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**Fiscal Deficits, Monetary Growth and Inflation  
Under Flexible Exchange Rates: the Italian Experience**

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## Fiscal Deficits, Monetary Growth and Inflation Under Flexible Exchange Rates: the Italian Experience\*

### *Introduction*

Since the conservative government of Margaret Thatcher came to power in 1979, the United Kingdom has embarked upon a policy of reducing the role of the public sector in the economy, which is the subject of heated controversy. The aim of the policy is to reduce the rate of inflation in the United Kingdom and to increase the efficiency of the private sector and thus the rate of growth of real gross domestic product (GDP) which is sustainable in the long run. However, aside from accelerating inflation in its initial phases due mainly, but not only to higher indirect taxes, the program entails a cost in terms of lower GDP growth and higher unemployment at least in the short run. Most of the controversy centers around the economic (and political) cost of higher unemployment in the short run compared with the longer-run benefits of a lower inflation rate.

Under many respects Italy's experience in the 1970s has been very similar to that of the U.K.'s: high inflation rates, coupled with sharp depreciations of the exchange rate, high public sector expenditure and large government budget deficits. The Italian economic profession and policy makers are perfectly aware that the high public sector deficit and the high ratio of government expenditure on goods and services and of government transfers to GDP have an impact on inflation. Several attempts have been made to reduce the Treasury financing requirement. On the whole

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these attempts have been characterized by the concern to proceed very gradually and by a greater emphasis on increasing tax revenues than to reduce expenditure.

This paper hopes to shed some light on the debate currently going on in Italy about the role of the public sector deficit by trying to quantify, (i) the contribution of the public sector to Italian inflation in the 1970s, (ii) the cost in terms of foregone GDP growth of a policy aimed at reducing the role of the public sector in the economy. For this purpose a medium sized model of the Italian economy composed of 20 stochastic equations and 11 identities is used in the paper. The model is specified in continuous time and is estimated by full information maximum likelihood using Wymer's programs (1976, 1979).

The plan of the paper is as follows. Section 1 briefly describes the behaviour of Italian government expenditure, government transfers, the Treasury financing requirement, money growth, inflation, and the growth of real wages in the 1970s. Section 2 briefly describes the model used for the simulations presented in Section 3. In Section 3 the level of real government expenditure on goods and services, the level of nominal government transfers and the ratio of direct taxes and social security contributions to the nominal wage bill are kept constant<sup>1</sup> at the level of the first quarter of 1973 and the model is used to simulate the time path of the key endogenous variables. No normative value should be attached to the particular path chosen for the fiscal variables in the simulation, whose only aim is to analyze the effect on the economy of a major change in fiscal policy. The simulated variables are then compared with the path they actually followed from the first quarter of 1973 to the third quarter of 1978.

The main results of the exercise can be summarized as follows: (i) the price level would have been about 22 per cent lower by the end of 1978 with respect to the actual outcome if the fiscal strategy described above had been adopted in early 1973, i.e., inflation would have been on average almost 4 percentage points lower per year; (ii) the cost in terms of foregone GDP

<sup>1</sup> In addition the exogenous growth rate of real wages has been halved with respect to the value estimated for the period 1961-1978 to bring it more in line with the actual real growth rate of wages in the 1973-1978 period. The real wage rate whose exogenous growth rate has been halved is defined net of social security contributions paid by firms and workers and net of direct taxation on dependent labor income.

growth would have been in the order of about 1 per cent per year on average for the six year period and in the fifth year the level of GDP would have returned to the level of the historical control solution; (iii) employment in industry would not have suffered much both because the wedge between nominal wages gross of direct taxes and social security contributions and net wages is assumed not to increase under the strategy adopted and because the rate of growth of net real wages estimated for the period 1960-78 has been halved, a plausible assumption given that the implementation of the policy package envisaged here would have required labor union's approval<sup>2</sup>. These conclusions are subject to the goodness of the estimated model and have to be taken with some caution. However, they seem to suggest that bold fiscal action rather than a step by step strategy is required in Italy to reduce inflation permanently and that it is important to implement major cuts on the expenditure (and transfer) side of the public sector<sup>3</sup>.

Due to space limitations, the equations of the model, the parameter estimates, and the ex post root mean square errors of the static and dynamic forecast are not reported in this paper. They are however reported in Tullio (1981 a).

