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Greece on the road to Economic and Monetary Union: Problems and Prospects

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* Views expressed here are strictly personal

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1. Introduction

At the European Summit in Dublin in June 1990, the heads of the 12 European Community States decided to convene in two intergovernmental conferences before the end of 1990 to negotiate the process of a) Economic and Monetary Union (EMU) and b) Political Union.

The first stage of EMU started on 1st July 1990. During this stage it is envisaged that, along with the completion of the internal market, drachma and the escudo will join the other Community currencies in the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS) while all capital controls will be removed.

Although the process of European integration has gained momentum over the last year, public debate in Greece as well as analytical contributions from experts have been limited compared to those in other Community members, especially in the European South. The present essay is an effort to analyze the constraints, imposed by the present economic situation in Greece, to the country's ability to keep up with the progress towards EMU as well as to offer a 'feeling' regarding the 'right' time for Greece's decision to join the ERM.

The arguments to be presented here belong to the sphere of economics. It should be mentioned, however, that political arguments are equally, if not more, important. Many observers believe that, especially after the events in Eastern Europe, the driving force behind the recent, unprecedented progress towards European integration is political and that the ultimate goal is the creation of the United States of Europe. For Greece there may be important gains from political union, such as those

related to external security, given the country's geographical location. If this is the case and since EMU is a necessary ingredient to political union, its costs and benefits for the participating countries are not just economic. This doesnot, of course, mean that the economic costs and benefits of EMU for a small country like Greece are given a priori: these depend on the particular form of EMU (for instance, whether fiscal federalism will prevail or not) as well as the timing of the implementation of its various stages. These are open issues and it is in the interest of all participating countries to present their cases convicingly in the various Community fora.

2. The recent performance of the Greek economy

According to the theory of optimum currency areas (Ishiyama, 1975), nominal convergence is the most important condition for a succesful move towards fixed exchange rates and, ultimately, the formation of a monetary union. This view, although not accepted by all schools of thought (see discussion below) seems to be the prevailing one among policy makers and is implicitly contained in important EEC documents such as the 'Delors Report' (1989) on EMU. On this score Greece's prospects for joining the ERM are rather poor: At the end of the first half of 1990, annual inflation was 21% against 5% in the EEC and 3% in Germany.

During the 1980's Greece's macroeconomic indicators under-performed the corresponding EEC ones with the exception of the unemployment rate while the overall policy stance was expansionary, contrary to the EEC experience (Tables 1 and 6). Perhaps the most notable characteristic was the slow GDP growth

relative to the EEC average and Greece's own post-war performance, despite the nominal expansion and the large increase in public sector deficits. There are many explanations for Greece's relatively poor macroeconomic performance during this period (see, among others, the 1984, '87, '90 OECD Surveys on Greece). These include (a) the failure to adjust to the two oil price shocks in the 1970's, (b) the operation of crowding-out mechanisms through government-led wage increases and price controls which reduced profitabily as well as through credit retioning (c) the operation of a costly industrial policy, biased in favour of traditional, internationally obsolete, manufacturing sectors (which should be contrasted to the growth oriented supply-side policies of the other Community-members), (d) the private sector's failure to restructure, following Greece's entry to the EEC in 1981, due to the 'family' character of firms and their short planning horizons as well as to distortions in labour, good and financial markets which hindered restructuring.

Two other characteristics of macroeconomic performance in Greece during the 1980's are worth noting:

a) The large increase in the net public sector debt to GDP ratio (from 30% in 1980 to 100% in 1989) was due to persistent primary deficits, which increased in election years (1981, 1985, 1989) and fell immediately thereafter. The rise in the average primary public sector deficit in the 1980's was mainly due to the dramatic rise in social consumption expenditure (mainly the increase in pensions on social grounds) while the average real interest rate on public sector debt was negative up to 1986 (Stournaras, 1990).

b) The seven year period 1979-1985 of expansionary policies was followed by a two-year stabilization programme in response to the sharp deterioration of macroeconomic conditions in 1985. The programme succeeded in reducing inflation to 13% at the end of 1987 from a peak of 25% at the end of 1985, the current account deficit to 2.6 percent of GDP from a peak of 9.5 percent in 1985 and the PSBR to 13 percent from a peak of 18 percent in 1985. The instruments used were a) a tight incomes policy, which reduced average real wages by almost 14% b) a 15% devaluation of the drachma in October 1985 and a policy of effective nominal exchange rate depreciation thereafter aiming at preserving the competitiveness gains on the basis of relative unit labour costs c) a tight fiscal policy which mainly affected public investment and d) a tight monetary policy (It should be noticed, however, that both monetary and fiscal policies turned out to be much less tight than planned). On the whole, the stabilization programme 1986-'87 was largely succesful in its macroeconomic goals and gave a boost to profitability and private investment, with a little assistance from the fall in world oil prices. Using the IMF's World Economic Outlook (1990) terminology regarding the experience from stabilization programmes in various countries, the Greek stabilization programme '86-'87 was mainly based on 'heterodox' rather than 'orthodox' instruments: that is, more on incomes policy and a depreciating effective exchange rate policy and less on financial restraint. (For a detailed description, see Papademos, 1990).

The stabilization programme expired at the end of 1987. In 1988 and 1989 incomes and fiscal policies were relaxed. Effectively, the only stabilizing instrument since then is the

exchange rate with a rate of depreciation which doesnot accommodate the inflation differential between Greece and her trading partners. The relaxation of fiscal and incomes policies since 1988, combined with two incoclusive general elections between June 1989 and April 1990, resulted in a rise of the PSBR (18 percent of GDP in 1989) an acceleration of inflation and an increase in the current account deficit.

The newly elected government in April 1990 proceeded with the implementation of a new fiscal stabilization programme, the modification of the wage indexation scheme as well as the introduction of measures to encourage private investment. Part of its programme includes the liberalization of the labour and goods markets and the privatization of certain corporations under effective government control. In addition, monetary policy is planned to remain tight while exchange rate policy in the first nine months of 1990 was strongly non-accommodating.

Despite the implementation of the new, fiscal stabilization programme inflation has accelerated (its annual rate in September 1990 was 21.8% compared to 14.6% in September 1989) and the current account deficit in the first half of 1990 was 90 percent higher than in the corresponding period of 1989. Although it is rather early to offer definite explanations for these developments, it seems that the acceleration of inflation in 1990 is due a) to the fact that, at its initial stage, the fiscal stabilization programme is based on increases in indirect taxation and public utility prices, b) to inflationary expectations, c) to the liberalization of the goods markets, especially the food market, while the deterioration of the current account, which is mainly due to the sharp deterioration of visible trade,

must be the result of the strong appreciation of the real exchange rate of the drachma, given that output remains sluggish.

Given the current state of the Greek economy, many have expressed doubts on whether Greece can follow the process of EMU. This is more so if the European Commission's proposals to complete the first stage by the end of 1992 are accepted without provisions for countries with serious imbalances. Since 60 percent of Greece's foreign trade is with the EEC, the pegging of the exchange rate to the low-inflation ERM currencies, the abolition of capital controls as well as certain features of economic union generate a number of serious questions. For the sake of simplicity these questions will be examined separately, despite that they are strongly interrelated.

3. Conditions for Greece's entry in the ERM

A. Theoretical considerations: Optimum Currency Areas vs. Credibility arguments

There are two views regarding the 'right' time for a currency to join a system of fixed (or almost fixed) exchange rates.

According to the first view, which has already been mentioned, a necessary, though not sufficient, condition has to do with the degree of nominal (that is monetary) convergence among the economies in question. Without sufficient nominal convergence, the fixing of nominal exchange rates will result in a loss of competitiveness, high real interest rates and tensions in asset markets, with detrimental effects to domestic production. This view is the prevailing one in the traditional theory of optimum currency areas (Ishiyama, op.cit.) and is largely accepted today (see, among others, Dornbusch, 1988, 1988a).

According to the second view (see Dornbusch (1988) for an exposition), which stems from the recent "credibility" literature and is based on the assumptions of new classical economics (namely instantaneous market clearing and rational expectations), by joining the ERM a high inflation country is making a credible commitment to disinflate. The crucial assumption made is that it is easier for the authorities to convince domestic agents on their disinflation intensions by joining the ERM rather than by simply announcing a restrictive money supply policy, perhaps due to (unspecified) costs in the case of droping out. Since it is credible, the tighter policy will be offset by changes in wages and prices with negligible effects on output.

In its extreme form, the second view implies that the timing of entry in the ERM is irrelevant and that inflation differentials prior to entry do not matter: the economy will immediately move to the rational expectations, low inflation equilibrium.

The assumptions on which the second view is based are extreme and even economists in the monetarist tradition express serious doubts regarding its policy consequences (Burns, 1990). In addition, the relaxation of the inst antaneous market clearing assumption has serious implications for the results. In Appendix A it is shown that rational expectations combined with sluggish prices and an "inventory" output adjustment mechanism imply that convergence to the rational expectations, fixed exchange rate equilibrium is cyclical rather than monotonic (prices and output may move in opposite directions at some stages of the adjustment process) while the relaxation of the rational expectations assumption (which, in this context, implies that agents do not

believe that the authorities will stick to the fixed exchange rate rule) produces instability. This last result is close to Obstfeld's (1988) who is among the very few authors concerned with the dynamic properties of the adjustment process in the context of the EMS.

In its milder version, the second view says that, by joining the ERM, a high inflation country will disinflate rapidly, minimizing output costs (Giavazzi and Pagano (1988)) while the relatively rapid disinflation in France, Italy and Ireland since 1982 is sometimes used as evidence in support of this version. However, this view has been strongly disputed (see, among others, Collins (1988), Dornbusch (1988)). It is argued that non-EMS countries have also managed to reduce inflation in the post-1982 period by adopting restrictive policies while the "sacrifice" ratios for EMS countries were no smaller than non-EMS ones.

Available evidence (see Table 2) shows that the elimination of inflation differentials between Germany and the "high inflation" EMS countries has been bought partly at the expense of a steady rise in Germany's trade surpluses with other EMS members (France, Italy) partly at the expense of high unemployment and high public debt (especially in Ireland) and partly at the expense of higher, compared to Germany's, real interest rates (in the case of Ireland, Italy, France and recently Spain). Moreover, it has been shown (Artis and Taylor (1988)) that the existence of capital controls did help France and Italy during the disinflation process by preventing destabilising speculation and excessive interest rate volatility, justifying Tobin's welfare enhancing argument in favour of "throwing sand in the wheels" of capital movements. The above arguments suggest that the ERM might

have helped high inflation countries to disinflate, but at a considerable cost, which would have been higher had capital controls been absent.

