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Likely Effects of CSF 1994-1999 on the Greek Economy: An ex ante Assessment Using an Annual Four-Sector Macroeconometric Model

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N. CHRISTODOULAKIS
S. KALYVITIS

CONTENTS

Page

ABSTRACT

The purpose of this paper in to provide an *ex ante* assessment of the effects that the second Community Support Framework (CSF) is likely to have on the economy of Greece in the short and medium run. The Community Support Framework aims to assisting the country to rectify structural deficiencies and put the economy on a path of sustainable growth. The Plan negotiated between the Greek government and the European Commission has been approved in July 1994 and envisages interventions that will raise infrastructures, induce fixed capital formation, support competitiveness, improve the efficiency of education and training, and foster regional development.

The assessment is quantified by employing a four-sector annual macroeconometric model for the Greek economy that portrays the main interactions between the various components of demand and supply and links domestic with international economic developments. To assess the impact of CSF actions on the macroeconomy, projections of main economic variables are constructed for a 20-year period under the assumption of full utilisation of the funds and then compare the outcome with the benchmark case of no intervention. The actions of CSF for Greece are consolidated to four main types of intervention that will facilitate the empirical estimation of their macroeconomic effects. The model is simulated for each type of intervention and under alternative assumptions accordingly to whether the effects are stemming from the demand side of the economy or incorporate the supply-side externalities that show the improvement of factor productivity by CSF actions. The incremental changes in output and productivity growth rates, the increase in employment and developments in the labour market, prices and public finances are analysed for each one intervention and for the total. At the same time, the model assumes that the currently approved Convergence Plan is implemented with the explicit aim to reduce public deficit and the debt burden, lower inflation and the cost of borrowing.

When all types of externalities are taken into account, total output in year 2010 will be higher than baseline by an impressive 9.5%, and will continue to grow at a rate faster by 0.26% per annum than would be otherwise. Over the period of simulation the output growth rate averages above the benchmark rate by 0.55% per annum and employment expands by an average of 95,000 new jobs. In the absence of externalities, output rises during the period of the CSF 1994-1999 but then returns to the benchmark course without any lasting improvement. This finding has serious implications for the allocation, implementation and monitoring of the Plan, since it calls for actions that ensure the maximum possible efficiency if a lasting improvement is to occur in the economy.

1. Introduction

The purpose of this paper in to provide an *ex ante* assessment of the effects that the second Community Support Framework (CSF) is likely to have on the economy of Greece in the short and medium run. The assessment is quantified by employing a four-sector annual macroeconometric model for the Greek economy that portrays the main interactions between the various components of demand and supply and links domestic with international economic developments.

The Greek CSF is designed to finance large-scale development projects and investment in physical and human capital, aiming to gear the economy of Greece onto a sustainable path of economic growth and development. As for the other main recipient countries of European Union (Ireland, Portugal and Spain), such an intervention has been deemed necessary in order to assist the less-developed members of the Union to modernise their economies, foster growth and, therefore, approach the welfare and efficiency of the most developed members of the Union. This process of *real* convergence is viewed as a prerequisite for the cohesion of EU and the sustainability of the *nominal* convergence objective of the Maastricht Treaty in the way to Economic and Monetary Union (EMU) of Europe. The second CSF will be operational during 1994-1999 and is going to be substantially more extensive in actions and far-reaching in impact than the first CSF implemented in 1989-1993.

Output per capita in Greece is 49% of the average in the EU, a figure that suggests that unless a strong growth differential is achieved in the near future in favour of Greece, the country may become a permanent laggard in the welfare and economic developments in the Union. In the past, Greece was behind the average European per capita income, but its economy was growing faster and the gap was reduced over time. Had this process continued, it would have led the Greek economy to converge with the European economies in per capita terms shortly after the end of this century. In the 1960s per capita GDP in Greece was growing at 7% per year against 3.9% of the european average, and - with such a difference - convergence in per capita income would have taken 42 years.[1] In the 1970s Greece had a growth rate of 3.7% and was still outperforming the european average of 2%, but convergence this time would have required a period of 81 years. In the 1980s the process was reversed and Greek per capita GDP was growing at only 1% per annum, much

[1]. For details of this growth accounting see Christodoulakis et al. (1990).

lower than the european counterpart of 1.8%. Since then, Greece systematically diverges from the rest of the European economies in terms of economic activity.

There is abundant evidence that the main factors of the decline in growth have been the fall of investment, the deterioration and inadequacy of infrastructure, and the lack of extensive training in new technologies and skills. Combined with the slow process of institutional reforms in critical areas of economic activity and policy, the country was not sufficiently prepared to face the lasting consequences of the shocks in energy prices in the seventies, the increasing openness to world competition in the eighties and, more recently, the challenges of the Single European Market. The Community Support Framework aims precisely to assisting the country to rectify those structural deficiencies and put the economy on a path of sustainable growth. The Plan negotiated between the Greek government and the European Commission has been approved in July 1994 and envisages the following main interventions:

- raise the provision and quality of infrastructures
- support fixed capital formation
- boost the competitiveness of the production sectors
- improve the efficiency of education and specialised training
- modernise of civil services
- foster regional development

The extent of CSF interventions amount to no less than Mecu 32,782 over a six-year period, a sum that represents an increase of 146% over the total first CSF implemented in 1989-1993. (With the amounts adjusted on the basis of annual flows, the increase becomes 64%.) The size of the programme is so enormous, that necessitates a continuous monitoring of its implementation and extensive evaluations of the outcome both at the level of individual actions as well as at the macroeconomy. Since the Plan involves several infrastructural and horizontal interventions, spillovers to other sectors and areas of economic activity are going to be substantial. Their assessment requires a careful quantification of the outcome it is likely to have on the industry-wide and macroeconomic level taking into account both the demand and supply side effects. A useful tool for such an analysis is perhaps an estimated macroeconomic model that portrays the basic structure and interrelationships, and can generate forecasts of the alternative course that the economy may take with and without such a type of interventions. Although macroeconomic models are frequently criticised for reflecting the structure of the past and, therefore, are unable to

capture possible breakthroughs in the future, they still provide a consistent and quantitative framework for analysing plausible developments.

Using a four-sector estimated model for the Greek economy, the present study attempts to assess the impact of CSF actions on the macroeconomy by constructing projections of main economic variables under the assumption of full utilisation of the funds and then compare the outcome with the benchmark case of no intervention. The incremental changes in output and productivity growth rates, the increase in employment, and developments in the labour market, prices and public finances are analysed for each one intervention and for the total. The structure of the paper is the following:

Section 2 gives a brief account of the problems of the Greek economy during the last twenty years and the main policies that have been followed in that period. A description is given for the relative size of the economy, the structure of the labour market, the mechanism of wage setting and the role of infrastructure in inducing investment. Then the state of public finances is described together with an outline of the main stabilisation policies that have been adopted in the past to reverse the explosive of public debt. The section ends with a discussion of some key aspects of the welfare system in Greece and the implications they have on economic and social cohesion of the country.

Section 3 describes the model on which the assessment of CSF is based. The model consists of four sectors of economic activity, namely those of agriculture, traded goods, non-traded goods and the public sector, and includes a detail system of price formation, wage setting and public finances.

Section 4 specifies the assumptions under which the benchmark forecast is obtained for a 20-year period 1991-2010. More specifically, it describes a likely course for the exogenous variables of the model, the institutional changes likely to be implemented, and the stabilisation targets that government has announced to follow in order to reduce the debt burden and qualify for the convergence criteria of the Maastricht Treaty. After the benchmark forecast is presented, the model is subjected to a number of stylised shocks in domestic and international variables, so that the dynamic properties and multipliers of the economy can be analysed.

In Section 5, the actions of CSF for Greece are discussed and then consolidated to four main types of intervention that will facilitate the empirical estimation of their macroeconomic effects. The four categories are those aiming to raise hard infrastructure, soft infrastructure interventions, aid to productive investment and, finally, the group of education and training actions. In this form the financial flows of CSF are easily represented in the model, while the effects that are likely to generate in growth and productivity are captured by introducing a number of supply side-side responses to those interventions.

The modelling of CSF is described in Section 6.

In Section 7, the model is simulated for each type of intervention and under alternative assumptions accordingly to whether the effects are stemming from the demand side of the economy or incorporate the supply response as well.

After the analysis of results, conclusions and directions of future research are discussed in the final Section 8.

2. The Greek Economy: Problems and Policies

2.1. From Convergence to Divergence

During the sixties and seventies, Greece was developing at growth rates much higher than the european average, but in the 1980s the process was reversed and the Greece was diverging from the other european economies. The decline of growth of the Greek economy during the last fifteen years did not come alone. Unemployment was very low in the 1970s, but then started to rising sharply reaching around 8-9% in recent years. The stagnation of economic activity meant that new jobs were not enough for an expanding labour supply, while labour market rigidities prevented firms to restructure employment. The opposite developments of growth rates and unemployment are demonstrated in Figure 2.1. Inflation was until 1973 one of the lowest amongst OECD countries, but then jumped to unprecedented levels and today remains the only double-digit figure in the European Union. The initial cause for the rise in inflation were the oil shocks of 1973 and 1978 that coincided with real wage increases in the seventies and early eighties. However, wage inflation remained lower than price inflation for most of the recent period, but a dramatic fall of inflation has not happened; see Figure 2.2. Other factors such as low productivity, lack of new investment, and imperfect functioning of markets seem to contribute to the persistent inflation. In lack of growth, various governments during the last twenty years show public spending as a possible hedge against unemployment. The result was a rise in budget deficits that brought about an explosive public debt and a rising trade deficit (Figure 2.3), but - alas - only negligible gains in activity.

Which have been the factors that led the high growth rates to a halt? To a large extent, the history of high growth rates in postwar Greece can be explained by the offer of low wages and the low initial capital accumulation which were able to attract investment from countries with highly paid labour force and low returns to capital. During the 1950s and 1960s foreign investors found Greece to be a country with a low accumulation of capital, and a workforce that was effectively disciplined though the combination of enhancing labour supply from the agricultural sector and repressing trade unions activity. In the meanwhile, the state managed to keep an adequate level of aggregate demand which, in combination with import barriers and factor availability, helped to maintain high levels of employment.

FIRURE 2.1

Growth and Unemployment Rates

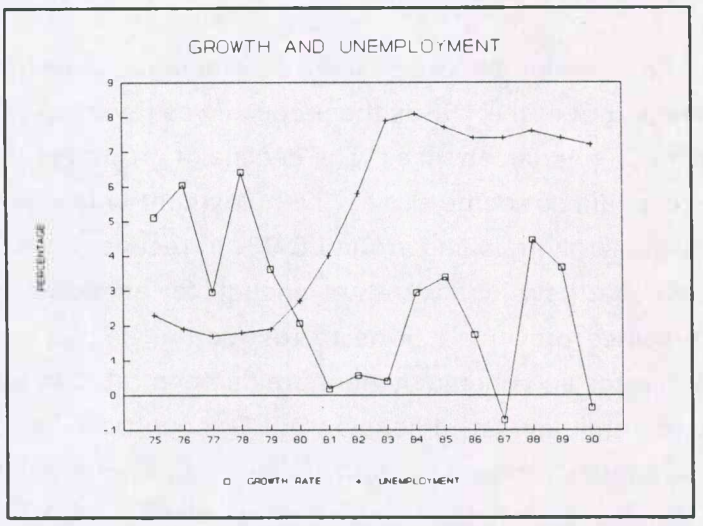


FIGURE 2.2

Wage and Consumer Price Inflation

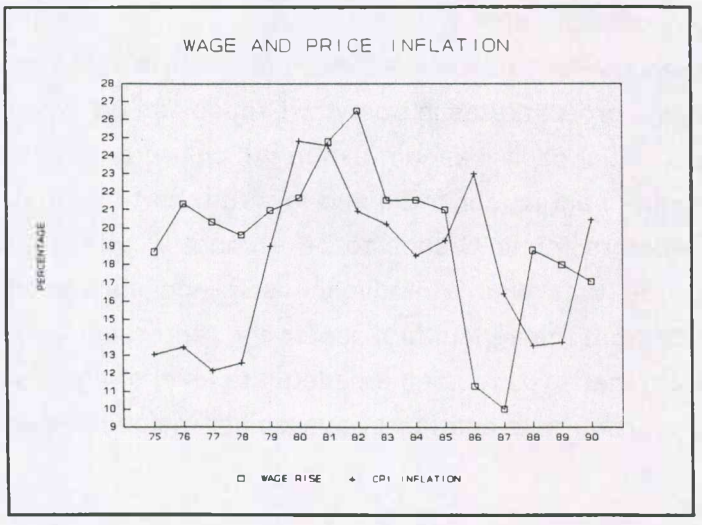
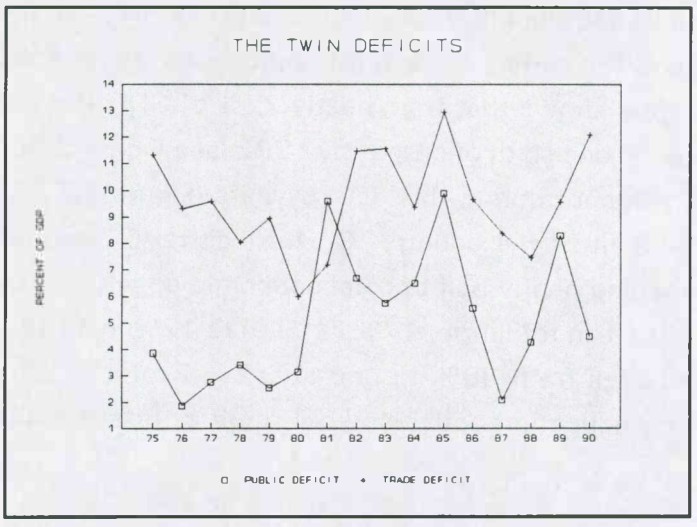


FIGURE 2.3

Public and Trade Deficits



A series of events in the mid 1970s put an end to this process. The oil price shocks of 1973 and 1979 meant a reorientation of world production towards more advanced technologies, the implementation of which required a different economic environment than before. Fixed capital investment became scarce and started to concentrate in countries that could offer a highly skilled workforce, modern infrastructure to support the changing modes of production, and a stable institutional framework to minimise the uncertainty of expected returns.

None of them was readily and adequately available in Greece, and the economy entered a period of prolonged stagnation. The situation was aggravated by domestic demand-push policies which were conceived to boost economic activity and increase employment. However, absent supply-side incentives, the rise in demand simply led to more imports and higher inflation. Below, we elaborate on some characteristics of the economy and the main policies that have been followed until recently.

2.2. Basic Features of the Greek Economy

2.2.1. Sectoral Developments

The share of tradable sector output which consists of mining and manufacturing was rising during the 1960s and the early 1970s, but the process was reversed after 1975 and the ratio steadily falls. Figure shows that from nearly 22% of GDP in late 1970s, the share of tradable sector declined to one sixth of output by 1992 (see Figure 2.4). In volume terms, traded output remained stagnant during the last 25 years (Figure 2.5), implying a serious process of de-industrialisation of the country. On the contrary, non-tradable sector was constantly increasing reaching nearly half of total economic activity; Figure 2.6. Output in agriculture declined as a share in total from 17% in 1975 to 12% in 1992. At the same time employment in agriculture fell from 36% to one quarter of total. Public sector involving administration, health and education activities kept more or less the same share of total output.

