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The Macroeconomic Impact of  
British Privatisation**

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# **The Missing Shock: The Macroeconomic Impact of British Privatisation**

## **Summary**

The privatisation policy pursued in the UK by Mrs Thatcher's government (1979-1990) and subsequently by Mr Major's government (1990-1997) was the largest experiment in public divestitures among capitalist economies. It had a deep impact on economic policy-making world wide, and was vastly imitated, in Western Europe, in the former planned economies, in a number of less developed countries. In this paper we test the impact of privatisation on macroeconomic performance in the United Kingdom using quarterly data from 1979 to 1999. In the econometric model, we use privatisation proceeds as an explanatory variable and we control for several other variables. Testing for cointegration the results show that there is a long run equilibrium relationship between GDP growth and the variables used in the model. However, in our empirical analysis we find a weak evidence that privatisation generated an aggregate shock on output in the UK. This result is consistent with empirical literature on microeconomic evidence that shows that in the UK ownership change per se had little impact on long term productivity trends.

**Keywords:** Privatisation, United Kingdom, GDP growth

**JEL Classification:** H32, H82, L16, L33

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## 1. Introduction

The broad question we would like to discuss in this work is whether British privatisation may be considered a major policy shock in the context of the country macroeconomic performance in the long term. There are three reasons for this inquiry.

First, the British economy changed considerably in the around twenty years we consider since 1979. Therefore, it is interesting to see denationalization in a wider perspective, as a part of a policy package that generated or reacted to macroeconomic signals.

Second, microeconomic analysis, i.e. cost-benefit analysis for individual agents may fail to capture indirect effects and externalities or net benefits and costs to third parties. In principle, a set of shadow prices offers all what we need for a general equilibrium evaluation. In practice, however, we must often rely on proxies and on partial equilibrium assumptions. Looking for aggregate impacts may be a way to check whether there are major spillovers.

Third, as Florio (2002) argues, in principle we can evaluate a large-scale policy reform by a macroeconomic welfare function, including as arguments output, prices, income distribution, unemployment, and a set of welfare weights as parameters. Therefore, it is helpful to look at changes in these variables.

We perform a simple test focusing on real GDP and its determinants as controls for the role of privatisation in the UK. The quarterly data used spans the period 1979-1999. The model has been estimated in line with the cointegration technique. The time series involved are not stationary and that renders traditional statistical tests invalid, but according to Engle and Granger (1987) if the linear combination of the series is stationary then these series are cointegrated and there exists an error correction representation (ECM) that incorporates short run dynamic adjustment. Moreover, the cointegrating regression represents the long term equilibrium relationship among the variables in the model and if the variables are cointegrated the least squares estimators of the parameters are consistent.

The results of the empirical analysis suggest that there is weak evidence of an aggregate shock on output generated by the ownership change. The variation in GDP attributable to privatisation seems very close to zero. The result is consistent with microeconomic evidence discussed in Florio (2002).

The remainder of this paper is organised as follows. Section 2 presents some conceptual issues that may be relevant for the discussion. Section 3 illustrates some of the macroeconomic

trends in the UK before and after privatisation. Section 4 describes the specification of the model and presents the results. Concluding remarks are reported in section 5.

## 2. Analytical framework

To evaluate the impact of privatisation on macroeconomic trends in Britain, this section presents some topics that may be relevant for the discussion.

In the short run, following divestiture, we may observe mainly demand effects, and an IS-LM framework may be appropriate, in spite of its well-known limitations. In the medium term, we need to consider supply-side effects. Productivity, costs, and prices may change, and we turn to an AS-AD framework. Lastly, in the long run, we should look to sustainable output growth, and we would need a growth model. A full specification of these three frameworks for the British economy would be a daunting task that goes far beyond our research scope. We simply suggest a mental experiment.

To begin, and to simplify, suppose we are in a closed economy. In the short term, output matches demand of consumption goods, of investment goods, and of public expenditures. Broad money supply matches money demand, which in turn depends upon output, prices, and interest rate. Prices are fixed. When we move to a dynamic setting and we consider a sufficient time span, we need to explain price changes. In the familiar AS-AD context, the supply side of the economy results from consistent wage setting in the labour market and price setting by firms. The former depends upon expected prices and costs, current unemployment rate relative to its structural rate, and labour protection by legislation or unionisation. In the longer run, we should look at sustainable economic growth and its proximate factors, labour force, capital, and knowledge (or other suitable definitions of innovation drivers).

Privatisation may potentially have an impact on several macroeconomic variables, in the short run as in the long run, particularly on output, employment, investment, and TFP, hence on costs and prices. We present here, informally, just some examples, with the proviso that several other cases are possible. Privatisation, which we consider here as a one-time sale of assets, amounts initially to changing the ownership shares in the existing stock of domestic assets.

On the demand side, a crucial variable is the differential between the present value of income of a public and a privately owned enterprise, ‘the public-private valuation differential’ (see MacKenzie, 1998 and Florio, 2002). The value may be negative, positive or *zero*. This sets three possible cases: indifference pricing, overpricing, and underpricing.

With underpricing (overpricing), government sells its assets as equity capital at a price less (more) than the expected net present value of the future stream of income under public ownership

regime, discounted by the discount rate of uncommitted public funds. At the same time, the sale price is less than the private valuation of the assets (otherwise, private agents will not buy).

Indifference pricing occurs when the sale price is exactly equal to the net present value of assets to the owner, and there is coincidence with value to the buyer.

A second variable is the method of financing the acquisition by the private sector. There are the following illustrative financing cases, each of them compatible with the above valuation cases:

- a) bond/equity swap: buyers acquire equities by selling government bonds they own (we exclude here sale of corporate bonds)
- b) equity/equity swap: investors sell other equities and buy privatisation shares
- c) money/equity swap: reduction of money balances (we exclude here financing acquisitions by loans) finances the acquisitions.

Lastly, a third variable is the way in which the government uses the privatisation proceeds (for example for reducing the public debt, re-investment or financing current expenditure).

Government may buy back bonds and reduce its net debt, or it can use the proceeds to pay for new public investment goods or to finance current expenditure, or it can reduce taxation, without changing its fiscal stance.

If there are several privatisation initial share offerings, there may be cases where government selects a combination for one divestiture decision and another one for another, so that we observe a combination of cases. However, we disregard this possibility, and focus here on a “one shot” large scale divestiture decision. Moreover, government may accompany divestiture with lax or binding price regulation (or liberalisation).

Because we have three variables and three possibilities for each of them, and two regulatory regimes, there are then  $27 \times 2 = 54$  combinations, probably with different macroeconomic impacts. For example, we can observe indifference pricing cum equity/equity swap cum public investment increase and tough regulation; or overpricing cum money/equity swap cum tax decrease and lax regulation.