Given that Greece's current inflation rate (22%) is substantially higher not only than Germany's but, also, than the average EEC rate, the experience of the other, high inflation EMS countries is not very helpful as a policy guide: None of these countries joined the ERM with an inflation differential much higher than 6%, which is the wider ERM band of exchange rate fluctuations. If anything, it seems that the experience of developing countries, which have adopted nominal exchange rate pegging as part of a stabilization programme, is more relevant. In summarizing this experience, IMF's World Economic Outlook (1990, p.62) describes this policy as a risky one, resulting in large real appreciations and balance of payments difficulties. Even in those cases where foreign financing had been provided in sufficient amounts, nominal exchange rates had eventually to be adjusted. However, in countries with credible stabilization programmes, these exchange rate adjustments did not have a permanent inflationary impact.

B. Does nominal exchange rate depreciation have real effects?

According to a well-known argument, a policy of exchange rate depreciation is incapable of affecting competitiveness in highly indexed economies. In particular, if the labour market is characterized by real wage resistance, the nominal exchange rate is not an instrument of real adjustment and, therefore, a high inflation differential is not an obstacle to joining the ERM.

The system of automatic wage indexation in Greece (known as ATA) does not provide full compensation for CPI inflation to average wages since a) it is based on "progressive" indexation (that is high salaries are entitled to CPI compensation only up to a certain limit) b)"imported" inflation is subtracted from CPI inflation and c) wage pay installments are taking place every four months. In fact, during the 1986-87 stabilization programme, the indexation formula was modified, resulting in an almost 14% cut in real average wages in the two year period, while for the 1981-1990 period the rate of increase of average wages due to ATA was substantially lower than CPI inflation.

The large minimum wage increases granted in 1982-83 were the result of a government decision, not union militancy, while the relatively large wage increases in certain sectors in 1988-89 (in excess of the ATA induced increases) were the result of an effectively new two-tier system of wage bargaining: a) national bargaining, which was largely based on government's guidelines reflected in the,favourable to wage earners, modification of the ATA system b) sectoral and firm-by-firm bargaining, where local unions were aiming at increases over and above those granted in national bargaining. The resulting excessive wage increases were not surprising given the international experience of two-tier wage bargaining systems (see, among others, OECD Employment Outlook, 1987). It should be noted that trade union "leaders" in Greece are the unions of the State-controlled corporations and banks, a fact which suggests a strong corellation between wage increases and the political business cycle.

The newly elected government in April 1990 proceeded with the modification of the wage indexation system for 1990 by drastically reducing the degree of CPI indexation while it has announced that the ATA system will be abolished in 1991. At the same time it was said that decentralized bargaining based on firm-by-firm productivity deals will be encouraged by tax and social contribution incentives.

Given the present modification and the eventual abolition of the official wage indexation formula in Greece combined with the absence of union militancy in the private sector, the above mentioned view, which questions the efficacy of the nominal exchange rate as an instrument to facilitate real adjustment, is largely academic. However, and for the sake of the argument, it can be shown that, even with full wage indexation, nominal depreciation will have a lasting impact on competitiveness provided that there exists a factor of production the price of which is not fully indexed to the CPI. This might be a composite commodity produced by public entities (such as transport, electricity etc) and/or an imported commodity, such as fuel, with an excise tax element in the domestic producer price. If the price (or tax) of this input is held constant by the government, a nominal depreciation improves competitiveness even under full wage indexation (see Appendix B). In fact, nominal depreciation in this case is similar to a subsidy on the use of the factor in question. Effectively, the government is able to improve competitiveness by increasing its (real) financial deficit and public debt. However, this is not necessarily the case: If the tax system is characterized by a progressive income tax with no automatic indexation of income brackets (such as the Greek one)the

fiscal drag induced by the nominal depreciation will produce revenue to finance the (implicit) subsidy. According to Giavazzi and Spaventa (1988), the Italian response to the oil price shocks of the seventies under a regime of full wage indexation was based on an (implicit) subsidy to private production along the above lines.

C. Fixed exchange rates and the implications for public debt

The pegging of the nominal exchange rate by a high inflation, high public debt country embarked on a programme of fiscal consolidation may create serious difficulties. The reason is Sargent's and Wallace's (1981) 'unpleasent monetarist arithmetic'. In short, the ensuing overvalued currency needs to be supported by high real interest rates (in the absence of capital controls the equilibrium interest rate may become extremely high) which increases the debt-interest burden. If the difference between real interest rates and output growth is large, the debt to GDP ratio will continue to increase unless the primary (that is, net of interest payments) public sector account shows a surplus. A rising debt to GDP ratio implies that, sooner or later, the interest bill has to be financed by money creation. Therefore the policy of pegging the nominal exchange rate to low inflation currencies becomes unsustainable (see Dornbusch (1988)).

The implications of this 'unpleasant arithmetic' for Greece are quite obvious. At the end of 1988 Greece's Central Government debt to GDP ratio was 72.7 percent while in 1989 the net of seignorage Central Government primary deficit was almost 7.0 percent of GDP (Seignorage revenue, defined as the change in the

monetary base as a proportion of GDP was equal to 1.5 percent). In addition, the effective, real interest rate on Central Government debt (that is the average interest rate plus the revaluation effect due to the drachma depreciation minus the CPI inflation rate) was about zero while output growth was 2.9 percent. Using the well-known formula on debt dynamics:

$$d_t - d_{t-1} = \pi_t - m_t + (r-g)d_t \ , \qquad (1)$$

where d is the Central Government debt to GDP ratio, π is the primary deficit to GDP ratio, r is the real, effective interest rate on Central Government debt, g is real output growth and m is seignorage revenue as a percent of GDP, we see that the realized, 4.0 percent increase of the debt to GDP ratio between 1989 and 1988 was due to the primary, net of seignorage, deficit π-m, while the real interest rate (net of growth) contribution was negative. Now, a stabilization policy based on the pegging of the nominal exchange rate will reduce seignorage revenue, m, and increase the average real interest rate, r. In fact, given the short average maturity of domestic public debt (less than a year) the average interest rate will rapidly follow the marginal one. Most likely, the output growth rate, g, will fall. Hence, the stabilization of the debt to GDP ratio entails a very drastic fiscal contraction. In order to obtain a 'feeling' of the needed contraction, one may (optimistically) assume that, as a result of pegging the exchange rate, the effective, real interest rate on public sector debt becomes 3.0 percent (much less than Ireland's in the post ERM entry period) while seignorage revenue drops to 0.7 percent (Irish level). Due to the ensuing contraction of economic activity, it may be optimistically assumed that g = 1.0 percent (Irish average GDP growth between 1982 and 1987 was actu-

ally negative). Solving eq.(1) for $d_t=d_{t-1}$ we obtain the debt stabilizing primary deficit to GDP ratio, π^*:

$$\pi^* = m-(r-g)d = -0.9\%, \text{ given that } d_{1989} = 0.77 \qquad (2)$$

Equation (2) suggests that the end of 1989 Central Government primary deficit to GDP ratio of 9.5% will have to be transformed into a primary surplus of 0.9% of GDP, requiring a fiscal contraction of more than 10 percentage GDP points. Such a reduction in the primary deficit to GDP ratio cannot realistically be achieved but in a number of years. In Stournaras (1990) it is shown that, on realistic, 'growth oriented' assumptions, a fiscal contraction equal to 7.5% of GDP requires a four-year fiscal stabilization programme which can be based on a) a gradual reduction of public consumption relative to GDP (mainly through an incomes policy aiming at constant real average pay, the freezing of public sector recruitments and the restriction of public procurement defence expenditure) and b) a recovery in tax-revenue (mainly through the enlargement of the tax-base by taxing farmers and professionals, as well as by the application of a system of 'objective' tax-assessment).

The time needed to eliminate the primary deficit will also suffice to stabilize the debt to GDP ratio, provided that the average, effective, real interest rate on public sector debt doesnot exceed output growth. However, experience has shown that, in certain countries (eg. Ireland), real interest rates exceeded output growth after ERM entry, even under the presence of capital controls. In a country like Greece with a total public sector debt to GDP ratio exceeding unity at the end of 1990, and with a high primary deficit, this becomes a fearful prospect: Despite the economically, socially (and politically)

costly efforts to eliminate the primary deficit, the debt to GDP ratio will, most likely, continue to increase, creating fears of insolvency or monetization and requiring even higher interest rates. Effective capital controls offer, at least in theory, a way out of the problem, although, as already noted, experience is pointing to the opposite. The abolition of capital controls before fiscal consolidation is achieved, will almost certainly cause an early collapse of the system via a large increase in interest rates. The extent of swap arrangements as well as fiscal transfers (not loans) needed between Greece and the ERM members in order to avoid these consequences is of unrealistic proportions, at least during the first stage of the European Economic and Monetary Union.

D. Fixed exchange rates and seignorage revenue

Dornbusch (1988a) claims that the inefficiency of the fiscal systems of the countries in the European South is a serious reason for these countries' maintaining higher inflation rates than the EEC countries in the European North, taking into account that inflation brings revenue ('seignorage') by taxing the monetary base. Hence, countries in the South should not attempt to tie their exchange rates to the currencies of the low inflation countries in the North. More recently, Canzoneri and Rogers (1990) have explored further this idea, constructing an optimum currency area model based on trade-offs between differences among the underground economies and the costs of multiple currencies.

In our opinion, this argument suggests that the pegging of the exchange rate should be postponed until the country (or countries) in question improves its tax system. It is not an argument against joining the ERM in the indefinite future, since the improvement of the tax system is, by itself, a policy objective. It should also be mentioned that, in Greece, the tax evasion which is related to the existence of the underground economy, is largely a problem of inefficiency of the tax system rather than an intrinsic characteristic of the society.

The policy implications of this argument depend on the significance of seignorage revenue. Table 3 shows that seignorage revenue in Greece in the 1980's is much lower than before, although still higher than Germany's, the EMS's "anchor" country.