FIGURE 2.4

Share of Manufacturing in Total Output

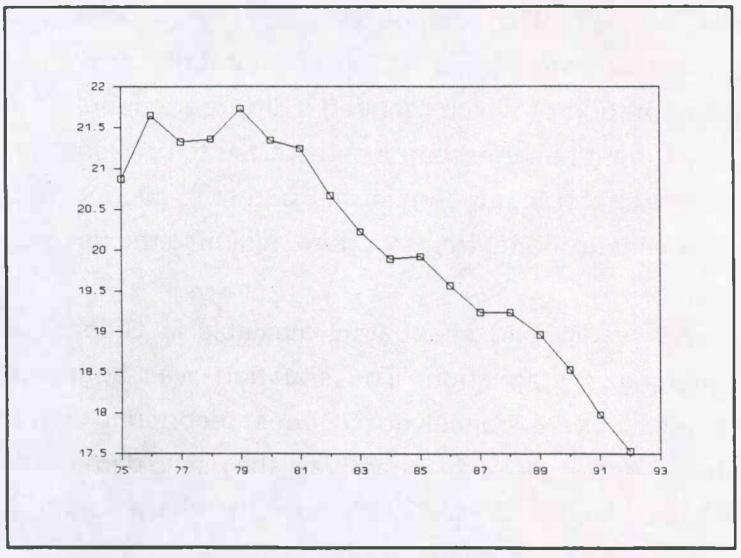


FIGURE 2.5

Manufacturing Output in 1970 Billion Drs

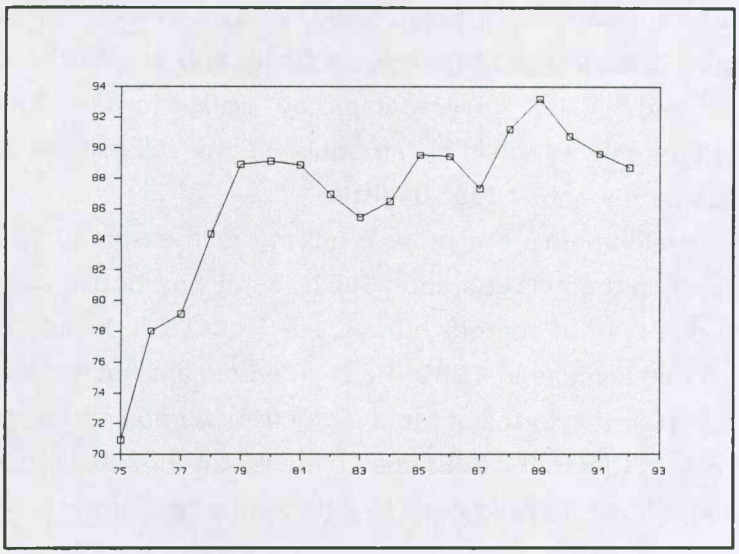
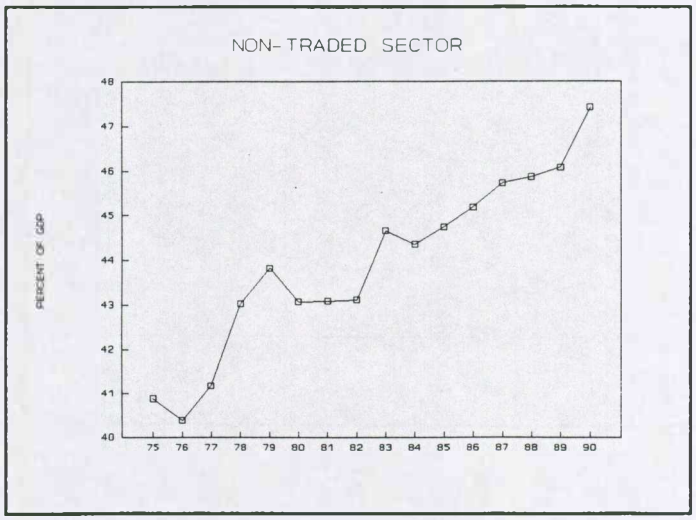


FIGURE 2.6

Share of Non-Traded Sector



Employment in manufacturing has remained virtually constant during the last decade. Combined with the stagnated output, this implies that labour productivity did not increase. In contrast, employment in non-tradable sector increased less rapidly than output and, as a result the average productivity has risen sharply. Figure 2.7 contrasts productivity in the two sectors starting from the same normalised basis in 1975. The two indices were moving in parallel until 1981, but then started to diverge sharply and in 1990 productivity in the non-tradables was exceeding that of tradables by 25%. In the agricultural sector, productivity increased only mildly, while in the public sector fell substantially since public employment increased sharply and output by little.

Of the above developments the most worrying is the shrinking of the industrial sector. Greek manufacturing today is characterised by small productive capacity, and value-added represents only one third of sector's output; see Figure 2.8. Fixed capital investment is in real terms at the same level as in 1980, R&D activities are not substantially endorsed by Greek industry and the various forms of technology transfer and management innovation are limited. Despite the fact that unit labour cost in manufacturing has been declining in real terms (Figure 2.9), competitiveness did not rise sufficiently to compensate for the removal

FIGURE 2.7

Productivity in Traded and Non-Traded Sectors

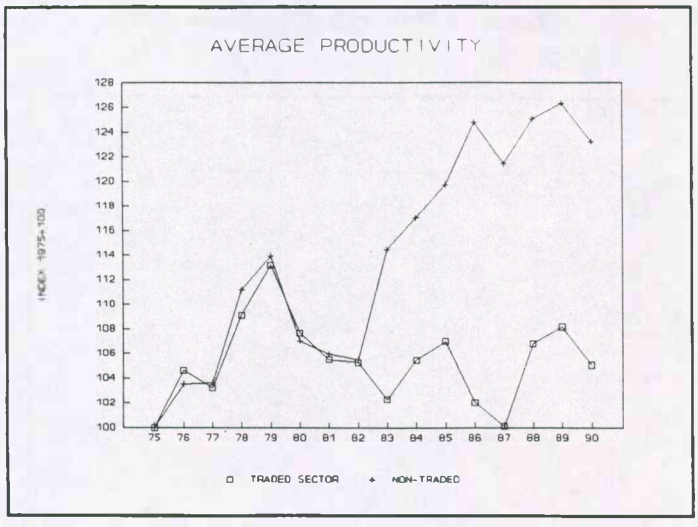


FIGURE 2.8

Share of Value Added in Manufacturing

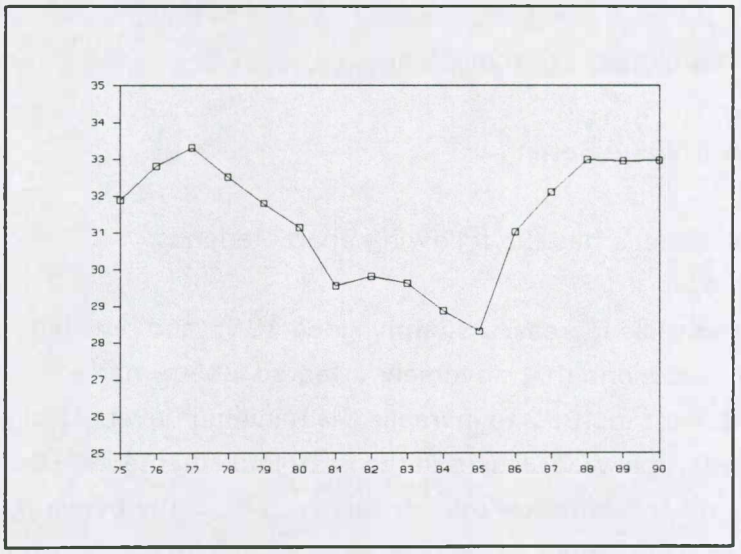
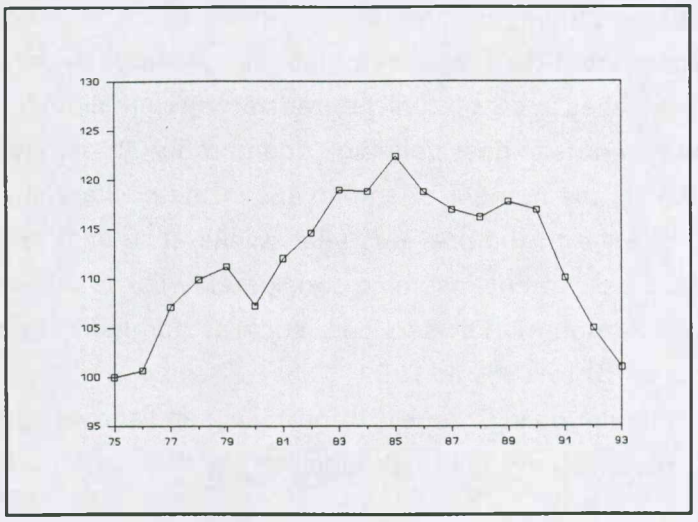


FIGURE 2.9

Unit Labour Cost in Manufacturing



of protection brought about by the single european market. However, one should not fail to note that there is a part of Greek manufacturing that moves in the opposite direction. During the last ten years, a considerable number of Greek firms managed to adopt new technologies, modernised their management and succeeded in highly competitive international markets. If this phenomenon continues, it is possible to induce changes in the other firms and lead the industry to the rise again.

2.2.2. Employment and Wage-Setting

Employment in Greece has the following characteristics:

(i) Unemployment has increased sharply since 1985 and remains persistent around 10%. One of the key decisions that adversely affected labour market conditions was the decision of the government in 1982 to increase the minimum level of wages by 40%, as a means to compensate for real wage losses in the past. Implemented in a period of increasing openness to foreign competition after the accession to EEC, the measure meant a serious fall in competitiveness. Unit labour costs rose by 26% in 1982 and, after a while, several firms - especially of medium size - were out of business. Unemployment started soaring in levels never experienced in Greece in the past and remained at relatively high levels ever since. The lack of adequate new investment by firms, restrictive labour market practices and the sizable immigration flows during the last five years made the reduction of unemployment unattainable.

(ii) Variability of employment over the business cycle is much lower than the variability of output, suggesting the presence of labour hoarding practices in Greece.[1] This finding suggests that increases in output will be translated to smaller shifts in employment.

(iii) Public employment is excessively high compared with depended employment in the private sector. In 1982, the number of employees in the civil administration and public forces rose by 11.5% relative to the previous year, while at the end of 1985 it was 32% higher relative to 1981. Employment rose also considerably in the wider public sector, and employees in mainly-public non-market services, such as administration and health, were increased from 12% in 1980 to 19% in 1991.

(iv) Agricultural population in Greece is trend-falling and shows considerable variation between successive periods of low and high land fertility.

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[1]. According to Christodoulakis et al. (1994) the variability of employment is found to be more than three times lower than the respective figure for output.

(v) Self-employment is widespread and rising.

(vi) Regarding skill composition, evidence suggests that there is shortage of skilled and highly-trained workforce, whilst there is abudence of unskilled labour. The situation did not seriously improve over the last decade, despite the rise in demand and training opportunities available. According to a recent study on the ex-post of the Community Support Framework (Brennan, 1993), Greece had the lowest allocation of funds and the least efficiency during the period 1989-1992 to the training of the workforce to new skills.

Wage-setting in Greece is a highly centralised process of bargaining between the employers' federation and trade unions. Besides, the institutional framework of negotiations is heavily regulated by government. The main agreement concerns minimum wages in the private sector, which is subsequently used as the basis for negotiating wages and salaries in the rest of the economy. During the eighties, the government had institutionalized an automatic indexation scheme, with lower wages adjusting fully with inflation while the adjustment of higher wages was below that level. The indexation scheme was postponed during the short-lived stabilisation programme of 1983-1984, suspended during the second stabilisation programme in 1985-1988, implemented again during 1988 and 1989, and finally abolished in 1990.

Bargaining over the minimum wage mainly evolves around the extent of covering the losses due to past or expected inflation, but other issues concerning the level of unemployment, training and job safety have recently entered the agenda of negotiations. A further adjustment of wages, to take into account productivity of firms and profitability changes, continues at the sectoral or the firm level, at least as far as the private sector is concerned.

2.2.3. Investment and Infrastructure

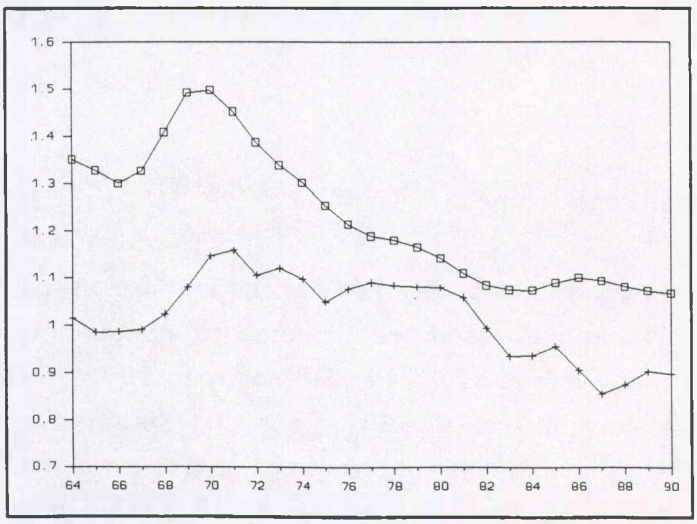
The most important characteristic of the Greek economy in the post-1974 period was the gradual reduction of national resources allocated to investment. Private and public investment taken together averaged 23% of GDP between 1975-1979, but then started falling to reach a record low of 16% in 1987. Following the relative stabilisation of the economy achieved in 1987, investment started rising again to a modest 18.5% in 1992 but without any clear tendency to grow further. In contrast, the growth rate of private consumption remained always positive even in periods of severe contraction of output, thus suggesting strong intertemporal smoothing. In the absence of income growth, this had detrimental effects on savings and contributed to the fall of private sector investment.

At the same time, public infrastructure was not sufficiently modernised and, combined with the decline in private investment, contributed to the erosion of competitiveness. (For example, several intenrational surveys recognise that the lack of modern telecommunications creates "...disincentives for new business to settle in Greece"; see, among many others, OECD, 1992.) Since 1980, the structure of public expenditure in Greece shifted away from investment finance to consumption spending. Public investment averaged only 5.60% percent of GDP, compared with an average 7.70% in the 1960s. Public investment in Greece in 1990 was at 4.70% of GDP, below the level of 5.30% in 1980, despite the explosive rise of public debt between 1980 and 1990. As a result, infrastructure in crucial sectors failed to come up with the need for improvement in order to facilitate economic activity and attract new investors.

In Figure 2.10 we plot the development of infrastructure during the last three decades in Greece, and compare it with a measure of average productivity of private capital. Infrastructure is defined as the stock of public capital invested in transport, communications and electricity, and is scaled as a ratio to the stock of private capital in large-scale manufac-

FIGURE 2.10

Infrastructure and Productivity in Manufacturing



turing. As an index of average productivity we use the ratio of manufacturing gross output to the same private capital stock. The picture reveals a very strong correlation between the two ratios. Periods of rise in infrastructure are associated with increasing private capital productivity; when the former declines, especially after 1978, the latter is also falling. Over the period 1964-1990, the correlation coefficient between the two variables is found to be 0.70, while over the subperiods is found to be 0.93, 0.77 and 0.43 for the 1960s, 1970s and 1980s respectively. Thus, it appears that the utilisation of public infrastructure by the private production is declining over time.

2.2.4. Public Debt and Deficits

One of the most severe problems of the Greek economy during the last decade has been the rise of the public debt. Total public spending rose considerably in the 1980s reaching 40% of output in 1992, after a peak of 46% in 1990. Revenues rose too, but to a lesser extent, indicating the difficulty of extending the tax base and monitoring the timely collection of taxes (for an analysis of the problem see Christodoulakis, 1994a). Peaks in expenditure and troughs in revenues occurred mainly during the election years 1981, 1985, 1989 and 1990, pointing to the existence of strong political cycles in the Greek economy (see Figure 2.11 where election years are denoted by E).

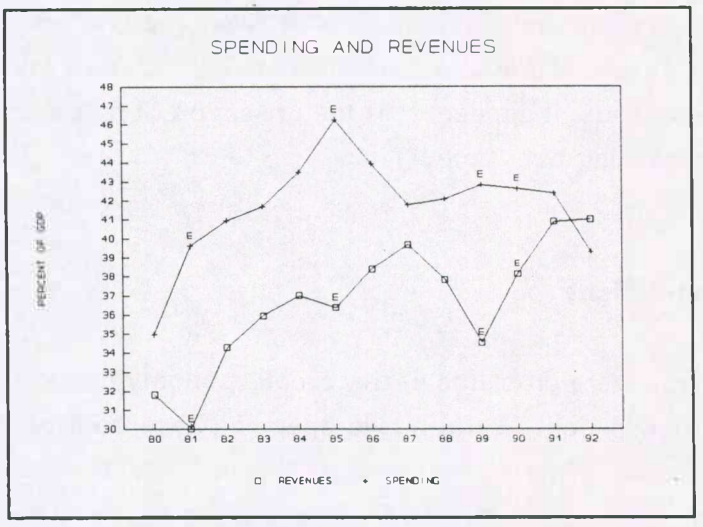
To finance its widening deficits the government had to borrow, thereby increasing public debt from 29% of output in 1980 - one of the lowest in EC at that time - to the alarming level of 107% in 1992 - the fourth higher burden in European Union after Italy, Belgium and Ireland. Interest payments as a ratio to GDP were also rising rapidly due to the increase in real interest rates and the absence of any serious economic growth in that period.

