BUDGETARY ASPECTS OF ECONOMIC AND MONETARY INTEGRATION IN EUROPE

Frederick van der Ploeg

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Centre for Economic Policy Research
6 Duke of York Street
London SW1Y 6LA
Tel: (44 71) 930 2963

ABSTRACT

Budgetary Aspects of Economic and Monetary Integration in Europe*

This paper analyses some of the implications of the proposals of the Delors
Committee for monetary and fiscal policies in Europe. The merits of an
independent ESCB are discussed. We offer four reasons why, in the absence of
European coordination of budgetary policies, the size of the public sector may
be too small relative to the first-best outcome: first, with an independent central
bank seigniorage revenues will only accrue through real growth, so that taxes
must be raised and exhaustive public spending must be cut; second, an
economic union means that spending by an individual treasury benefits the other
treasuries, so that there is an inadequate provision of public goods; third,
international competition drives tax rates down and leaves fewer funds for the
public sector; fourth, an appreciation of the real exchange rate of Europe has the
nature of a public good, hence the level of exhaustive public spending tends to
be too low.

Frederick van der Ploeg
CentER, Tilburg University
PO Box 90153
5000 LE Tilburg
The Netherlands
Tel: (+31 13) 662770

1990, the Commission presented its report on the EMU under the title 'One Market, One Money'. The author has contributed to the companion volume of independent experts a paper entitled 'Macroeconomic Policy Coordination during the Various Phases of Economic and Monetary Integration in Europe'. This paper will be published in a forthcoming issue of European Economy and discusses at length in a non-technical fashion the technical issues that arise in the present paper.

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NON-TECHNICAL SUMMARY

Recently, the decision has been made to let the second stage of the plans for Economic and Monetary Union in Europe (EMU) commence on 1 January 1994. Only Britain does not agree. Stage 2 requires the foundation of a European Central Bank, popularly referred to as the EuroFed, which in turn requires a new Treaty of Rome. Stage 2 also requires a narrowing of EMS bands, closer coordination of national monetary and budgetary policies, and a much wider use and acceptance of the ecu. The Delors report argued that in order to be successful, EMU requires rules on the conduct of budgetary policies. This paper analyses the optimal setting of monetary and fiscal policies within the EMU, emphasizing questions of allocation rather than of stabilization, and is firmly grounded within the modern theory of public finance.

The question that the paper attempts to address is whether EMU poses a threat to the current size of the public sector or not. Attention is focused, however, on the easier question of whether EMU will result in a public sector in Europe that is too small relative to the first-best outcome. To answer this question, the paper considers the optimal revenue mix for treasuries and central banks and the optimal size of the public sector. Attention is paid to the role of public debt and foreign debt in smoothing tax and seigniorage revenues as well as in smoothing private consumption. Both non-cooperative and cooperative outcomes are considered. We discuss the advantages and disadvantages of an independent EuroFed, and then the potential gains of coordinating fiscal policies under EMU, on the realistic assumption that countries benefit from the presence of an independent EuroFed.

Section 2 considers competition among the national central banks and treasuries of a monetary union. Each treasury can appropriate a certain amount of the seigniorage revenues collected by the common central bank. Our analysis suggests that the absence of international policy coordination among the various ministers of finance causes excessive monetary growth and inflation as well as too-low tax rates throughout the region. Each national treasury will be tempted to act independently in order to gain more of the seigniorage of the European central bank. Such behaviour fails to internalize the adverse effects of grabbing more seigniorage on the common inflation rate. The danger is that this leads to an erosion of the base for raising seigniorage as private agents economize on the use of money and could even put the region on the wrong side of the seigniorage-Laffer curve.

Since monetary discipline and credibility of the common central bank are not assumed to be a problem, an independent central bank appears to be less desirable than a dependent central bank with or without international policy coordination. An independent central bank leads to a sub-optimal government

revenue mix: too little inflation and tax rates that are too high. Most observers agree, however, that monetary discipline is a problem and can only be guaranteed by an independent central bank, for otherwise ministers of finance will succumb to the temptation of levying a surprise inflation tax to wipe out the real value of nominal wage or debt contracts. Indeed, this seems to be the view of Dr Pohl — the president of the Bundesbank — who fears that appointing central bankers from countries which do not have the Bundesbank's anti-inflation reputation to the board of the EuroFed is like throwing away the baby with the bathwater. The paper shows that Dr Pohl may be right, since in the absence of reputation, tying one's hands by having an independent central bank can improve welfare.

Section 3 modifies the analysis in four directions in order to capture the flavour of the proposals of the Delors Committee. First, national treasuries can only appropriate seigniorage that occurs through real growth since the EuroFed is assumed to be independent and focus entirely on price stability. Treasuries must thus issue debt and raise taxes to finance their spending. Second, the EMU as a whole is treated as a small open economy vis-à-vis the rest of the world. This enables one to pay attention to the externalities associated with the common determination of Europe's current account and of the value of the ecu in world markets. Third, the analysis assumes that individual countries care about the level of public goods provided by other EMU countries. Finally, the analysis allows for tax competition, which is particularly relevant for mobile factors of production.

Section 4 argues that with EMU there is, in contrast to the conventional belief, a danger that unless budgetary policies are coordinated the public sector will be not too large, but too small. Tax competition will tend to force down tax revenues and thus leave less room for spending. This spending tends not to be recognized as a European public good, nor do discussions recognize the public-good nature of Europe's current account. Those who think that the current size of the public sector in Europe is too large should therefore welcome EMU. Others will eventually become concerned and argue for the coordination of budgetary policies at a community level in order to safeguard the size of the public sector in Europe.

1. Introduction

Europe is in the process of becoming more and more integrated. The removal of all physical, technical and fiscal obstacles to free intra-European trade in goods and services and to free factor movements within Europe should lead to the completion of the internal market for Europe by 1992. Most of Europe's capital markets should be liberalised by 1st July 1990. The proposals of the Delors Committee for Economic and Monetary Union in Europe (EMU) have given a great impetus to this process. The proposals also involve the delegation of the responsibility of monetary policy to a European System of Central Banks (ESCB), which requires a new Treaty of Rome, the establishment of a common European Currency Unit (ECU) in parallel to the existing national currencies, and (after narrowing the bands of the European Monetary System) a move towards irrevocably fixed intra-European exchange rates. Some of the more controversial proposals of the Delors Committee are that national governments of the EMU will face restrictions on the size of public sector deficits, will not be allowed to finance spending by printing money, and will face limits on borrowing from abroad. This paper is concerned with the effects of the EMU on the conduct of fiscal policy in Europe and, in particular, on the size of the public sector in Europe.

The standard view is that the EMU will only work when Europe is an optimum currency area (Mundell, 1961). Although there is plenty of labour mobility between West-Germany and East-Germany, cultural, historical, language and housing barriers make a significant degree of labour mobility within the rest of Europe an unlikely event. This lack of mobility leads to problems of adjustment and a need for stabilisation policy, particularly when idiosyncratic shocks hit the countries of the EMU. For example, consider a switch in the taste of preferences away from goods produced by Britain towards goods produced by France. In a first-best world where all markets clear immediately, there is no need for labour mobility or a flexible pound-franc exchange rate. The trade deficit of Britain with France will disappear, because prices in Britain will fall and prices in France will rise. In a second-best world nominal wages and prices are rigid in the short run, so the alternatives are to either have a depreciation of the pound or to have people migrate from Britain to France. The former cannot happen under the EMU, whilst

the latter is unlikely to occur (neither is Britain likely to produce French goods). Nominal wages and prices would, of course, adjust in the long run, but this is accompanied by transitory unemployment in Britain and transitory over-employment in France. This is why the EMU performs badly under idiosyncratic shocks and is dominated by regimes of floating exchange rates (van der Ploeg, 1989b). Some argue that Europe should learn from fiscal federalism in the US and have a Federal Transfer Scheme to cushion the impact of shocks by a redistribution of income, say tax the French and transfer the revenue to individuals in Britain. Initial estimates for the US suggest that a third of state-specific shocks are cushioned by federal transfers (Sachs and Sala-i-Martin, 1989).