#### 1. *The growth of the public sector in Italy from 1968 to 1978: an overview*

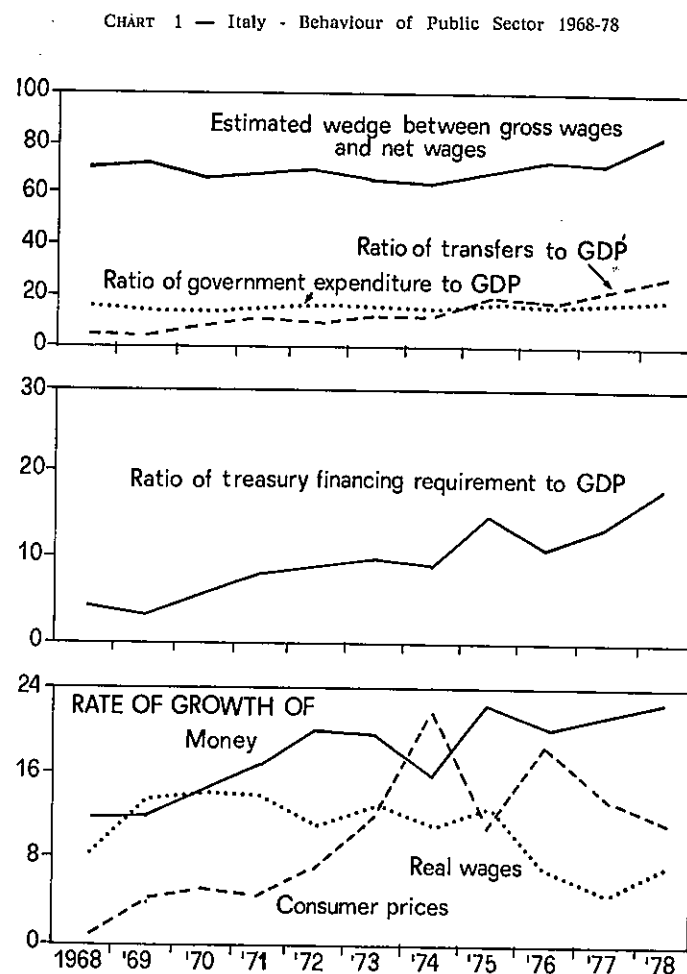
Chart 1 shows the behavior of a number of key fiscal variables like government expenditure on goods and services, transfers and the Treasury financing requirement as a ratio to GDP from 1968 to 1978. Also an estimate of the wedge between wages gross of social security contributions and wages net of direct taxes is shown in Panel 1. A number of non-fiscal variables like inflation, the rate of growth of money and the rate of growth of hourly real wages in industry are shown in Panel 3. The year 1968 precedes the big wage push of 1969 and was therefore chosen as the initial year. The last year for which data are reported in Chart 1 is 1978 both because the sample period for estimation of the model does not go beyond 1978 and because in 1979 external

<sup>2</sup> For a detailed description of the reasons for halving this rate of growth see Section 3.

<sup>3</sup> An interesting issue not analyzed here is whether a drastic increase in taxes would also reduce inflation without affecting the long term growth path of the economy.

factors start playing a greater role in the determination of Italian inflation in connection with the new round of oil price increases.

Panel 1 shows that the ratio of government expenditure including investment on goods and services to GDP has remained



relatively constant over time at around 15 per cent, but that transfers have increased sharply from less than 6 per cent of GDP in 1968 to over 25 per cent in 1978. Since tax revenues did not increase accordingly the Treasury financing requirement grew as a

ratio of GDP from about 4 per cent in 1968 to almost 18 per cent in 1978. The large addition to net wealth of the private sector arising from the large public sector deficit provided a stimulus to consumption and to inflation.

