from the analysis of figure 2 that this condition must be that the union central bank should have the same preferences as the German central bank. Note that Italy may be glad to accept, if the welfare gain from a lower inflation exceeds the welfare loss from a greater variance of unemployment in the union. Thus, this analysis provides the intellectual underpinnings for the Maastricht decision to institute a European Central Bank which is a close copy of the Bundesbank (political independence, price stability as the sole objective of monetary policy).

What about the Maastricht entry conditions? Can these equally be derived from the analysis underlying figure 2? At first sight they can. The European Central Bank will be composed of representatives of the participating

countries. Even if the ECB is made independent these representatives may still have different inflation preferences. Majority voting in the Board may then put the German representative in a minority position, so that the equilibrium inflation rate in the union would exceed the German one. In order to avoid this outcome Germany will want to control the entry into the union, so that only those countries with the same preferences join the union (see Morales and Padilla (1994)).

The Maastricht entry conditions can now be interpreted in this perspective. Before the union starts, the candidate member countries are asked to provide evidence that they care about a low inflation rate in the same way as Germany does. This they do, by bringing down their inflation rate to the German level. During this disinflationary process, a temporary increase in the unemployment rate will be inevitable (a movement along the short-term Phillips curve). This self-imposed suffering is added evidence for Germany that countries like Italy are serious about fighting inflation. Once the proof is given, these countries can be left in safely.

This interpretation of the Maastricht convergence requirements has now become the conventional one. It certainly sounds plausible. There is, however, a major problem with this interpretation. Countries going through the convergence game may act opportunistically, i.e. they may do this today so as to gain access later. Once they are in the union, they will reveal their true preferences. In addition, even if the present governments of the candidate member countries are serious about inflation and submit themselves wholeheartedly to the disinflationary process, they do not commit future national representatives in the ECB to the same monetary policy stance. Put differently, the fact that France has reduced its inflation rate during the 1990s so as to be accepted in the monetary union, will not bind the French representative in the ECB in the year 2010 to follow the same low inflation policies. At that moment the policies of the French authorities of the 1990s will have become irrelevant. The only relevant constraint in 2010 will be the fact that the ECB is politically independent and that its statutes commits the ECB to a stable money policy. Thus, one can conclude that the entry requirements in no way solve the German problem. They provide no additional guarantee that the future monetary policies of the ECB will be

geared towards low inflation, (additional to the one enshrined in the statutes of the ECB).

In fact, the same Barro Gordon model underlying figure 2 can be used to show that inflation convergence as a prerequisite for a monetary union is harmful. Suppose a monetary union between Italy and Germany is started, and that the ECB has been made an exact copy of the Bundesbank. In that case, the inflation equilibrium in Italy can credibly be reduced from E_I to E_G without a temporary increase in unemployment. This follows from the fact that the monetary union is a monetary reform which eliminates the lira and the Banca d'Italia together with the unfavourable reputation suffered by these institutions. Expectations concerning the loss of purchasing power of the new European currency will be unrelated to the past losses of purchasing power of the lira. Thus the monetary union is a technique to bring about inflation convergence at minimal cost.

In contrast, the Maastricht requirement of bringing about inflation convergence *before* the union starts is a technique that maximises the cost of convergence (without guaranteeing success). This can also be seen from the same figure 2. Italy is forced to reduce its inflation rate before entering the union. Thus, it will have to do so carrying the burden of a low reputation. As a result, economic agents will be sceptical, so that inflationary expectations do not decline easily. This forces the Italian authorities to move the economy along a downward sloping short-term Phillips curve. Unemployment increases. In this strategy, ultimate success is not guaranteed. It is likely that the Italian authorities fail to acquire the same low inflation reputation as the German authorities. As a result, Italy never quite reaches the same low inflation equilibrium as Germany. Since the Maastricht Treaty also requires Italy to peg its exchange rate, the lira experiences an increasing real appreciation during the transition, leading to doubts that this disinflationary process can be sustained. Speculative crises are set in motion, forcing devaluations of the lira. These devaluations lead to renewed divergencies of inflation. In order to qualify for entry, Italy will have to start a new process of disinflation. The cycle can start all over again.