Although there are serious incentive problems associated with such a budget-neutral transfer scheme for the EMU (van der Ploeg, 1990), it may be all that is available because the limits on budget deficits proposed by the Delors Committee act pro-cyclically and are not likely to lead to successful stabilisation policies. It seems more sensible not to set limits on budget deficits and let the countries of the EMU pursue their own counter-cyclical stabilisation policies. When all countries of Europe are hit by identical shocks, the EMU seems by far the best exchange-rate regime since beggar-thy-neighbour attempts to appreciate the currency and export inflation are avoided. Given that the goods markets of Europe are becoming more and more integrated, there is a problem that in the face of a common adverse supply shock the fiscal stance of the countries of the EMU will in the absence of European coordination of budgetary policies be too tight.[1]

The stabilisation aspects of the EMU are thus quite clear. There will be a need for coordination of fiscal policies, perhaps, even for a European Federal Transfer Scheme or, alternatively, there should be no

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[1] The reason is that as the goods markets of Europe become more and more integrated, the beneficial effects of a fiscal expansion in one country of the EMU on net exports of other EMU-countries are likely to dominate the adverse effects arising from higher interest rates and crowding out. The result is that a fiscal expansion is a locomotive policy, which in the absence of policy coordination within the EMU will not be used enough to fight stagflation (van der Ploeg, 1989a).

restrictions on the budget deficits of individual treasuries. The allocation and public-finance aspects of the EMU have received much less attention and are the main subject of this paper. The question we would like to address is whether the EMU poses a threat to the current size of the public sector or not. However, we address ourselves to the easier question of whether the EMU leads to a too small public sector relative to the outcome under the first-best outcome. To answer this question, we will consider the optimal revenue mix for treasuries and central banks and also consider the optimal size of the public sector. Attention will be paid to the role of public debt and foreign debt in smoothing tax and seigniorage revenues and private consumption. In addition, we will compare non-cooperative and cooperative outcomes. We first consider the disadvantages and advantages of an independent ESCB and then move on to the potential gains of coordinating fiscal policies under the EMU on the assumption that it can benefit from an independent ESCB.

In Section 2 we consider the competition among the central banks and treasuries of a monetary union. Each treasury is assumed to be able to appropriate a certain amount of the seigniorage revenues collected by the common central bank. The main result is that absence of coordination between the various ministers of finance leads to excessive monetary growth and inflation throughout the region and to too low national tax rates, because each treasury fails to internalise the adverse effects of grabbing more seigniorage from the common central bank on the common inflation rate. When money demand depends negatively on inflation, this leads to an erosion of the base for raising seigniorage revenues and may even put the region on the wrong side of the seigniorage Laffer curve (Aizenman, 1989). Given that monetary discipline and credibility are not assumed to be a problem, the case of an independent common central bank comes off worst from the welfare point of view because it leads to a sub-optimal public revenue mix. However, an independent central bank may be desirable when discipline cannot be guaranteed and when ministers of finance are otherwise known to succomb to the temptation of levying a surprise inflation tax in order to, say, wipe out the real value of public debt and reduce tax distortions.

In Section 3 we modify the analysis in four directions, because we want to capture the flavour of the proposals for the EMU recently put forward by the Delors Committee in a better way. Firstly, individual treasuries are only permitted to appropriate the seigniorage that occurs through real growth since the ESCB is independent and is charged solely with the objective of maintaining price stability. Instead, they have to finance most of their budget deficits by issuing debt. The treasuries can sell their debt to private individuals at home and abroad, both in the other countries of the EMU and outside the EMU, and to the ESCB and other banks outside the EMU. To facilitate the analysis, we assume that bonds are perfect substitutes. This does not seem unreasonable, as a short cut, because most of the capital markets of Europe are meant to be fully liberalised by 1st July 1990. The ESCB prints the ECUs and uses the proceeds from seigniorage to purchase bonds on the open market. Secondly, we no longer assume that the monetary union is a closed economy. Instead we assume that the EMU is a small open economy vis-à-vis the rest of the world which takes interest rates as given on the world market. We can then focus on an externality associated with the joint determination of the real exchange rate and current account of Europe versus the rest of the world. A fiscal expansion by any of the treasuries of the EMU raises the demand for European goods relative to goods from the rest of the world and thus induces an appreciation of the real exchange rate of Europe and a deficit on Europe's current account. Absence of policy coordination in Europe means that Europe's current account is not recognised as a public good and thus leads to inefficient outcomes for the fiscal policies pursued under the EMU (cf., Cohen and Wyplosz, 1989). Thirdly, we assume that each member country of the EMU also cares about the level of public goods provided by other member countries. In view of the planned completion of the internal market for Europe, it seems reasonable to suppose that countries care about each others' levels of spending on the environment, research and development, foreign aid, infrastructure, museums, etcetera. The absence of policy coordination means that public spending is not recognised as a public good for Europe as a whole and therefore its supply will be too low. Finally, we also allow for the possibility that each country of the EMU also attempts to have slightly lower taxes than its competitors. This

form of tax competition drives down tax rates and levels of public spending.

In Section 4 we conclude by making a case for an independent ESCB and arguing that, unless budgetary policies are coordinated, the EMU leads to a smaller size of the public sector. Those who think that the current size of the public sector in Europe is too large, will welcome such developments. Others might not and will argue for the coordination of budgetary policies in order to safe-guard the size of the public sector in Europe.

2. Competition among the treasuries and central banks of a monetary union

2.1 The model

The monetary union consists of N countries denoted by the subscripts $i=1,...,N$. Exchange rates are irrevocably fixed and consequently there is a common inflation rate throughout the region. Treasury i's primary budget deficit is defined as the excess of exhaustive public spending (g_i) over tax revenues (τ_i). Its full deficit includes interest payments on outstanding debt (rd_i) and must be financed by selling debt (d_i) or by seigniorage revenues (s_i). The (growth-corrected) real interest rate (r) is determined on the world market. It follows that the budget constraints of the treasuries are given by

$$\dot{d}_i = rd_i + g_i - \tau_i - s_i, \quad d_i(0)=d_{io}, \quad i=1,...,N, \qquad (2.1)$$

where all quantity variables are expressed as fractions of the full-employment level of national income. Individual treasuries are, in contrast to the rather strange recommendation of the Delors Committee for guidelines on public sector deficits, free to borrow on the open market as long as they remain solvent. Solvency of a treasury requires that its debt must not grow at a faster rate than the interest rate in the long run. When the treasuries are solvent, their budget constraints can be written as

$$rd_i + g_i^P = \tau_i^P + s_i^P, \quad i=1,\ldots,N \tag{2.1'}$$

when the permanent level of exhaustive public spending is defined as

$$g_i^P(t) \equiv r \int_t^\infty \exp[-r(s-t)] \, g_i^e(s,t) \, ds \;,$$

where $g_i^e(s,t)$ denotes the expected value of $g_i(s)$, $s>t$, conditional on all information available at time t, and τ_i^P and s_i^P are defined in a similar fashion. In other words, the current treasury debt plus the present value of the stream of future exhaustive public spending must equal the present value of the stream of future direct tax and seigniorage revenues. The central bank of the monetary union is run by the various treasuries and thus not independent, so its budget constraint is given by

$$\left(\sum_{i=1}^N s_i \right) = \theta m N \tag{2.2}$$

where θ denotes the monetary growth rate of the region and m denotes the holdings of real money balances by an individual country. For the time being, we assume that the velocity of circulation and thus m is constant and the same for each country. The quantity theory of money then says that the common rate of inflation (π) is determined by the excess of monetary growth (θ) over growth in real income (n).

2.2 Absence of cooperation causes excessive inflation

Each treasury is concerned with the most efficient revenue mix for financing a given stream of exhaustive public spending. In other words,

each treasury wishes to minimise the excess burden caused by raising tax and seigniorage revenues. We assume that the dead-weight losses correspond to the familiar welfare triangles[2] and are proportional to real output, so that the welfare-loss function of treasury i can be written as:[3]

$$W_i \equiv \frac{1}{2} \int_0^\infty \exp(-rt) \left[\tau_i^2 + \beta \pi^2 \right] dt, \quad \beta > 0. \tag{2.3}$$

When treasury i chooses a sequence of τ_i and s_i to minimise (2.3) subject to (2.1'), (2.2) and $\pi = \theta - n$, taking τ_j, s_j, $j \neq i$ as given, we obtain the non-cooperative outcome (denoted by the superscript N). When all treasuries jointly choose τ_i, s_i, i=1,...,N, to minimise $W_1 + W_2 + ...W_N$, we obtain the cooperative outcome (denoted by the superscript C).

A non-cooperative monetary union leads to $\tau_i^N = (\beta/mN)\pi^N$, $\dot{\tau}_i^N = 0$, i=1,...,N, whilst a cooperative monetary union leads to $\tau_i^C = (\beta/m)\pi^C$, $\dot{\tau}_i^C = 0$, i=1,...,N. Each of the countries has an equal say in running the central bank of the monetary union, so we assume that the cooperative outcome simply minimises the sum of the countries' welfare losses. This is the reason that the marginal distortion from collecting seigniorage revenues is N times as large under the cooperative as under the non-cooperative outcome.