Another interesting development was the growth of the wedge between wages gross of social security contributions paid by workers and firms and the wage net of direct taxes paid by dependent labor (Panel 1). The increase in this wedge has an important effect on the economy because inflation, the demand for labor and employment are affected by the gross wage rate, while the workers and labor unions can reasonably be assumed to be interested in the wage net of social security contributions and direct taxes. If the wedge goes up labor becomes more militant in the attempt to keep real net wages from being eroded. The Italian government has on several occasions in the ten years under review reduced the cost of the social security system to firms by transferring part of the cost to the government budget. But whatever the short-run effects of this policy on profit margins and on inflation, the medium run effects are highly uncertain because the budget deficit worsens, other things being equal. In order to contribute to the reduction of inflation in a permanent manner, it would be preferable to reduce the costs of the social security system by increasing its efficiency and by reducing the extent of the services provided by it until the benefit to the workers would equal the social cost of the system. Right now it does not seem to be incorrect to say that the benefit to workers is much smaller than the social cost, however, defined. Otherwise the working class could have been talked into accepting a reduction or a smaller increase in real net wages in exchange for more social security. The wedge as we have estimated it<sup>4</sup> was about 71 per cent in 1968 fell to 64 per cent in 1974 and went up to almost 83 per cent in 1978. Thus, despite the fact that some of the costs of the social security system were taken over by the budget in the course of the seventies, in 1978 the wage rate gross of all items mentioned above was almost double than the net wage. The size of this wedge is a very strong incentive for workers and firms to develop a black or hidden economy in which the wedge is zero.

<sup>4</sup> The computation of the wedge involved an estimation of the share of social security contributions paid by firms and the workers as well as of the degree of direct taxation of wages.

## 2. *The structure of the model*<sup>5</sup>

The main emphasis of the model used in the simulation of this paper is on the interaction between stocks and flows and hence between the monetary and financial side of the economy on the one hand and the real side on the other. It is therefore particularly suited to study the transmission mechanism of monetary and fiscal policy.

The exchange rate was initially assumed to be exogenous and the 29 equations model was estimated for the whole sample period i.e., from the third quarter of 1961 to the end of 1978, under this assumption. Two more stochastic equations were then added to the model, one endogenizing the exchange rate and the other endogenizing the interest rate on Treasury bills, whose market became very large only in the course of the 1970s, in connection with unprecedented levels of the Government budget deficits. The enlarged model was then reestimated for the flexible exchange rate period (first quarter of 1973 to third quarter of 1978) by constraining the parameters of most equations to be equal to the estimated values obtained from the smaller model for the whole period. In this way despite the problem of insufficient observations relating to the flexible exchange rate period the exchange rate could be endogenized and the effects of fiscal and monetary policy could be simulated also on the exchange rate.

Two features of the model used here are particularly worth noting because of their novelty in empirical work. First, the sum of physical capital and financial net (outside) wealth is used as the main scale variable in both the financial sector and in the real sector of the economy. Second, a series of expected inflation rates based on sample surveys is used in the model and the mechanism of formation of expectations is explained.

The first feature allows disturbances in financial markets to have a direct impact on consumption and hence on the level of economic activity. For example, changes in the effective exchange rate, which change the valuation of the stock of foreign assets owned by domestic residents, and changes in the current account both are allowed to affect consumption.

<sup>5</sup> For a more detailed presentation of the model used here see Tullio, (1981a).

The second feature involves use of a series for the expected rate of inflation of wholesale prices constructed on the basis of sample surveys that exist in Italy<sup>6</sup>. These expectations have been endogenized in the model with the change in expectations being explained by the rate of growth of import prices and by a cyclical term (equation 14 of Table 2 of the Appendix of Tullio (1981a)). Inflationary expectations affect investment, consumption and asset demands and are therefore an important channel of transmission of monetary policy, in addition to changes in the stock of wealth.

Four sectors interact in the model: the private sector, commercial banks, the foreign sector and the Government sector which includes the Bank of Italy. The version of the model with the exchange rate exogenous, is composed of 18 stochastic equations plus 11 identities.

The financial system explains the following endogenous variables: (i) currency in circulation outside banks (equation 2), (ii) total deposits at commercial banks (equation 1), (iii) postal savings deposits (equation 3), (iv) government bonds held by the private non-bank sector (equation 4), (v) net foreign assets held by the private sector (equation 5), (vi) net foreign assets held by commercial banks (equation 6), (vii) government bonds and bills held by banks (equation 21) and (viii) the interest rate on government bonds (equation 17). There are two identities, one defining the wealth of the private sector (equation 24) and another for the balance sheet of commercial banks, which is assumed to determine bank credit to the private sector (equation 25). The scale variable in all asset demand functions of the private sector is total net wealth in real terms, except in the demand function for currency in circulation, where the transaction motive is assumed to prevail. Total net wealth is the sum of the stock of real capital in industry plus all financial assets held by the private sector, minus advances by commercial banks to the private sector. All these financial variables are deflated by the general price level. Furthermore the stock of assets held abroad is included as part of wealth and corrected for capital gains and losses resulting from

<sup>6</sup> The survey allows for 6 classes of expectation of the rate of change of wholesale prices: -5 per cent or less, -4 to -2, -1 to +1, 2 to 4, more than 5 and no expectations. The series obtained is believed to be fairly accurate. See I. Visco (1976).

exchange rate changes<sup>7</sup>. Financial wealth results also from the cumulation of the current account and the government budget deficit and could therefore also be defined accordingly in the model. This additional identity is implicit in the model; if introduced explicitly it could determine the stock of financial wealth and equation (24) would then determine one of the financial assets which are here kept exogenous.