We focus here on just two illustrative combinations: privatisation with underpricing, public debt redemption, and with and without lax regulation or competition.

Government sells its assets as equity capital at a price less than the expected net present value of the future stream of income and less than the private valuation. Privatisation proceeds are committed to buy back bonds. Savers finance their acquisition of new equities by selling government bonds

This case has several macroeconomic consequences. In the short run, private wealth increases, because while the savers have to sell bonds up to a value of the sale price, they receive a

windfall capital gain<sup>1</sup> and that may give a push to demand. Because in the short run government taxes are unaffected, while public investment falls, fiscal policy is restrictive. However, the increase of private consumption and investment may counteract this negative impact. The IS curve shifts upwards, while the LM curve is unaffected. We may observe an initial demand shock, proportional to divestiture value and to the extent of underpricing.

In the medium term, the picture changes. First, if the private discount rate is greater than the social discount rate, as it often may be true, indifference pricing or underpricing imply that the stream of real income generated by privatised companies is higher than by the nationalised companies. This is because the valuation is inversely related to the discount rate. There are two different scenarios.

Private owners may expect higher productivity. This in turn, if the mark up is constant (or decreasing because privatisation is compounded with greater competition or strict price regulation) implies a decrease in output prices. For a large-scale privatisation (in the UK output of privatised corporations was around 10 percent of GDP, in transition economies a higher share), this reduces the general price index. Hence, real money increases and the LM curve shifts downwards. Aggregate demand shifts, and we have a new equilibrium with an increase of output, and a decrease of interest rate. Cost decrease implies that the AS curve shifts downwards and this allows higher output with price decrease. This sequence confirms the initial impact on demand. Employment may temporarily decrease, but higher output may counteract this initial impact.

Alternatively, with lax regulation and weak competition, we may observe a different story. Profit expectation after privatisation may be based on an outlook for higher relative prices. Private investors forecast undemanding price regulation and unconstrained market power. In the AS-AD framework, the result of a higher mark-up over costs may be inferior output equilibrium. Thus, while privatisation has limited impact on the IS curve because both public and private wealth are unaffected, it may have opposite impact on output in the longer term, following changes in relative prices.

Thus, we may have two new possible equilibria, one clearly expansionary, the other one recessive. These depend upon the origin of profit expectation, higher productivity or higher mark-up. In the “higher productivity” scenario, we have both favorable demand and supply effects. In the “higher mark-up scenario” the demand positive impact is counteracted by an adverse supply shock. There is a range of combinations between the two scenarios and some caveats.

First, government lost net wealth, or the net present value of future incomes, less privatisation proceeds. In the long run, if it wants to restore its net wealth it needs either to raise tax,

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<sup>1</sup> Florio (2002) shows that in the UK this may have been around 20 percent in 24 hours.

perhaps in the form of capital gains taxation (as with the Labour “windfall tax”) or to reduce current expenditures. This policy may counteract the expansionary impact of underpricing policy (even if households do not thrust the Barro-Ricardo equivalence).

Second, there may be a negative impact on private investment because underpricing is in fact a subsidy to buyers of already existing assets. This subsidy increases the return to equity of owners of privatised companies as compared with the owners of other companies, and may in the long run displace investment in other sectors.

Third, cost savings may counteract increased mark-ups.

Summing-up: in the short run, with underpricing, the impact is expansionary, government net worth is diminished, private net worth increased, and privatisation is not very different from a public transfer financed by debt. In the longer run, the increase of output could be further sustained by strict regulation or increased competition, but it could also be reversed by an increase of company mark-up. Government may limit the demand effects if it taxes away the capital gains that accrued to buyers or raises other taxes in future in order to recoup the wealth it has lost.

Incidentally, we may note that with underpricing and higher mark-up there is a regressive redistribution of wealth from the taxpayers and consumers in favor of the shareholders. This may bring down consumption and output in the long term (particularly if some of the shareholders are foreign investors).

An alternative or complementary path to bring down the AS curve, is to force down wages, perhaps through a decrease of labour protection (e.g. limiting the power of unions and the scope of labor legislation). This may have been important in the British experience.

Lastly, in an open economy with a regime of flexible exchange rates, a wide privatisation program may attract capital from abroad and thus we may observe appreciation of the local currency. However, if there are inflationary effects associated with divestiture, the opposite may happen. The sign of exchange rate change sign is therefore ambiguous.

All this looks rather complex, but in a sense, it amounts to restate the obvious. In the short term, privatisation may have mainly demand effects, and in medium term supply effects. This may change equilibrium output. There will be output increase if there is underpricing (without expectations of subsequent capital gain taxation), plus productivity increase, and no mark up increase.

Without an initial productivity shock, the impact of public divestitures on output will probably be negligible or negative.

In fact, the privatisation productivity jump may not materialise because of slack regulation, weak competition, and because the effect of ownership change per se is small.

In the long run, we need a permanent change in productivity performance to sustain a new growth pattern.

We discuss briefly this point. As Schipke (2001,p.11) points out:

“The extent to which a reduction in government activity has implications for output growth depends on whether and to what degree privatization affects the national savings rate, the level of capital investment (both physical and human), the efficiency with which the resources are used, and the rate of technological progress. Furthermore, whether the divestment of public enterprises has a one-time or transitory impact or instead affects economic growth permanently depends on which models captures growth process most adequately”.

According to endogenous growth theory, higher savings and investment, because of decrease of public deficit, may sustain a long term increase of the growth rate. Therefore, if privatisation contributes to better financial conditions in the public sector and to faster adoption of new technologies in the private sector, we should be able to discern not just output increase, but also output growth increase in the long run. The economy will change its development trajectory.

However, the “if” conditions are very important here, as our previous examples show.