The fundamental insight common to both the non-cooperative and cooperative outcome is that tax rates are smoothed (cf., Barro, 1979),

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[2] There is a slight problem in justifying the cost of inflation in terms of triangles under the money demand schedule, since under the quantity theory this schedule is flat and in general the empirical magnitude of these costs have been small. Nevertheless, it seems reasonable to assume that inflation is costly (e.g., Fischer and Modigliani, 1975). One possibility is that a higher level of anticipated inflation leads to a higher variance of unanticipated inflation, which then in the absence of full indexation causes a misallocation of resources, arbitrary redistributions and, perhaps, fewer long-term contracts.

[3] This (and the model of Section 3) adopts a reduced-form approach in order to get a quick grasp of the policy issues involved. There is thus a danger that some of the results do not carry over to a fully specified model of the ongoing strategic interactions between optimising governments and a rational private sector in which one distinguishes between pre-commitment and (Markov) perfect equilibria (Obstfeld, 1990).

that inflation rates are smoothed, and that tax and seigniorage revenues go up and down together (Mankiw, 1987; Grilli, 1989). The point is that the marginal distortions from the various current and future sources of raising revenues must be equalised[4] and that the treasuries may only borrow to finance transitory increases in exhaustive public spending. The best example is that treasuries are allowed to borrow for investment projects with a market rate of return, because these leave the permanent level of exhaustive public spending unaffected but increase the actual level of exhaustive public spending. In general, there is a trade-off between aiming for zero tax distortions and aiming for zero inflation (or full liquidity) which leads to both positive tax rates and positive inflation rates (Phelps, 1973).

Since there is a common inflation rate throughout the region, tax rates must be the same throughout the region as well, even though levels of exhaustive public spending and of public debt may vary from country to country. This has interesting implications for the solidarity required in a monetary union. When a monetary union consists of two countries, the first with a higher level of permanent spending and the second with a smaller need for public revenues $(rd_1+g_1^p>rd_2+g_2^p)$, the first country obtains more seigniorage revenues from the common central bank than the second country $(s_1>s_2)$. In other words, a monetary union is sustainable only when countries with a small public sector transfer revenues to countries with a large public sector. Alternatively, when the costs of tax collection or the size of the black economy are much larger in one country than in the other countries (smaller β for some countries), tax rates are lower than the average and the country also receives an implicit transfer of seigniorage revenues. The Delors Report recommends a convergence of levels of public spending and debt. This seems reasonable in view of the above observation that the political sustainability of a monetary union is then more likely. An even stronger view is that such redistributions are politically so unlikely that a dependent ESCB is never going to happen. A more

[4] The tax-smoothing result depends on the rate of time preference being the same as the market rate of interest. If it is greater (smaller), governments are relatively impatient (patient) and the tax and inflation rates must be expected to increase (decline) over time.

optimistic view holds that the distribution of seigniorage according to need is the political price one has to pay for monetary unification.

Substitution into the treasuries' intertemporal budget constraints yields a comparison of the non-cooperative and the cooperative outcome:

$$\pi^N = \left[\frac{rd+g^P-nm}{(\beta/mN)+m}\right] > \pi^C = \left[\frac{rd+g^P-nm}{(\beta/m)+m}\right] \qquad (2.4)$$

$$\tau^N = \left[\frac{rd+g^P-nm}{1+(m^2N/\beta)}\right] < \tau^C = \left[\frac{rd+g^P-nm}{1+(m^2/\beta)}\right] \qquad (2.5)$$

where g^P is defined as $g^P \equiv \left[\sum_{i=1}^{N} g_i^P\right]/N$ and d and τ are defined in a similar fashion. Conflict between the national ministries of finance of a monetary union leads to excessive monetary growth and inflation (and thus to too low direct tax rates), because each country fails to internalise the adverse effects of grabbing more seigniorage on the other countries of the monetary union. International policy coordination leads to lower monetary growth and higher tax rates.

There are two extensions to the above argument. The first is to allow money demand (m) to depend negatively on inflation. In that case, the lack of international policy coordination also leads to an erosion of the base for raising seigniorage revenues and may even put the region on the wrong side of the seigniorage Laffer curve (Aizenman, 1989).[5] The second is that individual treasuries may also care about their balance of payments position. The monetary approach to the balance of

[5] However, if there are only two assets, money and bonds, and the portfolio shares $(m_i/(m_i+d_i))$ depend on the relative rate of return on these assets, i.e., inflation, the optimal steady-state inflation rate for a closed economy (and thus for a cooperative monetary union) is determined by the full liquidity rule (Turnovsky and Brock, 1980; Yashiv, 1989). It follows that inflation and tax rates do not necessarily need to go up and down together anymore and that international policy coordination in a monetary union without an independent central bank need not be necessary.

payments gives the common inflation rate as $\pi = \left(\dfrac{1}{N}\right)\left(\displaystyle\sum_{i=1}^{N} \theta_i\right) - n = \theta - n$,
where $\theta_i = s_i/m$ denotes the rate of domestic credit expansion for
country i, and the balance of payments (as a fraction of the demand for
money) of country i as $z_i = \theta - \theta_i$. When the average of the desired
values for the z_i's is negative, absence of international coordination
of monetary policies causes excessive inflation as countries try to
defend themselves against reserve accumulation by expanding domestic
credit and thus raising the common inflation rate (Hamada, 1976).

2.3 The case for an independent ESCB

Many practitioners advocate an independent central bank (denoted by
thesuperscript I) whose policy should be solely directed at maintaining
price stability. This leads to $\pi^I=0$, $\dot{\tau}_i^I=0$, i=1,...,N, and $\tau^I=rd+g^P-nm$.
An independent central bank achieves a stable price level and thus the
ministries of finance need to resort to higher tax rates than would be
the case with a dependent central bank. It is easy to show that
$W^I>W^N>W^C$, so that the lowest welfare loss is achieved when the various
ministers of finance coordinate their budgetary and monetary policies
and the highest welfare loss is achieved under an independent central
bank.

Why then do practitioners advocate an independent central bank?
Why then does the Delors Report strongly advocate an independent ESCB
based on the German model?[6] The main reason is that they do not trust
treasuries to havesufficient monetary discipline to guarantee price
stability, because they forever have the temptation to levy an inflation
tax in order to finance additional public spending, or to accommodate
demands for higher wages. Practitioners believe that an independent

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[6]In fact, the Delors Report recommends a federal structure in which the
central banks of the EMU-countries are incorporated in a ESCB. The ESCB
should have three levels of organisation: (i) the Council of the ESCB
consisting of the presidents of the national central banks, which are
independent of Community and national authorities (cf., the German
"Zentralbankrat"); (ii) the Board of the ESCB, which monitors monetary
developments and oversees the implementation of the common monetary policy
(cf., the "Direktorium"); and (iii) the national central banks which execute
the decisions taken by the Council (cf., the "Landeszentralbanken").

central bank, directed by ultra-conservative central bankers who only care about price stability, will not succomb to a surprise inflation tax in order to wipe out the real value of outstanding nominal treasury debt (e.g., Gros, 1988), the real value of the nominal wage (e.g., Barro and Gordon, 1983) or the real value of money balances (e.g., Calvo, 1970, Barro, 1983). Whenever this does happen, equilibrium inflation will be higher and equilibrium tax rates will be lower. Since ministers of finance, unions and other agents anticipate that an independent central bank is not going to give in to their demands, they settle for less and as a result inflation is lower and taxes are higher than would be the case under a dependent central bank without much monetary discipline. Undoubtedly, this is the reason why central bankers -- the main signatories of the Delors Report -- are very much in favour of an independent ESCB. Hence, it is more relevant to compare cooperative and non-cooperative outcomes under a dependent central bank (i.e., discretion denoted with the superscripts ND and CD, respectively) with the outcome under an independent central bank (i.e., rules). To assess the case for an independent central bank, one should trade off the disadvantage of a sub-optimal government revenue mix against the advantage of better monetary discipline and the lower inflation this brings with it.