All demand functions for asset holdings are assumed to be homogenous of degree one in prices (ex-ante homogeneity). The actual nominal rate of growth of total bank deposits is assumed to depend on the discrepancy between desired and actual real deposits and on the actual rate of inflation. Expected inflation is assumed to affect the demand for bank deposits positively because periods of high expected inflation have also been in the recent Italian experience periods of greater uncertainty.

Also part of the financial block is the equation determining the interest rate on government bonds (equation 17), which is assumed to adjust with a lag to the foreign interest rate corrected for the expected inflation differential between Italy and the rest of the world. The ratio of net reserves to imports is also assumed to affect the interest rate. This equation could be also interpreted as a reaction function of the Bank of Italy. Under this interpretation the Bank of Italy is assumed to adjust the interest rate to movements in foreign rates and inflation differentials and to reserve movements. Alternatively the interest rate could be considered as market determined. Yet the first interpretation appears more realistic owing to the occasionally heavy intervention of the Bank of Italy in the market for government bonds. In the version of the model estimated from 1973 to 1978 the interest rate of Treasury bills is also endogenous (equation 19). Thus the term structure of interest rates albeit in a simple form is endogenous in the second version of the model.

Turning to expenditure, output and the labor market, the model retains the Keynesian feature that output is demand-determined in the short run. The endogenous components of gross domestic product are: (i) private consumption expenditure (equation 7), (ii) private investment in machinery and equipment (equa-

<sup>7</sup> The stock of assets held abroad was obtained by cumulating the capital account of the balance of payments. It is therefore net of financial assets owned by foreigners in Italy, which are a small magnitude compared to the stock of financial assets owned by Italians abroad.

tion 8),<sup>8</sup>, (iii) exports of manufactured goods (equation 9), (iv) imports of manufactured goods (equation 11), and (v) imports of raw materials and other non-manufactured goods (equation 12). By contrast exports of non-manufactured goods<sup>9</sup>, exports and imports of services, public and private construction and government expenditure are all exogenous. Since the industrial sector is the leading sector in the Italian economy<sup>10</sup>, real value added in industry which appears in the demand for labor (equation 16), in the equation determining expectations of inflation (equation 14), and inflation (equation 13) in both import demand functions (equation 11 and 12) and in the investment function is also endogenous (equation 27).

The labor market comprises two stochastic equations, one determining nominal hourly wage rates in industry (equation 15) and the other the demand for labor by firms in the industrial sector (equation 16).

As far as the foreign sector is concerned, imports and exports have been split into three categories: services, manufactured goods and other goods. Services have been considered as exogenous along with exports of non-manufactures, which are a very small fraction of total exports. The split into three categories was done in order to avoid aggregation problems and obtain a better estimate of price elasticities in Italian foreign trade. This is of particular importance in connection with any J-curve effects that might be observed. Changes in the net international reserves of the Bank of Italy are determined by the balance of payments identity (equation 23).

Turning to the government sector, real government expenditure and nominal transfers are assumed to be exogenously determined. Total revenues are instead assumed to depend with a lag on nominal GDP (equation 18). An important identity in the model is the government budget constraint (equation 21). The government budget deficit, is assumed to be financed by sales of bonds and bills to the public and the banks, by issuing postal deposits and by borrowing from the Central Bank.

<sup>8</sup> Italian data on inventory accumulation are believed to be rather unreliable and no attempt was made to explain inventory accumulation.

<sup>9</sup> They are less than 10 per cent of total exports of goods.

<sup>10</sup> See Paolo Sylos Labini (1968).

In the Italian institutional setting the assumption that real government expenditure is exogenous and not the dependent variable of a policy reaction function is quite realistic since government expenditure has not been actively used as an anticyclical tool. By contrast monetary policy has been widely used as an instrument to control the cycle.