The accumulation of public debt makes the options tougher as time goes by. In 1990, debt stabilisation required that budget deficit has to be turned to a small surplus of 0.3% of GDP (Alogoskoufis and Christodoulakis, 1991). Today the requirement for surpluses is around 5% if unorthodox outcomes, such as monetisation or repudiation, are to be avoided.

Concerning the structure of revenues, indirect taxes account for around 70% of the total tax revenues. A little more than 50% of the indirect tax revenues are revenues from the VAT and the remaining comes from other indirect taxes and duties. There are two VAT rates at 8% and 18% and a number of goods and services are exempted from value added taxation. The system of value added taxation was reformed in the early 1990s. Until then

FIGURE 2.11

Public Spending and Revenues



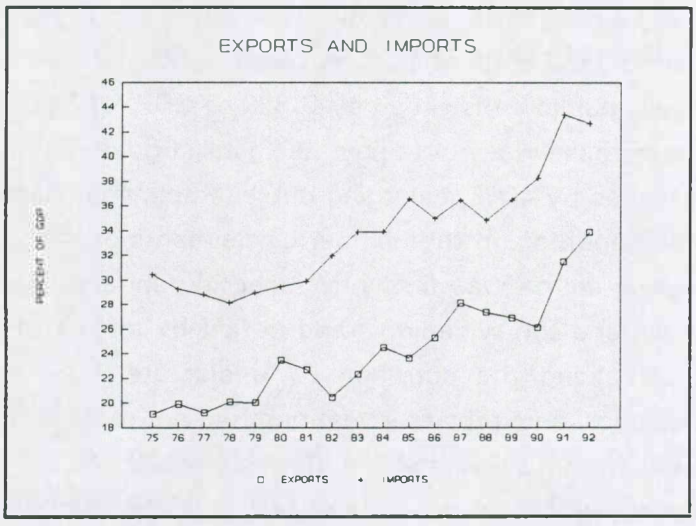
there was a third rate at 36% which was abolished and, at the same time a large number of items was moved from the 8% rate to the 18% rate.

2.2.5. The External Sector

Figure 2.12 displays imports and exports of goods and services in real terms as a percentage of GDP. Being in a permanent state of trade account deficit, the external sector was mainly held in equilibrium by invisible receipts and capital inflows. The boost of demand during the 1970s and 1980s led to an increase of imports that reached 43% of GDP in 1992 that more than offset the rise in exports. As Figure 2.3 suggests, trade deficit follows closely the developments in public deficits, lending support to the twin-deficits hypothesis. The deficit widened sharply in the early eighties after the accession to EEC, and was slimmed down between 1985-1988 as a result of the stabilisation measures at that period described in the next subsection.

As far as exchange rate policy is concerned, Greece abandoned the fixed rate regime in 1974 and the monetary authorities adopted a crawling peg policy where the exchange was targeted to cover most of the inflation differential between Greece and its competitor

FIGURE 2.12
Exports and Imports as Shares of GDP



countries. The exchange rate target is achieved via a system of exchange and capital restrictions which insulated the economy from occasional pressures in the foreign exchange market. The abolition of capital controls in June 1994, forced monetary authorities to rely more in the short-term interest rates and the use of foreign exchange reserves in order to achieve the exchange rate target.[1]

2.3. Stabilisation Policies

Economic policy during the last twenty years in Greece is mainly characterised by a series of fiscal expansions and subsequent stabilisation measures attempting to control the process of rising public debt. Below we examine the major episodes of fiscal expansion and the stabilisation programs that attempted to control the imbalances.[2]

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[1]. For a detailed account of those policies, see Christodoulakis and Karamouzis (1994).

[2]. A detailed account of those policies and an evaluation of alternative strategies for fiscal correction in Greece is given in the report by Christodoulakis (1994b).

The first major departure from prudent fiscal policy was initiated by the Conservative government in 1980-1981, by an increase of public spending, lower taxation - either explicitly through the reduction of marginal tax rates or implicitly by overlooking the collection of arrears - and an expansion of credit. Total spending of the general government rose by more than 5 percentage units of GDP between 1980 and 1981, total revenues fell by 1.4% and, as a result, public deficit rose by 6.8% of GDP; cf Figures 2.2 and 2.11. A new round of spending increase was started by the socialist government in 1982 by raising the minimum level of wages by 40%, enlarging public employment and the public sector, and expanding both the benefits and the number of claimants of the welfare system.

A stabilisation programme was first introduced in January 1983, in an attempt to control fiscal imbalances and the widening trade deficit by means of postponing several wage increases and devaluing the currency by a discrete 10%. The results of the Programme were rather poor, and private investment did not recover. Instead it fell further to 11% of GDP in 1985, from 13% in 1983. Inflation was 20.2% in 1983, and economic activity remained stagnant with a growth rate of only 0.4% per annum, while budget and trade deficits continued to widen.

To finance its persisting deficits the government was increasingly borrowing from abroad. At 1985 foreign debt has risen to USD 12.3 bn, or 24% of GDP, compared with USD 7.0 bn or 7% of GDP in 1980. The process of foreign debt accumulation appeared to be unstable, due to the fact that real world interest rates were becoming much higher than domestic growth rates and current account deficits were showing no sign of reversal. A new Stabilisation Programme was called for in October 1985 with the main purpose to correct the external imbalance. The key ingredient of the programme was a discrete devaluation by 15%, accompanied by a tough incomes policy that ruled out pay rises in either the public or the private sector. The programme coincided with a number of favourable developments in the world economy, such as the decline of interest rates, the fall in oil prices and a recovery in economic activity in the major OECD economies.

However, the programme achieved only part of the announced targets. Inflation fell down to less than 13% at the end of 1987, the lower level since 1977, and the improvement of unit labour costs allowed exports to rise from 22% of GDP in 1985 to 29% in 1987. Total imports fell from 37% of GDP in 1985 to 35% in 1988, but this was mainly due to the dramatic reduction of oil prices. Non-oil imports actually increased from USD 7.3 bn in 1985 to 10.1 bn in 1987, confirming the hypothesis of very low price elasticity of imported goods in Greece. Private investment in 1988 reached 12.3% of GDP compared with 11% in 1985, and the economy, after contracting by 0.72% in 1987, grew by 4.5% in 1988, the highest rate since 1978. However, this increase was more than matched by

the decline of public capital formation which fell from 7.2% of GDP in 1985 to 4.6% in 1987.

The stabilisation programme was abandoned in 1988. Three successive elections in 1989 and 1990 meant that no long-lasting measures could be enforced and, as a result, the fiscal imbalance deteriorated further. In 1990, public debt was above 95% of GDP, while budget deficit had reached 15%. The government imposed an emergency tax surcharge, raised the prices of public utilities and cancelled a number of early-retirement schemes. In the longer-run it set targets to reduce the size of public sector by cutting a number of services, privatising public corporations, and liquidating the ailing firms under state control.

Primary deficits were indeed reduced in 1991, but not to the extent envisaged in the Budget, and public debt continued to rise. A new stabilisation plan was then introduced in 1992, that included a heavy increase in petrol tax as a means to increase revenues, reforms in the property tax system, a speed-up of privatisation, and a pledge for a thorough curb of tax-evasion practices. Budget deficit was reduced, leading for the first time to a primary surplus of 1.5% of GDP, but the programme was once more halted by the early elections in 1993.

Public finances were again deteriorated in 1993, and the new government had no other choice but insisting on the need for fiscal redress. Deficit-curbing policies rely on extending the tax base and rationalising public expenditure, rather than raising the tax rates. Currently, the government plans to curtail spending by imposing restrictions on new public employment, restraining wage increases considerable below the inflation rate, and curbing abuses of the welfare system.

In June 1994, the Government submitted a Convergence Plan to the European Commission in which the policies to reduce public debt and deficits, bring down inflation and increase labour market flexibility are outlined. The Plan envisages that by the end of the decade public debt will be decline to 103% of GDP after reaching a peak of 115% in 1996, inflation will fall to single-digit and nominal interest rates following suit. Fiscal redress will require a primary surplus that rises quickly to around 5% of GDP for as long as stabilisation is in force.

2.4. The Welfare State and Social Dynamics

Although the model on which the analysis of CSF is going to be performed in later sections does not include any notion of social dynamics and social welfare accounting, it would be an omission not to refer to the development and possible consequences of such issues. After all, the indirect target of CSF interventions is, by improving infrastructure and

efficiency, to increase the welfare and social cohesion of the member-states in the EU.[1] The social system in Greece today is characterised by crucial transition dynamics and potential threats. Although it has not yet managed to acquire the standards or efficiency of the system in other european countries, it is faced with severe fiscal constraints and lack of sustainability.

The expansion of the social security system in the 1980s was not accompanied by corresponding increases in contributions and/or taxation to finance it. The finances of the social system deteriorated further by the fact that the rise in unemployment and the early retirement of many workers resulted in fewer contributors and more claimants. The social security deficits were partly responsible for the huge expansion of the budget deficits and the accumulated public debt which marred the Greek economy in the 1980s. A number of the above policies were clearly unsustainable in the long-run and were partly reversed[2] in the late 1980s.

Public spending on health is already relatively low in comparison with the rest of the EC countries and needs in this area are likely to rise in the future as the population grows older. Therefore, significant spending cuts in health spending are unlikely and the burden of debt reduction will fall on other categories.

Even though the social security system expanded rapidly in the last fifteen years, still there does not exist a well-organized welfare state in Greece providing a welfare safety net for each citizen. The ageing of the population combined with early retirement provisions led to a rapid increase in the number of pensioners, while contributions did not rise accordingly and, consequently, the social security system became one of the top contributors to the budget deficit. Social security benefits are provided by a large number of autonomous funds. However, the three largest of them (covering, respectively, the industrial and commercial workers, the farmers and the self-employed) cover almost 85% of the labour force. They provide retirement, survivor and disability benefits as well as health care and sickness benefits. Unemployment benefits and family allowances are paid by a separate organization.

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[1]. The discussion of the social security system in Greece is based on the report by Christodoulakis and Tsakloglou (1994), that is part of Europe-wide study prepared for the European Parliament. The study provides an account of the problems that member states will have to face in the light of the EMU.

[2]. As a consequence, the level of inequality in 1988 was higher than in 1982 but still considerably lower than in 1974. The results of a number of poverty studies conducted on behalf of Eurostat suggest that poverty in Greece is higher than in all other EU member-states apart from Portugal, irrespective of whether poverty is measured in absolute or relative terms; Eurostat (1990).

The most significant part of the social security spending is devoted to the payment of pensions. Until recently the retirement age in the private sector was 65 for men and 60 for women, although there were many exceptions to this rule and many workers were retiring before reaching this age limit. In the public sector pensions were service-related and payable after 35 years of service irrespective of the age of the pensioner.

A reform of the system was introduced in the early 1990s. It included an increase in the retirement age for new entrants to the system, abolition of the service-related pension schemes for the employees of the public sector, reductions in benefits and increases in the contributions. Taking into account, firstly, that a number of these measures are expected to bear fruits after several years, secondly, that the longevity of the citizens is rising rapidly and, thirdly, that the fertility rate is below that required to keep the composition of population stable, it is likely that, as in many other European countries, new measures will be required in the near future. They may include even higher contributions, less generous pensions, further extensions of the retirement age and, possibly, a combination of employment with partial payment of pension (and, perhaps, some limited contributions) after the pensioner has reached the retirement age. However necessary, most of these measures are likely to reduce the welfare of both pensioners and non-pensioners.

Apart from the main Protocol of the Maastricht Treaty, Greece signed the Social Protocol as well, along with all other member-states (apart from the UK). The Social Protocol envisages some form of common social policy in the EC member states, in order to avoid social dumping. However, it does not contain any explicit reference regarding who will finance such a common policy and it is not very clear how it will be implemented. At the economic level, the main consequence of the implementation of the clauses of the Social Protocol in the case of Greece will be the increase in the non-wage costs of labour. Taking into account productivity differentials, Greece has high labour costs per unit of output. Therefore, further increases in the cost of labour are likely to have adverse effects. If a common social policy is to be implemented at some time in the future, Greece is likely to need some compensation for the above loss of competitiveness and increase in unemployment.

The level of aggregate inequality declined spectacularly in the early eighties as a result of a number of drastic but rather badly designed redistributive policies adopted at that time - real average and minimum salaries, wages and pensions were increased administratively and very abruptly and the social security system was extended to cover segments of the population which were not covered until then - but even then it was still substantially higher than the level of inequality in most EC member-states.

However, inequality is a potential problem for Greek society. Recent studies have demonstrated that even though there are considerable differences in the mean consumption expenditures (or incomes) of socioeconomic groups, inequalities within these groups are very high. When the population is grouped into homogeneous groups, income variations "within-groups" are far more important in accounting for aggregate inequality than variations "between-groups". In these cases, the "between-groups" component of inequality is always below 20% of aggregate inequality and even when the sample is split into very fine and extremely homogeneous groups using the above factors simultaneously, variations "between-groups" are found to account for only between one quarter and one third of aggregate inequality.

3. A Four-Sector Econometric Model for Greece

In this section we sketch the structure of the Greek economy model that is used later for the evaluation of the CSF effects. The structure is basically similar to the HERMIN type models that have been estimated for Ireland by Bradley and Wright (1992), Portugal by Modesto and Neves (1993) and for Spain by Herce and Sosvilla-Rivero (1993). For a detailed presentation of the economic structure of the model and the econometric estimates the reader is referred to Christodoulakis and Kalyvitis (1994).

Most of the equations are estimated in the form of Error-Correction Mechanism with long-run and short-run equations to account for the flaws of ordinary estimation techniques that appear when non-stationary time-series are estimated in levels. Estimation is usually carried over the period 1960-1990, although in some cases lack of national accounts data made estimation possible only over the shorter period 1974-1990.

3.1. The Supply Side

The supply side of the model consists of four sectors: tradable, non-tradable, public and agricultural. For the tradable and non-tradable sectors, a CES production function is assumed involving the production factors of labour and capital, and a time trend to account for technical progress embodied in labour and capital. The function has the form:

$$Q = A[\delta(e^{\lambda_L t}L)^{-\rho} + (1-\delta)e^{\lambda_K t}K^{-\rho}]^{-\frac{1}{\rho}} \qquad (3.1)$$

where Q, L and K are added value, fixed capital stock and employment respectively, A is a scale parameter, $\sigma = 1/(1+\rho)$ is the constant elasticity of substitution, and λ_L, λ_K are the rates of technical progress. This production function leads to the joint demand system for investment and labour that depend positively on output and are downward-slopping in the factor cost. The system takes the following functional form:

$$\text{Investment} = f(\text{output, cost of capital, technical progress}) \qquad (3.2)$$

$$\text{Labour} = f(\text{output, cost of labour, technical progress}) \qquad (3.3)$$

Capital stock accumulates according to the simple process:

$$K_t = (1-\delta)K_{t-1} + I_t \qquad (3.4)$$

where δ is the depreciation rate and I_t is the gross investment flow in each period.

The results suggest that both tradable and non-tradable sectors of the Greek economy are characterized by constant returns to scale, confirming several macroeconometric studies; for a survey of the latter see Christodoulakis (1993b). The elasticity of substitution is found 0.38 for the tradable sector and 0.60 for the non-tradable sector. Technical progress is labour using and capital neutral in both sectors.

Output in the tradable sector is modelled as a function of aggregate domestic expenditure in the economy, expected competitiveness and world output. The output of the non-tradable sector is modelled as a function of aggregate domestic expenditure, but it is also found to depend to a small extend on the volume of exports to account for export-generated services such as transport, communication, banking, etc.

Public sector output is determined by the number of persons employed, while in the short-run it is adversely affected by increases in public employment. It has the form:

$$\text{Public sector output} = f(\text{employment, changes in employment}) \qquad (3.5)$$

Finally, output in the agricultural sector is estimated through a Cobb-Douglas production function of labour and capital stock with constant returns to scale. Investment in agriculture depends on the cost of credit and last period capital stock, which is then adjusted by depreciation and new investment.