Italy has a larger black economy and a less efficient tax system than Germany and therefore finds it optimal to extract relatively more revenues from seigniorage than from direct taxation (e.g., Canzoneri and Rogers, 1990). Some even argue that this is a good reason against the EMU and in favour of a crawling peg between the currencies of northern and southern Europe for this would accommodate the required inflation differential (e.g., Dornbusch, 1988). However, this argument ignores the monetary discipline the Bundesbank gives to the Banca d'Italia under the European Monetary System (EMS) (e.g., Giavazzi and Pagano, 1988) and hopefully under the EMU. The gain in central bank credibility and the accompanied tying of one's hands may be the main advantage of the EMS and hopefully the EMU. This advantage is particularly relevant for countries with a large stock of outstanding nominal government debt, such as Italy and the Netherlands, and with a greater preference for low

inflation than eliminating tax distortions (Gros, 1988).[7]

To illustrate the argument, attention will be focused on the monetary discipline an independent ESCB may offer in safe-guarding the real value of public debt, probably the most important source of time inconsistency for Europe, but it is important to realise that the arguments in favour of an independent central bank could just as easily have been made in terms of removing the incentive to use unanticipated inflation to achieve a temporary gain in employment.[8] Treasuries now issue nominal (rather than real or indexed) bonds with a guaranteed nominal rate of return, $r + \pi^e$ where π^e denotes the expected inflation rate. The expected or ex-ante real interest rate, the real interest rate for short, is according to the Fisherian hypothesis determined by consumption tastes and production technologies, more or less independent of the expected inflation rate. For given tastes and production technologies, any change in nominal interest rates must then be due to a change in expected inflation rates. The realised or ex-post real interest rate, $r + \pi^e - \pi$, is relevant for the borrowing and lending activities of the treasuries. It decreases with unanticipated inflation, which is one way in which governments can reduce the level of their inflation-corrected deficits and reduce the growth of their debt-GDP ratios.[9] It is straightforward to show that in equilibrium

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[7] In any case, one could argue that one should implement the first-best policy of eradicating the black economy thus reducing the costs of tax collection and enabling oneself to cut the inflation rate. Alternatively, one might try to explain the inefficiency of the tax system and the associated reliance on seigniorage in terms of how unstable and polarised the political system is (Cukierman, Edwards and Tabellini, 1989).

[8] Wage indexation is prevalent throughout Europe, so there is presumably less of a possibility to use a surprise inflation to erode the real value of the wage. The ratio of real (high-powered) money balances to public debt is generally quite small (13% for the UK, 23% for the Netherlands, 30% for Spain and 76% for Germany over the period 1962-1987) and as money is mainly held for transactions rather than for speculative purposes, it seems reasonable to focus on the incentives to wipe out the real value of public debt. Of course, the first-best policy is to destroy such incentives to renege on nominal contracts through, for example, the issue of indexed rather than nominal bonds. Conversely, an independent ESCB does not destroy all forms of capital levy.

[9] Since d_i is no longer a predetermined variable, an increase in the level

$$\pi^{ND} = \left[\frac{rd+g^P-nm}{m+\beta/(mN+d)}\right] > \pi^{CD} = \left[\frac{rd+g^P-nm}{m+\beta/(m+d)}\right] > \pi^{I}=0 \qquad (2.6)$$

and thus that $\tau^{ND} < \tau^{CD} < \tau^{I}$ must hold. The presence of an outstanding nominal public debt is an open invitation to wipe it out with an unanticipated inflation tax. Since a dependent ESCB cannot be trusted not to take up the invitation, inflation under the discretionary outcomes is higher than under the rules outcomes ($\pi^{ND} > \pi^{NR}$ and $\pi^{CD} > \pi^{CR}$). As far as the treasuries are concerned a dependent ESCB and competition within the EMU improves welfare, because this reduces tax distortions. However, as far as central bankers are concerned, this increases inflation and thus reduces welfare. This is in a nutshell the conflict between ministers of finance and central bankers.

The condition under which an independent ESCB (I) yields higher welfare than a dependent ESCB with cooperation among the treasuries (CD) is given by

$$(\beta-m^2)d > (\beta+m^2)m, \qquad (2.7)$$

whilst the condition under which one prefers an independent ESCB over a non-cooperative EMU and a dependent ESCB (ND) is given by

$$(\beta-m^2)d > [\beta(2-N)+Nm^2]m. \qquad (2.8)$$

One is more likely to come out strongly in favour of an independent ESCB rather than a cooperative EMU with a dependent ESCB when the level of public debt in Europe and when the priority one attaches to eliminating inflation rather than to cutting tax distortions is high. It is

rather than the <u>growth</u> of the nominal money supply leads to an equal increase in the price level and can thus be used to wipe out the real value of public debt at "the stroke of a pen". Here we are concerned, however, with unanticipated increases in inflation.

therefore not much of a surprise that the Delors Committee, which consisted largely of central bankers, has come out in favour of an independent ESCB.

Inequality (2.8) is more (less) likely to be violated as the number of members of the EMU increases, provided that β exceeds (is less than) m^2. In other words, when the priority one attaches to price stability exceeds the priority one attaches to getting rid of tax distortions and the number of EMU-countries is large, one always prefers an independent ESCB to a non-cooperative EMU with a dependent ESCB. When one, nevertheless, comes out in favour of an independent ESCB, one should be aware that macroeconomic policy coordination within the EMU may well be counterproductive[10] when one restricts attention to discretionary outcomes. The following counter-example makes the point: when d = -m, the CD-outcome yields the same welfare as the I-outcome and, when $\beta(N-3) < m^2(N-1)$, the ND-outcome yields a higher welfare than the I-outcome, so that the CD-outcome is worse than the ND-outcome. Sufficient conditions for the inequality are N=2, N=3 or $\beta<m^2$. Macroeconomic policy coordination destroys discipline and can thus be counterproductive.[11] This is more likely to occur when the advantage of cooperation in the form of lower inflation is outweighed by the disadvantage in the form of more tax distortions and when the number of countries is small. The counter-example can be understood by thinking of a clever scheme for restructuring treasury debt in order to overcome the problem of time inconsistency in the cooperative outcome: eliminate the incentive to erode the stock of real money balances by buying an equal stock of nominal bonds from the public (so when a treasury reneges it loses just as much on its assets as it gains on real money balances) and issue indexed bonds for the remainder. In the non-cooperative outcome there

[10] Macroeconomic policy coordination under the EMU can also be counterproductive when budgetary policies are used to fight stagflation caused by a global supply shock, because this may provide an adverse response from the US (van der Ploeg, 1989a).

[11] This also occurs under a regime of floating exchange rates when the monetary authorities are tempted to use a surprise inflation to erode the real value of wages and boost employment (Rogoff, 1985) or to use the seigniorage revenues to reduce distortionary taxes and boost the level of exhaustive public spending (van der Ploeg, 1988).

is still an incentive to renege leading to higher inflation, but this may be desirable when the costs of collecting taxes are high enough.

The Delors Committee has come out strongly in favour of an independent ESCB for the EMU, which may be justified in terms of the enhanced monetary discipline this would offer. A related argument in favour of an independent ESCB is that this avoids the costs associated with unpredictability of inflation. We will assume an independent ESCB in the remainder of the paper. Monetary policy then ensures a stable price level, which means that monetary growth equals real growth (θ=n). The only source of seigniorage revenues that is available to the treasuries is due to real growth, so that if previously treasuries relied on inflation taxes as well, taxes must be raised or the level of exhaustive government spending must be cut.

3. European Monetary Union with an independent central bank

3.1 The model

The EMU consists of N countries. Since individual treasuries of the EMU are, according to the proposals of the Delors Committee, no longer allowed to print money and they only get these seigniorage revenues which accrue through real growth (s_i=nm), their intertemporal budget constraints must when they are solvent be given by:

$$rd_i + g_i^P = \tau_i^P + nm, \quad i=1,\ldots,N. \tag{3.1}$$

where we have assumed that seigniorage revenues collected by the ESCB are equally distributed to the treasuries of the EMU.[12] We abstract from

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[12] When the ESCB manages the value of the ECU in world markets, one should take account of interest losses or gains on foreign reserves (e.g., dollar-dominated assets) in the budget constraint of the ESCB. However, if foreign reserves earn a market rate of return, they can be netted out of the ESCB's budget constraint (e.g., Buiter, 1990, Chapter 5).

risk premia and assume that all bonds are perfect substitutes, which means that European interest rates are tied to world interest rates. The ESCB is independent and must pursue a stable price level, so that it sets Europe's monetary growth rate equal to Europe's real growth rate ($\theta=n$).