However it has been argued (see, among others, Giavazzi and Giovannini, 1989) that implicit seignorage revenue may also be important. Implicit seignorage revenue is usually related to the primary and secondary reserve requirements imposed on the banking system. Since Greece is characterized by a banking system which is largely subordinated to the financial needs of the public sector, implicit seignorage revenue must be high. This question will be examined later along with that of capital controls, since, effectively, it is capital controls which allow the regulation of the domestic banking sector.

E. The 'right' time to enter the ERM

The discussion in the previous sections provides strong arguments in favour of the view that Greece should not enter the ERM before a) its inflation rate converges to ERM levels and b)

it improves upon the present fiscal conditions. In fact, this conclusion, which is mainly based on monetary considerations, is reinforced by the negative effects of certain EEC Single Market directives on domestic production as well as by certain transitional effects of the process towards Economic Union. These effects will be examined later.

It is now widely recognized (Chalikias (1990), IMF (1990α) that expansionary fiscal policies accommodated by monetary policies are largely responsible for Greece's inflation in the 1980's. This suggests that the basic ingredient of a disinflation strategy must be a programme of fiscal contraction.

Observing that a) credit expansion to the public sector is the largest component of broad money (M3) growth in the last several years and b) broad money growth net of output growth and a trend decrease in broad money velocity 'explains' CPI inflation satisfactorily in the medium to long-term (IMF, 1990a), we have made certain elementary calculations using a money demand - money supply framework of the IMF's 'financial programming' type, asking the following question: How long is it needed for Greek inflation to converge to ERM levels given a) a programme of fiscal consolidation based on an annual reduction of the PSBR to GDP ratio of about three percentage points, b) zero net public sector foreign borrowing for each of the following years starting from 1991 (that is, assuming that the current account deficit is offset by autonomous net capital inflows), c) that a rising share of the PSBR will be financed by non-bank domestic sources, so that at the end of 1994 almost half of the PSBR is financed in this way (compared to 16.6% in 1989, 31.2% in 1988 and 20% in 1987), d) an annual net credit expansion to the private sector (that is,

net of bank bonds) equal to 6.0 percent of GDP (see Appendix C for a discussion of this and the other assumptions), e) output growth equal to (in percent): 2.2 in 1991, and 3.0 in the following years.

In Appendix C it is shown that, on the above assumptions, inflation decelarates as follows:

Inflation projections (end-year, %)

1989	1990	1991	1992	1993	1994
14.8	25.0(est.)	17.3	11.5	7.6	4.0

Hence, given the framework and the assumptions used, inflation decelerates to 4.0 percent at the end of 1994. It is also noteworthy that fiscal consolidation is achieved roughly in the same year: Assuming that, during the period in question, real interest rates are roughly equal to GDP growth, the assumed PSBR reduction entails a pattern of primary deficit reduction such that the Central Government debt to GDP ratio starts falling between 1993 and 1994 (See Appendix C and Stournaras, 1990).

Given that a) ERM steady state inflation is unlikely to exceed 4.0 percent, b) the 6.0 percent exchange rate fluctuation band will most likely be abolished during the first stage of EMU, c) Greece's inflation convergence to ERM levels at the end of 1994 will only be marginal, one can conclude that, on the nominal convergence criterion, Greece cannot enter the ERM before the end of 1994.

4. Abolition of Capital Controls

According to the Delors Report (1989), during the first stage of EMU all capital controls have to be abolished, the aim

being the creation of a fully integrated financial market.

Despite the increasing openess of the Greek economy in the 1980's and the liberalization of several categories of capital transactions in recent years (see Bank of Greece, Annual Reports), Greece still retains significant controls on capital movements. However, the EEC directive of 24 June 1988 requires Greece (as well as Spain, Portugal and Ireland) to liberalize all categories of capital transactions by the end of 1992, with a possibility of a three-year extension period for Greece and Portugal. Controls on long-term capital transactions have to be abolished earlier, by mid-1991. This mainly concerns long-term capital outflows since long-term capital inflows are virtually free for EEC residents.

Capital controls have played an important role in the Greek economy. They have allowed the development of a banking sector which is subordinated to the financial needs of the public sector and an extra degree of freedom in macroeconomic policy.

Controls on short-term capital outflows have generally been effective. First, domestic interest rates have been significantly and persistently lower than the rate implied by covered interest rate parity (see Table 4). Second, in the absence of capital controls, the authorities would not be able to subsidize the public sector

a) by issuing Treasury bills with a negative ex-post real interest rate up to 1986 (see Table 4). If the government had to borrow at "world" real interest rates, the growth of the public sector debt to GDP ratio would have been much higher.

b) by the implicit interest-rate subsidy through blocked bank funds. Apart from primary reserve requirements (8.0 percent

of deposits), commercial banks are obliged to invest 38.0 percent of their deposits in Treasury bills and to earmark 10.5 percent of their deposits for low-interest loans to public entities. The interest rate received is thus generally lower than the 'market' rate, with the difference being the implicit interest rate subsidy to the public sector. It is estimated that this 'implicit' seignorage revenue is about 1.6 percent of GDP (see Table 5), which has to be added to the ordinary seignorage revenue we have already described (Table 3). It is obvious that in the absence of capital controls the cost advantage of banks established abroad, which are not obliged to block funds at below-market interest rates, would allow them to offer lower cost services to Greek residents and, therefore, eliminate Greek financial intermediation along with the implicit subsidy to the public sector. It is noteworthy that the spread between lending and deposit rates in Greece was 6.5 percentage points in 1988 (interest on short-term credit minus interest on 3-month deposits) against a European average of about 4.1 percent (Caminal and others, 1990). This large spread is caused by the blocking of funds already described as well as by the highy concentrated structure of the Greek banking sector, where two State-controlled banks cover almost two-thirds of all banking business.

Apart from the above effects, the existence of capital controls allowed the authorities to pursue an extremely expansionary fiscal policy in the eighties without running, in effect, against the external constraint: As described in Stournaras (1990a), despite the large increase in the public sector deficit in the 1980's, the average current account deficit as well as the

average trade deficit to GDP ratio remained virtually unchanged compared to that of the 1970's. This was the result of heavily crowded-out private investment through credit rationing (as well as other mechanisms) which, to a large extent, was made possible by the existence of capital controls. In this context it is also noteworthy that, despite the largely negative real interest rates on deposits in Greece until 1986, the household savings ratio has consistently been among the highest in OECD (OECD, Economic Outlook, 1990). This observation, which, incidentally, is in contrast to the, prevailing in the popular press, view regarding the spending custom of the average Greek citizen, remains to be explained.

International experience suggests that the abolition of capital controls should not precede domestic liberalization of the banking system and the stabilization of the economy (see, among others, Torres, 1990). In Greece, the most important remaining constraints on domestic banking are the secondary reserve requirements, aiming at financing the PSBR at low cost. The reduction of the PSBR is a precondition for the elimination of secondary reserve requirements (otherwise, the average interest rate on public sector debt will have to increase substantially with destabilizing effects on public debt), while the elimination of secondary reserve requirements is a precondition for the abolition of capital controls (otherwise domestic intermediation will be eliminated by low-cost foreign banks without similar secondary reserve requirements).

There is another important argument suggesting that capital controls should be retained in Greece during the process of fiscal consolidation: As Giovannini (1988) has shown, capital

controls is a welfare-enhancing instrument in cases where capital flight is due to fears of taxation of domestic assets. In Greece, wealth taxes are very low by international standards, interest income is tax-exempt while tax-evasion is considered to be an important reason for the high public sector deficit. Voices in favour of property taxation as well as the introduction, from the beginning of 1991, of a system of tax-assessment based on annual changes in wealth, might lead to widespread capital flight.

If convergence of inflation to ERM levels and the stabilization of the debt to GDP ratio cannot be achieved before 1994, it is imperative that Greece is allowed to make use of the three-year extension period after the end of 1992 before it eliminates controls on short-term capital movements.

3. Certain conficting, intermediate objectives of EMU

Although it is widely recognized that EMU will bring long-term benefits to Community-members as a whole (Cecchinni, 1988, EEC Monetary Committee, 1990), it is not clear a) how these benefits will be allocated to individual members, b) whether transitional, short-run costs might hinder the necessary adjustment. The European Commission has recognized these problems (see the Delors Report (op.cit.) as well as other EEC documents) although definite proposals have not yet been made. An important step in the effort to tackle the regional and transitional problems of economic (but not monetary) integration was made in February 1988, when the European Council decided to enhance the Structural Funds of the Community and adapt their policies to the needs of economic integration. As a result of

this decision, it is estimated that Greece's annual net receipts from the EEC's various funds will be close to 6.5 percent of GDP at the end of 1992, as against 4.0 percent in 1989 (Stournaras et al., 1988). However it should be noted that Greece is already in difficulties in absorbing funds from the Regional Fund, due to the requirement that about half of the cost of investment projects financed by the Community has to be covered from national sources in combination with the current fiscal problems.

Neven (1990) argues that EEC-member countries in the European South will enjoy long-term benefits from economic integration because it is in these countries that there are still unexploited opportunities for specialization. These are inferred from the large differences in wages that exist between these countries on the one hand, and the other EEC members on the other.

The long-term gains for these countries, which will result from a welfare-improving re-allocation of resources due to the elimination of domestic protection (trade barriers have already been eliminated), will be 'traditional' gains from trade, i.e. gains based on trade among industries rather than within industries. Since most of the realized trade among the old EEC members is intra-industry trade, the Community enlargement towards the South is a new experience and poses questions related to the dislocation costs of re-allocation. As it is widely recognized (Padoa-Schioppa, 1989), the re-direction of trade requires movement of factors of production, closure of firms and opening of new ones in different sectors. This process, which is actually just starting to operate in Greece with the closure of certain state-controlled 'ailing' enterprises, involves transitional

costs due to lack of perfect factor mobility. Hence the conflicting intermediate objectives of EMU: At exactly the time where full flexibility is needed to facilitate adjustment to the needs of inter-industry trade a) monetary union requires fixity of exchange rates, b) EEC competition policy prohibits sector and firm-specific subsidies and c) EEC tax-harmonization policy penalizes small, local manufacturers of tobacco and beverages, with a substantial contribution to domestic value-added, by reducing the ad-valorem element in favour of the fixed element in the total excise tax (Stournaras (1988), Manessiotis (1989)).