### 3. Fiscal policy simulation: 1973-1978

The model presented in the previous section has been used to simulate from 1973 to 1978 the effects on the Italian economy of a more restrictive fiscal policy than the one which has been actually followed during the period. It is assumed that the real level of government expenditure on goods and services ( $g$ ) is kept fixed at the level of the first quarter of 1973. Nominal government transfers ( $Tr$ ) are also kept constant at the level of the same quarter. Because the wedge between nominal wage costs of firms and wages net of social security contributions and direct taxes is exogenous in the model (see equation 15a) it is consistent with the reduction in taxes implied by the above fiscal policy to assume that the ratio of direct taxes to dependent labor income is also kept constant at the level of the first quarter of 1973. Furthermore the estimated exogenous growth rate of real wages is clearly unsustainable in the long run. In order to bring it more in line with the rate of growth of technical change and population, it was halved. Two considerations are in order here. First, the trend in real net wages, parameter  $\beta_{37}$  of equation (15b) in table 2 of the Appendix of Tullio (1981a), estimated over the whole period 1961-78 implies a growth rate of 9-10 per cent per year. In the period from 1973 to 1978 the actual annual rate of growth of wages net of social security contributions and direct taxes has fallen considerably to about 2 per cent per year both because labor unions have become somewhat less aggressive but above all because the wedge between gross wages and net wages has increased markedly (see Chart 1). Thus the halving is consistent with the experience of the period 1973-1978 and makes the simulation more realistic. Second, a simulation has been performed also by leaving parameter  $\beta_{37}$  unchanged. It turns out that the path of output is lower and prices higher but the difference is not striking probably because the period of the simulation is relatively

short and nominal wages affect prices in the model with very long lags. Part of the seemingly low sensitivity of inflation and total output to changes in the path of real net wages is also due to the fact that we are dealing here only with wages in the industrial sector, which implies that the wage rate in all other sectors is the same in the two simulations<sup>11</sup>.

Chart 2 shows the time path of the ratios of the exogenous variables  $g$  and  $Tr$  in the simulation to their actual historical values. Real government expenditure, is about 10 per cent lower by the end of the sample period and nominal government transfers about 55 per cent lower<sup>12</sup>. Taking into account the reduction in inflation which the model predicts, government transfers would be lowered by a smaller amount in real terms, by the end of the period.

The model is then simulated from the first quarter of 1973 to the third quarter of 1978. The last quarter of 1978 was dropped for estimation of the flexible rate model and for simulation because of the sharp recovery which occurred in that quarter and data problems in the foreign trade statistics. The average level of the simulated variables is then compared with the average level of the actual ones. The difference of the average values of the simulated endogenous variable expressed as a per cent of the actual historical values is contained in the first column of Table 1. The second column contains the root mean square errors of forecasts.

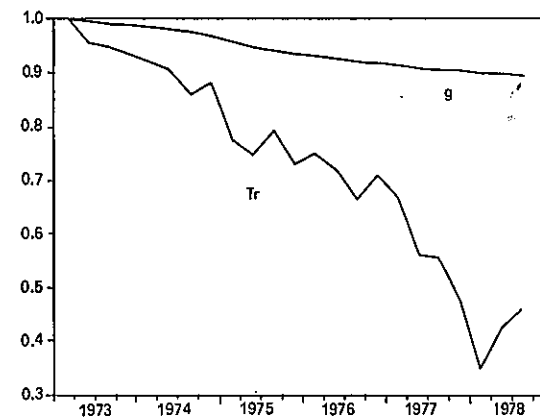
If the policy outlined above had been adopted in early 1973 the average price level would have been about 17 per cent lower in the roughly six year period. However, in the third quarter of 1978 it would have been about 22 per cent lower. The corresponding appreciation of the effective exchange rate would have been 32 per cent by the end of the sample period. Italian import prices and export prices of competitors in lire would have followed a very similar pattern. Export prices of Italian manufactures would have fallen less thus improving the Italian manufacturing terms of trade. Real exports would have followed the changes in relative export prices and fluctuations in foreign income and would

<sup>11</sup> Net real wages in industry grow at about 10 per cent per year in the simulation with  $\beta_{37}$  equal to the estimated value and at about 5 per cent in the other. The wage rate for the whole economy grows therefore at about 2 percentage point more in the first simulation (5 times the weight of industrial output in total GDP).