The quantity theory of money holds, so that m is constant. The irrevocable fixity of exchange rates under the EMU implies, of course, that all countries of the EMU experience a stable price level. The consolidated budget constraint for the N treasuries and the ESCB is given by

$$\dot{d} = rd + \sum_{i=1}^{N} (g_i - \tau_i) - nmN, \quad d(0) = d_o. \tag{3.2}$$

where $d \equiv (\sum_{i=1}^{N} d_i)$ denotes the net consolidated government debt of the EMU. The budget constraints of the private sectors of the EMU are given by

$$\dot{b}_i = rb_i + y_i - \tau_i - nm - c_i, \quad b_i(0) = b_{1o}. \quad i=1,\dots,N. \tag{3.3}$$

where b_i, c_i and y_i denote the holdings of bonds by private agents, the level of private consumption and the level of income of country i, respectively. Full employment in country i implies that $y_i = 1$. Net holding of foreign assets by Europe are defined as $f \equiv \left(\sum_{i=1}^{N} b_i \right) - d$, so that Europe's current account can be written as

$$\dot{f} = rf + \sum_{i=1}^{N} (y_i - c_i - g_i), \quad f(0) = f_o. \tag{3.4}$$

The sum on the right-hand side of (3.4) corresponds to Europe's balance of trade with the rest of the world. We assume solvency of the N private sectors, so that interest on assets plus the present value of

the stream of future income minus direct taxes and growth taxes on holdings of assets must be sufficient to finance the present value of the stream of future consumption:

$$c_i^P = r b_i + y_i^P - \tau_i^P - nm, \quad i=1,\ldots,N. \qquad (3.3')$$

Together with (3.1) this implies that Europe as a whole is solvent, so that the present value of the stream of future balance-of-trade surpluses must equal Europe's outstanding net foreign debt:

$$\left(\frac{1}{r}\right) \sum_{i=1}^{N} \left(y_i^P - c_i^P - g_i^P \right) = -f \ . \qquad (3.4')$$

The EMU as a whole faces this intertemporal budget constraint, but individual EMU-countries do not face such a constraint.

We assume that goods produced by the various European countries are perfect substitutes and that the "law of one price" holds for Europe, which is of course unreasonable. However, a strict interpretation of the planned integration of goods markets throughout Europe ("1992" and all that) may warrant such a heroic assumption as a short cut. Purchasing power parity between Europe and the rest of the world is even more unrealistic, hence we reject this and assume that goods from Europe and from elsewhere are imperfect substitutes.[13] Equilibrium in the market for European goods requires

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[13] In any case, there is a lot of empirical evidence which suggests that volatility in real and in nominal exchange rates go together (Mussa, 1986). More precisely, in moving to the EMS the volatility of intra-European nominal exchange rates and of real exchange rates decreased substantially (Mussa, 1990). Hence, from an empirical point of view, it may not be that unreasonable to assume that the "law of one price" holds roughly within the EMU. Since the exchange rate of the ECU vis-à-vis the rest of the world is supposed to float, it is not reasonable to assume the "law of one price" between Europe and the rest of the world.

$$\sum_{i=1}^{N} y_i = \sum_{i=1}^{N} (c_i + g_i) + c_*^m - E\left(\sum_{i=1}^{N} c_i^m\right) , \tag{3.5}$$

where c_*^m denotes exports of Europe to the rest of the world, c_i^m denotes imports by country i of the EMU from countries outside the EMU, and E denotes the real exchange rate of Europe (the relative price of goods from outside Europe in terms of European goods). We assume a Cobb-Douglas sub-utility function in terms of goods from Europe and from elsewhere, so that $c_*^m = \phi^* c_* E$ and $c_i^m = \phi c_i / E$, $i=1,\ldots,N$, where ϕ (ϕ^*) denotes the constant value-share of imported goods in total private expenditure of Europe (the rest of the world) and c_* denotes the exogeneous level of total private expenditure of the rest of the world. Upon substitution into (3.5), we obtain the real exchange rate of Europe:

$$E = \sum_{i=1}^{N} [y_i - (1-\phi)c_i - g_i]/(\phi^* c_*). \tag{3.6}$$

When producers' prices are a fixed mark-up $(\omega_1 > 1)$ on wages in Europe, real incomes in Europe are given by

$$\omega = \omega_o E^{-\phi} \approx \omega_o (1 - \phi E), \quad \omega_o \equiv (\omega_2/\omega_1) > 0, \tag{3.7}$$

where ω_2 denotes the level of the productivity of labour. Hence, an increase in spending by any of the N treasuries leads ceteris paribus to a one-for-one deficit in Europe's current account and an excess demand for European goods. The latter is choked off by an appreciation of the real exchange rate of Europe, which induces a fall in consumers' prices and a boost in real income for Europe.

The rate of expected CPI-inflation in Europe, $\phi(\dot{E}/E)$, is positive (negative) when Europe's real exchange rate is expected to depreciate, i.e., when Europe's real interest rate exceeds (is below) the real interest rate of the rest of the world, but this can only, of course, be a temporary event. We are concerned with what fiscal policies should be

pursued by each of the treasuries of the EMU. We assume that each
treasury wishes to attain a desired level of exhaustive public spending
($\bar{g}_i$), a desired level of private spending ($\bar{c}_i$), a desired tax rate
associated with no distortions (zero), and a desired level of the real

exchange rate of Europe and thus of real income ($\bar{\omega}_i$). Since we assume
that the internal market for Europe is completed, it seems reasonable to
suppose that each treasury also cares about an appropriate level of
public goods in other countries of the EMU and also attempts to maintain
a better tax climate than in other counties of the EMU. Furthermore,
each treasury minimises quadratic deviations from these desired levels
and trades off all these objectives by giving different weights to them.
Each treasury chooses a sequence of tax rates and levels of exhaustive
public and private spending to minimise its welfare-loss function,

$$W_i \equiv \frac{1}{2} \int_0^\infty \exp(-rt) \left[\gamma_1 (g_i - \bar{g}_i)^2 + \gamma_2 (c_i - \bar{c}_i)^2 + \gamma_3 \tau_i^2 + \gamma_4 (\omega_i - \bar{\omega}_i)^2 \right.$$

$$\left. + \gamma_5 \sum_{j \neq i} (g_j - \bar{g}_j)^2 + \gamma_6 \sum_{j \neq i} (\tau_j - \tau_i - \bar{\tau})^2 \right] dt, \qquad (3.8)$$

subject to the constraints (3.1), (3.3′), (3.6) and (3.7). Hence,
treasuries attempt to maintain an adequate level of public goods and of
real income, to have a tax advantage over their competitors, and at the
same time use the current account to smooth private consumption and use
government debt to smooth tax distortions. In Section 2, we abstracted
from pure fiscal externalities and effectively assumed that
$\gamma_1 = \gamma_2 = \gamma_4 = \gamma_5 = \gamma_6 = 0$.

3.2 The non-cooperative outcome

This outcome corresponds to a Nash-Cournot outcome for a
differential game with pre-commitment. The Hamiltonian for treasury i
is defined as:

$$H_i = \frac{1}{2}\gamma_1(g_i-\bar{g}_i)^2 + \frac{1}{2}\gamma_2(c_i-\bar{c}_i)^2 + \frac{1}{2}\gamma_3\tau_i^2 + \frac{1}{2}\bar{\gamma}_4\left[\sum_{j=1}^{N}\left(y_j-(1-\phi)c_j-g_j\right) + \bar{\bar{\omega}}_i\right]^2$$

$$+ \frac{1}{2}\sum_{j\neq i}\left[\gamma_5\left(g_j-\bar{g}_j\right)^2 + \gamma_6\left(\tau_j-\tau_i-\bar{\tau}\right)^2\right] +$$

$$\lambda_i(rd_i+g_i-\tau_i-nm) - \mu_i(rb_i+y_i-c_i-\tau_i-nm) \tag{3.9}$$

where $\bar{\gamma}_4 \equiv (\omega_o\phi/c_*\dot{\phi})\,\gamma_4$, $\bar{\bar{\omega}}_i \equiv (c_*\dot{\phi}/\omega_o\phi)(\bar{\omega}_i-\omega_o)$, λ_i denotes the marginal welfare loss arising from an additional unit of treasury debt for country i, and μ_i denotes the marginal welfare gain arising from an additional unit of private assets for country i. When the mark-up desired by workers in country i $(\bar{\omega}_i)$ exceeds what is left of productivity once firms have taken their cut (ω_o), country i attempts to increase its real income beyond what it can afford by appreciating the real value of the exchange rate of Europe $(\bar{\bar{\omega}}_i>0)$. The first-order conditions for treasury i are:

$$\gamma_1(g_i-\bar{g}_i) + \lambda_i = \bar{\gamma}_4\left\{\sum_{j=1}^{N}\left[y_j-(1-\phi)c_j-g_j\right] + \bar{\bar{\omega}}_i\right\} \tag{3.10}$$

$$\gamma_2(c_i-\bar{c}_i) + \mu_i = \bar{\gamma}_4(1-\phi)\left\{\sum_{j=1}^{N}\left[y_j-(1-\phi)c_j-g_j\right] + \bar{\bar{\omega}}_i\right\} \tag{3.11}$$

$$\gamma_3\tau_i = \lambda_i - \mu_i + \gamma_6\left[\sum_{j\neq i}^{N}(\tau_j-\tau_i-\bar{\tau})\right] \tag{3.12}$$

$$\dot{\lambda}_i = \dot{\mu}_i = 0 \tag{3.13}$$

(3.1) and (3.3′). In deriving the first-order conditions treasury i takes the policy actions of the other treasuries $(c_j, g_j, j\neq i)$ as given, hence the equilibrium concept assumes zero conjectural variations and corresponds to a non-cooperative Nash-Cournot outcome with

pre-commitment.