It should be noted that the elimination of domestic subsidies exerts asymetric effects among the Community members. Just to mention a few:

a) Firms in North-European countries have access to (and the knowledge to use) a wide range of financial and insurance facilities, absorbing partly the 'shock' of the elimination of direct state aid. It is characteristic that factoring and forfaiting have not yet been introduced in Greece while export insurance is at an embryonic stage.

b) The enforcement of quality standards will, most likely, dislocate certain Greek products, not because of lower quality, but due to the lack of a proper accreditation system.

c) Greek producers are more vulnerable to external energy shocks than the other EEC producers. Greece's oil to GDP ratio (measured in tonnes of oil equivalent per $1000 GDP) was 0.32 in 1988 against 0.18 in the EEC. Only Portugal (0.39) and Luxemburg (0.36) are having higher ratios than Greece's (IEA, Energy Policies and Programmes of IEA countries, 1989).

Given that EEC's transfers to Greece are mainly directed a) to the agricultural sector in order to support agricultural incomes in the context of CAP, b) to infrastructural, long gestation projects, it is obvious that no 'shock absorbing' mechanism remains, with the exception of one: direct wage cuts. However, this is difficult to envisage not only in Greece but in almost all European countries due to union activity. In Greece, the fact that 10% of households are below the p overty line according to a recent report by the National Statistical Service while minimum wages are very close to this limit, makes this short of adjustment extremely difficult.

A reconciliation of EMU objectives may be achieved by the creation of a supra-national shock-absorbing mechanism at the early stages of EMU, to deal mainly with the problems of transition, the lack of flexibility implied by the freezing of national instruments and the asymmetric effects of EMU on the various regions. Although expressed in a rather different way, a similar argument may be found in the EEC's Monetary Committee document: 'Economic and Monetary Union: The Economic Rationale and Design of the System' (1990).

The creation of such a mechanism is, effectively, a step towards fiscal union. Given the large intra-EEC regional disparities and the likely establishment of the majority principle in Community decision-making,which will reduce the bargaining power of smaller countries, fiscal union seems to be indispensable to the cohesion of EMU, not only transitionally but, also, in its final stage. The likely problems of small countries in the periphery of the EEC in the last stage of EMU and the ways to tackle them are briefly examined in the next section.

6. Regional problems in the last stage of EMU

The issues examined so far are mainly related to problems in the transition towards the last stage of EMU. Even if one assumes that nominal convergence and fiscal consolidation are achieved rapidly, the move to a single currency and a single Central Bank does not solve regional problems. Since real convergence is a lengthy process, the existing regional disparities in the Community regions, especially after the inclusion of Greece, Portugal and Spain, will persist for a long time.

The issue is whether EMU will contribute towards greater real convergence or lead to even greater disparities. This question has been extensively analyzed in various contributions to the theory of optimum currency areas surveyed by Ishiyama (op.cit.) and in earlier discussions regarding European integration (Kaldor, 1977). Although many of the arguments have already been discussed in previous sections dealing mainly with the questions of nominal convergence and the asymmetric effects of EMU, there are further issues which are of a long-term nature.

Historical experience suggests that the impact of economic and monetary unions on the peripheral, less developed regions may be negative, with Southern Italy and Northern England being the most well-known examples in the European context. In fact, the Delors Report on EMU (op.cit.) recognizes this and stresses the need for countervailing policies. The need for such policies stems from a) the existing large disparities between the North and the South of the Community, such as income per head and productivity and b) the existing rigidities in factor markets which hinder convergence. On both these considerations, Europe appears

to be much less integrated than the USA (Eichengreen, 1990).

Theory suggests that there are three main constraints to real convergence among regions in an EMU:

a) lack of labour mobility

b) lack of sufficient wage flexibility

c) Myrdal's (1957) "circular and cumulative causation".

The first two are related to the inflexibility of the labour market while the third is a combination of labour market inflexibility and dynamic instability effects.

Labour mobility in Europe is much smaller than in America (Eichengreen, 1990). This is due, among other factors, to language barriers, social custom, different education and social security systems and the lack of co-ordinated housing policies. Although policies to encourage labour mobility will undoubtedly exert a positive effect in alleviating imbalances in EMU, it is unlikely that, in practice, this can be an adequate adjustment mechanism, while the social and economic costs of migration might turn out to be quite high (Ishiyama, op. cit.).

Wage flexibility in an EMU with a very low inflation rate might entail nominal wage cuts in regions hit either by a demand or a supply shock. Due to union activity such cuts are difficult to envisage, as it has already been argued in the previous section. In addition, average wages in the European South will, most likely, show a tendency to get equalized to those in the North either as a result of more specialized trade ("factor price equalization") or to European-wide collective bargaining. If such equalization occurs before average productivity levels converge, unemployment and regional difficulties will increase substantially (Wolf, 1989).

Closely related to the above arguments is the observation that differences between rates of increase of real wages in various manufacturing sectors, as well as between manufacturing sectors in different industrial countries, are generally smaller than differences between the corresponding average productivity growth rates, implying divergent movements between the corresponding unit labour costs (Ishiyama, op.cit., Kaldor, 1977). Although adequate explanations for this empirical observation have not yet been given, this must be related to (European) wage bargaining practices, where the pace of average wage settlements is set by unions in sectors with the highest productivity growth. Extenting this argument to the pan-European labour market, it is implied that relative unit labour costs will turn against regions with the comparatively lower average labour productivity growth. As a result, business capital will tend to move towards areas with high productivity growth, causing, what Myrdal (1957) has called "circular and cumulative causation", where the meaning of this is that the pace of economic growth of the various regions doesnot necessarily tend to a state of balance. Modern spatial economics offer more explanations to cumulative causation processes such as economies of scale related to centrally located urban agglomerations and large corporations (see, among others, Padoa-Schioppa, op.cit.).

Although recent historical experience doesnot suggest that countries in the periphery of Europe are necessarily experiencing lower rates of productivity than those in the centre, Greece's recent experience is not encouraging (Table 6): labour productivity growth was substantially lower than in the EEC during the period 1979-1989,while real unit labour cost appreciated

both absolutely and in comparison to the EEC average.

Given the above mentioned constraints, there seems to be little doubt that the only instrument that can be used effectively in the last stage of EMU in order to prevent the development of further regional disparities among European countries is a supranational system of fiscal transfers, in the form of an automatic stabilizer through increased net transfers to depressed regions. In effect Myrdal's "circular and cumulative causation" provides its justification: If EMU exerts an asymmetric 'shock' against less developed areas and in favour of developed ones, an automatic stabilizer transferring resources from those who gain to those who loose is mitigating an externality. Authors writing at different times such as Ishiyama (op.cit.), Kaldor (1977) in his evaluation of the Werner Report, and Eichengreen (1990), end up to the same conclusion.

The Community's decision to increase the resources of the Structural Funds in order to enhance the infrastructure of the less developed areas is a step in the right direction, in that it will contribute to higher rates of productivity in these areas. The question is whether this is an adequate mechanism given that the decision to double the Community resources was taken in order to facilitate adjustment to 'project 1992', not to facilitate adjustment under conditions of a full monetary union. A feeling regarding the extent to which the Community's budget can play the role of the automatic stabilizer is given by Eichengreen (op.cit.) who compares the scale of redistribution between the federal fiscal systems of USA and Europe: In spite of the fact that the USA is a much more integrated area than Europe, tax and transfer adjustment in USA eliminate as much as 40% of the

decline in regional economies, while the corresponding ratio for Europe is currently 1%.

As it has been argued in the previous section, a shock-absorbing mechanism at a supra-national level is also needed during the initial stages of EMU. Hence, the question of fiscal federalism should be posed as early as possible in the negotiations regarding EMU. Its necessity for Greece at an early stage has also been advocated by Stamatopoulos (1990).

7. Concluding comments and discussion of the results

The main constraints for Greece's joining the ERM and abolishing controls on capital movements are high inflation, fiscal imbalances, a heavily regulated domestic banking system, and low productivity growth relative to the EEC average. In addition, certain EEC directives exert asymmetric influences on member States and deprive national authorities from corrective instruments at a time when the restructuring of the economy according to the needs of inter-industry trade and the Single Market objectives require full flexibility and instrument availability.

Since fiscal imbalances and an accommodating monetary policy are mainly responsible for high inflation in Greece and the regulation of the banking system, the reduction of the PSBR will, in the medium-run, create the conditions for nominal convergence. According to a simple exercise using IMF's financial programming equations, Greek inflation will fall to 4% at the end of 1994 from 22% at the middle of 1990. The crucial assumption for this result is that the annual reduction of the PSBR relative to GDP in the coming years will be about three percentage points.

Entering the ERM and abolishing capital controls before nominal convergence is achieved will, more likely, result in a sharp deterioration of competitiveness and a sharp rise in real interest rates with detrimental effects to domestic production and public debt.

Nominal convergence is a necessary but not sufficient condition for Greece's succesful participation in EMU. Asymmetric influences on member-states from certain EEC Single Market directives, such as those related to competition and tax policies, as well as low productivity growth in the last several years in Greece relative to the EEC average, might create forces against real convergence between Greece and the other EEC countries, similar to those described by Myrdal and Kaldor as 'circular and cumulative causation'. Effectively, the only instrument left to national authorities to tackle the transitional problems to EMU as well as to avoid real divergence, is direct wage cuts. However this is very difficult to envisage due to union activity as well as to social considerations: minimum wages in Greek manufacturing are very close to the poverty limit.

It seems that the only way to achieve cohesion in EMU and avoid the creation of a two-speed Europe is a) to allow high inflation EEC countries enough time to disinflate and reduce fiscal imbalances before joining the lower ERM band and abolishing capital controls and b) to aim at the creation of a supranational mechanism of fiscal transfers, resembling the USA federal fiscal system both qualitatively and quantitatively, in order to act as a shock absorbing mechanism in the transitional stages to EMU as well as to act against real divergence in the final stage of EMU. However, such a move towards this form of fiscal federal-

ism is very difficult to envisage without sufficient progress towards political union in Europe.

APPENDIX A

The process of disinflation through pegging the nominal exchange rate and the role of expectations

Consider the following dynamic model (all variables are in logs except interest rates):

$$\dot{P} = \hat{\dot{P}} + v\,(y - \bar{y}), \qquad v>o \qquad (1)$$

$$\dot{y} = k(D - y), \qquad k>o \qquad (2)$$

where P is the domestic, current price level (a dot over a variable denotes its time derivative), $\hat{P}$ is the expected price level, $\bar{y}$ is normal output (exogenous), y is current output and D is aggregate, ex-ante demand; $\dot{P}$ is current inflation and $\hat{\dot{P}}$ is expected inflation.