Nominal increases in the wage rate in the tradable sector (WTR) are estimated in the form of an unemployment-augmented Phillips-curve. The equation also includes a term of productivity increases that exert a strong positive influence in wage formation. The inflation coefficient is smaller than one, indicating partial indexation of wages, a result which accords well with the institutional framework in Greece today and during most of the period 1974-1990. Wages in the non-traded sector as well as those in the public sector are assumed to follow - though by different degrees - the increases in the traded sector.

Prices are modelled as functions of the unit labour cost (domestic component) and the price of imports (external component) with homogeneity of degree one imposed in the econometric estimates. The general form is the following:

$$\text{Prices} = f(\text{Unit Labour Cost, Price of Imports}) \qquad (3.6)$$

Unit labour cost in real terms is modelled as a function of the average real wage rate that incorporates the productivity effect.

Labour supply is determined through an endogenous participation rate that depends positively on the real wage rate. The form is:

$$\text{Labour Supply} = f(\text{Real Wage Rate}) * (\text{Population}) \qquad (3.7)$$

and results to an upward-slopping supply curve.

3.2. The Demand Side

Private consumption is determined by assuming intertemporally optimising consumers, as in the Yaari-Blanchard model. Consumption is finally obtained as a function of disposable income, the stock of private sector wealth, inflation as a proxy for uncertainty and the interest rate as a determinant of the discount rate. The form is:

$$\text{Consumption} = f(\text{income, wealth, interest rate, inflation}) \qquad (3.8)$$

Real financial wealth is adjusted in every period by the real interest payments on last period stock and the new flow of savings. Total private wealth is obtained as the sum of financial wealth and the fixed capital stock owned by the private sector.

The other domestic component of demand are the inventories which are modelled as a ratio to last period's economic activity. The ratio is found to depend on the previous growth rate of output as an indication of future rise in demand, the cost of capital and inflation.

In the external sector of the economy, imports and exports are modelled as functions of domestic and foreign demand respectively, and relative prices. In the case of imports, relative prices are extended to an index of domestic competitiveness that takes into account the effect of tariffs. The functional forms are:

$$(\text{Imports}) = f(\text{Output, Domestic Competitiveness}) \qquad (3.9)$$

$$(\text{Exports}) = f(\text{Foreign Demand, Relative Prices}) \qquad (3.10)$$

The elasticities of imports with respect to output are 1.31 and 1.12 for the long and short-run respectively, while exports respond to changes in foreign demand with an elasticity of 2.54 and 2.33 in the long and short-run respectively.

The Drachma/ECU nominal exchange rate is modelled as a function of nominal unit labour cost (ULC) differentials between Greece and the European Union as a proxy for the erosion of competitiveness brought about by unequal price developments in Greece and competitor countries.

$$\text{Exchange Rate changes} = f(\text{ULC in Greece - ULC in EU}) \qquad (3.11)$$

The estimated coefficient in the last equation is not significantly different than one and therefore we postulated a coefficient equal to one when the model is used as a forecasting device. This reflects the Central Bank policy to accommodate any change in the relative costs of labour by exchange rate depreciation.

3.3. Public Finances

In the government sector, total revenues consist of direct and indirect taxes and non-tax revenue generated by various types of services and fee collection (such as rent of public buildings, road tolls, etc). Direct and indirect taxes are functions of output with long-run elasticities of 1.17 and 1.04 respectively. Non-tax revenues depend on the stock of public capital, inflation and the interest rate. The functional form are the following:

$$\text{Taxes} = f(\text{Output}) \qquad (3.12)$$

$$\text{Non-tax} = f(\text{Capital stock, Inflation, Int. Rate}) \qquad (3.13)$$

Public spending consists of consumption, investment, domestic transfer payments, subsidies and transfers abroad. The first component is determined as a function of public employment and public sector wages, while public investment and transfers abroad are kept exogenous. Transfer payments (mainly unemployment benefits) depend positively on last period payments and negatively on the growth rate of output as a proxy for economic recovery. On the other hand, subsidies to the private sector are mainly directed to exports and private investment projects. Since subsidies in Greece were frequently used to compensate losses in competitiveness, they were also found to depend negatively on the terms of trade (TTR).

Transfers = f(Previous transfers, Growth Rate of Output) (3.14)

Subsidies = f(Exports, Private Investment, TTR) (3.15)

Finally, public debt is adjusted in each period by interest payments and primary public deficit, while it is relieved by the amount of seigniorage. As a ratio to output, public debt accumulates according to:

$$BY_t = \frac{1+i_{-1}}{(1+\pi)(1+n)} BY_{-1} + DY_t - SY_t \qquad (3.16)$$

where i_{-1} is the annual nominal interest rate on 12-month Treasury Bills prevailed in last period, π is current inflation and n the output growth rate. BY, DY and SY denote public debt, primary deficit and seigniorage respectively expressed as percentages of GDP. In the absence of a monetary sector in the model, seigniorage has been approximated here by a constant estimated to be 1.14% of output over the period. Although this has the drawback that changes in inflation are not reflected in seigniorage, the estimated value is close to other empirical findings that assess seigniorage to be between 1 and 2% of GDP; cf Alogoskoufis and Christodoulakis (1991).

4. The Benchmark Forecast 1991-2010

In order to assess the effect that the second CSF is going to have on the economy of Greece we first set to construct a benchmark scenario that excludes this effect, and takes into account only a limited number of realistic policy developments and exogenous projections. This forms the basis against which alternative developments can be elaborated and compared. The benchmark forecast is obtained for the period until 2010, so that medium-term and long-term effects are taken into account.[1] The beginning period is set to be 1991 for two reasons: (i) to account for the fact that for a large number of variables (notably those of employment and wages) there are not yet official national statistics published after 1990, and, (ii) to compare the forecasted variables with the actual values, where available, and check the relevance of the projections.

4.1. Main Assumptions

The forecast 1991-2010 was obtained under a set of assumptions that combine realistic projections of exogenous variables with the policy environment that is likely to prevail over the period in question. The main assumptions are outlined as follows:

A1. Simple projections of the exogenous variables of the model

Variables such as the volume of world trade (YFIC), population (POP) and public investment (QIG) were set to grow at a rate similar to the average of the previous periods. Foreign nominal variables such as world prices (PFIC) and Unit Labour Cost in the European Community were set to rise at a rate equal to an expected inflation of 3% per annum.

A2. Keeping rates and some exogenous variables constant

Some policy-determined rates, such as the rate on excise duties (TARF), VAT, subsidies to enterprises (SUB), etc, are kept at the same level as in 1990. Another key exogenous variable that is kept at the 1990 level is employment in the public sector (LPS). This assumption is in line with stabilisation measures which try to reduce government

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[1]. Projections for an horizon longer than 20 years should capture the longer term properties of the model. However, these may be problematic in a model in which several key equations have been estimated over a shorter period of time.

spending and public employment as a proportion to the total, and also with strict guidelines from European Commission on the need to restrain public sector appointments.

A3. Exchange rate management and constant real interest rate

Throughout the forecasting period, real interest rate on 12-month Treasury Bills (RIR) are kept constant at 5% per annum. This assumption reflects the fact that capital markets in Greece are almost completely liberalised, so that monetary authorities cannot maintain a real interest rate below its world level. (In fact, the 5% level is slightly above the international real cost of borrowing to account for a risk premium due to the excessive debt burden of the country.) Nominal interest rate on 12-month Treasury Bills (IR12) is then obtained by the formula

$$IR12(t) = RIR + INFY(t)[1+RIR/100] \qquad (4.1)$$

where INFY is the GDP deflator annual inflation rate.

Nominal exchange rate against the ECU (XECU) is managed in such a way as to counter the erosion of competitiveness vis-a-vis the other european countries. The gradual depreciation rule is given by

$$\frac{XECU(t)-XECU(t-1)}{XECU(t-1)} = \psi\left[\frac{ULC(t-1)}{ULC(t-2)} - \frac{ULCEC(t-1)}{ULCEC(t-2)}\right] \qquad (4.2)$$

where ULC and ULCEC denote nominal unit labour costs in Greece and EC respectively, and ψ is the adjustment parameter here set equal to unity in order to fully match the competitiveness differential. The exchange rate against the US dollar is then determined via the exogenously given ECU-dollar rate. The above rule guarantees that a real exchange rate index evaluated on relative labour costs remains constant over time, i.e. that no real appreciation or depreciation is taking place. Given that real interest rate is kept to its world level plus the risk premium, the two assumptions imply that the condition of uncovered real interest parity is satisfied as required in a situation with liberalised capital markets.

A4. In-built stabilisation rules

Greek economy is currently undergoing a stabilisation programme to harness excessive public debt and deficit and reduce two-digit inflation rate, the highest in European Union. The main instrument of stabilisation is the increase in collected taxes, in order to achieve a primary surplus capable to reverse the exploding process of public debt. To capture this policy, we introduce a simple fiscal rule on the rate of direct taxation that guarantees that surplus targets are met in each period. Targets for primary deficits (DYS) for the period 1991-1993 are the actual outcomes (DY), while those for the remaining period 1994-2010 are the levels described in the Convergence Plan endorsed by the Parliament in June 1994 and submitted to the European Commission for final approval. Targets gradually increase to the level of 6% of GDP by 1999 and remain there for the rest of the projection period. As elaborated below, the envisaged primary surpluses will be sufficient to initially stabilise the debt-to-output ratio and then reduce it at a pace that is likely to be compatible with the Maastricht Treaty requirements.

A5. Increasing labour market flexibility

At the same time, the government is seeking to increase flexibility in labour markets as a way to resist pressure on real pay rises and to promote employment. To capture this process, we introduce a gradual reduction in the autonomous part of the wage equation. The general form of wage adjustment is the following:

$$\Delta \log W = \beta \varphi(t) + h(inflation, unemployment, productivity) \qquad (4.3)$$

where W is the nominal wage rate, β is the autonomous part and h(.) is a functional of explanatory variables. Constant β and function h(.) have been separately estimated for the tradable, non-tradable and public sector over the period 1974-1990. The constant β turns out to be positive in all sectors, and this may interpreted as the autonomous pressure to obtain wage increases on top of the adjustment effected by other developments in the economy. It also assumed that wage increases in the non-tradable and public sectors follow those of the tradable.

The process of labour market flexibility can be represented by scaling down constant β by a factor φ(t) which is equal to unity over the historical period of estimation and then declines geometrically according to:

$$\varphi(t) = (1-\lambda)\varphi(t-1) \qquad (4.4)$$

over the forecasting period 1991-2010. Rate λ is set equal to 2% per annum, indicating that by 2010 approximately a third of labour market inflexibilities will be removed. This schematic representation will be exploited later to study the effects of a quicker reform in labour market on the economy.

A6. Endogenous labour supply

The labour force in the agricultural sector follows a downward trend at the same rate as estimated in the historical period. In contrast, labour supply in the non-agricultural sector (LFNA) is determined through the participation rate which is hysteretic and rises with real wage increases. It takes the following form:

$$\frac{LFAN(t)}{POP(t)} = \frac{LFNA(-1)}{POP(-1)}[1+\rho\Delta QWR(-1)] \qquad (4.5)$$

where POP is total population, QWR is the real average wage rate in the non-agricultural sectors, and ρ is a parameter showing the sensitivity of the participation ratio to real wage increases. In the benchmark projection we set ρ=0.10, implying that a 10% rise in real pay will induce one extra percent of total population - that is about 100,000 persons - to seek employment.

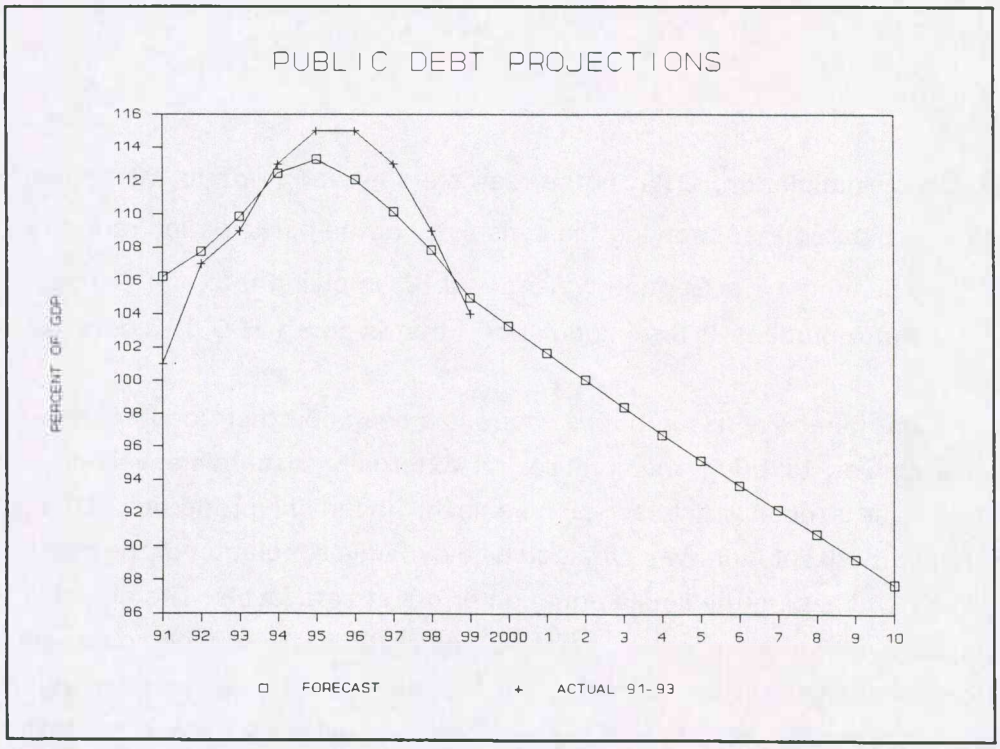
Apart from the above assumptions, there has been no other constant adjustment of endogenous variables to bring them closer to externally discernible values. Thus, the forecasting exercise is much simplified and reveals the underlying properties of the estimated model. The benchmark solution was obtained by a dynamic simulation of the model over the period 1991-2010, keeping the single-equation errors at zero levels. The model is found to converge quickly to solution values, and to generate a reasonable outcome for the macroeconomic variables. In the following we first describe the projected development of the main macroeconomic variables and then proceed to analyse some key multipliers of the model.

4.2. The Benchmark Scenario

The benchmark scenario is characterised by a slowly rising output. The **growth rate of output** (RTY) picks up quite closely the high rate of 1991 as well as the low rates observed in 1992 and 1993, and then it reaches a modest average rate of 1.4% over the remaining period (Figure 4.1). This rate is in agreement with most estimates of the course that the Greek economy is likely to take in the following years, **absent** european structural funds or any other type of substantial growth externalities.

FIGURE 4.1

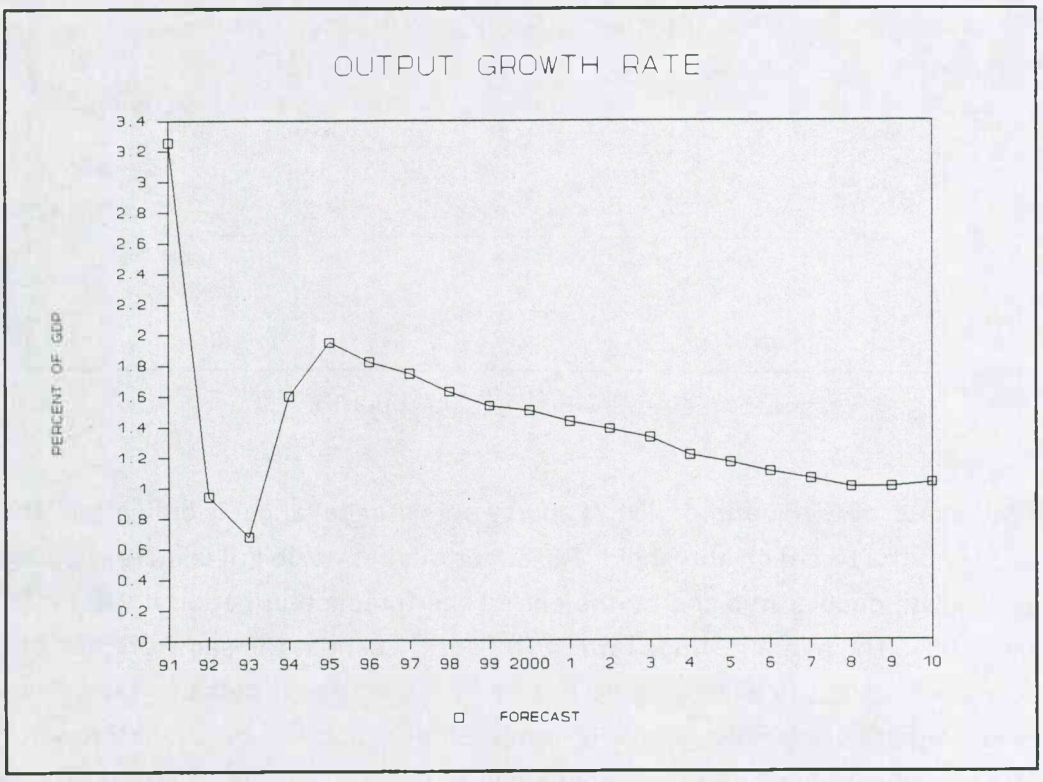
Forecast of the Debt-to-Output Ratio for the Period 1991-2010
Actual Values for 1991-1993
and Official Projections for the Period 1994-1999



The fiscal stabilisation rule ensures that adequate primary surpluses are achieved, which in turn ensure the containment of the debt burden. **Public debt** as a ratio to output (BY), follows almost closely the actual development in 1991-1993, then increases a still further due to the only gradual achievement of substantial primary surpluses, and starts falling after 1996. By year 2010, public debt is projected to reach 88% of output, still far from meeting the Maastricht fiscal requirements but not any more exploding further. As Figure 4.2 shows the model projections are smoother than official government targets for public debt that are included in the 1994 Convergence Plan. For such a debt reduction to be accomplished, the average rate of direct income tax has to rise considerably above the 1990 level.