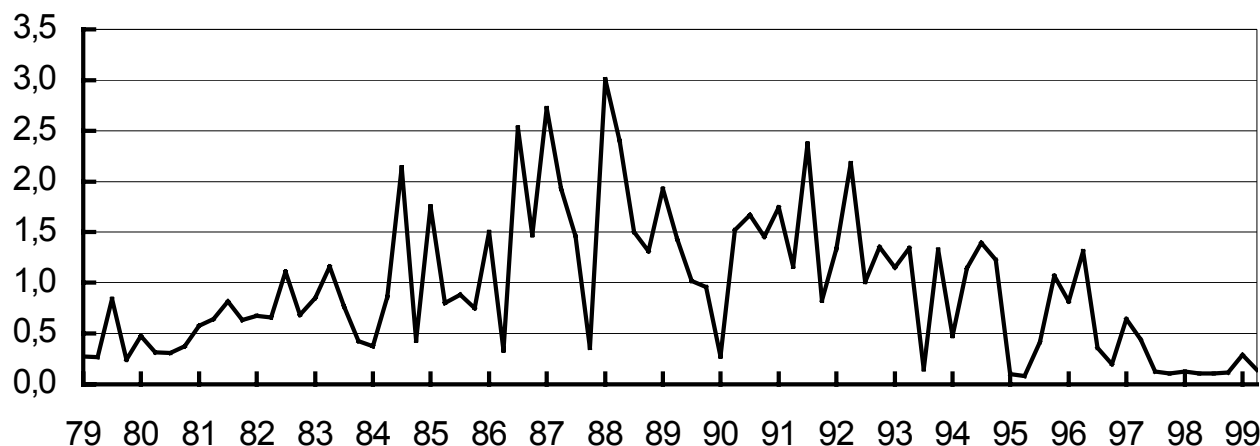
### **3. Macroeconomic trends in the UK**

The following is an illustration of the time profile of some macro variables to analyse the evolution of the macroeconomic trends in the UK during the period of privatisation.

a) in order to test the macroeconomic impact of privatisation we need an explanatory variable representative of divestitures. The most obvious candidate is the time series of privatisation proceeds, for which we have collected quarterly data, at constant 1995 prices, since 1979. Fig. 3.1 shows the privatisation proceeds as percentage of GDP. We added to net proceeds for sales of public corporation also the proceeds for the sales of council houses.



**Fig. 3.1 Privatisation proceeds as percentage of GDP (quarterly data)**



Source: our elaboration on ONS data.

Since, as presented in Fig. 3.1, the privatisation proceeds in some period are 2% or more of GDP, we could expect a significant impact of the privatisation programme on the macroeconomic performance in the UK. For example, Wallis (1987) and Florio (1990) review simulations of macroeconomic impacts of seven econometric models of the UK economy in the 1980s and find:

- 3.25% increase of public expenditures financed by high-powered money increase GDP by 0.6-0.9% for most models.
- 5% decrease of marginal rate of income tax (eg. from 30% to 28.5%) has a typical impact around 0.2% of GDP.
- 10% decrease of VAT rate (from 15% to 13.6%) has an impact around 0.2% on GDP.

All these examples have a dimension similar or inferior to the yearly flow of privatisation proceeds on most years. Thus we may be confident that the privatisation proceeding variable is not negligible in public finance terms.

b) The years between 1950-1979 were a period of relative decline for UK. Around 1950, the UK was third in the world, after the US and Switzerland, in terms of real per capita GDP (in PPP dollars, 1990, based on Maddison data). In 1979, UK was only 11<sup>th</sup>, after Belgium and Austria, while France and West Germany were now third and fourth in the ranking. Between 1979-1996 there was a further small drop, and UK ranked 12<sup>th</sup>. According to Craft (1998), the Conservative years were, if not a miracle, the end of the decline.

However, this achievement does not seem impressive. Ranking is not a very good performance. It seems better to compare levels. At the end of the 1970s, the per capita GDP of the UK was still 10 percent higher than the average for OECD countries. In 1996, it was 8 percent lower. The OECD (1998) survey<sup>2</sup> shows that the gap between the UK and the US between 1960 and 1996 was virtually unchanged (in fact, on average the gap was smaller in the first 20 years than after 1979).

Probably, the best comparison is with EU countries. If we take the British per capita income in 1960 to be 100, the other countries in the European Union recorded a level of 80 in 1960. These countries were recording over 100 in 1980 and, after some distancing in the following years, had overtaken the UK again in the 1990s.

To understand relative changes in income per person, we should consider GDP growth in different countries. Craft observes that it was 2.3 percent yearly for the UK 1950-1979, and 1,7 per cent in 1979-1996. He comments: "This took place in the context of a widespread retardation in growth in which British growth did not accelerate but slowed a lot less than most (other countries)." This may be true, but it is not an indication of good performance. Real GDP yearly growth in the UK 1960-1973, before the first oil shock, was more than 3 per cent, and only 1,4 percent in 1973-1979. It is fair to say that after those troubled years, the British economy simply converged to the low growth of most other developed countries.

After an initial slowdown probably because of monetarist policies in the 1980s, the annual rate of growth of GDP in the UK in the last decade of Conservative years, was around 2.5 per cent. This growth rate for the UK was probably close to its average for the last 50 years (Maddison,2001).

It is true that in 1950-1979, the British growth rate was only two thirds of the average of OECD countries. However, that average included excellent performances in some countries, as the growth rates of Japan (6,8 per cent), West Germany or Italy (both around 4,5 per cent). In the following twenty years, growth in the UK was still marginally below the OECD average. This does not look as a British growth miracle. It is the coming back of the old pattern, after the slump in the 1970s. At the same time, it reflects the fading of the true miracle in other countries. This view is reinforced when we look at productivity trends.

According to OECD (1998), privatisation, liberalisation, and deregulation of the labour market in the UK had a substantial impact on productivity.

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<sup>2</sup> OECD (1998, fig. 11, p.55)

“The wide-reaching programme of structural reform over the past couple of decades has probably helped UK productivity levels to catch-up with best practices although a substantial gap remains” (OECD, 1998, p. 54).

In fact, productivity per employee and per hour worked increased between 1985 and 1996 in the UK at a higher rate than that of other G7 countries, enabling the country to reduce the gap from the US. If we take 100 to be the value added per hour worked (or per worker) in the manufacturing sector in the US, in the UK it was 45.0 in 1960; 53.6 in 1973; 59.7 in 1985; and 69.7 in 1995.

Other authors suggest that the productivity growth in the 1980s in the UK was genuine and largely due to reduction of union power<sup>3</sup>, but masked by poor macroeconomic management and adverse demand side conditions. Again, this may be true, but labour productivity can increase for two different reasons. Sustained output growth can exceed employment growth. Alternatively, the denominator drives the process, and stable or modestly increasing output faces sharply decreasing employment. As we shall see below, in the UK there was wide de-industrialisation and unemployment tripled in few years. Hence, labour productivity growth exceeded output per capita growth.

Obviously, demand has an important role in productivity trends. In fact, the relative gain in productivity was 16 per cent in the last ten years of the period considered, during which the policies of the Conservative governments were fully unfurled. However, it was 19% in the 13 years before the first oil shock, years in which the political situation was quite different, with powerful trade unions and a large nationalised sector. In the intervening period, between 1973 and 1985, the relative increase in productivity was 11%.

International comparisons offer mixed evidence that the Conservative years mark an aggregate productivity jump.