Aggregate, ex-ante demand, D, is:

$$D = ay+g - b\,(P-e)-\theta r + \lambda\,(m-P), \quad a,b,\theta,\lambda>0 \qquad (3)$$

where a is the marginal propensity to consume, g is a fiscal parameter, e is the nominal exchange rate, $P-e$ is the real exchange rate (foreign prices have been normalized to unity), r is the domestic real interest rate, and $m-P$ is real money balances.

Assuming, for simplicity, a money demand equation of the 'quantity theory of money' type we can write: $m-P = \sigma y$. Denoting the expected, nominal exchange rate by $\hat{e}$ and the domestic (foreign) nominal interest rate by $i(i^*)$, perfect capital mobility implies: $r = i-\dot{P} = i^*+\hat{\dot{e}}-\dot{P}$. Therefore, equation (3) may be written as

$$D = g +(a+\lambda\sigma)y-b\,(P-e) + \theta(\dot{P}-\hat{\dot{e}}) \qquad (4)$$

where, for simplicity of notation, i^* has been set equal to zero.

Equation (1) says that current inflation is equal to expected inflation plus a linear, positive function of the output

gap (Note: $\bar{y}$ is associated with the natural rate of unemployment). Equation (2) departs from the existing models in the literature and says that current output increases if aggregate, ex-ante demand exceeds current output and vice-versa. In fact, eq. (2) reflects the (inventory) adjustment mechanism, following deviations between ex-ante demand and output.

Regarding the expected rate of inflation, $\hat{\dot{P}}$, we postulate

$$\hat{\dot{P}} = \xi \dot{P} + (1-\xi) \hat{\dot{e}} \quad , \quad 0<\xi<1 \qquad (5)$$

which says that expected inflation is a weighted average of current inflation and expected depreciation (The nominal exchange rate is the "anchor" of expectations while the inclusion of current inflation in the formation of expectations reflects the effects of habits, contracts, etc.).

Expectations about expected depreciation play a crucial role. Consider two alternative assumptions:

$$\hat{\dot{e}} = q \dot{e} \quad , \quad 0<q<1 \qquad (6a)$$

$$\hat{\dot{e}} = \pi (\dot{P}-\dot{e}) \quad , \quad \pi>0 \qquad (6b)$$

Equation (6a) postulates that expected depreciation is related to current depreciation, with an elasticity of expectations, q, of less than unity. The alternative assumption, formalized in equation (6b), says that expected depreciation is positively related to the current loss of competitiveness (remember that foreign inflation is zero), the presumption being that the authorities will, ultimately, react to a loss of competitiveness, either due to trade account deterioration or to pressures from exporters (see Dornbusch, 1986).

In fact it may be postulated that expected depreciation is a weighted average of (6a) and (6b) with the weights w and 1-w being the proportion of agents forming expectations according to

(6a) and (6b) respectively:

$$\hat{\dot{e}} = w\, q\, \dot{e} + (1-w)\, \pi\, (\dot{P}-\dot{\bar{e}}), \quad o<w<1 \qquad (7)$$

Rewriting its r.h.s, equation (7) may be written as

$$\hat{\dot{e}} = [wq-(1-w)\pi]\dot{e} + (1-w)\pi\, \dot{P} \qquad (8)$$

Assume now that the economy in question enters a system of fixed exchange rates: $e = \bar{e}$ and $\dot{e} = 0$. If expectations about the future exchange rate are governed by (6a) we have $\dot{e} = 0$. However if agents form expectations using (6b), which implies that they do not believe that the economy will remain in the fixed exchange rate system, we have: $\hat{\dot{e}} = \pi\dot{P}$. Using the "average" rule given be eq.(8) we have

$$\hat{\dot{e}} = (1-w)\pi\dot{P} \quad , \qquad (9)$$

Using equations (5) and (9), equation (1) may be written

$$\dot{P} = \phi\, (y-\bar{y}) \quad , \qquad (10)$$

where $\phi = v/(1-\zeta)[1-\pi(1-w)]$

Using eqs. (10) and (9), equation (4) may be written

$$D = g+[a+\lambda\sigma+(\theta v/1-\zeta)]\, y-b(P-\bar{e})-(\bar{y}\theta v/1-\zeta) \qquad (11)$$

Taking into account equation (11), equation (2) can be written as

$$\dot{y} = K[g-(1-a-\lambda\sigma-(\theta v/1-\zeta))y - b(P-\bar{e})-\bar{y}\theta v/1-\zeta] \qquad (12)$$

The system of dynamic equations under study consists of equations (10) and (12). Solving this system for $\dot{P} = \dot{y} = 0$, we obtain the equilibrium point (P*, y*):

$$P* = \bar{e} + g/b - y/b(1-\zeta)[(1-\zeta)\gamma+\theta v], \qquad (13)$$

$$y* = \bar{y} \qquad (14)$$

where $\gamma = 1 - [\, a + \lambda\sigma + (\theta v/1-\zeta)]$ (15)

We will assume $\gamma>0$, which implies that the traditional "Keynesian" multiplier is positive (in other words, $\gamma>0$ implies that the IS curve has the normal, negative slope in the

(r,y)space). Eq. (13) gives an equilibrium price level p^* which is a positive function of autonomous demand, g, and a negative function of potential output, $\bar{y}$. Equation (13) also implies a one-to-one positive relationship between P^* and the level at which the nominal exchange rate is pegged, $\bar{e}$.

The important question is whether the pair (P^*,y^*) defined in (13), (14) is a stable equilibrium, given the adjustment process described by (10) and (12). To answer this question, we construct the phase diagram of the dynamic system in the (P,y) space. This is shown in Figure 1A.

In Figure 1A, along the locus $y=\bar{y}$ there is price stability ($\dot{P}=0$), while along the locus DD, ex-ante demand is equal to realized output ($\dot{y}=0$). In fact, the algebraic equation of the DD locus is

$$P = \bar{e} - (\gamma/b)y + g/b - \bar{y}\theta v/b(1-\zeta), \qquad (16)$$

and its slope is $-(\gamma/b)<0$, since $\gamma>0$

To the left of DD, realized output is less than ex-ante demand; therefore output increases ($\dot{y}>0$). To the right of DD, $\dot{y}<0$. In figure 1A, the parallel to the y-axis arrows show the motion of y.

The motion of P is given by eq.(10). If $1>\pi(1-w)$, $\dot{P}>0$ if $y>\bar{y}$ and $\dot{P}<0$ if $y<\bar{y}$. Hence, the motion of P under the assumption

$$1 > \pi (1-w) , \qquad (17)$$

is given by the parallel to the P-axis arrows. The combined motion of P and y gives the phase diagram shown in Figure 1A. It follows that the equilibrium point $(P^*,\bar{y})$ is stable, although convergence is cyclical.

A special case (with condition (17) being satisfied) is that with $\zeta=0$, $w=1$. That is, expectations about future inflation

are entirely forward looking while expectations about future depreciation are formed according to (6a). Given that the authorities commit themselves to a fixed exchange rate ($\dot{e}=0$) we have $\dot{\hat{P}} = \dot{\hat{e}} = 0$, which implies that expectations about future inflation are rationally formed, given that foreign inflation is zero. Even in this case where expectations are formed rationally, convergence to equilibrium is cyclical, due to the fact that output follows a gradual adjustment mechanism (eq. (2)).

If condition (17) is not satisfied, that is if

$$1 < \pi (1-w), \qquad (18)$$

the parameter φ defined in equation (10) is negative. This implies: $\dot{P}<0$ if $y>\bar{y}$ and $\dot{P}>0$ if $y<\bar{y}$. The motion of the system is now shown in the phase diagram of Figure 2A.

Figure 2A shows that under assumption (18) the system of equations (10) and (12) has the property of saddle-point instability. That is, although equilibrium is unstable, there is a unique convergence path AA'. It is obvious that only by a fluke the economy will find itself on the path AA': in general, motion leads away from equilibrium. (Note: According to a rather extreme view of rationality, saddle point instability is a desirable property since it helps far-sighted individuals, who know the "correct" model of the economy, to solve it, locate the convergent path AA' and "jump" to it; however, the idea of solving the model and "jumping" to the unique, convergent path is in contrast to decentralized gradual adjustment mechanisms like the one postulated in equations (1) and (2)).

Condition (18) is likely to obtain when a) a large proportion of agents in the economy believe that the authorities will not stick to a fixed exchange rate but will react to the change

in competitiveness with an exchange rate adjustment and b) the elasticity of expectations - parameter π in equation 6b - is greater than unity. In fact, a reasonable assumption is that π depends on the cumulative loss of competitiveness under the fixed exchange rate, regime, that is $\pi = f[\int_0^s \dot{P}\, ds]$, with $f' > 0$.

A crucial assumption made above is that potential output, $\bar{y}$, is exogenous. If $\bar{y}$ is made to depend on investment, which, in turn, depends on the real interest rate, r, as well as competitiveness, P-e, supply-side effects are also present. In this case it is interesting to examine how the process of disinflation through pegging the nominal exchange rate affects $\bar{y}$ relative to its trend.

APPENDIX B

The real effects of devaluation

Consider the following model (all variables are in logs)

$$w = \bar{\eta} + \alpha\gamma P + (1-\alpha)\gamma e, \quad \bar{\eta}>0, \quad 0<\alpha<1, \quad 0\leq\gamma\leq 1 \qquad (1)$$

$$P = \bar{k} + \theta w + \mu e + (1-\theta-\mu)t + \sigma y, \qquad (2)$$

$$\bar{k}>0, \quad 0<\theta<1, \quad \sigma<0, \quad 0<\mu<1,$$

$$y = cg - b(P-e), \quad c,b>0 \qquad (3)$$

where: w is the nominal wage rate, P is the domestic price level, e is the nominal exchange rate (an increase in e denotes nominal depreciation), t is the price of an input supplied by the government (it may be considered as a composite commodity produced by public corporations), g is a fiscal parameter, P-e is the real exchange rate (competitiveness is e-P; foreign prices have been normalized to unity and their log is zero).