FIGURE 4.2

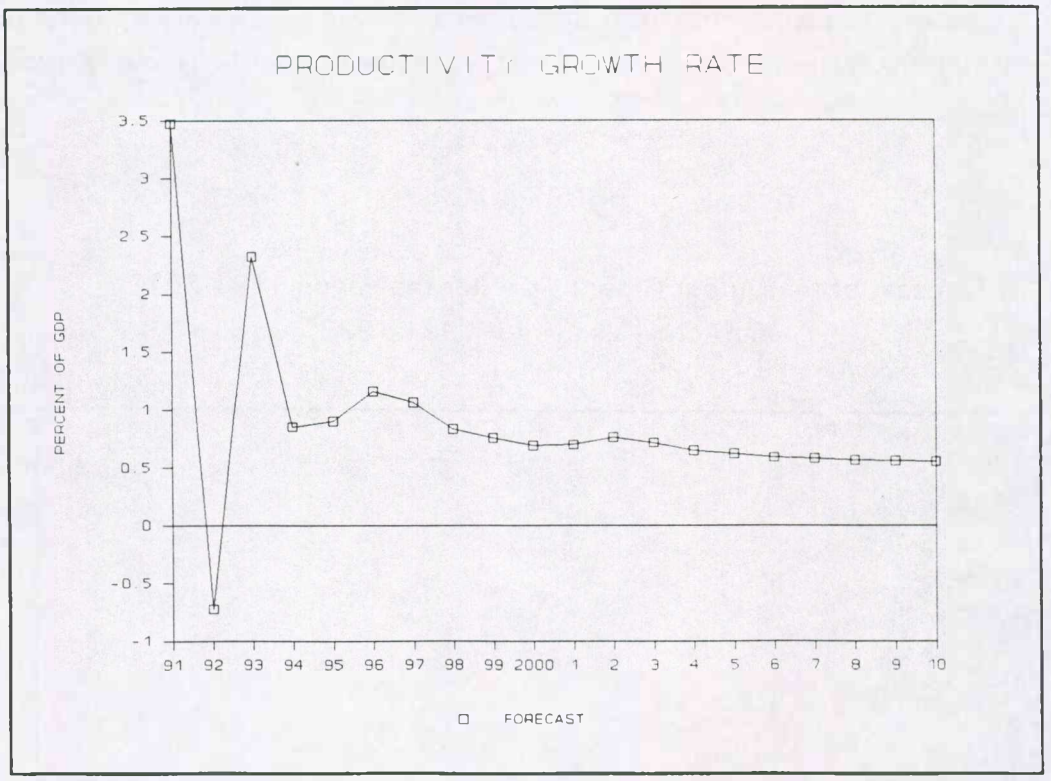
Forecast of the Output Growth Rate for the Period 1991-2010
and Actual Values for 1991-1993



The rate of growth of **average labour productivity** (RTR) is around 1% per year during the period of forecasting, as displayed in Figure 4.3.

FIGURE 4.3

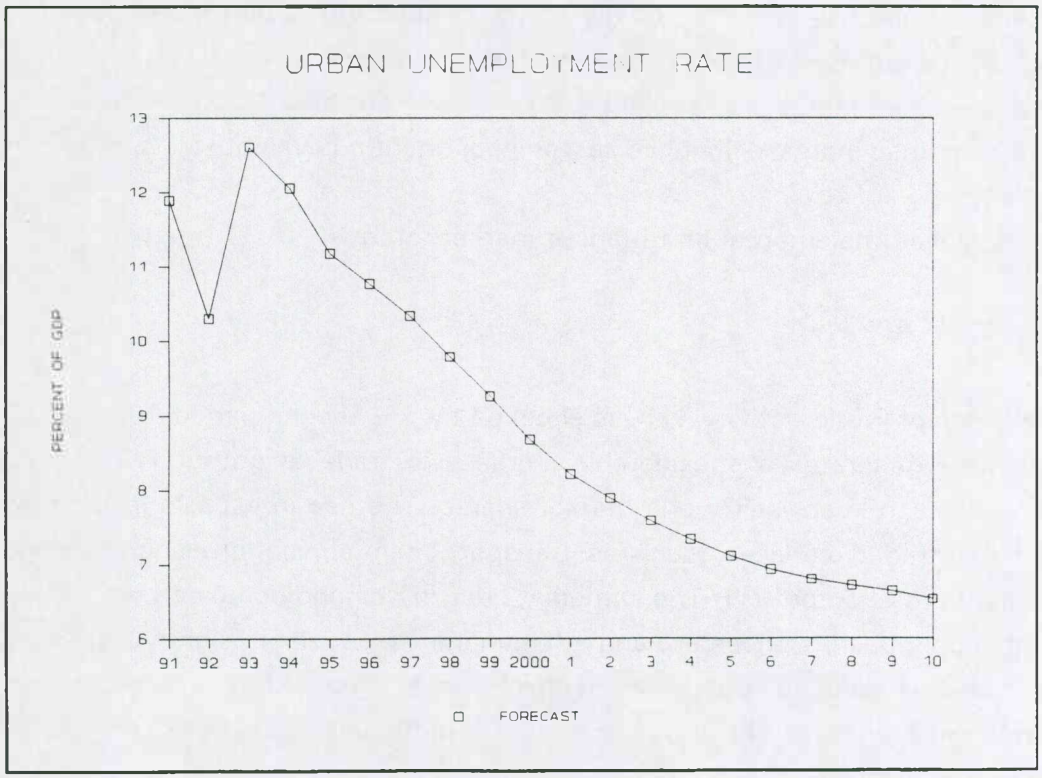
Forecast of Productivity Growth Rate for 1991-2010



Inflation rate of GDP deflator (INFY) shows persistence, and it is only after 1994 that starts falling from the two-digit threshold. As labour market flexibility is increasing over the years, inflation rate decelerates and by the end of the forecasting period it will be fallen to no less than 8.6%. The average **wage rate** (WR) rises by almost the same proportion as the price level, and as result the average growth rate in real wages is close to zero. Given that labour market rigidities are only gradually removed and there is no breakthrough in real wages, **urban unemployment rate** (UUR) is highly persistent. It remains around the level of 11% until 1994, and then starts to decline to 6% by the end of the period (Figure 4.4). Total **employment** (L) rises by 11.4%, which is the net composite result of a 23.8% rise in

FIGURE 4.4

Forecast of Unemployment Rate for 1991-2010



non-agricultural jobs (LNA) and a reduction by 28.8% in primary sector employment (LAGR). At the terminal period, the labour supply (LFNA) will be risen by 16.7%, mainly as a result of population increase.

Finally, the growth rate of **per capita output** (RPC) averages 0.75% per annum. Given that the european average of per capita output is estimated to grow at a rate of at least 1%, it implies that in the benchmark scenario without CSF aid the Greek economy will further drift away from its european partners. The extent to which the benchmark gap will be reduced through the structural funds is going to be investigated in the next three sections.

4.3. Key Multipliers

To portray the dynamic properties of the model over the forecasting period, we analyse the response of key macroeconomic variables to a number of individual demand and supply shocks:

(a) A sustained rise in world activity of 1% relative to the benchmark level.
(b) A sustained rise in foreign prices of 10% relative to base.
(c) A sustained increase in public sector employment by 20,000 persons.
(d) A sustained increase in public sector investment equivalent to 1% of benchmark GDP.
(e) A quicker implementation of labour market reforms.

The Rise in World Activity

The index of world activity YFIC is shocked by 1% for the period 1991-2010, and this immediately generates a considerable increase in tradable output (YTR), as Greek exporters respond to keep their world market shares. The rise in exports induces also an increase in non-traded services (such as transport, communication, energy, etc), and, consequently, in total output (Y). The immediate rise in demand combined with the slower response of supply pushes prices up, and inflation increases, albeit slightly. Public debt as a ratio to output is reduced, due to the higher output. (Recall that, by assumption, real interest rates are kept constant and primary surpluses have to meet the same prescribed targets as in the baserun.)

Unemployment rate falls substantially in the beginning, but later the rise in real wages erodes part of the new jobs and unemployment returns to base. Results are depicted in Table 4.1.

The Rise in Foreign Prices

The variables related to foreign prices are the price index PFIC and the average unit labour cost in the EC countries (ULCEC). Both of them are shocked by 10% over the whole period 1991-2010.

Two cases are distinguished, according to whether it is the nominal or the real exchange rate that is kept fixed during the simulation. In the first case, the nominal exchange rate is kept at the baseline level without any adjustment to price differentials

TABLE 4.1

Sustained 1% Rise in World Activity

	1991	1995	2000	2010
Tradable output, YTR	0.99	0.96	0.81	0.30
Non-tradable, YNT	0.33	0.72	0.66	0.85
Total output, Y	0.37	0.59	0.54	0.55
PGDP inflation, INFY	-.26	0.59	0.20	0.25
Debt-to-output, BY	-.13	-1.33	-1.05	-1.62
Urban unemployment,UUR	-.20	-.44	-.35	-.27
Real wage rate, QWR	-.03	0.47	0.57	0.92

(For output and wage rate changes are percentage deviations from baseline. For the other variables, the changes are simple differences from base rates.)

between domestic and foreign producers. The price shock passes to import prices (PM) by 7.9% in the beginning and by 8.6% by the end of the period. (Note here that the final impact remains **lower** than the external price shock, due to the fact that import traders are *shading* their margins downwards in an attempt to keep their market share against domestic producers.) Wholesale price index (WPI) is initially responding more slowly, and by the end of the period it has accommodated the external price shock. Output deflator (PGDP) shows the same pass-through of the external shock, due to the sizable domestic component in the formation of prices. The wage rate in the traded sector (WTR) rises by 9.8% at the end, while real wage rate (QWR) remains virtually the same as in the baseline.

Domestic demand increases by 0.3% in average and this causes tradable and non-traded output to increase after a while, due to the rise in exports brought about by the less-than-full accommodation of the external shock. As a result, total output increases relative to baseline while urban unemployment falls. The debt-to-output ratio initially improves due to the rise of inflation, that reduces the *ex post* real interest rate. Results are shown in Table 4.2.

TABLE 4.2

Sustained 10% Rise in Foreign Prices with Fixed Nominal Exchange Rate

	1991	1995	2000	2010
Import prices, PM	7.91	8.46	8.61	8.64
Wholesale prices, WPI	5.11	5.68	7.77	9.13
GDP deflator, PGDP	3.88	4.34	7.35	9.31
Total output, Y	-.16	0.78	0.36	0.24
Traded sector wage, WTR	1.78	2.99	6.61	9.79
Debt-to-output, BY	-3.79	-.87	-.98	-1.12
Urban unemployment,UUR	-0.10	-.79	-.73	-0.13
Real wage rate, QWR	-2.96	-2.65	-.97	0.79

(For prices, wages and output changes are percentage deviations from baseline. For the other variables, the changes are simple differences from base rates.)

The picture changes considerably if the nominal exchange rate is left to crawl in order to keep the competitiveness index constant; results are shown now in Table 4.3. Since the foreign ULC is shocked immediately but the domestic cost responds only gradually, the exchange rate is nominally **appreciated** by 7.4%. This cancels most of the foreign price shock, and the import price index gradually rises to 4.46% by the end of the period. PGDP rises by 4.8%, and WPI by 4.9%. Output falls in the beginning exactly the same as in the previous case, but later improves because - in the lack of inflation - total demand rises. The debt-to-output ratio now improves, and the real wage rate rises slightly.

A Sustained Increase in Public Employment

Public employment (LPS) rises by 20,000 additional jobs. Since LPS is - as explained in assumption A2 - kept frozen in the 1990 levels, the shock amounts to an equi-proportional

TABLE 4.3

Sustained 10% Rise in Foreign Prices with Fixed Real Exchange Rate

	1991	1995	2000	2010
Import prices, PM	7.91	-0.23	3.34	4.46
Wholesale prices, WPI	5.11	-0.10	3.50	4.82
GDP deflator, PGDP	3.88	-0.20	3.60	4.95
Total output, Y	-0.16	1.33	-0.06	0.29
Traded sector wage, WTR	1.78	0.90	3.65	5.45
Debt-to-output, BY	-3.79	-1.61	-0.08	-0.94
Urban unemployment,UUR	-0.10	-.76	-0.15	-0.19
Real wage rate, QWR	-2.96	-.66	0.09	0.54

(For prices, wages and output changes are percentage deviations from baseline. For the other variables, the changes are simple differences from base rates.)

change of 2.8% of baseline public employment. The effect on the economy is different in the short and in the medium run. In the beginning, the rise in LPS generates extra public sector output that drives total demand upwards and increases output and employment in the traded and non-traded sectors. As unemployment falls, wages rise, competitiveness deteriorates and output and employment decrease as taxes rise to finance the extra borrowing. The debt-to-output ratio improves due to the initial rise in output, but later this improvement evaporates as output is reduced.

An interesting pattern characterises the growth rate of output (RTY). Fueled by the positive impact on output, it initially rises, but later it falls below the baseline rate. Numerical results are shown in Table 4.4.

TABLE 4.4

Sustained Rise in Public Employment by 20,000 Persons

	1991	1995	2000	2010
Traded sector empl, LTR	-0.09	-1.11	-1.38	-1.80
Non-traded empl, LNT	0.00	-0.09	-0.25	-0.49
Total employment, L	0.52	0.25	0.07	-0.25
Total output, Y	0.19	-0.11	-0.21	-0.59
Output growth rate, RTY	0.19	-0.09	-0.04	-0.05
Debt-to-output, BY	-0.62	-0.34	-0.01	0.82
Urban unemployment,UUR	-0.61	-0.29	-0.09	0.29
Real wage rate, QWR	-0.08	0.01	20.02	-0.35

(For employment, wages and output changes are percentage deviations from baseline. For the other variables, the changes are simple differences from base rates.)

A Sustained Increase in Public Investement

Public investment (QIG) is increased by a constant amount that is equal to 1% of base output in 1991. The effect of public investment in this simulation is purely felt through demand, as no infrastructure externalities are modelled in this stage. Two cases are examined, according to whether the in-built stabilisation rule is fixed at its baseline levels, or is left to vary endogenously. In the first case, the primary surplus targets are not met since the financing of extra public investment increases government expenditure. In this case, all types of output increase and total output rises by 0.32% over the baseline. Numerical results are shown in Table 4.5. In absolute terms, this represents an increase of 2.0 bn Drs in 1970 prices while the increase in public investment was 5 bn Drs. The multiplier is thus only 0.40. The low value of the multiplier is explained by the rise in real wages that cause demand for labour to shrink. The gross public deficit rises by 1.32% of GDP in the beginning of the period, reflecting the equivalent rise in public spending. However, this causes debt-to-output ratio to rise by the same amount which, subsequently, generates extra interest payments. As a result, public deficit (DY) rises by 1.1% of GDP by

the end of the simulation period. Debt-to-output ratio rises by 33 percentage units, but nevertheless remains sustainable at the level of 106%.