Moreover, when we consider separately the manufacturing sector and the marketed services, the story is different. In the former, the monetary squeeze and recession in the early 1980s provoked substantial labour shedding and then raised capital per employee. Labour productivity growth in manufacturing increased substantially, while there was no change or decrease in the service sector that includes most of the privatised industries.

c) we turn now to our controls, starting with investments. In the 1990s<sup>4</sup>, public investments in the UK declined at an average annual rate of 0.8%, with a cumulative effect of falling from a modest 1.3% in 1988 to 0.98% in 1997, perhaps the lowest level of all OECD countries. This

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<sup>3</sup> Oulton, 1995; Brown et al, 1997

<sup>4</sup> Cf. OECD Tab. A, p.176

phenomenon is only to be expected if a large scale privatization policy is not offset by using the proceeds from divestments for infrastructure investments but rather for public debt redemption or financing current expenditure<sup>5</sup>.

We can ask ourselves whether private investment substituted public investment to a corresponding or higher degree. The rate of growth of private investments over the period averaged 2.5% (2.9% of residential construction). However, despite this rate of growth, the gross non-residential investment in the UK, as a share of GDP, is the lowest in the European Union.

The OECD (1998) Survey on UK states that:

“Low investment, especially by companies (...) manufacturing and public sector (...) has become, in conjunction with sluggish labour supply, a barrier to sustained expansion” (p. 18).

On the arrival of the Thatcher government in the UK the *ratio* of investment to GDP was in the region of 18%, in 1997 it had then fallen to below 16% (with a peak of over 20% in 1989)<sup>6</sup>.

d) The 1980s in the United Kingdom witnessed a decisive attack by the Government on elements of rigidity in the labour market. Senior Conservative politicians considered privatisation also, if not mainly, as a move with which to weaken the trade unions.

“Since the early 1980s, the United Kingdom’s labour market has been radically transformed. A series of employment laws reduced employees’, and especially unions’, bargaining power. Wage councils - which set occupational minimum wages and work conditions - were largely abolished, welfare benefits reduced in relative terms and eligibility tightened. These reforms helped reduce structural unemployment but had little discernible effect on raising employment rates. Despite a highly deregulated and more flexible labour market, the aggregate participation rate has not increased over the past couple of decades, averaging 75%, considerably lower than the United States and Scandinavian countries” (OECD, 1998).

One could note here that the participation rate in the UK is much higher than in a number of countries in continental Europe.

Moreover, of the 7.5 million individuals of working age but economically inactive, a large quota is made up of people either taking early retirement or defined as disabled.

The second group, especially, recorded a spectacular increase. Over the twenty years the absolute increase was 1.5 million people, or 4% of the population. As a result, while unemployment fell, also

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<sup>5</sup> See Appendix, chapter 1; Newbery, 2002.

<sup>6</sup> The OECD data on the other hand are not in full agreement with the picture that emerges from HM Treasury (1999, p. 131) which, at 1995 prices, shows growth in the ratio of non-residential investments to GDP between 1982 and 1989, then drop off until 1994 and subsequently a noticeable recovery.

because of the increased participation of women, there was an increase in the number of people with a history of work who were excluded from the labour force, especially adult males.

On average, between 1988 and 1997 the unemployment rate in the UK was 8.1% and at the end of the period it was 7.1%. This is a quite a low figure if compared to the situation in a number of other countries in continental Europe. However, if a large part of the increase in the number of disabled and early-retired is disguised unemployment, then involuntary unemployment in United Kingdom was over 10%, no better than that of other European countries.

It seems reasonable to conjecture that a part of the involuntary unemployment disguised as invalidity or early-retirement can be traced back to the large scale downsizing of privatised firms.

e) Looking at the budget balance of the public sector there is evidence of a deterioration in the 1970s, followed by a policy of fiscal contraction in the 1980s, which coincides with the three mandates of Mrs. Thatcher, and then a worsening in the 1990s under the government of John Major, and lastly a net improvement in recent years of our time horizon.

The ratio of public debt to GDP contracted in the 1970s, falling by a good 20 points, remained stable in the first half of the 1980s, decreased in the second half of the decade by almost another 20, and then worsened again (an increase of roughly 10 points).

The net worth of the public sector (which includes both financial liabilities and real assets) deteriorated considerably, from a maximum of 82% of GDP in 1979 to a minimum of 13.7% of GDP in 1998.

Between 1979 and 1997 the *ratio* between taxation and GDP increased by 2 points; over the same period total public spending fell from 43% to 39%; the average reduction, if we compare the seventies, eighties and nineties, does not appear to be an impressive one for a government strongly committed to “rolling back the state”.

Moreover, a large part of the cuts in spending was due to the decline in public investments.

f) Inflationary process in the UK is a long-term phenomenon, which, despite the monetarist policies of the first phase of Conservative governments, has been a constant feature over the past twenty years. HM Treasury (1999, p. 10) summarises it as follows:

“...for most of the past 30 years, the UK's inflation record has been poor. During the 1970's, inflation averaged 13 per cent, peaking at almost 27 per cent in August 1975. Inflation averaged 7 per cent during the 1980s and reached over 9 per cent in the early 1990s. From 1980 to 1997 the

UK had the second highest average inflation rate of the G7 countries, and it had greater variability in inflation than all countries but France and Italy”.

In this context, we can ask ourselves whether the sectors that were first nationalised and then privatised contributed to containing inflation, if they were neutral or if, on the contrary, they amplified it.

When we control for demand and input prices, the privatised sectors did not experienced output price trends that were terribly different from the long run performance of the nationalised industries. Furthermore, while some of these sectors may have recorded some reductions in prices in real terms, for example telecommunications, others recorded increases, for example water, buses, and railways.

To sum up our findings are the following.

First, public sector investment in the UK fell quite drastically over the period considered for two distinct reasons:

- a) because as state owned enterprises gradually disappear, so do their investments;
- b) because of the adoption of restrictive budgetary measures.

Private investment did not substitute falling public investment. Although, after a long period of stagnation private investments picked up at the end of the 1990s, coinciding with the favorable cycle in the whole OECD area, the investment ratio in the UK was low in comparison with EU countries. This hindered output growth.

Second, despite the liberalisation of the labour market and the transfer of a large number of workers from the traditionally very unionised public sector to the private one, the participation rate did not increase. Involuntary unemployment, bearing in mind disguised forms of unemployment due to early retirement or invalidity, did not decrease and was no lower than that of many EU countries.

Third, long term inflation in the UK was no lower, and often higher than that of other European countries. The prices of the services of some privatised utilities dropped, but others increased. Even conceding that the average price index of privatised firms was falling in comparison with RPI index, overall the productivity change in the service sector was modest and real price decrease was lower than its potential<sup>7</sup>.