Equation (1) says that the nominal wage is set to satisfy a target real wage: $\bar{\eta}$ is the target, aP+(1-a)e, is the consumer price index with a(1-a) being the share of domestic (foreign) output in consumption expenditure, and γ is the indexation parameter.

Equation (2) is the (marginal cost) price of domestic output, where $\bar{k}$ is the - assumed constant - mark-up (it is related to the own price elasticity of domestic output), σ is a positive constant denoting decreasing returns to scale in domestic production while the coefficients of w, e and t sum-up to one implying that the cost function of domestic output is homogeneous of degree one in input prices.

Finally, equation (3) is the (reduced form) demand equilibrium condition.

Using eq. (1) in eq. (2) and manipulating we obtain

$$P-e = \frac{1}{1-\theta\alpha\gamma}\left[\bar{k}+\theta\bar{\eta}+\sigma y+e(\theta\gamma+\mu-1)+(1-\theta-\mu)t\right], \qquad (4)$$

Equation (4) may be considered as the supply-side equilibrium locus: it gives combinations of the real exchange rate, P-e, and output, y, consistent with profit maximization and the wage equation. Diagramatically it is a line with a positive slope in the (P-e, y) space since $\sigma/(1-\theta\alpha\gamma)>0$. Figure 1B depicts equation (4) - supply side equilibrium - as well as equation (3) - demand side equilibrium. The intersection of the two loci give the equilibrium real exchange rate and output, where it has been assumed that the target real wage, $\bar{\eta}$, is such that equilibrium output, y*, falls short of full employment output, $\bar{y}$.

The position of the demand locus DD, depends only on the fiscal parameter g while that of the supply locus, SS, depends on the mark-up $\bar{k}$, the target real wage $\bar{\eta}$, the price of the public utility's input, t and the nominal exchange rate e. In particular, since $\theta\gamma+\mu-1<0$, a devaluation shifts the SS locus to the right resulting in a lower real exchange rate and higher output.

It may be noted that even if $\gamma=1$ (i.e. there is full wage indexation to CPI) a devaluation still reduces the real exchange rate (raises competitiveness) since, by assumption, $\theta+\mu<1$. In fact if $\gamma=1$ a unit nominal depreciation and a unit reduction in the price of public utilities' composite commodity have the same effect on the real exchange rate.

Effectively, the real effects of devaluation on competitiveness under real wage rigidity ($\gamma=1$) are due to the presence of a composite, non-traded commodity, produced by public entities and used as an input in private production, whose price is

not indexed to the CPI. This implies that a currency depreciation has real effects to the extent that the government (the public entity) is prepared to increase its real deficit to subsidize private production. However, this is not always the case: In countries - like Greece -with a progressive income tax and without fully indexed income brackets, inflation increases the tax-burden through fiscal drag. Hence the "implicit" subsidy to private production need not necessarily imply a higher public debt.

APPENDIX C

How long does it take for Greek inflation to converge to ERM levels?

If, as argued in the text, large inflation differentials is a major constraint in Greece's decision to join the ERM, a reasonable question to ask is how long (and under what conditions) is needed for Greek inflation to converge to ERM levels?

Obviously, the answer to such a question depends on a number of factors such as the nature of expectations, the impact of government policies, the market of contracts, the market adjustment mechanism etc. Rather than employing a model incorporating all these factors, we use a simple, two-equation, monetarist experiment of the IMF's "financial programming" type (Taylor, 1983). The first equation is a log-linear transactions demand for broad money (M3) function

$$\Delta M/M = \Delta K/K+\Delta P/P+\Delta y/y, \qquad (1)$$

while the second equation is the supply of broad money, derived from the banking system consolidated balance sheet:

$$\Delta M^s = PSBR-NBF+\Delta L+BB, \qquad (2)$$

where ΔM^s is the absolute change in money supply (endogenous), $\Delta K/K$ is assumed to be equal to its trend value (0.03), $\Delta P/P$ is inflation (endogenous), $\Delta y/y$ is the GNP growth rate (exogenous), PSBR is the (net) Public Sector Borrowing Requirement (controlled by the government) NBF is domestic, non-bank financing of the PSBR, ΔL is net credit expansion to the private sector and BB is the basic balance (equal to the current account surplus plus autonomous, net capital inflows), all of them being exogenous variables.

Equation (2) is actually the basis for Bank of Greece's annual monetary programmes based on independent projections for the rhs variables, while equation (1) has been found to trace CPI inflation in the last several years satisfactorily (IMF, 1990a). In fact in its last annual report, the Bank for International Settlements (1990) reports that similar exercises have been done recently for a number of countries, regarding the prediction of the medium to long-run price level on the basis of an equation like (1) above, with satisfactory results.

Given that the main source for M3 growth in Greece is the credit expansion to the public sector (IMF, 1990a, Bank of Greece, Annual Reports), it is reasonable to assume that a medium-term programme aiming at reducing M3 growth-and inflation-should be based on a reduction of the credit expansion to the public sector. In fact we use the following scenario (see Table 1C) regarding the evolution of the exogenous variables of the system of equations (1) and (2):

Table 1C

	1990	1991	1992	1993	1994
ΔY/Y (%)	1.8	2.2	3.0	3.0	3.0
PSBR (% of Y)	17.0	15.0	12.0	9.0	6.0
ΔL (% of Y)	5.7	6.0	6.0	6.0	6.0
BB(bill.drachm.)	-300.0	0.0	0.0	0.0	0.0
NBF (% of PSBR)	23.0	25.0	30.0	35.0	45.0

The assumed GDP growth after 1992 is close to the 1988-90 average, the assumed reduction in the PSBR relative to GDP may be considered as realistic (ways to achieve this reduction are discussed in Stournaras (1990)), credit expansion to the private

sector remains roughly the same ratio to GDP as in recent years (the planned credit reduction to sheltered and stagnant sectors, like ailing enterprises, and the development of the stock market, make this assumption compatible with higher private investment) while the assumptions regarding BB and NBF may also be considered as realistic (their magnitudes are actually close to those prevailing in the years 1987, 1988 under the influence of the 1986-87 stabilization programme).

Given the above scenario regarding the exogenous variables, the solution to the system of equations (1) and (2) gives:

	1991	1992	1993	1994
ΔM/M (%, end of year)	22.5	17.5	13.6	10.0
ΔP/P (%, end of year)	17.3	11.5	7.6	4.0

According to the above table, inflation falls to 4% at the end of 1994.

The above conclusion depends mainly on the assumed steady reduction of the PSBR relative to GDP. This assumes a break in the political business cycle established since 1979 under successive governments: as it now widely recognized, the reduction of the primary public sector deficit is more a "political" and less a technical problem.

Since the PSBR is only indirectly under government control, given that interest payments on public debt are "predetermined", it is interesting to derive the required reduction in the primary deficit relative to GDP which is consistent with the assumed (in Table 1C) reduction of the PSBR to GDP ratio.

By definition

$$PSBR_t = i_t D_{t-1} + \Pi_t, \qquad (3)$$

where i is the average effective interest rate on net public sector debt, D, and Π is the primary deficit. Dividing both sides of (3) by Y_t, we obtain

$$\varepsilon_t = \frac{i_t}{1+g_t} \cdot d_{t-1} + \pi_t \,, \qquad (4)$$

where ε_t is the $PSBR_t$ divided by GDP_t, d_{t-1} is D_{t-1} divided by GDP_{t-1}, π_t is Π_t divided by GDP_t while g_t is GDP growth between t and t-1. Similarly,

$$\varepsilon_{t-1} = \frac{i_{t-1}}{1+g_{t-1}} d_{t-2} + \pi_{t-1}, \qquad (5)$$

Subtracting (5) from (4) we obtain

$$\varepsilon_t - \varepsilon_{t-1} = \pi_t - \pi_{t-1} + \frac{i}{1+g} (d_{t-1} - d_{t-2}), \qquad (6)$$

where it has been assumed that

$$i_t/1+g_t = i_{t-1}/1+g_{t-1} = i/1+g, \qquad (7)$$

From the government's budget constraint we have (see, among others, Stournaras (1990)):

$$d_{t-1} - d_{t-2} = (\pi_{t-1} - m_{t-1}) + \frac{d_{t-2}}{1+g} (i-g), \qquad (8)$$

where m_{t-1} is seignorage revenue relative to GDP (approximated by the change in the monetary base relative to GDP) at time t-1.

Using equation (8) in equation (6) we obtain

$$\pi_t - \pi_{t-1} = \varepsilon_t - \varepsilon_{t-1} - \frac{i}{1+g} \left[\pi^*_{t-1} + \frac{d_{t-2}}{1+g} (i-g)\right], \qquad (9)$$

where $\pi^*_{t-1} = \pi_{t-1} - m_{t-1}$

Eq. (9) gives the required change in the primary deficit, $\pi_t - \pi_{t-1}$, given the assumed change in the PSBR, $\varepsilon_t - \varepsilon_{t-1}$. For instance if i=g and for a given reduction in the PSBR, $\varepsilon_{t-1} - \varepsilon_t = \bar{\phi} > 0$, the required reduction in the primary deficit is given by

$$\pi_{t-1} - \pi_t = \bar{\phi} + \frac{i}{1+g}\,\pi^*_{t-1} > \bar{\phi}, \qquad (10)$$

It is noteworthy that if the average interest rate, i, on public sector debt is sufficienty lower than GDP growth, g, the reduction in the primary deficit relative to GDP may be lower than the required reduction in the PSBR relative to GDP. This follows directly from equation (9).

8. References

1. Artis, M. and M. Taylor (1988): 'Exchange rates, interest rates, capital controls and the EMS: assessing the track record' in Giavazzi, Micossi and Miller (eds) The European Monetary System, Cambridge University Press and CEPR.

2. Bank of Greece, (1981-1989): Annual Reports.

3. Bank for International Settlements (1990): Annual Report.

4. Burns, T. (1990) "The hard ECU: A European way forward together" Presentation at the Bank of Greece, 27 July '90.

5. Caminal et al (1990):

6. Canzoneri, M. and C.A. Rogers (1990) 'Is the European Community an Optimal Currency Area? Optimal Taxation Versus the Cost of Multiple Currencies' American Economic Review, June

7. Cecchinni, P. (1988): The European Challenge 1992. Wildwood House.

8. Chalikias, D. (1990): 'The role of monetary policy in Greece'. Presentation at the Thessalonica Chamber of Commerce and Industry, August.