<sup>12</sup> The data used for Chart 2 are those used for estimation; they are moving averages of the raw data.

have fallen on average by about 2 per cent. Real imports of manufactures and of raw materials would have been 15 and 5 per cent lower on average largely because of a lower level of value added in manufacturing. Thus imports would have checked the fall in GDP considerably to less than 1 per cent for the average of the period<sup>13</sup>. A cost of less than 1

CHART 2 — Italy - Ratio of Real Government expenditure and nominal Government transfers used in simulation exercise to actual values (1973-Q1 to 1978-Q3)



per cent foregone GDP growth over a period of 6 years seems to be a relatively small cost considering the large fall in average inflation and the improved financial conditions. Furthermore, it is likely that the average fall in GDP and in particular of industrial value added is overvalued in the model, because the wage policy envisaged to accompany the fiscal restraint would have led to a fall in real wages and a considerable increase in employment in industry. Since there are no direct feedbacks in the model from employment in industry to value added in industry, the increased demand for labor is probably not fully transmitted to output<sup>14</sup>. Interest rates and the expected rate of inflation would all have been lower on average, as expected.

<sup>13</sup> The term «fall» has to be interpreted here relative to the control solution. Hence GDP would only have grown less than in the control solution.

<sup>14</sup> In order to avoid this shortcoming the supply sector of the economy would have to be developed in greater detail. This is left for further work.

Before proceeding further it is perhaps important to point out that the money supply is endogenous in the model. Hence the ultimate cause of the reduction in inflation would not necessarily have been the restrictive fiscal policy alone, but fiscal policy coupled with the financial policy which monetary authorities could have followed under the changed circumstances.

TABLE 1 — Italy: Mean Deviations of Endogenous Variables of Simulation from Actual Values and Root Mean Square Errors in Forecasts