The predictions of this model have essentially come out. Up to 1992, countries like Spain and Italy applied strenuous disinflationary policies using

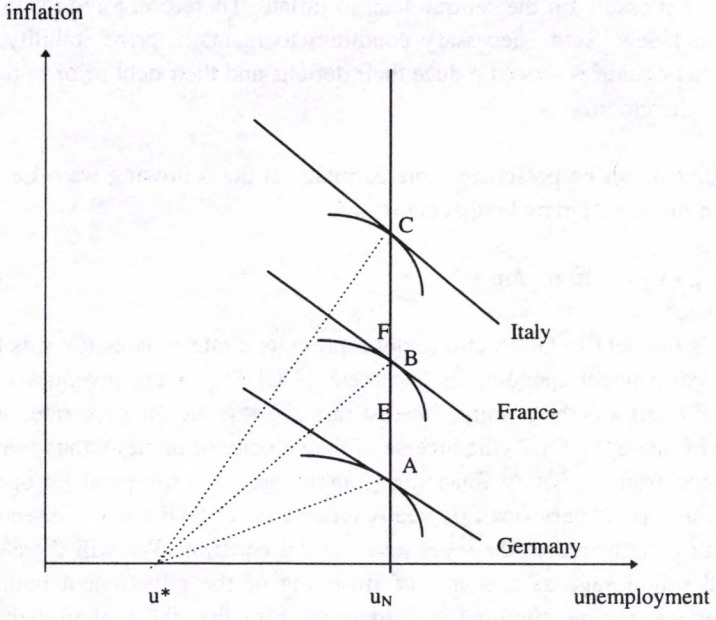
a strategy of pegging to the German mark. This led to both a narrowing of inflation differentials with Germany and a strong real appreciation. The latter induced speculative crises, leading to sharp depreciations of the lira and the peseta. Although initially these sharp depreciations did not affect inflation very much in these countries (mainly because of the recession), since 1994 inflation differentials with Germany have started to increase significantly. These inflation divergencies are likely to increase even further, given the size of the depreciations of the lira and the peseta. In figures 3a and b, we show the movements of the inflation differentials of Italy and Spain with Germany, together with the real exchange rate of the lira and the peseta. We observe the cycle in inflation convergence and real appreciation followed by real depreciation and inflation divergence. In order for Italy and Spain to guide their inflation rates within the 1.5 differential prescribed by the Maastricht Treaty, an new policy of painful disinflation will have to start, leading to the same phenomena of real appreciation. The probability of success of this new disinflation will be equally low as the previous one. We conclude that the Maastricht inflation convergence (and fixed exchange rate) requirements not only are needlessly painful for countries with a high inflation reputation. They will also turn out to be very difficult to meet in the foreseeable future. The door to monetary union will be shut for a long time for these countries.

Although the Barro-Gordon model cannot easily be used to justify on economic grounds why countries should convergence in terms of inflation prior to their entry into the monetary union, the same model allows us to understand the political economy problem inherent in the process of monetary integration between high- and low inflation countries. Let us consider three countries now, Germany, France and Italy. The three countries are identical except for their preferences with regard to inflation. Germany is assumed to be the thought on inflation, Italy is assumed to be "permissive" while France takes an intermediate position. We represent the inflation equilibrium in figure 4 (Note that we have omitted the disturbances in the short-term Phillips curves). Assuming that in the monetary union the preferences of the European Central Bank will reflect some average of the individuals' participants we will obtain different inflation outcomes depending on the number of participants in the union. If Germany and France form a union without Italy, the inflation equilibrium will be located between the points A and B, say in E. If the union consists of the three countries, the

inflation equilibrium will be located between points A and C, say in F. Thus, from the point of view of Germany, the large union is less attractive than the small union. (This is in fact also the case for France). As a result, Germany has an incentive to keep the union small and to prevent Italy from joining.

The Maastricht inflation convergence criteria can now be understood. They are not conditions that for some scientific economic reason must be satisfied to form a monetary union. Their function is to keep the monetary union small, and to keep out the high-inflation countries. The convergence criteria are not there to help countries to converge smoothly into the union. They are to be interpreted as road-blocks preventing the high-inflation countries from entering the union.

Figure 4: Inflation equilibrium with three countries



4. THE "NEW" VIEW OF MONETARY INTEGRATION AND BUDGETARY CONVERGENCE

In the previous section we argued that the nominal convergence requirements of the Maastricht Treaty (inflation and interest rate convergence) cannot easily be justified in the framework of the "new" view of monetary integration. What about the budgetary convergence requirements? Can these be derived from this "new" view? The issue here is not whether deficit and debt levels are too high or too low. They are probably too high in most European countries and should be reduced. The issue is whether deficit and debt reduction should be erected as conditions for entry into the monetary union.

The standard argument for doing this can be formulated as follows. High budget deficits and high government debts are a threat to price stability. They put a lot of pressure on the central bank to inflate. Therefore, a reduction of deficits and debts is a necessary condition to maintain price stability. It follows that countries should reduce their deficits and their debt prior to their entry into the union.