Combining the first-order conditions, we find that $\tau_i^p = \tau_i$, $g_i^p = \tau_i$ + nm - rd_i and $c_i^p = rb_i + y_i^p - \tau_i$ - nm so that we can solve for $(g_i,\ c_i,$ $\tau_i, i=1,\ldots,N)$ from:

$$(1-\phi)\gamma_1\left[\bar{g}_i - \overline{g}_i^p - (rd_i + g_i - \tau_i - nm)\right] = \gamma_2\left[(\bar{c}_i - \overline{c}_i^p) + rb_i + y_i^p - \tau_i - nm - c_i\right]$$
$$(3.14)$$

$$\gamma_1\left[\bar{g}_i - \overline{g}_i^p - (rd_i + g_i - \tau_i - nm)\right] + \bar{\gamma}_4\left\{\sum_{j=1}^{N}\left[y_j - y_j^p - (rd_j + g_j - \tau_j - nm) + \right.\right.$$

$$\left.\left.(1-\phi)(rb_j + y_j^p - \tau_j - nm - c_j)\right] + \bar{\bar{\omega}}_i - \bar{\bar{\omega}}_i^p\right\} = 0 \qquad (3.15)$$

$$\gamma_1(g_i - \bar{g}_i) - \gamma_2(c_i - \bar{c}_i) + \gamma_3\tau_i = \bar{\gamma}_4\left\{\phi\left[\sum_{j=1}^{N}\left[y_j - (1-\phi)c_j - g_j\right] + \bar{\bar{\omega}}_i\right]\right.$$

$$\left. + \gamma_6\left[\sum_{j\neq i}^{N}(\tau_j - \tau_i - \bar{\tau})\right]\right\}, \qquad (3.16)$$

$i=1,\ldots,N$. It seems sensible to focus separately on the three externalities: (i) spending by individual treasuries is a public good to Europe as a whole; (ii) international tax competition; and (iii) the real exchange rate and current account of Europe are jointly determined.

3.2.1 Tax and consumption smoothing

Let us first discuss the case where treasuries are not concerned with using the real exchange rate of Europe to boost the real income of their citizens $(\gamma_4 = 0)$ or with trying to achieve a better tax climate than abroad $(\gamma_6 = 0)$. The advantage of this case is that treasuries make up their mind about policy without taking into account the actions of the other treasuries. The result is:

$$g_i^N - \bar{g}_i = \gamma_2(rb_i + y_i^p - \overline{c}_i^p) - (\gamma_2 + \gamma_3)(rd_i + \overline{g}_i^p) + \gamma_3 nm \qquad (3.17)$$

$$c_i^N - \bar{c}_i = (\gamma_1 + \gamma_3)(rb_i + y_i^p - \overline{c}_i^p) - \gamma_1(rd_i + \overline{g}_i^p) - \gamma_3 nm \qquad (3.18)$$

$$\tau_i^N = \gamma_1 (rd_i + \bar{g}_i^p) + \gamma_2 (rb_i + y_i^p - \bar{c}_i^p) - (1 - \gamma_3) nm \qquad (3.19)$$

$$\dot{d}_i^N = \bar{g}_i - \bar{g}_i^p, \quad d_i(0) = d_{i0} \qquad (3.20)$$

$$\dot{b}_i^N = (y_i - y_i^p) - (\bar{c}_i - \bar{c}_i^p), \quad b_i(0) = b_{i0} \qquad (3.21)$$

$$\dot{f}^N = \sum_{i=1}^{N} \left[(y_i - y_i^p) - (\bar{g}_i - \bar{g}_i^p) - (\bar{c}_i - \bar{c}_i^p) \right], \quad f(0) = f_o \qquad (3.22)$$

where the normalisation $\gamma_1 + \gamma_2 + \gamma_3 = 1$ has been used. The most striking result is that treasuries only borrow when they temporarily desire to have a higher level of exhaustive public spending, i.e., when they anticipate that their desired level of exhaustive spending falls in the future. A good example is public investment in the environment or education, because then public spending will temporarily be high in order to finance the investment and in the future the treasury reaps the benefits and thus public spending, net of returns on investment projects, will be lower. If public investment projects enjoy a market rate of return, the permanent level of public spending is unaffected and treasuries should borrow for investment projects. It is a pity that the Delors Committee did not even allow individual governments to borrow for capital expenditures (as effectively is the case in the U.S.). A more traditional example is that treasuries should borrow in war time. Tax rates are smoothed in the sense that they only respond to permanent changes in the desired levels of exhaustive public and private spending and in income. Similarly, private agents only save (borrow) when their current income exceeds (falls short of) their permanent income and when their desire for consumption is expected to increase (fall). The EMU as a whole borrows, i.e., has a deficit on its current account, when the public or the private sectors temporarily desire a higher level of consumption and when income is temporarily below its permanent level. These results on tax smoothing (e.g., Barro, 1979) and on consumption smoothing (e.g., Sachs, 1981) are, of course, a direct consequence of the life-cycle hypothesis.

When the level of exhaustive public spending is exogenous ($\gamma_1 \Rightarrow 1$, $g_i = \bar{g}_i$), tax rates are set to finance debt service plus the permanent level of public spending ($\tau_i = rd_i + \bar{g}_i^P - nm$) and private consumption equals its desired level minus the permanent level of the trade deficit minus debt service of the treasury plus interest income derived from bond holdings ($c_i = \bar{c}_i + r(b_i - d_i) + y_i^P - g_i^P - \bar{c}_i^P$). Ricardian debt neutrality holds, so that treasury debt is not a part of private wealth and interest received from the treasury is not part of private income. With exogenous levels of exhaustive public spending the problems of tax and of consumption smoothing are decoupled (cf., Roubini, 1988).[14] In general, the exhaustive spending of treasuries is endogenous and responds positively to permanent income and private assets and negatively to outstanding treasury debt. When permanent income and private asset holdings are higher, the treasuries can afford to have more exhaustive public spending and higher tax rates. Similarly, when debt service and the permanent level of desired public spending increases, private consumption must be reduced. Seigniorage revenues only accrue through real growth under an independent ESCB and are used to cut taxes and raise the level of exhaustive public spending at the expense of private consumption.

3.2.2. International tax competition

Now also allow for the effects of international tax competition ($\gamma_6 > 0$). It can then be shown that (3.20)-(3.22) hold as before,

$$g_i^N - \bar{g}_i = \tau_i^N + nm - (rd_i + g_i^P), \quad c_i^N - \bar{c}_i = (rb_i + y_i^P - \bar{c}_i^P) - \tau_i^N - nm, \text{ and}$$

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[14] When the desired level of consumption is constant and one allows for investment one has that Europe's current account must equal transitory income minus the consolidated public sector budget deficit for Europe minus investment. In other words, international capital mobility implies that investment must be financed through capital inflows and be unrelated to private saving. Taking account of the independent role of public budget deficits helps to explain the apparent international immobility of capital (Roubini, 1988).

$$\tau_i^N = -\gamma_6(N-1)\bar{\tau} + \left(\frac{1+\gamma_6}{1+\gamma_6 N}\right)\left[\gamma_1(rd_i+\bar{g}_i^p) + \gamma_2(rb_i+y_i^p-\bar{c}_i^p)\right]$$

$$+ \left(\frac{\gamma_6}{1+\gamma_6 N}\right)\sum_{j\neq i}\left[\gamma_1\left(rd_j+\bar{g}_j^p\right)+\gamma_2\left(rb_j+y_j^p-\bar{c}_j^p\right)\right] - (1-\gamma_3)nm \quad (3.19)$$

International tax competition becomes more important once the European markets for goods, services and factors of production have been completed ("1992"). Individual treasuries will be increasingly concerned with keeping their tax rates in line with those abroad, because otherwise their workers will prefer to migrate to the rest of the EMU and their consumers will prefer to buy their products from the rest of the EMU. Treasuries do not want their tax rates to diverge too much from their competitors, because otherwise they lose all their revenues to their competitors.[15] Indeed, one of the main concerns of Dutch macroeconomic policy is to bring marginal income tax rates and VAT rates down to the European average or, more specifically, to the German levels. This is the reason why we choose to have $\gamma_6>0$. Indeed convergence is a major objective, but it is not clear what one should converge to (the lowest, the highest or the average tax rate?) and whether one converges to Pareto-efficient levels of tax rates or not. In order to get a grip on this question, we assume that individual treasuries attempt to have a better tax climate than in the rest of the EMU in order to be a tax haven. This is why we choose $\bar{\tau}>0$.