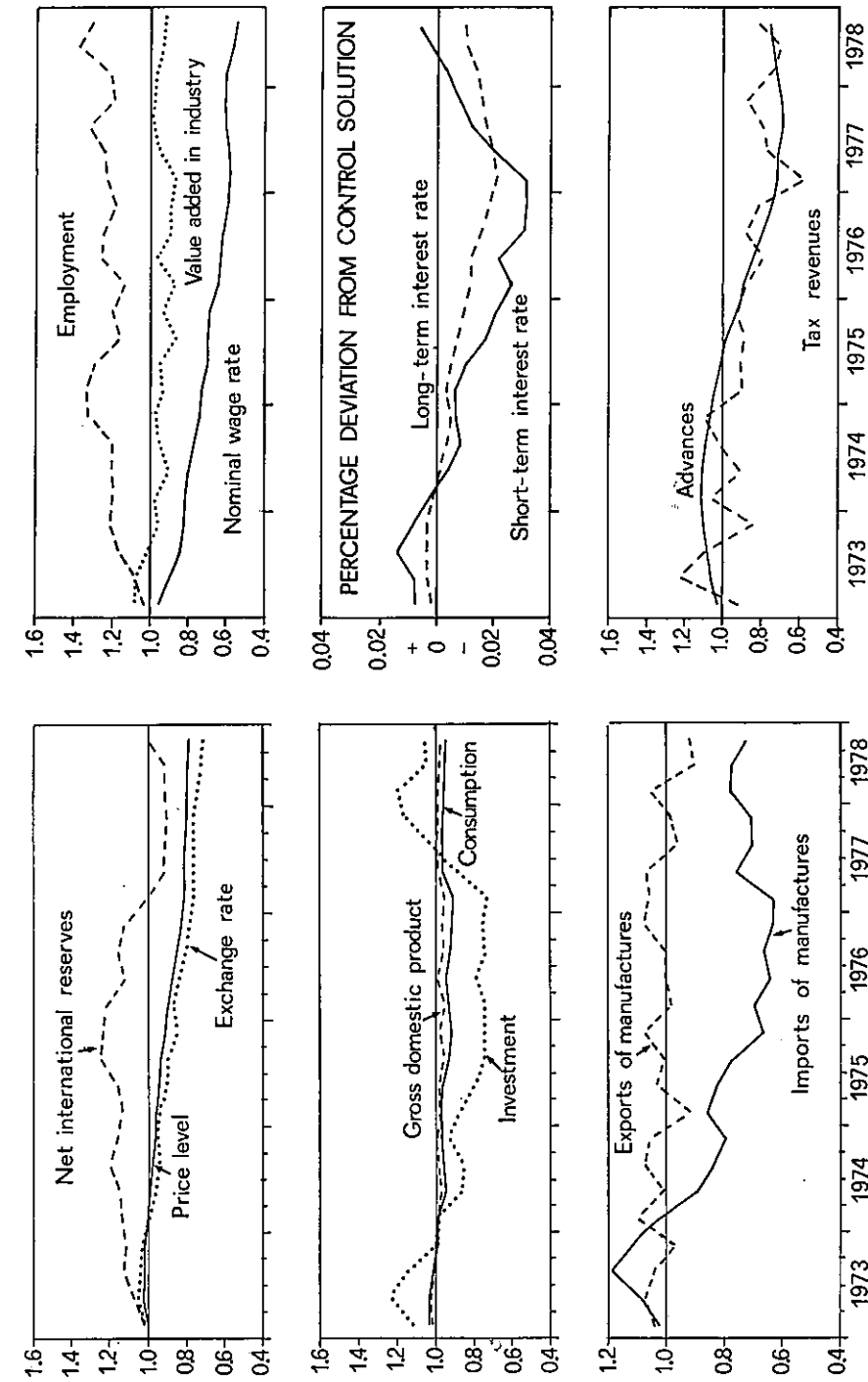
Variable	Mean deviation $y^s - y^a / y^a$	Root mean square error in forecasts	Variable	Mean deviation $y^s - y^a / y^a$	Root mean square error in forecasts
TBD	-0.157	0.205	L	-0.197	0.221
C	-0.053	0.080	$r_{TIT}$	-0.011	0.015
PSD	-0.408	0.424	T	-0.188	0.295
B	-0.422	0.512	S	-0.195	0.223
BF	-0.005	0.109	$r_B$	-0.009	0.022
BFB	-0.164	0.279	BB	-0.242	0.703
d	-0.021	0.067	$K_{IND}$	-0.022	0.032
inv	-0.013	0.262	$R_n$	-0.537	0.345
$x_M$	-0.018	0.088	f	-0.004	0.098
$p_{im}$	-0.182	0.206	A	-0.136	0.131
$i_M$	-0.148	0.303	y	-0.008	0.015
$i_o$	-0.045	0.195	$v_{IND}$	-0.026	0.046
p	-0.167	0.187	$p_{im}$	-0.203	0.229
$\Pi^e$	-0.007	0.016	$p_{io}$	-0.203	0.231
w	-0.423	0.454	$p_i$	-0.202	0.227
			$p_{imw}$	-0.201	0.224

More interesting than these comparisons of the averages which depend crucially on the length of the period chosen is the time profile of the main variables with respect to the values resulting from the dynamic forecasts in which all exogenous variables take on their historical values. Chart 3 shows the time profile of the main simulated variables in the system as a per cent deviation from the values resulting from the dynamic forecasts. On the whole the policy envisaged here exerts most of its impact on the real economy within three to four years. Fluctuations in investment are particularly marked and have a strong impact on the observed behavior of GDP. The time profile of investment is determined largely by the behavior of the real interest rate which initially falls due to a larger increase of short-term expectations of inflation<sup>15</sup> than of the nominal rate of interest. The rise in investment

<sup>15</sup> The series of expectations of inflation used in estimation refers to expectations of wholesale price inflation in the 6 months ahead.



CHART 3 — Ratio of Simulated Variables to Historical Control Solution (Q1-1973 to Q3-1978)



stimulates income in the first two quarters of the simulation. The fall in the real interest rate is therefore intensified by the increase in short-run expected inflation which in turn is influenced positively in the two initial quarters of the simulation by the growth of GDP above the control solution. The actual behavior of prices and of the exchange rate in the first two quarters of the simulation is such that expectations of inflation turn out to be correct, which as far as consumer prices are concerned is not surprising given that the two equations have the same explanatory variables (equation 13 and 14).

This « perverse » crowding-in effect of reduced fiscal expenditures on expectations of inflation, inflation, the exchange rate and the level of GDP is not only very small but also short level. As the exchange rate starts appreciating with respect to the control solution and the fall in expectations of inflation causes the real interest rate to rise, real investment falls below the control solution for several years. As a result GDP also falls below the control solution.