The situation is different when the new expenditure on public investment is matched by rising direct tax rates so that primary surpluses (-DY) remain at the baseline target levels. In that case, the direct tax rate has to rise by a further 1.30% pa in average and this drains all output gains. The debt-to-output-ratio increases slightly above the baseline.

Increasing Labour Market Flexibility

To study the effects of a quicker implementation of labour market reforms, we increase parameter λ described in assumption A5 and equation (4.4) from 2% to 2.5%. Schematically, this implies that an extra quarter of existing market rigidities are removed by the end of the simulation period. The results, shown in Table 4.6, are quite noticeable. Output rises by 1.45% relative to baseline, and unemployment falls by as much as 1.7 percentage units by year 2010. Real wages are by 0.9% lower, and the debt burden is somewhat eased.

TABLE 4.5

Sustained Increase in Public Investment by 1%
of Output without Fiscal Balance Rule

	1991	1995	2000	2010
Tradable output, YTR	0.45	0.37	0.16	-0.29
Non-tradable, YNT	0.00	0.84	0.64	0.71
Total output, Y	0.09	0.52	0.38	0.32
PGDP inflation, INFY	-0.04	0.42	0.07	0.14
Public deficit, GDY	1.32	1.21	1.15	1.11
Debt-to-output, BY	1.26	5.48	13.58	33.34
Urban unemployment,UUR	-0.10	-0.31	-0.21	-0.10
Real wage rate, QWR	-0.03	0.38	0.36	0.52

(For output and wage rate changes are percentage deviations from baseline. For the other variables, the changes are simple differences from base rates.)

TABLE 4.6

Increasing Labour Market Flexibility

	1991	1995	2000	2010
Tradable output, YTR	0.01	0.70	1.56	3.41
Non-tradable, YNT	0.01	0.28	0.59	1.21
Total output, Y	0.00	0.28	0.63	1.45
PGDP inflation, INFY	-.07	-0.47	-0.49	-0.31
Debt-to-output, BY	.06	0.19	-0.19	-1.43
Urban unemployment,UUR	-.01	-.25	-0.71	-1.69
Real wage rate, QWR	-.06	-0.33	-0.64	-0.90

(For output and wage rate changes are percentage deviations from baseline. For the other variables, the changes are simple differences from base rates.)

5. The Second CSF for Greece

5.1. An Overview

The Greek Community Support Framework for 1994-1999 has been approved in July 1994, successfully concluding the negotiations between the European Commission and the Greek Government on the basis of a revised Regional Development Plan that has been submitted by the latter in December 1993. The aim of the Plan is to gear the economy of Greece onto a sustainable development course and, thus, enhance real convergence with other european economies in the road to Economic and Monetary Union. The Plan addresses the main problems of the economy that is characterised by inadequate capital formation, insufficient training of the labour force in new technologies, lack of growth and severe macroeconomic imbalances.

The means by which the Plan aims to face these deficiencies are summarised by the following actions:

- raising the provision and quality of infrastructures
- supporting fixed capital formation
- boosting the competitiveness of the production sectors
- improving the efficiency of education and specialised training
- modernisation of civil services
- fostering regional development

The Greek CSF together with the Cohesion Fund amount to Mecu 32,782 which considerably higher than the first CSF. The CSF plan accounts for 90% of total of which 23% are allocated to regional plans.

In terms of financing, about Mecu 16,582 representing half of total are coming from the Community Budget, whilst the balance (49.5%) represents the national contribution. The latter is sourced from the public sector. There is supposed to be a serious involvement of the private sector amounting to 26% of total, but not yet as an integral part of the Plan. The cofinancing from private sources concentrates on the building of physical infrastructure that can be partly operated and managed by private firms (40% of total), the action on competitiveness (46%) and in the regional plans (20%). There is no private sector cofinancing in the Cohesion Fund, and only marginal participation in the regional plans and the interventions for improving the quality of life.

Contemplating the impact that CSF is going to exert on the economy of Greece, the Plan tentatively expects that it will boost the growth rate of output by an additional 0.90% per annum, and will create around 100,000 new jobs by the end of the decade.[1]

One important issue, concerning the realisation of the RDP, is the availability of the government contribution of Mecu 7,529 given the worrisome state of public finances. As the budget is likely to be required to generate primary surpluses in order to stabilise the currently explosive debt burden over the period of implementing the Plan, the following dilemma will emerge: either debt stabilisation by tight fiscal measures will be abandoned in the hope of a spectacular outburst of growth that will marginalise the burden relative to output, or else taxation should be expanded and raised in order to secure both the achievement of primary surpluses and the prompt availability of national contributions. In the analysis that follows in later sections we opt for the second option, in line with the commitment of the government to go ahead with the parallel implementation of the CSF Plan and the Convergence Plan.

5.2. The Five Development Axes

The CSF Plan consists of five development axes which are briefly described below. Table 5.1 contains the amounts allocated to each axis and the sources of finance for each of the interventions.

Axis-I: Promotion of Domestic Integration by Large-Scale Infrastructure

The first axis aims at reducing regional isolation and promote the connectivity of different geographical areas in Greece and between Greece and the rest of the world. Infrastructure networks are going to be built for transport, communications and energy, amounting to a total of Mecu 8,272.

In transport, interventions include the construction of major highways on the axis of Thessaloniki-Athens-Patras as well as the Egnantia Road in Northern Greece that will provide access to the Balkan countries and the Black Sea. The railway of the same axis will be modernised and connected to the Transeuropean Railway Network. Both transport initiatives will be additionally supported by the Cohesion Fund in which Mecu 1,530 are allocated to transport projects. The main networks are going to be supplemented by a number of lower-

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[1]. The estimates are obtained from the Synoptic Presentation of Priority Axes of the CSF 1994-1999 (Ministry of National Economy, 1994).

TABLE 5.1
Community Suport Framework 1994-1999 for Greece
Financial Plan by Axis and Intervention (in Mecu)

DEVELOPMENT AXES	Total	EU	Public	Private
I. INFRASTRUCTURE NETWORKS	8,272.2	2,737.1	2,154.6	3,380.5
1. Highways and Ports	5,212.4	1,327.4	884.9	3,000.0
2. Railways	490.1	294.1	196.1	0
3. Communications	452.2	250.7	201.5	0
4. Energy	1,163.9	510,3	340.2	313.4
5. Natural gas	953.6	354.6	531.9	67.1
II. QUALITY OF LIFE	2,690.9	1,456.8	1,092.3	141.8
6. Urban development	1849.3	853.7	853.7	141.8
7. Health and Welfare	339.4	226.4	113.0	0
8. Environment	502.3	376.7	125.6	0
III. COMPETITIVENESS	7,526.1	2,684.3	1,381.1	3,460.7
9. Industry and Services	3,318.2	720.0	468.3	2,129.9
10. R & D	579.3	316.2	105.4	157.7
11. Tourism and Culture	517.7	229.1	182.6	106.0
12. Agriculture	2,822.8	1,269.0	574.8	979.1
13. Fishery	288.1	150.0	50.0	88.1
IV. HUMAN RESOURCES	3,716.3	2,556.3	932.6	227.4
14. Education	1,847.6	1,385.7	461.9	0
15. Continuous training	1,235.4	756.0	252.0	227.4
16. Long term unemployed	328.1	246.1	82.0	0
17. Civil Service	305.3	168.5	136.7	0
V. REGIONAL PLANS	7,426.9	4,474.4	1,491.5	1,461.0
TOTAL (CSF)	29,721.3	13,980.0	7,069.9	8,671.4
Cohesion/Fund	3,061.2	2,602.0	459.9	0
1. Cohesion fund-Transport	1,530.6	1,301.0	229.6	0
2. Cohesion fund-Environment	1,530.6	1,301.0	229.6	0
TOTAL CSF & COHESION FUND	32,782.5	16,582.0	7,529.0	8,671.0

scale projects that will be financed by the actions of Axis-V for the regional development.

In communications, interventions will include the modernisation of telecommunications, the expansion of networks, technological innovations and development of new products and services. special attention will be given to building the infrastructural networks that are necessary for accessing the european networks and ensure participation in the informational highways. Mail service will be restructured and modernised after a business plan is submitted describing the viability, likely extension and innovation of postal services.

Action in the energy sector will involve the completion of the natural gas mega-project, the development of energy-saving technologies, and part of the hydroelectric project in Achelous river.

Axis-II: Improving the Quality of Life

Three interventions are planned by this axis involving a total of Mecu 2,691: Urban development, Health and Welfare, and Environment. The first intervention involves the completion of the Athens underground and the construction of a similar system in Thessaloniki. The two systems are expected to relieve the two bigger cities of Greece from congestion and urban pollution, which are currently at very high levels. The second intervention includes extension and modernisation of various Health centres, the introduction of new programmes such as tele-medicine, a national network for health and diagnostic information, and the construction of a National Haematological Centre.

The third intervention on environment has set very ambitious targets for the creation of a country-wide system for monitoring main pollutants, extensive facilities for cleaning and recycling processes, and the reduction of the air pollution in the Greater Athens area. Additionally, the plan allocates resources for the completion of the National Estate Plan, the implementation of new urban designs in decayed areas, the protection of ecological systems, and the support of a system for the prevention of large-scale industrial accidents. The amount allocated to environmental actions is only half a billion Mecu, but they will be supplemented by the other half of the Cohesion Fund (that is by an additional amount of Mecu 1,531).

Axis-III: Growth and Competitiveness

The third axis constitutes the main thrust of the CSF programme that aims directly at improving competitiveness of the production sector. Of the Mecu 7,526 allocated to the axis, 44% will finance industrial investment and the provision of industry-related services.

Another 42% is allocated to agriculture and fishery, while the rest will finance the Research and Development and interventions in tourism and culture.

The Operational Plan for Industry aims to rectify the structural deficiencies of the Greek secondary sector that were described in Section 2 of this paper. The target is to strengthen the international competitiveness of Greek industry, as the only means to achieve a sustainable path for employment and growth. The plan envisages the inducement of foreign direct investment and the support of the domestic dynamic firms as the way to overcome the chronic problems of under-investment and technological backwardness in Greek industry. The main interventions include:

- Support for the creation of new, and enlargement of existing, competitive firms on the basis of a detailed business plan.
- Improving the industrial infrastructure by creating a new Institute of Metrology and Standards, restructuring the management and raising efficiency of industrial zones, assisting the implementation of environment-friendly technologies, and financing the concentration of obnoxious facilities in controlled areas.
- Boosting competitiveness of small and medium size industries by encouraging the adoption of new technologies, the use of financial instruments and modern management.

The intervention in Research and Technology aims to improve cooperation between research institutions and firms, foster technological innovation, extend and complete the national grid of R&D facilities, and train young researchers. Despite the substantial growth over the last decade, Greece continues to have the lowest R&D expenditure as a ratio to GDP among EU countries (0.46% of GDP in 1992), while the participation of the private sector is minimal and far from being systematic. On the other hand, the research potential in Greece is growing and the country has achieved a participation rate in competitive Europe-wide programmes that by far surpass the total population or the research population proportion of the country. The Operational Plan for Research and technology aims to bridge the gap between a growing supply of research and a cautious demand by the firms. The programme will finance large research projects specifically aiming to the realisation of new products and production methods, and will support schemes to facilitate the utilisation of existing research outcomes.

The intervention for Tourism and Culture aims at modernising tourist services in popular resorts, promote various forms of year-round tourism, and support the renovation and preservation of cultural heritage.

In agriculture the intervention will assist the re-orientation of traditional cultivations, finance investment for new types of livestock and field production, and promote the rational use of local natural resources-especially irrigation systems and forests. The action on fishery includes the modernisation of fishing equipment and vessels, the expansion of controlled cultivations, and new investment for value adding and marketing activities of the enterprises.

Axis-IV: Upgrading Human Capital and Promotion of Employment

This axis involves 11% of total CSF resources for Greece and will attempt to raise the efficiency and quality of the education system, finance training and retraining of employees into new skills and technologies, help to upgrade the efficiency of civil service, and implement drastic policies to fight the long-term unemployment and social exclusion. Much of the need for an expansion and modernisation of employment rests with this programme. Given that the corresponding action in the first CSF 1989-1993 was characterised by very low returns and a widespread misuse of financial resources, special attention has been paid for the monitoring and the on-going evaluation of the programme in the new CSF.

Actions will involve both training and investment in educational infrastructure (such as school buildings, computer networks and new educational tools). Cofinancing from the private sector will take place only for the actions in continuous training, since part of it is undertaken by private institutions. The remaining actions are financed exclusively by european or national public funds.

Axis-V: Reducing Regional Inequalities and Isolation

This axis consists of 13 Regional Plans, one for every region in the country. The actions envisaged in these plans are complementary and supplementary to those included in the previous four axes. Each plan lays out a number of interventions aiming to raise the local infrastructure, assist regional activity especially in agriculture and by SMEs, protect the environment and improve the socioeconomic conditions of the area.

5.3. Consolidating the CSF Actions

In the form that CSF has been described in the preceding subsection, it is very difficult to obtain an assessment of its likely macroeconomic impact for two reasons. First,

because several actions with similar expected outcomes on the economy are included in different interventions. For example, the raising of physical infrastructure is envisaged to be the exclusive aim in Axis-I, a substantial part of Axis-II (the construction of the two underground systems will absorb 69% of the resources), a small part in Axis-III, exactly half of the Cohesion Fund and an unspecified but surely important component of the human resources programme and the regional plans. To enable the modelling of CSF, the actions entering the five development axes are grouped in four categories as follows:

Type H, including all actions aiming to raise the 'hard' infrastructure. This category includes the first axis, the urban development initiative of Axis-II, the action on environment, all the Cohesion Fund, and assumes that half of the resources of the regional programmes will finance physical infrastructure.

Type S, with the actions on raising the 'soft' infrastructure. It includes the interventions on Health and welfare from Axis-II, Tourism and culture from Axis-III, Research and Development, the other half of the regional programmes, half of the human resources programme that will be devoted to educational infrastructure, and the small part of Technical Assistance that will be devoted to the finance of monitoring and evaluation activities.

Type P, that consists of the aid to productive investment in industry, agriculture and fishery.

Type E, with the other half of the human resources programme that will be used for the remuneration of trainers and trainees.

The four types of interventions are summarised in Table 5.2, together with the corresponding amounts and the sources of financing. In this form, the actions of CSF are going to be analysed in the next sections.

TABLE 5.2
Consolidated Allocation and Financing

(In Million ECUS)

SECTORS	Total	EU	Public	Private
HARD INFRASTRUCTURE				
Axis 1	8,272	2,737	2,154	3,380
Athens & Salonica Tube	1,849	854	854	142
Environment	502	377	125	0
Cohesion TSP	1,530	1,301	229	0
Cohesion ENV	1,531	1,301	230	0
Regional (H)	3,713	2,237	746	731
Total H	17,397	8,807	4,338	4,253
Percent	100	51	25	24
SOFT INFRASTRUCTURE				
Health	340	227	113	0
Tourism and Culture	518	229	183	106
R & D	579	316	105	158
Human resourcs (H)	1,858	1,278	466	114
Regional (S)	3,713	2,237	746	731
Technical assistance	91	71	20	0
Total S	7,099	4,358	1,633	1,109
Percent	100	61	23	16
PRODUCTION				
Industry	3,318	720	468	2,129
Agriculture & Fishery	3,110	1,419	623	1,067
Total P	6,428	2,139	1,091	3,196
Percent	100	33	17	50
HUMAN RESOURCES	1,858	1,278	466	114
Percent	100	69	25	6
TOTAL	32,782	16,582	7,528	8,672
Percent	100	51	23	26

6. Macroeconomic Analysis of CSF

6.1. Accounting for CSF

Each flow of CSF is characterised by two attributes: (i) the proportion which is expected to be implemented in period t, and, (ii) the ratios of financial contribution from European Union, National Authorities and the private sector. An amount of S Mecu that is allocated to a specific sector for the whole period will generate the following annual flow F_t in constant 1970 Drachma billion:

$$F_t = S * T_t * (X_t/P_t) * (\alpha + \beta + \gamma).$$

In this expression, T_t is the proportion to be allocated in period t, X is the prevailing nominal exchange rate in Drs/Ecu, P is the GDP deflator normalised to have P(1970) = 1, and α, β, γ denote the cofinancing ratios of EU, Government and private sector respectively, with $\alpha + \beta + \gamma = 1$. The various cofinancing ratios are calculated on the basis of the amounts in Table 5.2, and shown below the total sum of each type of intervention.