When all the countries of the EMU have identical levels of permanent income, private and public debt, and desired private and public consumption, tax rates will be downward biased to the extent of $\gamma_6(N-1)\bar{\tau}$. The bias increases as the number of member countries of the EMU increases and arises from futile, beggar-thy-neighbour attempts to cut tax rates. In general, when an individual treasury is faced with competitors in the EMU who have a much lower need for revenues, due to

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[15] In fact, this statement is only true when lower taxes are not capitalised. If one country has lower taxes, then house prices may go up by exactly the same amount as the annuity value of the tax advantage.

lower levels of debt and permanent levels of public spending, it will be forced to cut tax rates, cut public consumption, and allow private consumption to flourish, even though it is faced with a large need for government revenues. Tax smoothing does not only occur over time, but also across different countries.

3.2.3 Real income and Europe's real exchange rate

Finally, also allow individual treasuries to manipulate the real value of the ECU in order to boost the income of their citizens ($\gamma_4 > 0$). Budgetary policies of the various treasuries now jointly determine Europe's real exchange rate and current account. In order to focus on the nature of this externality alone, we assume that all exogenous variables are the same for all countries of the EMU and that there are no transitory shocks ($y_i = y_i^P \equiv y$, $\bar{c}_i = \bar{c}_i^P \equiv \bar{c}$, $\bar{g}_i = \bar{g}_i^P \equiv \bar{g}$, $\bar{\bar{\omega}}_i = \bar{\bar{\omega}}_i^P \equiv \bar{\bar{\omega}}$). It then follows that $g_i = \tau_i + nm - rd_i$, $c_i = rb_i + y - \tau_i - nm$, and

$$
\tau_i^N = \left\{ \frac{\gamma_1(rd + N\bar{g}) + \gamma_2[r(f+d) + N(y-c)] + \bar{\gamma}_4 \phi N[\phi(Ny + rd) - (1-\phi)rf + N\bar{\bar{\omega}}] - \gamma_6 N(N-1)\bar{\tau} - \gamma nm}{(1 + \bar{\gamma}_4 \phi^2 N)N} \right\}
$$

(3.19″)

where $\gamma \equiv [1 - \gamma_3 + \bar{\gamma}_4 \phi^2 N]N$. The effect of treasuries being concerned with the real income of their citizens is to attenuate the positive effect of desired exhaustive public spending and the negative effect of private spending on the tax rate and to reduce the downward bias in tax rates arising from international tax competition. The cut in tax rates arising from seigniorage revenues is larger when countries care about real income. An increase in the desired level of real income leads to an increase in the tax rate and public consumption and to a fall in private consumption, because this induces an appreciation of the real value of the ECU versus currencies of the rest of the world, reduces the costs of goods imported from the rest of the world, and thus boosts the real income of the citizens of the EMU.

3.3 The cooperative outcome

The previous section characterised the non-cooperative fiscal policy responses under the EMU. Here we compare them with the

cooperative outcome. In order not to get side-tracked by what the appropriate outcome of the bargaining process between the N countries should be, we focus on a symmetric version of the problem. Hence, we assume that $d_{io} = d_o$, $b_{io} = b_o$, $\bar{g}_i = \bar{g}$, $\bar{c}_i = \bar{c}$, $y_i = y$ and $\bar{\omega}_i = \bar{\omega}$, $i=1,\ldots,N$. This means that, under European coordination of fiscal policies, $(g_i, c_i, \tau_i, i=1,\ldots,N)$ are jointly chosen to minimise the sum of the welfare-loss functions of the countries of the EMU $(\sum_{i=1}^{N} W_i)$ subject to the constraints (3.2), (3.4'), (3.6), 3.7) and (3.8). The details of solving this problem for the European Council of Ministers of Finance are more straightforward than those of Section 3 and are thus omitted.

3.3.1 Inadequate provision of public goods

We first consider the case where treasuries do not attempt to appreciate the real exchange rate of Europe in order to boost the real income of their citizens $(\gamma_4=0)$. In view of the planned completion of the internal market for Europe, it seems reasonable to assume that countries care more and more about each others' levels of public spending on the environment, training of low-skilled workers, research and development, foreign aid (e.g., to Eastern Europe), infrastructure, museums, etcetera $(\gamma_5>0)$. Although each country of the EMU benefits from a higher level of public goods provided by other countries of the EMU, they do not have to pay the price in the form of higher taxes for it. Absence of coordination of budgetary policies means that exhaustive public spending is not recognised as a public good for Europe as a whole and consequently its supply will be inadequate. In order to see this, consider the results for the cooperative outcome (3.20)-(3.22).

$$g_i^C - \bar{g} = \left(\frac{\gamma_2[rf+N(y^P-\bar{c}^P-\bar{g}^P)] - \gamma_3[rd+N(\bar{g}^P-nm)]}{[1+\gamma_5(N-1)]N} \right) \qquad (3.23)$$

$$c_i^C - \bar{c} = \left(\frac{[\gamma_1+\gamma_3+\gamma_5(N-1)][rf+N(y^P-\bar{c}^P-\bar{g}^P)] + \gamma_3[rd+N(\bar{g}^P-nm)]}{[1+\gamma_5(N-1)]N} \right) \qquad (3.24)$$

$$\tau_i^C = \left(\frac{[\gamma_1 + \gamma_2 + \gamma_5(N-1)][rd + N(\bar{g}^P - nm)] + \gamma_2[rf + N(y^P - \bar{c}^P - \bar{g}^P)]}{[1 + \gamma_5(N-1)]N} \right) \qquad (3.25)$$

i=1,...,N. When we set $\gamma_5 = 0$, there are no externalities and the cooperative outcome (3.23)-(3.25) reduces to the non-cooperative outcome (3.17)-(3.19). It is clear that, in general, $g^N < g^C < \bar{g}$. Hence, absence of coordination under the EMU leads to an under-provision of public goods. Cooperation means that treasuries spend more, so that less is available for private consumption ($c^C < c^N < \bar{c}$) and direct taxes must be raised ($\tau^C > \tau^N > 0$).[16]

A special case needs to be made for public investment. In view of the developments in Eastern Europe, the bad state of the environment and the demand for infrastructure, this is badly needed in Europe. There are two aspects of this type of public investment that should be stressed: its international and its intertemporal nature. Since public investment is a public good for Europe as a whole, its supply will be deficient in the absence of budgetary policy coordination. Just as important, however, is the fact that public investment with a market rate of return leaves the permanent level of exhaustive public spending uneffected, but increases the current level. The optimal response from the point of view of public finance is to borrow and leave tax rates unaffected. Unfortunately, the Delors Report recommends guidelines on public sector deficits without making a reference to public investment or to permanent levels of public spending. Such a myopic view on public finance is bad economics and bound to harm public investment in Europe. Much better is to advocate the "golden rule" of public finance: tax for permanent increases in exhaustive public spending, but borrow for temporary increases in exhaustive public spending associated with, for example, public investment.

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[16] We have assumed that $rd + N(\bar{g}^P - nm)$ is positive and $rf + N(y^P - \bar{c}^P - \bar{g}^P)$ is negative.

3.3.2 Competition pushes tax rates down

Now consider the situation where individual treasuries also try to keep their tax rates a bit below the rest of the EMU ($\gamma_6 > 0$, $\bar{\tau} > 0$). In fact, the cooperative outcome then corresponds exactly to (3.23)-(3.25). The reason is that when the treasuries coordinate their fiscal policies, they realise that in equilibrium it is futile to attempt to get a better tax climate than its EMU-competitors and thus beggar-thy-neighbour tax cuts are avoided. Absence of coordination leads to an additional downward bias in tax rates, $-\gamma_6 (N-1)\bar{\tau}$, which means that the public sector will have to dwindle and the private flourishes even more. The outcome under tax competition is inefficient, since all members of the EMU would be better off if tax rates and thus the size of the public sector are increased. The inefficiency would be somewhat less if we allowed countries to compete in the provision of public goods (e.g., an efficient legal system) as well. The theory of clubs may then serve as a useful guide to decide whether a sub-group of countries wishes to specialise in the production of certain public goods or specialise in tax havens for some taxes or not.