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<sup>7</sup> The inflationary impact of cuts in capital account public spending was studied by Buitier (1987), in a different context. He shows, applying a model of a small open economy, that public investments cuts four separate effects:

- a) A direct effect on spending, which presumes a reduction of the budget deficit of exactly the same size as the investment cut;
- b) A direct effect on budget revenues, equal to the variation in cash flows from the management of public capital;

Moreover, one specific channel of transmission suggested by the UK experience is the formation of an unexpected capital gain by households because of underpricing of privatisation shares and council houses. To accommodate this ‘shock’ of unexpected enrichment, the families’ marginal propensity to saving should rise, if only provisionally. What actually happened was that during the period considered the rate of saving of families plummeted and there were occasional booms in consumption and real estate investments.

In the first phase of the British privatisation policy, under-pricing, public investment cuts and tax reforms, faced with rigidity of supply, because of the prolonged stagnation of private and public investments, contributed to inflationary trends and to large deficits in the trade balance.

Fourth, there is no clear evidence that positive shocks on the supply side did anything to divert economic growth in the UK from its long-term trend. It is also difficult to identify any effect on the level of GDP and on productivity changes in the long-run. The “miracle” apparently was just the end of decades of relative decline in comparison to other countries. However, this was more the effect of the fading of exceptionally high growth elsewhere than of a good performance of the British economy.

Having said this, apparently we have a conceptual case for a shock while prima facie no clear evidence of it: thus, we want to test our time series to discover if data may support the view that after controlling for other variables, privatization in fact had a potential beneficial effect on output.

#### 4. Methodology and results

In specifying our model we take into account the results shown in Barnett (2000). The author, using a panel of 18 countries, analyses the relationship between privatisation programme and macroeconomic performance and he finds that increased privatisation is associated with improvement in real GDP growth. In the regressions, Barnett includes both contemporaneous and lagged proceeds coming from privatisation and the only control variables used is the lagged GDP growth.<sup>8</sup> In our work we try to replicate the same framework using UK data, but our results seem

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- c) An indirect effect on tax revenue, as a consequence of the influence of lower investments on aggregate demand and thus on fiscal receipts;
  - d) Lastly an effect on the demand for money which, given a certain rate of real interest and of inflation, operates through the income (or wealth) of the agents.

Whilst it is clear, also intuitively, that *ceteris paribus* effect a) is deflationary and that effect b) is ambiguous, the last two effects are unambiguously inflationary. It is therefore possible that the two groups of effects balance each other out.

<sup>8</sup> In order to determine the permanent effects of privatisation on GDP growth, the author estimates equations of the following form:  $y_{it} = \mu_i + \alpha y_{i,t-1} + \delta p_{it} + u_{it}$  where  $y_{it}$  is the GDP growth,  $p_{it}$  are privatisation proceeds expressed as a share of GDP and  $u_{it}$  are the residuals.

not to be robust and quite different suggesting that such a model is likely not to be suitable for UK analyses.<sup>9</sup>

In the paper we develop a different model to perform a simple test of the long run impact of privatisation on output in the UK. Our test focuses on real GDP and its determinants as controls for the role of privatisation.

We test a loglinear regression equation of the form:

$$y_t = \mu + \beta Priv_t + \gamma z_t + \varepsilon_t \quad (1)$$

where:  $y_t$  is real GDP,  $Priv_t$  are privatization proceeds,  $z_t$  is a vector of explanatory variables and  $\varepsilon_t$  is an error term. Our variable of interest is  $Priv$ , therefore a positive and significant estimate of the parameter  $\beta$  would suggest a positive long-run elasticity between privatization and output for the UK economy.

Based on the previous discussion, and data availability, the variables we have selected as controls include, for different specifications: government expenditures, taxes, investment, export, import, broad money supply, inflation, interest rates, unemployment, the working days lost because of industrial actions, price of shares and surplus per employee. In other words, it is hypothesised that the real GDP is affected by several demand and supply related variables and, in order to identify the role of privatisation on GDP, a measure of privatisation proceeds is added. We use quarterly data and the period covered is 1979-1999. We transform nominal values in 1995 constant pounds by the appropriate GDP deflators<sup>10</sup>.

The empirical regression equation (1) is in loglinear form, causing the coefficient of the variables to be elasticity and reducing heteroscedasticity.

One of the main issues related to the estimation of time series data, concerns the stationarity of the variables involved. In fact, statistical inference about the parameter may be problematic if the level representation of real GDP contains non stationary variables. Therefore, stationarity tests are conducted for the several concerned variables used in the model. Performing a Dickey and Fuller's (1979) ADF (augmented Dickey-Fuller) test and Phillips and Perron's (PP) (1988) test, we find that the variables involved are integrated of the same order: I(1). Figure A.1, reported in the Appendix, presents the trend of each variables used in the model.

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<sup>9</sup> Our regressions are not reported in the paper, and are available with the authors on request.

<sup>10</sup> See Appendix for data sources and details of variable construction.



A second issue that is closely related to the first is whether the concerned variables are cointegrated. This is important, because if there exists cointegration, it can be concluded that there is a long-run equilibrium relationship between these variables even if they are nonstationary. Moreover, if there is cointegration the regressions (1), called the "cointegrating regression", is attempted to fit the long run equilibrium relationship without worrying about the dynamics and the least square estimators of the parameters are consistent.

The test for cointegration proceeds in two steps following Engle and Granger (1987) procedure. First, after testing the integration of the individual series, we run the cointegrating regression linking the several series in level, as in equation (1). Once equation (1) is estimated, the residuals,  $\varepsilon_t$ , are recovered and subjected to the usual unit root test using ADF test and/or PP test. If the residuals are stationary we can assume cointegration. A cointegrating regression is suggested to represent the long-term equilibrium while the cointegrating error term  $\varepsilon_{t-1}$  serves as a measure of disequilibrium. If evidence in support of cointegration is found, we estimate an error correction model (ECM) that incorporate the first differenced form of equation (1) and its lagged residuals, as follows:

$$\Delta y_t = \mu + \beta \Delta Priv_t + \gamma \Delta z_t + \theta \varepsilon_{t-1} + u_t \quad (2)$$

where  $u_t$  is a random error term.

It is interesting to note that estimating equation (1) in first differences (excluding the error correction term) is inappropriate if the variables have an error correction representation; the omission of the error correction term would entail a misspecification error and a potentially biased elasticity coefficient if cointegration is admitted.

Further, a negative and statistically significant estimate of  $\theta$  would suggest convergence of the model to a long-run equilibrium and the coefficient  $\theta$  can be interpreted as a speed of the adjustment.

Regarding the empirical results, the estimation of equations (1) with some different specifications are shown in Tab.4.1. The residuals generated from the cointegration equation are tested for stationarity using ADF and PP test and the test statistics generated from the equations (1) and (2) are presented in Tab. 4.1.