9. Collins, S. (1988). 'Inflation and the European Monetary System' in Giavazzi, Micossi and Miller (eds.), op.cit.

10. Delors, J. et al (1989): 'Report on EMU', EEC Committee for the study of EMU.

11. Dornbusch, R. (1986): Dollars, Debts and Deficits Leuven University Press and MIT University Press.

12. Dornbusch, R. (1988): 'Credibility, debt and unemployment: Ireland's failed stabilization', Economic Policy.

13. Dornbusch, R. (1988a): 'The European Monetary System, the dollar and the yen' in Giavazzi, Micossi and Miller (op.cit.)

14. EEC, Monetary Committee (1990): 'EMU: Economic Rationale and Design of the System'.

15. Eichengreen, B. (1990) 'Currency Union', Economic Policy.

16. Giavazzi, F. and A. Giovannini (1989): Limiting Exchange Rate Flexibility: The European Monetary System. The MIT Press.

17. Giavazzi, F. and M. Pagano (1988): 'Theadvantage of tying one's hand: EMS discipline and Central Bank credibility, European Economic Review, 32.

18. Giavazzi, F. and L. Spaventa (1988) 'Italy: the real effects of inflation and disinflation', Economic Policy.

19. Giovannini, A. (1988) 'Capital controls and public finance: the experience in Italy' in Giavazzi, F. and L. Spaventa (eds, 1988): 'High public dept: The Italian experience, CEPR and Cambridge University Press.

20. International Energy Agency (1989): Energy Policies and Programmes of IEA countries, OECD, Paris.

21. International Monetary Fund (1990): World Economic Outlook.

22. International Monetary Fund (1990a): Report on Greece.

23. Ishiyama, Y (1975): 'The theory of optimum currency areas: A survey' IMF Staff Papers.

24. Kaldor, N. (1978): Further Essays on Applied Economics Part III, Duckworth.

25. Manessiotis, B. (1989): Tax harmonization in the tobacco industry (in Greek). Institute for economic and industrial research, Athens.

26. Myrdal, G. (1957): Economic Theory and Underdeveloped Regions, London.

27. Neven, D. (1990) 'The Gainers and loosers from 1992', Economic Policy.

28. Obstfeld, M. (1988): 'Competitiveness, realignment and speculation: the role of financial markets' in Giavazzi, Micossi and Miller (eds), op.cit.

29. OECD, Surveys on Greece, 1984, '87, '90.

30. OECD, Economic Outlook, 1989.

31. OECD, Employment Outlook, 1987.

32. Padoa-Schioppa, T. et al. (1987): Efficiency, Stability and Equity: A Strategy for the evolution of the Economic System of the European Community, Oxford University Press.

33. Papademos, L. (1990): 'Greece and the EMS: Issues, prospects and a framework for analysis' in P. de Grauwe and L. Papademos (eds): The EMS in the 1990's (forthcoming). Center for European Policy Studies and Bank of Greece.

34. Sargent, T. and N. Wallace (1981) 'Some unpleasant monetarist arithmetic' Federal Reserve Bank of Minneapolis Quarterly Review.

35. Stamatopoulos, H. (1990): 'Constraints in the exercise of national economic policy in the process towards EMU (in Greek). Economikos Tahidromos.

36. Stournaras, Y. et al (1988): 'Greece and project 1992', Mimeo Ministry of National Economy, Athens.

37. Stournaras, Y. (1990): 'Public Sector Debts and Deficits in Greece: The experience of the 1980's and future prospects', Rivista di Politica Economica, July-August.

38. Stournaras, Y. (1990a): 'The two deficits under credit rationing, and real wage rigidity: the case of Greece during the 1980's. Presented at the CERP-Bank of Greece conference on 'Macroeconomic Policy and the external constraint' May 1990.

39. Taylor, L. (1983): Structuralist Macroeconomics, Basic Books.

40. Torres (1990): 'Portugal, the EMS and 1992' in P. de Grauwe and L. Papademos (eds): The EMS in the 1990's (forthcoming).

41. Wolf, M. (1989): 'The tricky aerodynamics of EMU', Financial Times, 7 August, 1989.

Table 1

Main Economic Indicators

	1961-73	1974-81	1982	1983	1984	1985	1986	1987	1988	1989	1990
1. Gross domestic product											
EUR 12 (% change)	4.8	1.9	0.8	1.6	2.3	2.5	2.8	2.8	3.8	3.4	3.1
Greece (% change)	7.7	3.0	0.4	0.4	2.8	3.1	1.2	-0.4	4.0	2.5	2.3
2. Inflation (Priv. Consumpt. Deflator)											
EUR 12 (% change)	4.6	12.3	10.5	8.5	7.2	5.9	3.8	3.4	3.6	4.8	4.5
Greece (% change)	3.5	16.8	20.7	18.1	17.9	18.3	22.0	15.7	13.9	14.3	15.0
3. Rate of Unemployment											
EUR 12 (% of civilian labour force)	2.2	5.5	9.5	10.0	10.8	10.9	10.8	10.4	10.0	9.0	8.7
Greece (" " " ")		2.3	5.8	9.0	9.3	8.7	8.2	8.0	8.5	8.5	8.5
4. Gross fixed capital formation											
EUR 12 (% of GDP)	23.4	22.1	20.2	19.6	19.3	19.2	19.0	19.2	20.0	20.6	20.9
Greece (% of GDP)	21.7	22.9	19.9	20.3	18.5	19.1	18.5	17.4	17.9	18.8	19.2
5. Current balance											
EUR 12 (% of GDP)	0.4	-0.3	-0.7	0.1	0.3	0.8	1.4	0.8	0.3	0.1	0.3
Greece (% of GDP)	-2.9	-1.7	-4.4	-5.0	-4.0	-8.2	-5.2	-2.5	-1.5	-3.4	-3.5
6. Net lending, general government											
EUR 12 (% of GDP)	-0.7	-3.7	-5.5	-5.3	-5.4	-5.2	-4.8	-4.3	-3.6	-2.9	-2.9
Greece (% of GDP)			-7.7	-8.3	-10.0	-13.8	-12.5	-11.7	-14.2	-18.9	-19.1
7. Money supply (end of year)											
EUR 12 (% change)	11.9	13.4	11.9	10.7	9.9	10.0	10.3	11.0	10.6		
Greece (% change)	18.2	25.1	29.0	20.3	29.4	26.8	19.0	24.8	22.8	24.2	
8. Gross debt, general government											
EUR 12 (% of GDP)		39.8	48.0	51.2	54.4	56.9	57.9	59.6	59.3	58.6	58.0
Greece (% of GDP)		26.3	36.1	41.2	49.5	57.9	58.3	63.3	70.3	78.1	87.3

Source: European Economy, 42, Nov. 1989

Table 2

	Inflation (1)					Real Interest Rates (2)					Rate of Unemployment (3)				
	G	Fr	I	Sp	Irl	G	Fr	I	Sp	Irl	G	Fr	I	Sp	Irl
1982	4.8	11.5	16.9	14.5	14.9	3.9	3.4	3.3	2.7	2.7	5.0	8.2	9.2	16.4	11.4
'83	3.2	9.7	15.2	12.4	9.2	2.2	2.8	3.2	7.0	5.3	6.6	8.4	10.0	18.2	14.0
'84	2.5	7.7	11.8	10.8	7.7	3.0	4.0	5.5	1.8	5.2	7.1	9.8	10.1	20.1	15.5
'85	2.1	5.8	9.0	8.2	4.7	3.1	4.1	9.4	2.9	7.1	7.2	10.2	10.2	21.5	17.4
'86	-0.5	2.7	5.8	8.7	4.0	5.1	5.0	7.6	2.8	8.3	6.4	10.4	11.2	21.0	17.4
'87	0.6	3.1	4.9	5.7	2.7	3.1	4.8	6.6	10.4	8.1	6.2	10.5	12.1	20.5	17.5
'88	1.2	2.7	5.3	4.9	2.4	2.8	4.8	6.0	6.4	5.4	6.1	10.0	12.1	19.5	16.7
'89	3.1	3.3	6.0	6.6	4.0	3.5	5.8	6.7	7.8	5.5	5.5	9.5	12.1	17.3	15.5
'90	2.6	3.0	6.1	6.8	3.0	5.1	7.5	7.2	8.2	8.9					

	Net Public Sector Debt (4) (% of nominal GDP)					Germany's trade balance (5)	
	G	Fr	I	Sp	Irl	with France	with Italy
						(billion $)	
1979						3.8	-1.5
1980						5.9	1.0
1981						5.8	1.1
1982	19.8	17.8	63.4	14.6	92.2	7.0	1.0
'83	21.4	20.0	68.7	18.6	104.7	4.1	0.2
'84	21.6	21.1	74.4	23.2	113.2	5.8	0.8
'85	21.9	22.9	81.3	27.9	117.7	5.7	1.0
'86	21.6	25.2	86.2	30.5	133.2	7.0	2.0
'87	22.9	25.4	89.9	30.4	135.6	9.0	4.0
'88	23.6	25.6	92.2	30.5	132.8	10.5	6.2
'89	21.9	25.4	94.3	29.3	125.4		
'90	21.3	25.0	96.5	28.4	118.2		

(G = Germany, Fr = France, I = Italy, Sp = Spain, Irl = Ireland)

(1) % change, private consumption deflator. Source: OECD, Economic Outlook .
(2) Money market interest rates net of inflation. Source: IMF: IFS, May '90.
(3) % of the labour force: Source: OECD, Economic Outlook.
(4) Source: OECD, Economic Outlook. For Ireland, gross debt.
(5) Source: P. Norman, Financial Times, 6.1.1990.

Table 3

Seignorage Revenue (percent of nominal GDP)

	Portugal	Greece	Italy	Spain	Germany
1979-81	5.29	3.28	1.37	1.32	0.00
1982	5.86	3.39	1.45	1.87	0.48
1983	2.70	-0.02	1.49	2.01	0.50
1984	0.63	3.48	1.39	7.51	0.35
1985	1.07	0.56	1.81	0.59	0.30
1986	1.62	0.22	0.60	0.88	0.56
1987	2.85	3.09	0.69	1.28	0.84
1988	2.19	0.57	0.65	-0.36	1.01

Source: Gros, D. (1990): 'Seignorage and EMS discipline', in P. de Grauwe and L. Papademos (eds): The EMS in the 1990's (forthcoming).