The argument can be presented more formally in the following way. Let us start from the government budget constraint:

$$\dot{b} = g - t + (i - \pi)\, b - \pi m \qquad (1)$$

where b is the debt to GDP ratio (a dot represents a rate of change); g is the primary government spending as a percent of GDP; t is tax revenues as a percent of GDP; i is the nominal interest rate and π is the inflation rate, m is the ratio of money to GDP (the inverse of the velocity of money); thus πm is the revenue from monetary financing (seigniorage). For a typical European country this term is very small (typically around 1% of GDP) and of a second order nature compared to the other terms in the equation. We will therefore disregard seigniorage as a source of financing of the government budget. Note that we assume (without loss in generality) that the real growth of output is zero.

The nominal interest rate can also be written as:

$$i = r + \pi^e \tag{2}$$

where π^e is the expected inflation rate, and r is the real interest rate. Substituting (2) into (1) yields

$$\dot{b} = g - t + (r + \pi^e - \pi)\, b \tag{3}$$

We observe that it is only the unanticipated component of inflation ($\pi^e - \pi$) that affects the budget constraint, i.e. inflation which is higher than expected lowers the debt burden. Fully anticipated inflation ($\pi = \pi^e$) does not lower the debt burden. The reason is that a fully anticipated inflation reduces the real value of the outstanding debt and increases the nominal interest rate at the same time.

It should be stressed that the extent to which unanticipated inflation affects the real value of the debt depends on the average maturity of the government debt. The government budget constraint (3) implicitly assumes that all the government bonds have a long maturity, i.e. the holders of government bonds are locked in with a given interest rate which has been set previously, based on the then prevailing expectations of inflation. This allows the government to produce surprise losses for the holders of this debt. If the debt consists of short term (floating) securities, this will not be possible anymore. We will come back to this issue to show that the incentives to inflate change drastically when short maturity bonds are allowed.

Setting $\dot{b} = 0$ in (3) we obtain the condition necessary to stabilize the debt to GDP ratio. It can be interpreted as a necessary condition for solvency of the government. We can rewrite this condition as follows:

$$t = g + r\, b + (\pi^e - \pi)\, b \tag{4}$$

We observe that, given the level of spending, g, and the real interest rate, r, there is a trade-off between the tax rate and the inflation rate, i.e. an unexpected increase in inflation allows the government to reduce taxes (as percent of GDP) while keeping the solvency constraint intact. This trade-off,

however, only holds if inflation is unanticipated. In a rational expectations world, there can be no systematic deviation between expected and realized inflation, so that on average $\pi^e - \pi = 0$. Thus, from (4) we can write the "long-run" trade-off between inflation and taxation that is necessary to maintain solvence as follows:

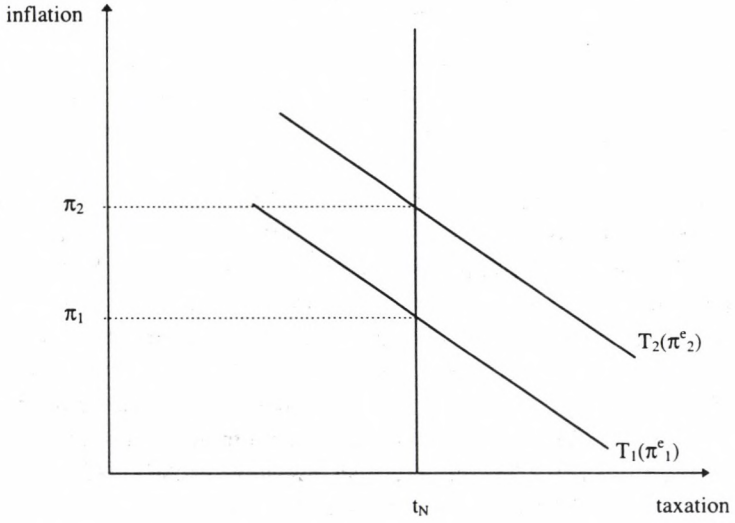
$$t_N = g + r\,b \tag{5}$$

where we interpret t_N as the "natural" rate of taxation given the level of spending, the accumulated debt and the real interest rate. This natural level of taxation is independent of inflation.

It will be clear that we have formulated the problem in a similar framework as the Phillips curve framework. Equation (4) is the "short-term" solvency constraint. It has a structure reminiscent of the short-term Phillips curve. Unanticipated increases in inflation reduce the burden of the debt, very much like unanticipated inflation reduces unemployment. Equation (5) is the long-run solvency constraint which is similar to the long-run (vertical) Phillips curve. The "natural" tax rate is independent of inflation, very much like the natural unemployment is.