For every different specification the tests indicate that the residuals are stationary and therefore this suggest that there exists cointegration. Hence, there generally exists a significant long-run relationship between the UK GDP and the several variables included in the model.

Regarding our interest in the coefficient of *Priv* we find that in most specifications the coefficient  $\beta$  is positive and statistically significant but very close to zero, suggesting a weak impact on the growth of the country. In some model we use the rate of interest instead of M4 as control variables. In these cases, the coefficient  $\beta$  is never significant and the ADF and PP test suggest that there exists a weak co-integration among the variables involved.

From Tab. 4.1 we may analyse the long-run elasticity of the other control variables included in the model, and the sign of their estimated coefficient seems in line with the macroeconomic theory.

To examine the short-term adjustment process to deviation from the long-run equilibrium relationship the parameters of the error correction model are presented in Tab. 4.2. The results show that  $\beta$ , that indicates the short run effect of privatisation proceeds on GDP, is not statistically significant. In Tab. 4.2 we report a standard diagnostic test (Ramsey's RESET).

In conclusion, we find a statistically significant positive parameter for privatisation proceeds, but it is very close to zero. GDP elasticity for privatisation proceeds is around 0,003 in our best empirical model. We obviously need to be careful in the interpretation, because we are testing a simple reduced form equation of the UK economy and there may be several omitted variables.

However, in other models, where we consider cumulated proceeds or where we use an HP filter for GDP, or other explanatory variables, the parameter estimates are even lower or not significant<sup>11</sup>.

These coefficient estimates, taken together, suggest that - at least until 1999 - privatization *per se* had a very modest macroeconomic impact on GDP in the UK. Therefore, we can exclude the existence of major growth externalities in our time horizon, and we can turn to the microeconomic approach.

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<sup>11</sup> The regressions are not reported in the paper, and are available with the authors on request.

**Tab. 4.1**

Estimates of the cointegration regression model Equation 1 with log GDP as the dependent variable.

Variabili	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	5.622 <i>a</i> (19.39)	6.15 <i>a</i> (27.35)	6.959 <i>a</i> (17.69)	6.438 <i>a</i> (16.47)	6.375 <i>a</i> (15.34)	6.167 <i>a</i> (19.06)	6.882 <i>a</i> (17.11)	6.653 <i>a</i> (15.24)
PRIV	0.005 <i>a</i> (2.78)	0.001 (0.74)	0.003 <i>b</i> (2.16)	0.005 <i>a</i> (2.91)	0.004 <i>a</i> (2.67)	0.001 (0.74)	0.003 <i>c</i> (1.84)	0.003 <i>c</i> (1.87)
GNET	0.060 <i>b</i> (2.06)	0.025 (1.20)	0.051 <i>b</i> (2.15)	0.058 <i>b</i> (2.29)	0.064 <i>b</i> (2.26)	0.025 (1.18)	0.061 <i>b</i> (2.34)	0.064 <i>b</i> (2.13)
INV	0.343 <i>a</i> (17.19)	0.212 <i>a</i> (8.52)	0.28 <i>a</i> (11.76)	0.286 <i>a</i> (9.40)	0.285 <i>a</i> (9.25)	0.211 <i>a</i> (7.57)	0.274 <i>a</i> (11.12)	0.287 <i>a</i> (11.13)
EXP	0.214 <i>a</i> (9.32)	0.187 <i>a</i> (10.27)	0.165 <i>a</i> (6.99)	0.171 <i>a</i> (6.28)	0.173 <i>a</i> (6.24)	0.186 <i>a</i> (8.30)	0.167 <i>a</i> (7.04)	0.172 <i>a</i> (6.64)
M4		0.115 <i>a</i> (6.79)				0.114 <i>a</i> (5.97)		
INTEREST	0.009 (0.815)				0.005 (0.47)		0.010 (0.93)	-0.007 (-0.99)
INFLATION	-0.013 <i>b</i> (-1.96)	-0.011 <i>a</i> (-3.10)	-0.010 <i>b</i> (-2.28)	-0.008 <i>c</i> (-1.70)	-0.01 (-1.50)	-0.011 <i>a</i> (-3.01)	-0.014 <i>b</i> (-2.26)	
UNEMPLOYMENT	-0.012 (-1.35)	-0.024 <i>a</i> (-3.50)	-0.037 <i>a</i> (-3.65)	-0.027 <i>a</i> (-2.54)	-0.027 <i>a</i> (-2.57)	-0.025 <i>a</i> (-2.90)	-0.039 <i>a</i> (-3.76)	-0.029 <i>a</i> (-2.97)
DAYLOST	-0.009 <i>a</i> (-4.91)	-0.004 <i>b</i> (-2.34)	-0.012 <i>a</i> (-6.70)	-0.007 <i>a</i> (-3.64)	-0.007 <i>a</i> (-3.65)	-0.004 <i>b</i> (-2.27)	-0.012 <i>a</i> (-6.73)	-0.012 <i>a</i> (-6.15)
UNDER								0.002 (0.57)
SURPLUS			0.092 <i>a</i> (4.12)				0.092 <i>a</i> (4.13)	0.088 <i>a</i> (3.76)
FTSE 100				0.036 <i>a</i> (2.56)	0.035 <i>b</i> (2.45)	0.001 (0.08)		
R <sup>2</sup> adj	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
DW	1.23	0.83	1.35	1.15	1.15	0.84	1.36	1.35
ADF	-3.23	-2.66	-3.94	-2.85	-2.89	-2.65	-4.08	-4.11
PP	-6.16	-4.63	-6.45	-5.83	-5.86	-4.62	-6.50	-6.70

Note: t-statistics are in parentheses. *a*, *b*, *c* denotes statistical significant at 1%, 5% and 10% level of significance. The critical values of the ADF and PP statistics are computed by McKinnon at the 1, 5 and 10% level are -3.51, -2.89, -2.58 respectively.

**Tab. 4.2**

Estimates of the error correction model Equation 2 with the first difference of log GDP as the dependent variable.