Table 4

Extent of capital controls:

Mean deviation from covered interest parity

	1982-1985	1985-1988
Belgium	0.16	0.09
Denmark	-4.21	-2.85
France	-2.34	1.14
Germany	0.52	0.17
Greece	-9.15	-9.73
Ireland	-0.04	-1.58
Italy	-0.63	-0.17
Netherlands	0.30	0.12
Portugal	-11.78	-3.70
Spain	-3.42	-1.34
UK	-0.03	-0.26

Source: Eichengreen (1990)

Memorandum Item: Ex-post real interest rates on 3-month treasury bills in Greece

1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
-6.6	-8.8	-8.6	-5.0	-4.5	-1.0	-1.8	-4.9	0.8	2.5	1.5

Source: Bank of Greece.

Table 5

Blocked bank funds and the implicit interest rate subsidy to the public sector

December 1988

Blocked bank funds to the public sector (% of total bank deposits)(1)	56.5
primary reserve requirement	8.0
secondary reserve requirement	38.0
earmarked funds to public entities	10.5
Total bank deposits (billions drachmae)	4.194
Interest rate on blocked funds (Weight. Average)	14.1
'Market' interest rate (Weighted average)	19.0
Interest Rate Subsidy - % of GDP	1.6

Source: a) OECD Economic Surveys, Greece, 1989-90

b) Bank of Greece

(1) Blocked bank funds to the private sector (small scale units and handicrafts) amount to 10.0 percent of total bank deposits.

Table 6

Labour productivity (LP)[1] and real compensation per employee (RCE)[2]
(annual % change)

	1973/60		1979/73		1984/79		1989/84		1989/79	
	LP	RCE	LP	RCE	LP	RCE	LP	RCE	LP	RCE
Europe 12	4.5	4.6	2.3	2.6	1.7	1.3	2.0	1.2	1.8	1.2
Greece	8.2	5.5	3.0	5.6	-0.3	1.2	1.2	0.5	0.4	0.8
Portugal	7.4	7.7	3.1	5.1	0.2	-1.4	2.9	0.7	1.5	-0.3
Spain	6.5	7.1	3.2	3.9	3.1	1.3	2.2	0.7	2.6	1.0
Ireland	4.3	3.9	3.4	4.2	3.0	2.1	2.6	1.0	2.8	1.5

Memorandum Item: Real unit labour cost (1979=100)

	1979	1981	1985	1986	1987	1988	1989
Europe 12	100.0	101.2	96.8	95.6	95.2	94.3	93.8
Greece	100.0	104.4	109.6	105.1	103.8	104.4	104.0
Portugal	100.0	99.8	89.7	85.4	85.2	83.7	83.0
Spain	100.0	98.9	89.5	86.2	85.7	85.0	85.0
Ireland	100.0	99.8	93.8	93.2	91.8	90.2	88.4

Source: EEC, Annual Economic Report 1988-1989, Statistical Annex
(1): LP = GDP at constant prices per person employed.
(2): RCE= Compensation of employees per wage and salary earner deflated by the GDP deflator.

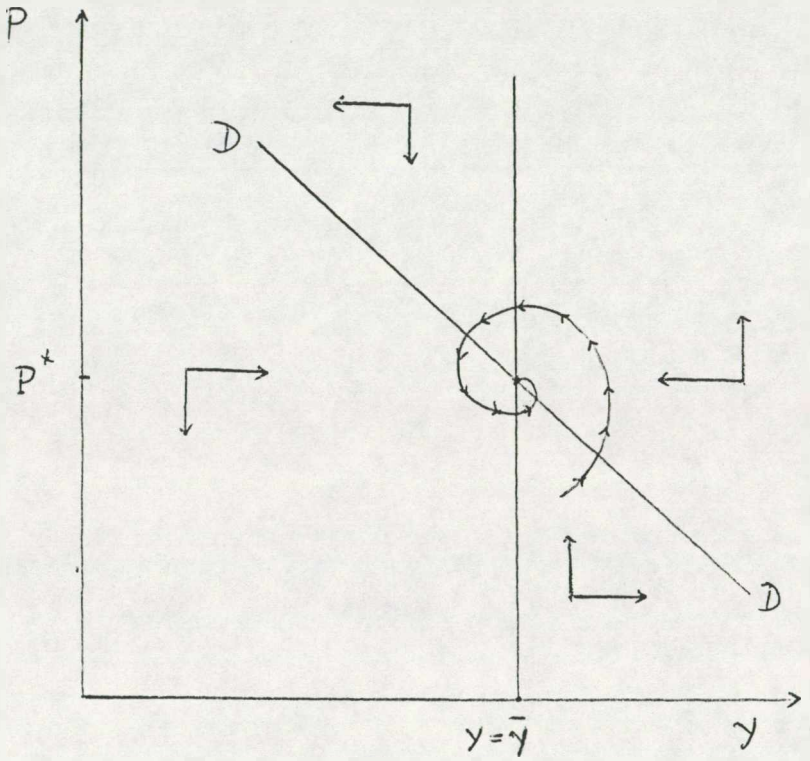

Figure 1A

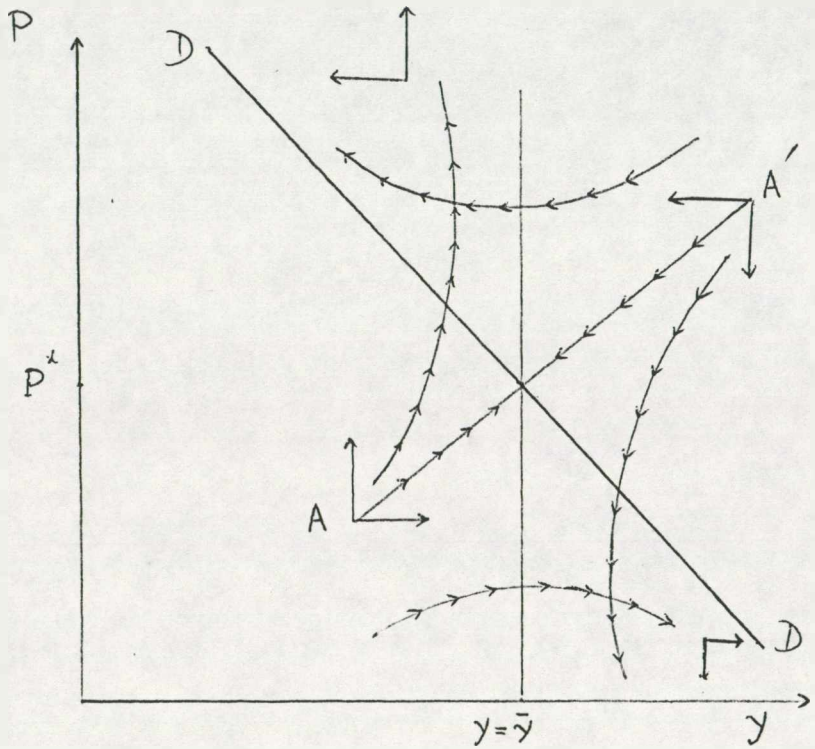

Figure 2A

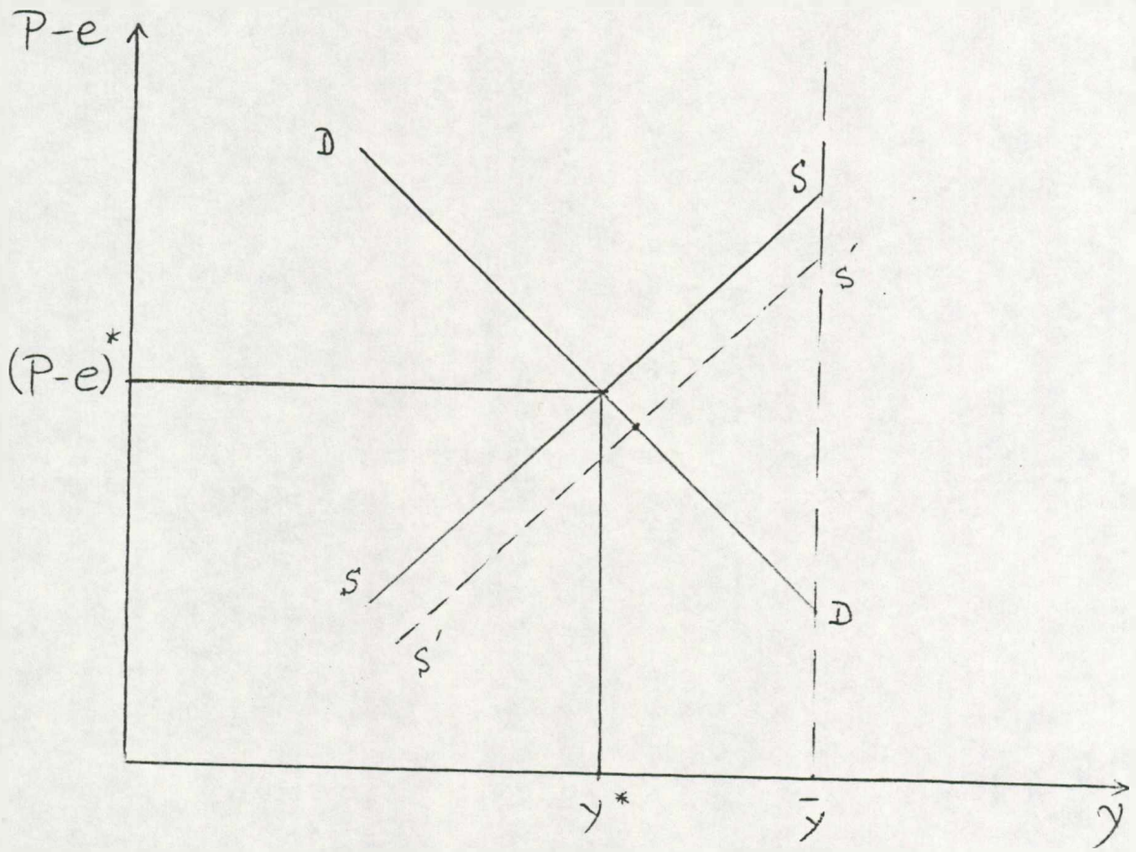

Figure 1B