One can represent equations (4) and (5) graphically. This is done in figure 5. The short-term trade-offs are represented by the downward sloping lines. There is one such trade-off for every level of expected inflation. The slope of these short-term trade-offs is given by the parameter b (the debt to GDP ratio) in equation (4). It can be seen that as b increases the short-term trade-off becomes flatter. A higher b also leads to a displacement to the right of the "natural" taxation rate.

Figure 5: Trade-off between inflation and taxation



Assume now that the authorities aim at minimizing a loss function of the type

$$L = t^2 + a\,\pi^2 \tag{6}$$

where a is a parameter expressing the weight given by the monetary authorities to the inflation target; both inflation and taxation are perceived to be costly by the authorities. The monetary authorities set the inflation rate so as to minimize the costs of inflation given that they also care about minimizing the tax burden.

Minimizing (6) and using the rational expectations assumption allows us to derive the optimal (time consistent) inflation rate:

$$\pi^* = \frac{b}{a}\,t_N = \frac{b}{a}\,(g + rb) \tag{7}$$

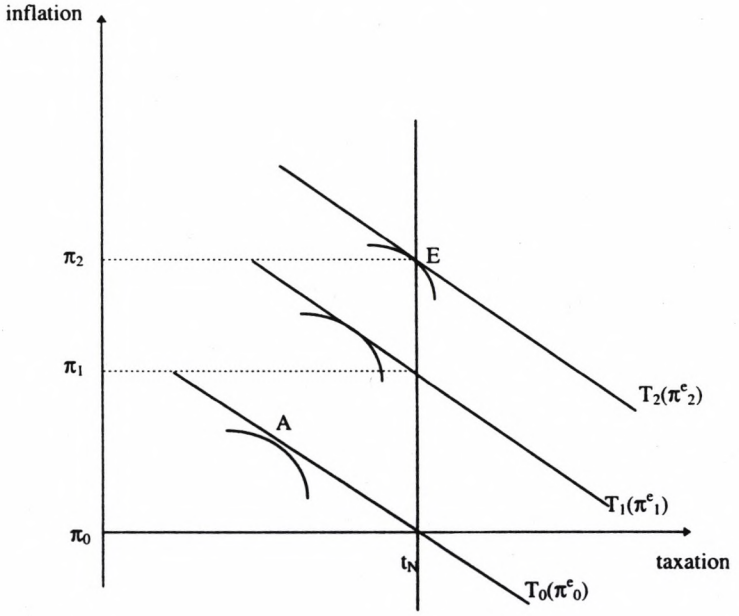
This solution can also be illustrated graphically. This is done in figure 6. The indifference curves, derived from the loss function (6), express the preferences of the authorities. Assume that the authorities would announce

that they aim at an inflation rate equal to π_0. It can immediately be seen that this announcement is not a credible one. Once the announcement is made, the authorities have an incentive to cheat and to go to point A which is located on a more favorable indifference curve. Rational agents realize this and will call the announcement bluff. The only credible point which also satisfies the rational expectations condition is given in point E. It can be seen that the authorities do not have an incentive to raise the inflation rate anymore.

The model can now be used to analyze the need for budgetary convergence requirements. As can be seen from equation (7) the level of the debt to GDP ratio, b, affects the equilibrium inflation rate. A country with a high debt to GDP ratio will have a high equilibrium inflation rate. This has to do with the fact that a high debt to GDP ratio gives incentives to the authorities to produce surprise inflations. Agents realize this and will therefore expect a high inflation rate. This creates a problem for monetary unification. Suppose two countries (say Germany and Italy) consider forming a monetary union. Suppose also that their preferences regarding inflation are identical (their a's in (7) are the same). These two countries only differ because the debt to GDP ratio is higher in one (Italy) than in the other (Germany). The equilibrium inflation in the two countries becomes[5]:

[5] We also assume that the real interest rate and the primary spending are the same in the two countries.

Figure 6: Inflation equilibrium



$$\pi_G^* = \frac{b_G}{a}(g + rb_G)$$

$$\pi_I^* = \frac{b_I}{a}(g + rb_I)$$

so that

$$\pi_I^* > \pi_G^* \text{ if } b_I > b_G$$

We also show this solution graphically in figure 7.