Variabili	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.003 <i>a</i> (4.66)	0.001 (1.55)	0.003 <i>a</i> (4.35)	0.003 <i>a</i> (4.41)	0.003 <i>a</i> (4.63)	0.001 (1.39)	0.003 <i>a</i> (4.48)	0.003 <i>a</i> (4.27)
ΔPRIV	5.15E-05 (0.07)	-0.0005 (-0.77)	-0.0004 (-0.68)	3.06E-05 (0.04)	5.65E-05 (0.079)	-0.0005 (-0.77)	-0.0005 (-0.68)	-0.0003 (-0.45)
ΔGNET	0.006 (0.41)	-0.002 (-0.12)	0.01 (0.69)	0.002 (0.15)	0.005 (0.37)	-0.001 (-0.10)	0.013 (0.90)	0.009 (0.60)
ΔINV	0.083 <i>a</i> (3.31)	0.073 <i>a</i> (3.27)	0.07 <i>a</i> (2.99)	0.082 <i>a</i> (3.43)	0.074 <i>a</i> (3.00)	0.070 <i>a</i> (3.15)	0.064 <i>a</i> (2.65)	0.076 <i>a</i> (3.01)
ΔEXP	0.128 <i>a</i> (3.93)	0.112 <i>a</i> (3.78)	0.115 <i>a</i> (3.63)	0.118 <i>a</i> (3.58)	0.109 <i>a</i> (3.29)	0.103 <i>a</i> (3.35)	0.108 <i>a</i> (3.37)	0.112 <i>a</i> (3.31)
ΔM4		0.181 <i>a</i> (4.29)				0.182 <i>a</i> (4.32)		
ΔINTEREST	0.011 (1.49)				0.01 (1.47)		0.008 (1.23)	-0.002 (-0.34)
ΔINFLATION	-0.01 <i>a</i> (-2.76)	-0.004 (-1.27)	-0.009 <i>a</i> (-3.07)	-0.006 <i>c</i> (-1.85)	-0.009 <i>b</i> (-2.40)	-0.003 (-1.08)	-0.012 <i>a</i> (-3.45)	
ΔUNEMPLOYMENT	-0.065 <i>a</i> (-4.86)	-0.063 <i>a</i> (-4.50)	-0.064 <i>a</i> (-4.50)	-0.07 <i>a</i> (-5.15)	-0.071 <i>a</i> (-5.24)	-0.065 <i>a</i> (-5.11)	-0.065 <i>a</i> (-5.09)	-0.057 <i>a</i> (-4.38)
ΔDAYLOST	-0.003 <i>b</i> (-2.35)	-0.002 <i>c</i> (-1.85)	-0.004 <i>a</i> (-3.06)	-0.003 <i>b</i> (-2.16)	-0.003 <i>b</i> (-2.21)	-0.002 <i>c</i> (-1.89)	-0.004 <i>a</i> (-3.05)	-0.004 <i>a</i> (-2.85)
ΔUNDER								-0.0005 (-0.21)
ΔSURPLUS			0.051 <i>a</i> (3.63)				0.051 <i>a</i> (3.59)	0.044 <i>a</i> (3.00)
ΔFTSE 100				0.011 (1.46)	0.011 (1.41)	0.008 (1.10)		
ECM(-1)	-0.284 <i>a</i> (-4.32)	-0.374 <i>a</i> (-4.84)	-0.30 <i>a</i> (-4.25)	-0.299 <i>a</i> (-4.40)	-0.299 <i>a</i> (-4.43)	-0.379 <i>a</i> (-4.90)	-0.301 <i>a</i> (-4.24)	-0.303 <i>a</i> (-4.13)
R <sup>2</sup>	0.60	0.65	0.63	0.59	0.60	0.66	0.64	0.60
R <sup>2</sup> adj	0.54	0.60	0.58	0.54	0.55	0.61	0.59	0.54
DW	1.67	1.91	1.89	1.72	1.66	1.89	1.84	1.74
Test RESET	0.82 prob (0.37)	1.78 prob (0.19)	0.50 prob (0.48)	2.20 prob (0.14)	1.99 prob (0.16)	2.80 prob (0.10)	0.45 prob (0.50)	0.65 prob. (0.42)

Note: t-statistics are in parentheses. a, b, c denotes statistical significant at 1%, 5% and 10% level of significance.

## 5. Conclusion

The objective of this paper is to analyse the impact of privatisation on macroeconomic performance in the United Kingdom.

The first issue that we have investigated regarding the impact that the different ways of selling public assets may have on output. From this angle, if the government wants to increase output in the long run should not focus only on privatisation but should promote other industrial policy such as competition or price regulation.

The second issue refers to the trend of some macroeconomic variables. The analysis suggests there is no clear evidence of a structural break in GDP growth before and after privatisation. Moreover, there is no evidence of productivity changes in the long run; the participation rate did not increase; public investment dropped sharply; the long term inflation in the UK was no lower than that of other European countries .

In the empirical exercise we estimate the long-run relationship between privatisation proceeds and gross domestic product in the UK. Our main objective is to see whether privatisation had positive effects on the macroeconomic improvement in Britain. Following the cointegration techniques we have found a weak relationship between our variable of interest, namely privatisation proceeds, and the GDP. This result is confirmed in most specifications we have used, both in long run and short run equation.

We repeat, these are just conjectures that are scarcely demonstrable at this stage. However, it appears to be equally difficult with the data that we have reported to demonstrate the opposite position: that privatisation over the past twenty years had a positive impact on the country's growth and welfare.

Two possible objections are worth considering. One may admit that there is no macroeconomic evidence of a supply-side shock, but consider that this is because the impact, albeit positive, is small and cannot be captured by aggregate variables. A related, but somewhat different objection is that the positive impact is masked by other adverse changes (Oulton, 1995).

As for the first objection, the issue seems to be how we can say that a supply shock is "small" relative to the economy. If we consider the privatisation proceeds/GDP its dimension is certainly not negligible, being in some years more than 1-2 per cent of GDP. This dimension is comparable with fiscal reforms that are usually tested by standard macro-econometric models of the British economy as we have described in section 2.

The second possible objection is similar in spirit, but it advances the doubt that positive and negative shocks cancel out each other. There is little doubt that monetary policy and high exchange rates in the 1980s damaged the British economy, particularly exports. There is also little doubt that there was an investment slowdown for most of the 1990s. Our empirical models support the view that GDP in the UK is highly dependent on the rest of the world and on investment. According to Oulton (1995), without the British participation in the ERM and without budgetary mismanagement by the Exchequer in the '90s, we may have been able to observe the positive impact of the supply side shocks, including industrial legislation reform, privatisation, and higher participation in education and vocational training. However, our empirical tests control for fiscal stance, exports,

and investments, and we cannot confirm nothing more than a very modest impact of privatisation *per se*.

The results presented are in keeping with microeconomic evidence that shows that the impact of ownership change *per se* is limited (Florio, 2003) and that the drivers of productivity changes are demand, technology, regulation and liberalisation.

In conclusion: if government wants to increase output in the long run should not focus on privatisation, but on ways to achieve higher productivity in the concerned sector. It should have an industrial policy to do that. This may include privatisation and an active policy to promote competition, or privatisation and strict price regulation, or restructuring state owned enterprises in combination with competition or with price regulation and a hard budget constraint. Which solution is better depends upon the best way in practice to get a productivity jump.

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## Appendix

Descriptions of the data used and their sources follow.

The data are quarterly and cover the period 1979:2-1999:1. Data are at constant 1995 prices and seasonally adjusted; data at current prices have been deflated by the GDP deflator.