More static, micro-based stories of tax competition and tax harmonisation argue that the completion of the internal market increases the possibility of tax avoidance and makes a number of economic activities more elastic so that, in order to avoid a large excess burden relative to the revenues collected, they should not be taxed very much (Sinn, 1989; also Keen, 1989; Frenkel and Razin, 1989). The winner of this uncoordinated process of tax harmonisation will thus be the more mobile workers, who are better able to make use of tax havens, the owners of capitals, and to a certain extent consumers (as competition forces down VAT rates), whereas the poor and less mobile workers will lose out (Sinn, 1989). Countries with high benefits will have to reduce them, for otherwise they will attract the poor from everywhere and their welfare-state system will collapse. Although some of these tax distortions associated with tax evasion can be avoided through, say, basing income taxes on nationality rather than on residence[17], by far the

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[17] Another set of results is that the residence principle leads to an inefficient world allocation of saving, that the source principle leads to an

best way seems to go for a coordinated approach to tax harmonisation.[18]

3.3.3 Cooperation avoids an under-valued ECU

Finally, consider the case where the treasuries cooperatively try to determine the value of the ECU in order to boost the real income of all citizens of the EMU ($\gamma_4 > 0$). As in Section 3.2.3, we assume that there are only transitory shocks. It follows that (when $\gamma_5 = 0$)

$$\tau_i^C = \left(\frac{\gamma_1(rd+N\bar{g}) + \gamma_2[r(f+d)+N(y-\bar{c})] - \gamma Nm + \bar{\gamma}_4 \phi N^2[\phi(Ny+rd)-(1-\phi)rf+\bar{\bar{\omega}}]}{(1+N^2\phi^2\bar{\gamma}_4) \; N} \right) . (3.25')$$

The positive effect of desired exhaustive public spending and the negative effect of desired private spending on the tax rate are less than in the absence of cooperation, both of which tend to reduce taxes and exhaustive public spending. As far as the current-account externality is concerned, exhaustive public spending is a public good for it appreciates the real value of the ECU, reduces the cost of imported goods for all EMU-citizens, and thus boosts the real income of all EMU-citizens. This is another reason that, in the absence of cooperation, the level of exhaustive public spending and tax rates throughout the EMU are too low. The special case $\gamma_1 = \gamma_2 = \gamma_5 = 0$ illustrates the basis point perhaps better:

$$\tau_i^C - \tau_i^N = \left[\phi(Ny+rd-Nm)-(1-\phi)rf+\bar{\bar{\omega}}\right]\left\{\frac{\bar{\gamma}_4\phi(N-1)}{(1+\bar{\gamma}_4\phi^2N)(1+\bar{\gamma}_4\phi^2N^2)}\right\} > 0 . \quad (3.26)$$

Absence of cooperation means that the treasuries are much less bothered

inefficient world allocation of investment, and that in a market-clearing world with perfect capital mobility (and the interest rate determined on the world market) the residence principle is optimal and there are no gains from tax coordination (Razin and Sadka, 1989)

[18] Given the liberalisation and integration of markets for capital, goods and services, there is much scope for individual European countries to impose adverse externalities on others and thus there is a need for coordination of capital income taxation within Europe, starting with agreeing on a tax base and followed by setting minimum statutory rates (Tanzi and Bovenberg, 1990).

with attempting to appreciate the real value of the ECU and boosting real income, so that the level of exhaustive public spending will be too low. Effectively, each EMU-country attempts to pass the burden of appreciating the real value of Europe's currency on to its EMU-competitors.

It is possible to think of other inefficiencies associated with the common determination of Europe's current account and real exchange rate. The EMU as a whole might have an explicit target value for its current account, perhaps, a deficit because Europe wants capital from outside to pour into Europe in order to rebuild Eastern-Europe. Since none of the EMU-countries sees Europe's current account as its prime responsibility, each one of them will try to shift the burden of loosening the fiscal stance to its EMU-competitors. The result is that public spending as a whole will be too low throughout the EMU, and capital inflows into Europe will not be high enough, relative to the outcome where all EMU-countries coordinate their budgetary policies.

So far, we assumed, in contrast to the recommendations of the Delors Report, that guidelines for public sector deficits are unnecessary and, perhaps, even undesirable. However, the externalities associated with the joint determination of Europe's current account suggest that it may be advisable to impose a requirement on the overall public borrowing requirement for Europe. The point is that, if EMU-countries only consider their own current account and not the current account of Europe, then such limits on borrowing from outside the European Community may act as a substitute for European coordination of budgetary policies.

4. Conclusions

A monetary union without an independent central bank leads, without coordination of the policies of the various fiscal and monetary authorities, to excessive inflation and to too low tax rates throughout the region. The reason is that each treasury fails to internalise the adverse effects of grabbing more seigniorage on the common inflation rate. An independent central bank for the region is inefficient from a

public-finance point of view, since it gives rise to too high tax rates
and to too low inflation rates. Nevertheless, an independent central
bank is often desirable because it is more likely to have a strong
monetary discipline and thus individual treasuries no longer have a
temptation to levy a surprise inflation tax. To assess the case for an
independent ESCB, one should trade off the advantages associated with
better monetary discipline and lower inflation against the disadvantages
associated with a sub-optimal public revenue mix. When the level of
nominal public debt is high and when the priority one attaches to price
stability is much more important than the priority one attaches to
cutting tax distortions, one comes out in favour of an independent ESCB.

Indeed, an independent ESCB is what the Delors Committee seems to
advocate for the EMU. In addition, it is recommended that under the EMU
national treasuries can no longer finance their deficits by inflation
taxes. There does not seem much merit in the proposals of the Delors
Committee for upper limits on government borrowing. However, it may be
desirable, from the point of view of the value of the ECU in world
markets and Europe's current account, to allow individual governments to
borrow what they want from European households and institutions, but to
constrain them in their borrowing from outside the European Community.

There are good reasons to believe that the size of the public
sector will be too small under the EMU, unless the treasuries of Europe
coordinate their budgetary policies. The first is that with an
independent ESCB seigniorage revenues only accrue through real growth,
so that taxes must be raised and spending on public goods must be cut.
A related problem is that, even though the inflation tax must disappear,
real growth leads to seigniorage revenues and it will be a major
political issue to decide how these revenues will be distributed to the
members of the EMU. The second is that public spending on items as the
environment, foreign aid, research and development, and infrastructure
is with the completion of the internal market more like a public good as
far as the rest of the EMU is concerned, whose supply will be inadequate
unless treasuries cooperate. The third is that international
competition between treasuries forces tax rates down and leaves less
funds for spending on public goods. The fourth is that treasuries may
wish to increase spending in order to appreciate the real exchange rate

of Europe and boost the real income of their citizens.   Since this
policy also has beneficial effects on the rest of the EMU, exhaustive
public spending will be too low unless cooperation takes place.   These
reasons are derived from considerations of public finance and of
efficiency in allocation.   When one considers the stabilisation role of
fiscal policies within the context of a Mundell-Fleming model of the
EMU, one can show that completion of the internal market and absence of
coordination leads to too tight fiscal stances when Europe is confronted
with an adverse supply shock (van der Ploeg, 1989b).   All these reasons
should give clear signals that the EMU may spell dangers for the degree
to which governments are prepared to tackle the problem of stagflation
and wide-spread unemployment and for the size of the public sector in
Europe.

    There is thus a danger that the size of the public sector under the
EMU will be too small relative to the first-best outcome, but it is a
legitimate question to ask whether the current size of the public sector
is too large relative to the first-best outcome.   Many people believe
that the size of the public sector is currently too large relative to
the first-best outcome,[19] so that we are now in a second-best world.
Introducing distortions in a second-best world may be desirable when
this cancels the effect of other distortions.   However, the experience
of the U.S. suggests that the EMU indeed poses a threat to the size of
the public sector.   In the long run, when the EMU is firmly established,
Europe may have to get used to the problem of coping with a too small
size of the public sector.   In the medium run, the absence of
coordination of budgetary policies may more quickly cut the size of the
public sector and bring Europe more quickly in the direction of the
first-best optimum.   People who believe that the current size of the
public sector in Europe is too large should like this.

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[19] To be fair, it is usually argued that this is due to too high levels of
transfer payments rather than to too much provision of public goods.

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