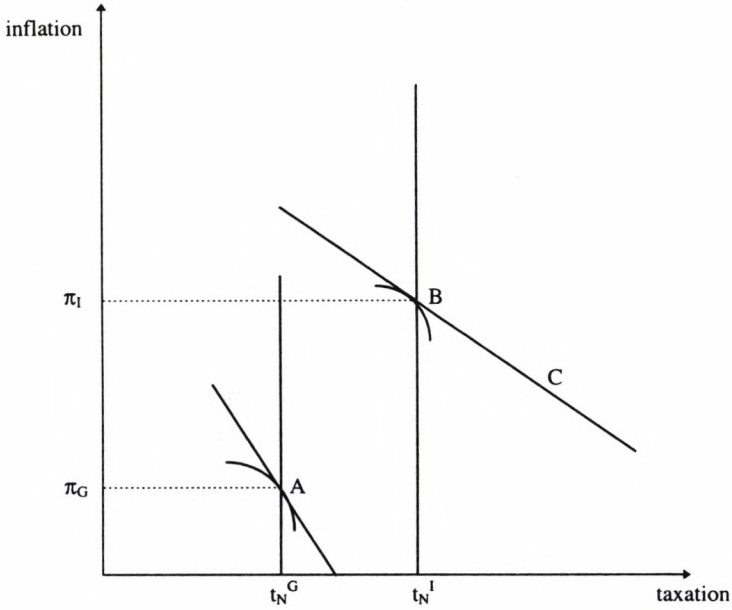
The difference in the debt to GDP ratios between the two countries has two effects. First, the natural taxation level t_N is higher in the high debt country Italy than in the low debt country Germany. Second, the slope of the short-term trade-off is flatter in Italy. This has to do with the fact that an inflationary surprise reduces the debt burden more in the high debt country

than in the low debt country. The result of all this is that the inflation equilibrium will be higher in Italy.

Thus, despite the same preferences towards inflation (as represented by the same indifference curves), the Italian authorities will still have a higher incentive to produce surprise inflation. This incentive does not disappear when Italy is in the union. As long as this country has a higher debt to GDP ratio the incentive to create suprise inflation will be present. This creates a problem for Germany. In the union, the German authorities will be confronted with a partner who will push for more inflation, despite the fact that it has the same preferences towards inflation. As a result, Germany stands to loose and will insist that Italy's debt to GDP ratio be reduced prior to entry so as to guarantee a low inflation in the union.

This argument for a prior reduction of the debt to GDP ratio is much stronger than the argument for prior reduction of inflation, because it does not depend on differences in the preferences with regard to inflation. As was argued earlier, if these differences in preferences exist, prior convergence will not solve the problem. The need to have budgetary convergence criteria is of a different nature. It is necessary to achieve low inflation in the union, and thereby to convince Germany to be part of the union, even if preferences with respect to inflation are identical. Achieving convergence to a low debt to GDP ratio prior to the union reduces the risk for Germany that the future monetary union will have an inflationary bias.

Figure 7: Inflation equilibrium in two countries



How is this conclusion affected by introducing debt of short maturity? We analyze this question in the following way. Let us rewrite the government budget constraint as follows

$$\dot{b} = g - t + (i - \pi)(1 - \sigma) b + r \sigma b \tag{8}$$

where σ is the share of short-term debt in the total government debt. Thus, σ b is the amount of short-term debt outstanding (as a percent of GDP). It is assumed that the real value of this short-term debt cannot be changed by surprise inflation. Only the real interest rate, r, affects the burden of this debt. The amount of outstanding long term debt is $(1 - \sigma)b$, the burden of which is influenced by surprise inflation. Setting $\dot{b} = 0$, using (2), and rearranging allows us to derive the short-term trade-off between inflation and taxation

$$t = g + r\,b + (\pi^e - \pi)\,(1 - \sigma)\,b \qquad (9)$$

We note the following. As the share of short-term debt increases, the slope of the short-term trade-off increases (it becomes steeper). In other words, the incentive to create surprise inflation declines. In the limit when all the debt is short-term $\sigma = 1$, so that the surprise inflation term drops out. The short-term trade-off line becomes vertical, coinciding with the long term one. There is no incentive to create surprise inflation anymore, despite the high level of the debt.

This result is of some significance for monetary unification. We observe that highly indebted countries tend to issue government securities with short maturity. Missale and Blanchard (1994) provide evidence for this. (For example, in Italy the effective maturity of the government debt had declined to less than one year in 1990, following the large increases in the debt during the 1980s). In addition, Missale and Blanchard show that there are good theoretical reasons why highly indebted countries tend to lower the maturity of their government debt. The short maturities reduces the government's incentive to produce surprise inflation. This then increases the willingness of wealth-owners to buy the debt. In the end this lowers the borrowing cost of the government.