The time schedule depends crucially on the readiness of the economy to absorb the flows from the Union, and also on the availability of domestic financial resources. Both are expected to improve over time, and for this reason factor F_t increases during 1994-1999. As has happened in the first CSF Programme, several projects are completed with some delay and final payments come after the planned horizon. To capture this predictable delay, the time factor is extended to year 2000 and the intertemporal allocation is assumed to be as in the following Table.

TABLE 6.1

Intertemporal Absorption Ratios of CSF

	1994	1995	1996	1997	1998	1999	2000	**SUM**
T	0.05	0.13	0.16	0.18	0.18	0.18	0.12	**1.00**

Each flow is modelled in such a way as to reflect both the increase in the benchmark level of relevant investment and the consequential burden for the public and private sector. The equations of the model that are modified to account for the CSF flows are listed below. The expression that appears in the rhs of each equation with the suffix *base* denotes the function of explanatory variables or the exogenous values that have been used in the benchmark forecasting. The notation of CSF flows uses the prefix F and the name of the corresponding variable:

- Investment in agriculture:

$$QIA = QIA_{base} + FQIA \tag{6.1}$$

- Investment in the traded sector:

$$QITR = QITR_{base} + FQITR \tag{6.2}$$

- Investment in the non-traded sector:

$$QINT = QINT_{base} + FQIH + FQIS \tag{6.3}$$

This equation includes the investment in hard infrastructure (FQIH) and the investment in soft infrastructure (FQIS) that mainly concerns activities in the non-traded sector.

- Public investment:

$$QIG = QIG_{base} + (\alpha+\beta)*FQIH + (\alpha+\beta)*FQIS + \beta*FQIA + \beta*FQITR \tag{6.4}$$

This equation assumes that the infrastructure investment will be of public property regardless whether it has been financed by Community or national government funds. Public investment also includes the cofinancing of investment in agriculture and industry. Variable QIG is then used in the model to determine the accumulation of the new public capital stock.

- Public deficit:

$$DEF = DEF_{base}$$

$$+ \beta * FQIH + \beta * FQIS + \beta * FHUM + \beta * FQIA + \beta * FQITR \qquad (6.5)$$

Public deficit increases by the amount of public cofinancing of all sorts of investment and also by the public contribution to the human capital training. (Note that the sums appearing in the deficit equation are different from those entering the public investment flow.)

- Private investment:

$$QIP = QIA + QITR + QINT + QIPS - QIG \qquad (6.6)$$

This equation determines the privately owned investment flows by subtracting from all sorts of investment those of the public sector. Variable QIP is then used in the model to determine the evolution of total private capital stock that enters in the definition of public sector wealth in the consumption function; see equation (3.8).

- Private sector financial wealth accumulates according to:

$$\Delta QFWP = (interest) + (savings) - \gamma * FQIA - \gamma * FQITR \qquad (6.7)$$

where the expressions in brackets denote the functions of interest payments and savings respectively, and Δ is the first difference operator. Savings are now reduced by the amount that the private sector has to contribute to the realisation of investment in agriculture and industry. However, the reduction of private savings are more than compensated by the increase in private investment flows. Assuming that apart from the government-financed part, investment in the traded and agricultural sectors remains in the private sector, the increase in private investment is easily worked out from (6.1), (6.2), (6.3), (6.4) and (6.6) to be:

$$(\alpha + \gamma) * FQIA + (\alpha + \gamma) * FQITR + \gamma FQIH + \gamma FQIS \qquad (6.8)$$

- Disposable income:

$$YDIS = YDIS_{base} + FHUM \qquad (6.9)$$

The disposable income that enters the consumption function is augmented by the amount spent on training either in the form of remuneration to trainees or a fee to the trainers.

Additionally to the above equations, we introduce two accumulation equations for the hard and soft infrastructure in order to assess the improvement of the capital stocks relative to the benchmark forecasting. Using the simple neoclassical accumulation process, we have:

$$QKH = (1-\delta)QKH_{.1} + QKIH_{base} + FQIH \qquad (6.10)$$

and

$$QKS = (1-\delta)QKS_{.1} + QKIS_{base} + FQIS \qquad (6.11)$$

where QKH, QKS are the stocks for hard and soft infrastructure respectively, and δ is the depreciation rate.

6.2. Modelling CSF Externalities

CSF actions are going to influence the economy through a multitude of supply and demand effects. At the current state of development, the model cannot handle all the complexity of CSF interventions, but nevertheless can be used to assess some aggregate effects on the Greek economy. Demand effects are captured by the appropriate rise in the components of domestic expenditure or personal income as has been described in the previous subsection. The supply-side effects will come by the rise in sectoral productivity due to the improved infrastructure, the reduction of cost due to the better training of the labour force, and the increase in fixed capital formation in the productive sectors as Community and public aid will induce private investment.

The positive impact of infrastructure on output and productivity growth has been investigated in an increasing number of studies for various economies. Ratner (1983) was the first to obtain a quantitative assessment for the US economy. A few years later, Aschauer (1989a) in a cross-country study examined the productivity growth in the G7 economies in association with the aggregate stock of public infrastructure invested in those countries, and suggested that a 1% increase in public capital as a ratio to GNP would be

associated with a 0.5% rise in the growth rate of output. His findings prompted further research on the US economy and other countries.[1]

The role of public infrastructure is also examined in the context of endogenous growth models. For example, Barro (1990) considers the flow of government expenditure on social infrastructure as a factor of production, and finds that the steady-state growth rate in the economy increases with the national income share of investment in infrastructure. Aschauer (1993) developed an endogenous growth model with the stock of public capital as a production factor, and employs it to explain regional differences in the growth rates.

For the Greek economy, it has been shown that public infrastructure has a positive and strong impact on the productivity of large-scale manufacturing, and established[2] that public infrastructure can be treated as a factor of production (Christodoulakis, 1994). Using a cyclically adjusted capital stock to account for the changes of utilisation over the business cycle, the long-run elasticity of output with respect to public infrastructure was found to be 0.27. In an alternative estimation using manhours to capture the business cycle effect, public infrastructure elasticity was found to be 0.36 in the long-run. Even the lower finding suggests that a permanent rise in public infrastructure by 10% of its current stock will boost large-scale manufacturing output by 2.7% in the long-run. Similar results were found by estimating a translog production function for the same sector of large-scale manufacturing (Christodoulakis and Segoura, 1994).

Having established the positive impact of infrastructure on output, the next step is to calibrate some new parameters in the estimated model, in order to study the economy-wide effects. In an econometric model, such as the one employed in this paper, the effect of infrastructure and human capital improvement can be analysed by introducing a number

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[1]. Employing a Cobb-Douglas production function, Aschauer (1989b) had established that the decline in US productivity growth in the 1980s is associated with the neglect for public infrastructure over the same period. Similar results have been obtained by Garcia-Mila and McGuire (1992) and Costa *et al.* (1987) for US, Rubio and Rivero (1993) for Spain, and Ford and Poret (1991) for the major OECD economies. An alternative approach is the estimation of a cost function. Lynde and Richmond (1992) find that public capital has important downward effects on the cost of production, and similar results are obtained by Mamouneas and Nadiri (1991) for US manufacturing, Shah (1992) for Mexico, Berndt and Hansson (1991) for Sweden, and Conrad and Seitz (1992) for the West German economy.

[2]. Taking into account the criticism by Tatom (1991) against the aforementioned approaches, the estimation took place by employing cointegration techniques for non-stationary time-series, and testing for the existence of Granger-causality from infrastructure to productivity and not vice-versa.

of externalities in the estimated equations for output and production costs. Externalities are modelled in a way similar to that suggested by Bradley *et al.* (1994) for the Irish and Portuguese economies, so that results are directly comparable between various CSF-recipient countries. Externality elasticities are **calibrated** in such a way as to take into account the elasticities that have been **estimated** at the large-scale industry level. The supply-side effects for the various types of CSF actions is described as follows.

(a) Hard Infrastructure

Output in each sector is given by a production function of the form

$$Y_s = \bar{A}_s f_s(K_s, L_s, t) \qquad (6.12)$$

where suffix s (s = T,N,G,A) stands for the traded, non-traded, public and agricultural sector respectively, K_s and L_s are the sectoral capital and labour inputs, t is technological progress, and A_s is a scale parameter. The bar indicates the estimated value used in the non-externalities simulations. The infrastructure externality is modelled by endogenising the latter as:

$$A_s = \bar{A}_s(QKH/\bar{\bar{Q}}\bar{\bar{K}}\bar{\bar{H}})^{\eta_s} \qquad (6.13)$$

where QKH is the accumulated stock of hard infrastructure, the bar indicates the stock in the no-externality case, and η_s denotes the externality elasticity for each sector with respect to QKH. In logarithmic terms, the affected equations are written as follows:

$$LnY_s = LnY_s(.)_{base} + \eta_s Ln(1 + \frac{\Delta QKH}{\bar{\bar{Q}}\bar{\bar{K}}\bar{\bar{H}}}) \qquad (6.14)$$

where $Y(.)_{base}$ denotes the function used in the non-CSF simulations. Externality effects are assumed to vary across sectors. The traded sector is assumed to be the readiest to incorporate the improvement of hard infrastructure into production, by means of energy savings, better transport, communication, etc. The non-traded and public sectors also

benefit from hard infrastructure but to a lesser extent, reflecting the lower capital intensity. The agricultural sector is assumed to benefit the least, given its slow adaptation to new technologies. Parameter values were chosen to be 5% for the traded sector, 2.5% for the non-traded and public sectors, and 1% for agriculture. The capital stock of hard infrastructure accumulates according to the process described by equation (6.10).

(b) Soft Infrastructure

Soft infrastructure actions will improve the social and cultural environment, enhance technological and educational capabilities, and bridge regional discrepancies by a multitude of local interventions. To capture the supply-side effect we assume that unit labour cost will improve in real terms. The augmented equation becomes:

$$QULC = QULC(.)_{base}(QKS/\overline{\overline{QKS}})^{\sigma_C} \qquad (6.15)$$

where QULC is real ULC, QKS is the capital stock of soft infrastructure, and σ_C is the elasticity with respect to changes in QKS. $QULC_{base}$ denotes the function of unit labour cost used in the non-externalities case and $\overline{\overline{QKS}}$ denotes the capital stock without the CSF intervention. Elasticity is set equal to -2%.

To a considerable extent, actions of soft infrastructure involve the public sector. Thus, it is reasonable to assume that public employment will increase above the level assumed in the benchmark scenario, as follows:

$$LPS = LPS(.)_{base}(QKS/\overline{\overline{QKS}})^{\sigma_E} \qquad (6.16)$$

In the above expression, LPS is public sector employment and σ_E is the elasticity to changes in QKS. The increase in public employment will automatically raise public sector activity, thus there is no need to add another elasticity for output. The elasticity is set equal to 10%.

The capital stock of hard infrastructure accumulates according to the process described by equation (6.11).

(c) Productive Investment

Investment aid to manufacturing and agricultural sectors affect explicitly the capital stock and output in those sectors. Hence, there is no need to consider further supply-side effects stemming from such actions.

(d) Education and Training

The effect of human resources fund that is used for training activities is measured by the extent it raises the employment of skilled workers. To assess the number of skilled workers that will be added to the labour force we employ a calculation similar to that of Bradley *et al.* (1994). Each trainee is assumed to receive a fraction μ of the wage rate in the non-traded sector (WNT), while instructors are remunerated the full rate and each of them trains a group of M people. The annual bill is given by:

$$FHUM*P = NHUM*(\mu*WNT) + (\frac{NHUM}{M})*WNT \qquad (6.17)$$

where FHUM is the annual CSF intervention for training (expressed in constant 1970 prices), P is the GDP deflator and NHUM is the number of trained workers per year. Inverting (6.17) we obtain:

$$NHUM = \frac{FHUM*P}{(\mu + 1/M)*WNT} \qquad (6.18)$$

Trained workers are added to the stock of skilled workers (QHUM) according to the accumulation process:

$$QHUM = (1-\varepsilon)*QHUM_{-1} + NHUM \qquad (6.19)$$

where ε is a depreciation rate set equal to 5% per annum. A data series for QHUM in the non-CSF simulations has been constructed by assuming that only half of existing employment is composed of skilled workers, that is:

$$QHUM_{base} = \xi^{*}(LA + LTR + LNT + LPS) \qquad (6.20)$$

where ξ is set equal to 0.50. The expected effect of the increase in skilled human resources is the improvement of labour productivity. To model this externality, we assume that unit labour cost in real terms changes in a way similar to that for the soft infrastructure interventions:

$$QULC = QULC(.)_{base}(QHUM/\overline{QHUM})^{\theta} \qquad (6.21)$$

where θ is the elasticity with respect to QHUM, and other definitions are similar to those in (6.15). The parameter value was set equal to -3%.

The externality elasticities to the various types of CSF intervention are summarised in Table 6.2.

TABLE 6.2

Parameter Values for Externality Elasticities

	Hard infrastructure	Soft infrastructure	Human resources
Traded output	$\eta_T = 0.05$		
Non-traded output	$\eta_N = 0.025$		
Public output	$\eta_G = 0.025$		
Public employment		$\sigma_E = 0.10$	
Agricultural output	$\eta_A = 0.01$		
Real unit labour cost		$\sigma_C = -0.02$	$\theta = -0.03$

7. Assessing the Macroeconomic Impact of CSF

For each category of CSF intervention, the model is simulated in order to assess two types of macroeconomic impact depending on whether the externality effects described in the previous section are absent or fully realised. In the first case, the simulation results are "partial" as they depict only the demand effects of CSF actions. In the second case, results describe the "full" impact of CSF stemming from both the demand side and the externality effects.

Besides the distinction between demand and supply-side effects, another crucial assumption is made about the course of stabilisation policy. As discussed in subsection 5.1 we assume that during the implementation of CSF the Convergence Plan continues unabated and achieves the same debt-to-output targets as projected in the benchmark scenario and shown in Figure 4.1. This is ensured by employing a simple fiscal rule according to which the direct tax rate is risen until a specified debt target is met in each period. Under this assumption, no change will occur in the debt burden or the gross public deficit as a consequence of CSF actions. The changes will appear now in the primary deficit that is upwards influenced by the cofinancing obligations of CSF and downwards by the increased revenues generated by the higher tax base.

In the following, we describe the partial and full simulations for the four categories of CSF action and then for total CSF.

7.1. Hard Infrastructure

Results for some key economic variables are shown in Table 7.1, while the time profiles of output are shown in Figure 7.1. In the absence of externalities, output rises by nearly 2% during the implementation of CSF, but after the intervention expires it is hard-landed to baseline levels. This result shows that no permanent effect should be expected, unless the supply-side effects of physical infrastructure are realised. The growth rate of output initially rises, but then returns to baseline, and the same occurs for the growth rate of productivity. Employment rises in the period if CSF but then it falls, due to the higher wages that have been struck during the period of the boom and price some people out of jobs.

The situation is different when externalities are taken into account. Output will be found to be 0.54% above the baseline at the end of the simulation period, after growing at a rate higher by 0.04% per annum in average. New employment is generated, but the output growth dominates and productivity grows at rate 0.03% per annum faster than in the

benchmark. Debt to output ratio remains the same. Figure 7.1 shows that the increase in output slackens at the terminal period of the Plan, but then recovers as infrastructure capital continues to be higher than the base and exerts the positive externalities on output. The temporary trough is a consequence of the fall in demand in year 2001 relative to the previous year.

7.2. Soft Infrastructure

A similar picture - albeit of smaller proportions - is shown in Figure 7.2 and Table 7.2 for the effects of soft infrastructure. Output rises by one third as in the case of hard infrastructure, reflecting the fact that total soft interventions are considerably below the amount allocated to the hard ones. An interesting difference is observed though in the trend of the output rise after the implementation period. In the full simulation, the growth rate of output continues to be above the baseline rate by 0.21%, and the same occurs for productivity growth. This is due to the fact that soft infrastructure exerts a downward impact on the real cost of labour, which in turn lowers prices, increases competitiveness and spurns growth for a long period of time.