The main sources for the data is ONS except for UNEMPL data that are from OECD and FTSE100 data that are from Datastream.

Variables:

PRIV: Privatisation Proceeds. The main source of Privatisation Proceeds are ONS "Financial statistic explanatory handbook, 2000 edition, and HM Treasury "Public expenditure: statistical analyses"

GDP: Gross Domestic Product

GNET : Net Government Expenditure calculated as: Total Current Government Expenditure less Public Sector Taxes on Income and Wealth

INV: Gross Fixed Capital Formation

EXP: Exports Total

M4: Broad Money Stock, end of period, level

INTEREST: Three Month Yield, Treasury Bills

INFLATION: RPI:Percentage change over 12 months - all items

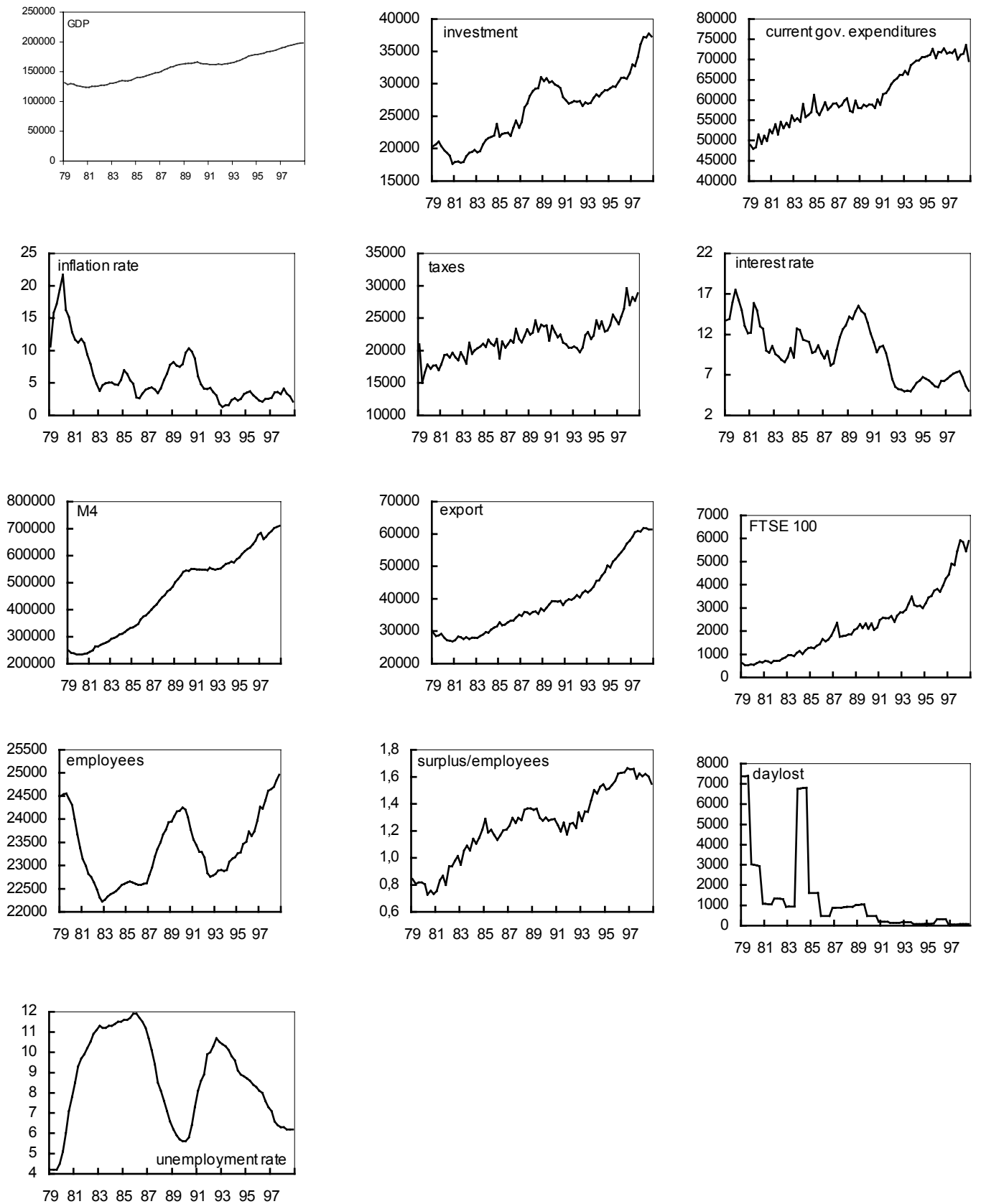
UNEMPL: Unemployed percentage of total labour force (source: OECD)

DAYLOST: Working Days Lost, yearly data. The quarterly data are calculated using the percentage of employee in each quarters.

SURPLUS: is a measure of mark-up calculated as: Gross Operating Surplus over Employee Jobs

FTSE100: is another measure of mark-up. FTSE 100 Price Index (Datastream)

**Fig. A.1 Macroeconomic Variables**



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- (lix) This paper was presented at the ENGIME Workshop on “Mapping Diversity”, Leuven, May 16-17, 2002
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- (lxi) This paper was presented at the Eighth Meeting of the Coalition Theory Network organised by the GREQAM, Aix-en-Provence, France, January 24-25, 2003
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- (lxv) This paper was presented at the EuroConference on “Auctions and Market Design: Theory, Evidence and Applications” organised by Fondazione Eni Enrico Mattei and sponsored by the EU, Milan, September 25-27, 2003
- (lxvi) This paper has been presented at the 4th BioEcon Workshop on “Economic Analysis of Policies for Biodiversity Conservation” organised on behalf of the BIOECON Network by Fondazione Eni Enrico Mattei, Venice International University (VIU) and University College London (UCL), Venice, August 28-29, 2003
- (lxvii) This paper has been presented at the international conference on “Tourism and Sustainable Economic Development – Macro and Micro Economic Issues” jointly organised by CRENoS (Università di Cagliari e Sassari, Italy) and Fondazione Eni Enrico Mattei, and supported by the World Bank, Sardinia, September 19-20, 2003
- (lxviii) This paper was presented at the ENGIME Workshop on “Governance and Policies in Multicultural Cities”, Rome, June 5-6, 2003
- (lxix) This paper was presented at the Fourth EEP Plenary Workshop and EEP Conference “The Future of Climate Policy”, Cagliari, Italy, 27-28 March 2003
- (lxx) This paper was presented at the 9<sup>th</sup> Coalition Theory Workshop on "Collective Decisions and Institutional Design" organised by the Universitat Autònoma de Barcelona and held in Barcelona, Spain, January 30-31, 2004

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