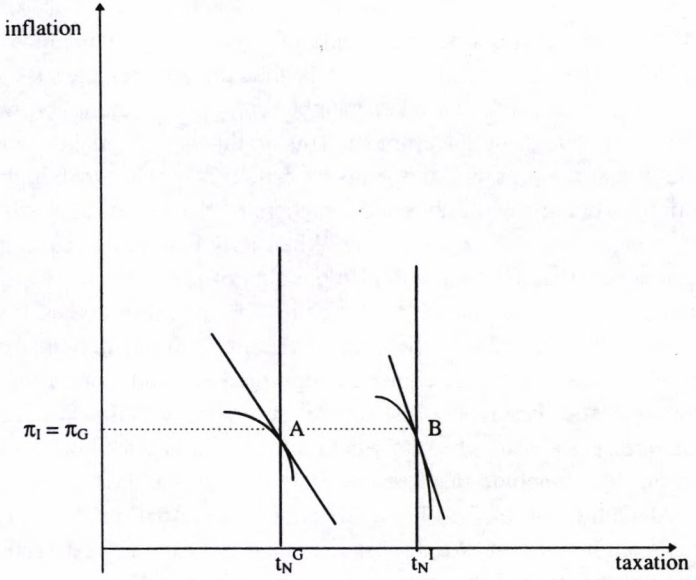
The previous analysis leads to the conclusion that the highly indebted country, say Italy, may not have a higher incentive to create surprise inflation than the low debt country, Germany. If the highly indebted country has reduced the average maturity of its debt sufficiently, it can generate the same inflation equilibrium as the low debt country. Such an outcome is shown in figure 8. Despite the high debt to GDP ratio in Italy, the high share of short-term debt has made the short-term trade-off steeper than in Germany creating the possibility of obtaining the same inflation equilibrium in Italy as in Germany. In this case Germany does not have to worry that the highly indebted Italian government will push for surprise inflation.

The exact condition for this result to hold can be obtained as follows. The expression of the rational expectations inflation equilibrium now becomes

$$\pi_G^* = \frac{b_G(1-\sigma_G)}{a}(g + rb_G)$$

$$\pi_I^* = \frac{b_I(1-\sigma_I)}{a}(g + rb_I)$$

Figure 8: Inflation equilibrium in two countries with different debt maturities



We can now derive the value of σ_I that will guarantee that $\pi_G^* = \pi_I^*$. This yields the following expression, (without loss of generality we set $\sigma_G = 0$):

$$\sigma_I = 1 - \frac{b_G(g + rb_G)}{b_I(g + rb_I)}$$

If the Italian debt to GDP ratio is twice the German level, a share of short-term debt, σ_I, slightly above 50 % will suffice to produce the same inflation equilibrium as in Germany. (Note that we have assumed that the preferences towards inflation, as measured by the parameter a, is the same in Italy and Germany. If a is lower in Italy, σ_I must be correspondingly higher).

From the previous discussion we conclude that the argument to impose budgetary convergence prior to entry in the union in order to reduce the risk of inflation in the future union, is weak. All we have to do is to require that highly indebted countries should maintain a relatively large fraction of their debt in short maturities. In other words, one should not allow these countries to lengthen the maturity of their debt prior to entry.

There are of course other possible arguments to impose prior reductions of government debt. The most prominent one is that this lowers the risk of default, and thus also the risk that other member countries in the union will have to bail-out the defaulting government. This argument only makes sense if one can show that the pressure to organise a bailout is higher when highly indebted countries default while they are members of the union, than while they are not. This, however, is not obvious. When Italy is not allowed in the union one can expect that a default will also put a lot of pressure on the other EU-members to bail-out the Italian government. This pressure comes from the fact that when Italy is outside the monetary union while it defaults, the lira is likely to collapse in the foreign exchange market, producing a lot of pressure from industrialists in the rest of the EU to support the lira. This exchange rate effect is absent when Italy defaults while it is a member of the monetary union. We conclude that keeping Italy outside the union may not necessarily reduce the risk of the EU-members of a future bailout operation. In fact it may even increase it. We discuss this possibility in the next section where we analyze the risks of the budgetary convergence requirements.