7.3. Aid to Production Investment

The increase in the investment flows in the traded and agricultural sectors boosts output and employment. The consequential rise of the corresponding capital stocks ensures that the positive impact remains strong for a long period after the end of CSF interventions, though output and productivity return to baseline growth rates. No externalities are assumed for this type of intervention. Results are shown in Table 7.3 and the response of output in Figure 7.3.

7.4. Education and Training

In the absence of externalities, the human resource programme degenerates to a pure income transfer to participants of purposeless training. This could lead to temporary increases in consumption and output, but the operation of the stabilisation rule ensures a one-to-one increase in taxation in order to achieve the debt targets. As a result, output remains virtually unchanged relative to the baseline level (see Table 7.4 and Figure 7.4).

The situation is very different when the externality effect is taken into account and real labor cost is brought down. A growth process is initiated similar to that described

TABLE 7.1
The Effects of CSF Hard Infrastructure

	Y	(**)	GRY	(*)	GRPL	(*)	L	(*)
	Part	Full	Part	Full	Part	Full	Part	Full
1994	0.54	0.64	0.55	0.65	0.51	0.57	1.65	2.81
1999	0.79	3.17	-0.46	-0.10	-0.22	-0.11	9.42	60.00
2005	-0.03	1.49	0.26	0.17	0.13	0.12	-0.72	33.00
2010	-0.64	0.54	0.14	0.04	0.05	0.04	-21.80	0.54
AVG	0.05	1.59	-0.04	0.04	0.00	0.03	-3.50	29.40

The column "part" displays simulation results without any externality effect, and column "full" the results with externalities taken into account.

An astersik indicates difference from baseline, two proportional change. Y is output at factor cost, GRY the growth rate of output, GRPL the growth rate in labour productivity, and L total employment in 1,000s.

TABLE 7.2
The Effects of CSF Soft Infrastructure

	Y	(**)	GRY	(*)	GRPL	(*)	L	(*)
	Part	Full	Part	Full	Part	Full	Part	Full
1994	0.22	0.26	0.22	0.26	0.20	0.16	0.5	3.70
1999	0.14	1.31	-0.21	0.12	-0.09	0.13	-0.9	30.08
2005	-0.03	2.82	0.09	0.33	0.04	0.32	-0.6	23.30
2010	-0.28	3.51	0.08	0.25	0.02	0.21	-8.9	9.40
AVG	-0.05	1.91	-0.02	0.21	0.00	0.19	-3.3	19.10

TABLE 7.3
The Effects of CSF Competitiveness Actions
(no externality is assumed for this action)

	Y	(**)	GRY	(*)	GRPL	(*)	L	(*)
	Part	Full	Part	Full	Part	Full	Part	Full
1994	0.34		0.35		0.29		1.9	
1999	4.01		0.32		0.20		62.3	
2005	2.61		0.26		0.12		27.6	
2010	2.38		-0.09		-0.02		21.4	
AVG	2.62		0.14		0.11		33.3	

TABLE 7.4
The Effects of CSF Human Resources Actions

	Y	(**)	GRY	(*)	GRPL	(*)	L	(*)
	Part	Full	Part	Full	Part	Full	Part	Full
1994	0	0	0	0	0	0.01	-.09	-0.2
1999	-0.06	0.88	0	0.33	0	0.21	-1.7	9.6
2005	-0.01	2.23	-0.01	0.14	0	0.15	-0.2	20.2
2010	-0.01	3.02	0	0.13	0	0.11	-0.1	25.1
AVG	-0.02	1.54	0	0.18	0	0.14	-0.6	14.3

The column "part" displays simulation results without any externality effect, and column "full" the results with externalities taken into account.

An astersik indicates difference from baseline, two proportional change. Y is output at factor cost, GRY the growth rate of output, GRPL the growth rate in labour productivity, and L total employment in 1,000s.

TABLE 7.5
The Effects of Total CSF Actions

	Y	(**)	GRY	(*)	GRPL	(*)	L	(*)
	Part	Full	Part	Full	Part	Full	Part	Full
1994	1.09	1.23	1.11	1.25	1.00	1.02	4.0	8.2
1999	4.77	9.41	-0.27	0.70	-0.07	0.44	67.0	161.3
2005	2.45	9.14	0.53	0.83	0.26	0.68	23.7	100.8
2010	1.53	9.53	0.11	0.26	0.04	0.31	-6.6	55.2
AVG	2.57	7.70	0.10	0.55	0.10	0.47	25.6	95.2

TABLE 7.6
The Effects of Total CSF Actions

	DY	(*)	LFNA	(*)	UUR	(*)	INFY	(*)
	Part	Full	Part	Full	Part	Full	Part	Full
1994	0.37	0.38	1.91	2.2	-0.07	-0.19	-0.82	-0.96
1999	0.02	1.09	10.38	30.8	-1.65	-3.78	2.74	0.74
2005	1.11	1.04	6.06	62.0	-0.49	-1.03	-1.06	-3.00
2010	-0.36	-0.26	5.76	86.3	0.33	0.88	-0.36	-2.60
AVG	0.10	0.45	6.2	44.9	-0.57	-1.44	0.48	-1.18

Notation: DY denotes primary deficit as a percentage of GDP, LFNA is non-agricultural labour supply in 1,000s, UUR is the rate of urban unemployment, and INFY the inflation rate of GDP deflator.

FIGURE 7.1

The Effects of Hard Infrastructure on Output
(+ with externalities, □ without)

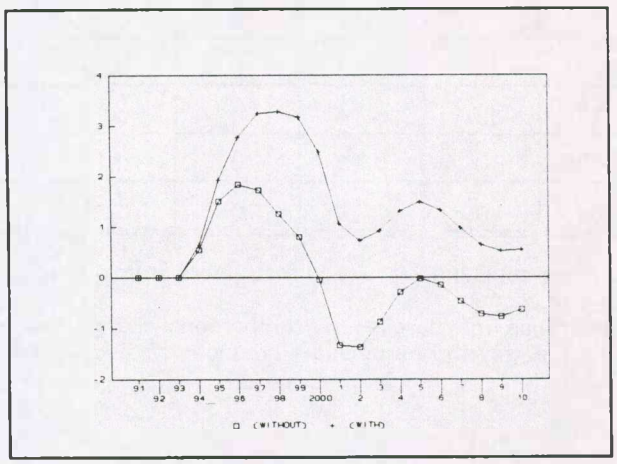


FIGURE 7.2

The Effects of Soft Infrastructure on Output

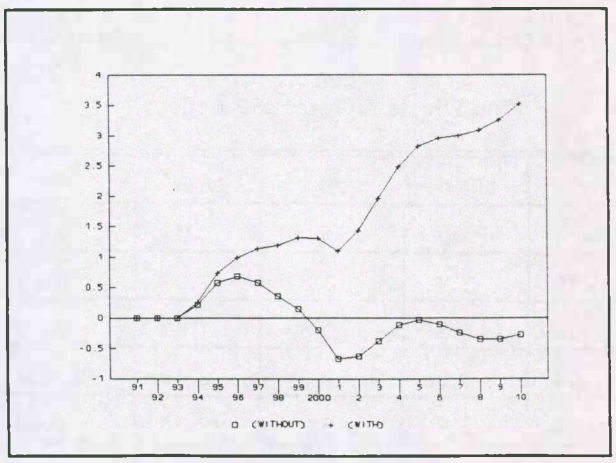


FIGURE 7.3

The Effects of Competitiveness Action on Output
(no externality is assumed for this action)

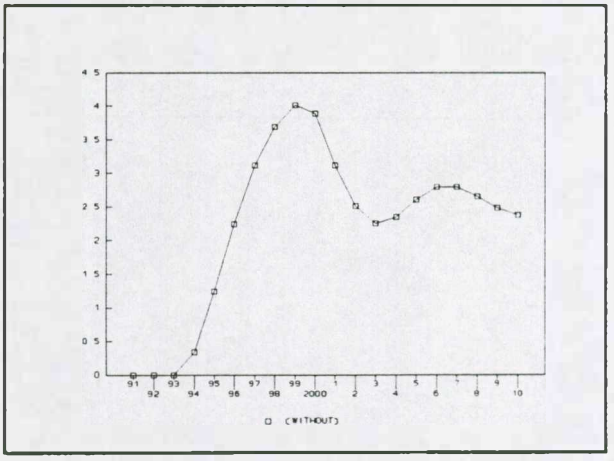


FIGURE 7.4

The Effects of Human Resources Action on Output
(+ with externalities, □ without)

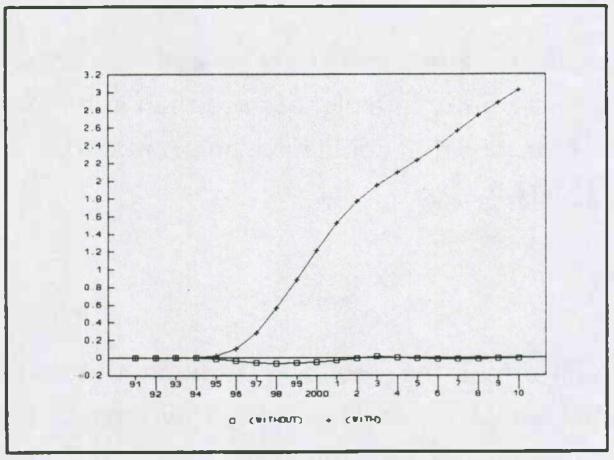
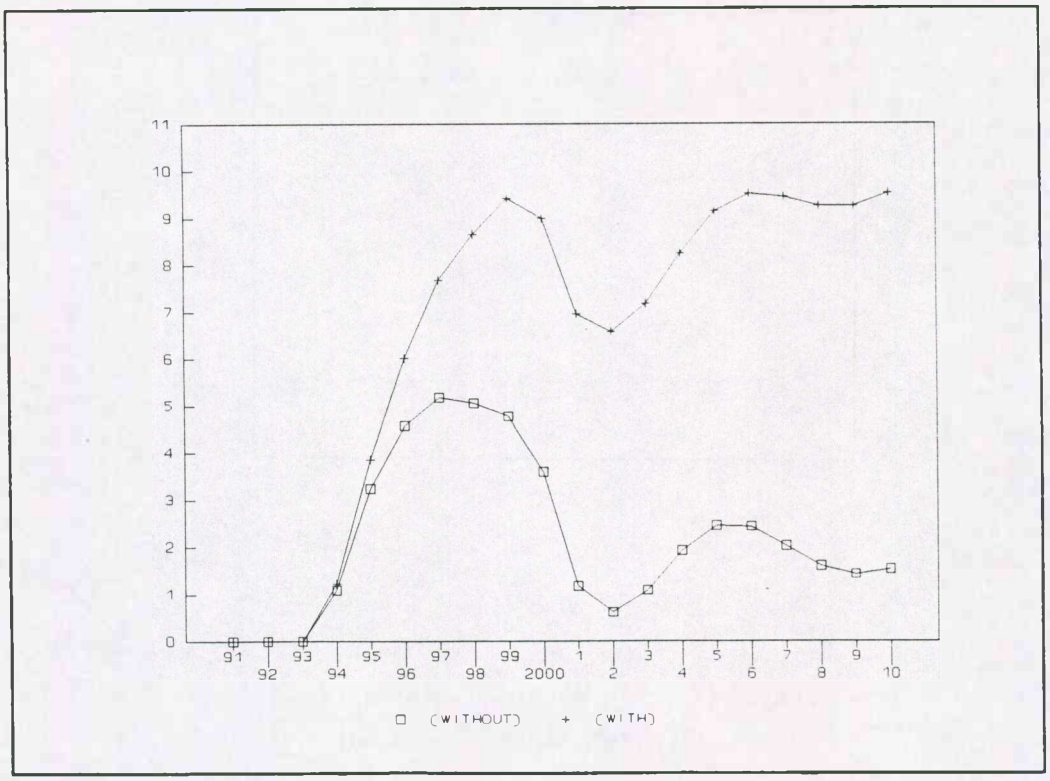


FIGURE 7.5

The Effects of Total CSF Actions
(+ with externalities, □ without)



above for the soft infrastructure interventions. The boost in competitiveness increases activity, output and productivity grow at a higher pace than in the baseline, and real wages improve. This erodes part of the jobs that could have been created, and employment remains at more or less the same levels.

7.5. Overall CSF Effects

The overall CSF will affect the economy through the cumulative impact of the separate actions. In the absence of externalities, output will rise by roughly 4.0% during the period of CSF actions but then will improve by only 1.5% of benchmark levels, mainly due

to the impact of productive investment. Growth rates of output and productivity will be returning to the base levels. The wage increases associated with the boom will have raised the participation rate, and at the same time some jobs will be gained. Unemployment rate may slightly rise after a period of containment in the years of CSF.

When all types of externalities are taken into account, total output in year 2010 will be higher than baseline by an impressive 9.5%, and, more importantly, will continue to grow at a rate faster by 0.26% per annum. Over the period of simulation the output growth rate averages above baseline rate by 0.55% per annum. During 1994-1999 the growth rate rises by around 1.2%, higher than the rate projected by the official CSF Plan for the same period. Employment expands by an average of 95,000 new jobs which is close to the figure officially expected.

8. Conclusions

Based on an estimated model of the Greek economy, the paper investigated the impact that interventions of the Community Support Framework 1994-1999 is likely to have on the economy of Greece. The analysis delineated four types of CSF actions and two kinds of effects. CSF actions were grouped according to whether they aim to (i) raise 'hard' infrastructure, (ii) finance 'soft' infrastructure interventions (such as R&D, health services, etc), (iii) support productive investment, and, (iv) train the labour force into new skills and improve the civil service. The effects were analysed first assuming that CSF operates only through raising the components of income and aggregate demand, and then by incorporating externalities on the productivity of output in various sectors and the reduction in costs.

The universal conclusion is that in the absence of externalities all types of CSF actions produce only a temporary rise in activity and employment, and, after the implementation period, the economy returns to the course that would have been the case without the funds. A permanent rise in growth, activity and employment is achieved only with CSF externalities. Such a conclusion may not be seen as surprising, given the disappointing experience of the first CSF 1989-1993. Being allocated mainly to a multitude of small-scale projects and uncoordinated actions, and driven mainly by the haste to absorb funds the first CSF had few lasting effects. The economy grew faster in 1990 and 1991, but then activity slackened. A similar picture emerges as a possible outcome for the second CSF if the effects are left to operate only through the demand side.

However, if externalities are assumed to operate even at a moderate scale, the picture changes starkly. Total output will be rising for a long period of time, and 10 years after the end of CSF will still be 9.5% higher than baseline. The economy will still be growing at a rate faster by 0.26% per annum, after having achieved an incremental increase of 0.55% per annum in average for a period of 15 years. Productivity, employment and the exporting capacity of the country will improve accordingly.

This finding has far-reaching implications for the allocation, implementation and monitoring of the Plan, since it calls for actions that ensure the maximum possible efficiency if a lasting improvement is to occur in the economy. National and EU authorities should make sure that the following conditions are satisfied in order to achieve the effect of externalities envisaged in the *ex ante* analysis of CSF:

(a) Design, construction and operation of hard infrastructure projects after a careful examination of the benefits that are going to accrue to the various sectors of economic

activity. The hard infrastructure actions of the Regional Programmes should be implemented in conjunction of the national-scale ones so that they supplementarity rather than repetition is achieved.

(b) The implementation of soft infrastructure actions should take into account the demand that is likely to develop for such services (e.g. R&D, culture, health, etc). The concentration on top-down activities that cannot attract substantial demand from the production and service sector should be avoided.

(c) Training and education should be geared to providing skills in current and future demand by the economic activities, so that their effect is felt on improving the productivity of the human factor.

(d) The implementation of the programme should ensure that all envisaged cofinancing by the private sector is realised, so that the maximum impact on investment and infrastructure utilisation is achieved.

The analysis in this paper is of course tentative and limited, not only because of its *ex ante* character but also because of the limitations of the model. Thus, several further steps should follow. First, the model itself should be further examined in its policy implications, tested in a greater number of multipliers, and improved by new estimation of equations as data become available. Second, the simulations of the model can be compared to microeconomic or industry-wide studies of the Greek economy, in which a more precise evaluation of the externalities effects can be obtained. Finally, the model should be extended to include the effects on crucial sectors such as the social security system, the environment, and the energy sector.

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