5. THE STABILITY OF THE CONVERGENCE PROCESS

The strongest argument that can be levied against the Maastricht convergence strategy is that it may actually make convergence of countries with weak currencies more difficult, if not impossible, to achieve[6]. We already mentioned this problem in section 3 when we discussed the inflation convergence. The problem is compounded when we add the budgetary requirements. Take again the case of Italy as represented in figure 7. Italy is in point B at the moment of the start of the transition period[7]. It will have to lower inflation and to reduce the government debt. If the disinflationary strategy is not fully credible, Italy will move along the short-term trade-off, say to point C. This movement coincides with an increase in the *ex post* real interest rate, i.e. as the disinflationary strategy is not credible the decline in the observed inflation is not matched by a decline in the expected inflation. The effect is that the debt burden is increased. The authorities must therefore increase taxes just to prevent the debt to GDP ratio from increasing. Thus the inflation convergence requirement makes debt reduction more difficult, when as in the case of Italy, a credible anti-inflation policy is difficult to follow. One can conclude that the Maastricht convergence requirements increase the costs of the debt reduction.

All this creates doubts about the possibility of meeting the Maastricht targets and is likely to induce speculative crises, which in turn raises the Italian interest rate. The troublesome aspect of these speculative crises is that they may become self-fulfilling, thereby pushing Italy on a new high-inflation and high deficit path. This then validates the doubts about Italy's ability to meet the Maastricht criteria. The whole process of convergence may actually impede a quick reduction of inflation and budget deficits.

This dynamics of the Maastricht convergence criteria creates a great risk of splitting the European Union apart. Those who are left out may in fact be left out for a long time. A significant number of countries that today lack the anti-inflationary credibility, may actually find it extremely difficult, if not

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[6] I am indebted to Daniel Gros for some of the ideas contained in this section. See Gros (1995).

[7] Note that we assume that the Italian inflation equilibrium is higher than the German one, either because of a low parameter a, and/or an insufficiently high σ_I.

impossible, to converge to the union members as long as they are left out. Such a situation will be very divisive for the European Union. This division of the European Union will create problems not only for the countries left out, but also for those who start the union. The exchange rates between the countries left out and the union members are likely to be volatile, creating distortions in trade flows, and undermining the single market program. Instead of promoting integration, a two-speed Europe is more likely to lead to a setback in the existing level of economic integration.

If this is a correct characterisation of the convergence dynamics for countries like Italy then it also follows that allowing these countries into the union without imposing prior convergence requirements would facilitate their convergence. In particular it would make it easier for these countries to reduce their budget deficits and to start a program of debt reduction. In order to illustrate this, we made the following calculations for two highly indebted EU-countries, Belgium and Italy. We computed the differential between the interest rate on domestic government bonds and the interest rate on bonds issued by the same governments in German Mark. This differential measures the pure devaluation risk (and not the default risk since the issuing government is the same). It is shown in the first column of table 1. In a monetary union this differential will disappear. Its existence today adds a burden on the government budget of these countries. The burden of the debt is measured by the real interest rate, however. Therefore the relevant comparison is the real interest differential. We show this in column 2. We observe that the real interest differential is higher than the nominal one in the case of Belgium. This has to do with the fact that the inflation rate is lower in Belgium than in Germany. The opposite occurs in the case of Italy. It can be expected that in a monetary union these inflation differentials will disappear. Thus, the observed real interest differentials measure the additional real burden of the debt in Belgium and Italy resulting from the absence of a monetary union. The final column then gives us an indication of the reduction of this debt burden (as a % of GDP) resulting from entry into the union by these two countries. We obtain these measures by multiplying the real interest differential by the debt to GDP ratio. It can be seen that this relief in the debt burden is substantial, amounting to 2 to 4% of GDP. Allowing these countries into the monetary union would make it easier to reduce their budget deficits to a level close to the 3% Maastricht norm.

Paradoxically, therefore, allowing these countries into the union without imposing that they fulfil the 3% norm prior to entry would actually allow these countries to meet the 3% norm more easily. In this sense it can be said that the imposition of the Maastricht convergence conditions makes convergence difficult[8].

Thus we seem to have reached a paradox. On the one hand the entry into the union of highly indebted countries like Italy and Belgium is perceived by Germany to go against its national interest because it could jeopardize price stability in the future union. On the other hand letting these countries in the union will make it easier for them to reduce their inflation and their government debt. At the same time allowing these countries into the union would eliminate the risk of a deep division of the European Union. How can this paradox be solved? In the next section we discuss some suggestions for reform that allow us to get out of this paradox.

Table 1: Interest differential between domestic currency and DM bonds (10 year) issued by Belgian and Italian government (1995) and debt burden.

	Interest differential		debt/GDP ratio	reduction in debt burden (in % of GDP)
	nominal	real		
Belgium	0.70	1.5	140 %	2.1 %
Italy	5.85	2.8	123 %	3.5 %

Source: JP Morgan, Global Markets, April 1995 and EC, European Economy.

[8] It is sometimes suggested that countries like Belgium and Italy could solve the unfavourable debt dynamics arising from being kept outside the monetary union by issuing bonds in DM (or in the union's common currency). This does not, however, solve the problem. For, when the DM (or the union's currency) appreciates vis a vis the BF or the Lira, the real burden of the Belgian and the Italian government debt increases. This problem is avoided if these countries are allowed into the union.

6. SUGGESTIONS FOR REFORM

The analysis of this paper suggests a number of reforms in the transition process towards monetary union. The general principle that should guide this reform can be formulated as follows. The transition to EMU should put less emphasis on convergence requirements and more on strengthening the future monetary institutions of the union. In other words, more emphasis should be put on ensuring that the future European central bank delivers on its mandate to produce price stability.

This general principle could be achieved in several ways. One has been proposed by Daniel Gros[9]. It foresees that countries who fail to satisfy the budgetary norms would not obtain a voting power on the board of director of the ECB. Thus, countries like Italy and Belgium, for example, would be accepted into the union. However, as long as their budgetary house is not in order, these countries would not be allowed to take part in the decision process of the ECB. As a result, there should be no fear that heavily indebted countries may push the ECB to pursue too expansionary monetary policies. The paradox we have discussed in the previous section can be resolved. By allowing highly indebted countries into the union, debt reduction targets become easier to achieve. At the same time the fear that these highly indebted countries may induce an inflationary bias to the union is allayed. This fear has been one of the main stumbling blocks for low inflation countries to allow countries following unorthodox fiscal policies in the union.

Another institutional strengthening consists in defining and enforcing a procedure for removal of the board of directors of the ECB should it fail to maintain price stability. Such a procedure would do much more to ensure price stability in the union in, say, the year 2010 than the insistence that countries reduce their inflation rates and their budget deficits in the second half of the 1990s, before the union starts. Such a reform also goes some way in making the future European Central Bank more accountable. In this context inflation targeting could be useful. Many central banks now follow inflation targeting procedure. The ECB could similarly be required to use such a procedure.

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[9] See Gros (1995).

These are only two proposals that follow the general principle formulated earlier, i.e. that less emphasis should be put on convergence criteria and more on strengthening the future monetary institutions in the union.

7. CONCLUSION

In this paper we surveyed the literature on monetary integration to find out what the economic rationale is of the Maastricht convergence requirements. The first theory we analysed, the theory of optimum currency areas (OCA), stresses that countries should have sufficient flexibility in wages and prices and sufficient mobility of labour to form a monetary union. This theory is completely silent on convergence requirements of the Maastricht type.

The OCA theory, however, teaches us an important lesson about Europe's monetary unification process: the European Union of 15 members is probably too large and too disparate to allow for a smooth functioning of a monetary union. A monetary union with fifteen would put too much pressure on the European Central Bank to accommodate for shocks that occur in one or more of the member countries. Thus, ideally the monetary union should be small. We argued, however, that the Maastricht convergence requirements do not provide the correct selection mechanism to determine the membership of this monetary club.

The second theory we surveyed was the so-called new view on monetary unification. The central insight of this theory is that the future monetary union must accommodate the desires of the low inflation country, Germany. This country is bound to loose its reputation of low inflation and will only be willing to join in a monetary union if this union is capable of producing low inflation. Therefore, Germany must be given guarantees before the union starts. One such guarantee is provided by the fact that the future European Central Bank will be a close copy of the Bundesbank (political independence, price stability as the sole objective of monetary policy).

This new view on monetary integration has also been invoked to rationalise the convergence requirements. We have argued that these convergence requirements have a poor theoretical basis. In addition, they also carry

important risks, i.e. the risk of a prolonged division of the European union, which will hurt not only those countries that are left out but also those that are allowed into the monetary union.

The analysis of this paper suggests a number of reforms in the transition process towards monetary union. As a general principle, the transition to EMU should put less emphasis on convergence requirements and more on strengthening the future monetary institutions of the union.

The proposed reform leaves one problem unresolved, however. As mentioned earlier, the OCA-literature suggests that the European Union of fifteen countries is not an optimum currency area. How can this problem be solved? We argued that the convergence criteria do not constitute the correct selection procedure for determining the optimal size of the union. Scientific studies, even if reliable, cannot be used either to solve this selection problem. The only reasonable alternative is to ask each EU-member country to determine for itself whether the benefits of the union outweigh its costs. To minimise the risk that too large a union would make European monetary policies erratic and unpredictable, the institutional reform suggested in this article are essential. It remains true that the risk of erratic monetary policies by the future European central bank cannot be completely eliminated. These risks, however, must be weighed against the risk for the European Union of keeping many countries against their wishes outside the monetary union.

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