An interesting aspect of the simulation is the appreciation of the exchange rate in real terms i.e. the lira appreciates in effective terms more than justified by the behavior of the price level. This is due to the sharp improvement in the current account and in the capital account of the balance of payments. It should be noted however that the strong appreciation of the lira is the most important factor which keeps inflation low in the simulation. The second most important factor is the fact that GDP would have been below the level of the control solution from 1974 to mid 1977. The deviation between the level of simulated GDP and the one resulting from the dynamic forecast would have been the greatest in 1976 with a shortfall of about 3 per cent, but afterwards GDP would have grown substantially faster than in the control solution such as to virtually close the gap by mid 1977.

#### 4. Concluding comments

This paper has presented one restrictive fiscal policy simulation performed from 1973 to 1978 with a macroeconomic model specified in continuous time and estimated by full information maximum likelihood using Wymer's programs (1976, 1979).

The policy strategy whose consequences for inflation, the exchange rate and GDP have been analyzed consisted of keep-

ing real government expenditure ( $g$ ) constant at the level of the first quarters of 1973. Similarly, the nominal level of government transfers ( $Tr$ ) has been assumed to remain constant at the level of the first quarter of 1973. Finally, the trend rate of growth of real wages estimated for the whole sample period has been halved and the ratio of direct taxes to dependent labor income has also been kept constant. The time path of all the endogenous variables of the model has then been compared with the time path obtained from the dynamic forecasts of the model. All exogenous variables other than the ones mentioned above follow their actual historical path both in the simulation and in the control solution.

The results of the simulation are the following: the price level would have been about 22 per cent lower by the end of the simulation period, implying almost a 4 per cent lower inflation rate per year and the exchange rate would have appreciated by 32 per cent with respect to the control solution. At the same time it turns out that the cost in terms of foregone GDP growth would have been about 1 per cent on average over the roughly 6 year period. It goes without saying that the reliability of these results depends on the goodness of fit of the estimated model.

If the simulation results presented in this paper can be considered reliable, it seems that the government budget deficit coupled with the increase in the stock of money which it entailed, given the reaction function of monetary authorities, has been a most important source of inflation in Italy<sup>16</sup>. It follows that the inflation problem cannot be solved without courageous cuts in government budget expenditures and in the government budget deficit. These qualitative results are well known in the literature on the causes of inflation. Our contribution consisted in quantifying the effects on inflation of a reduction in fiscal expenditure and in showing that the costs in terms of foregone GDP growth and employment would not seem to be substantial, especially if the policy package is accompanied by a moderate growth of wages adjusted for inflation.

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<sup>16</sup> The growth of money in the face of high budget deficits is made endogenous in the model via a reaction function of Italian monetary authorities.

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## RESUME

Dans la première partie du travail on décrit les tendances des principales variables économiques en Italie de 1968 à 1978 avec une attention particulière aux variables fiscales et aux salaires bruts et nets.

Dans la deuxième partie du travail on estime, avec l'aide d'un modèle économétrique de l'économie italienne, l'effet de l'augmentation du déficit des finances publiques sur l'inflation en Italie de 1973 à 1978.

Le modèle, composé de 31 équations est décrit dans le numéro de Mars 1981 de l'« I.M.F. Staff Papers ». Il s'agit d'un modèle de déséquilibre estimé dans le temps continu avec une méthode de maximum vraisemblance développé par Clifford Wimer.

Dans une simulation on suppose que les dépenses du secteur public sont constantes au niveau du premier trimestre 1973. La politique monétaire est déterminée par une fonction de réaction de la Banque Centrale, estimée pour l'entière période 1961-1978. En outre on suppose que la différence entre les coûts nominaux du travail dans l'industrie et les salaires nets de contributions sociales et d'impôts directs, reste constante.

Les résultats de la simulation montrent que si on avait suivi la politique fiscale supposée de 1973 à 1978 l'inflation annuelle aurait été plus basse de presque quatre points par rapport à l'inflation actuelle. C'est à dire à la fin de 1978 le niveau des prix aurait été de 22 pour cent plus bas que le niveau historique.

En même temps le coût en terme de produit national brut aurait été limité: le produit national brut se serait accru moins que l'accroissement historique pendant trois ans et demi, mais en 1977 il se serait accru beaucoup plus. Déjà avant la fin de la période de simulation il aurait atteint le niveau historique.

## ZUSAMMENFASSUNG

Im ersten Teil der Arbeit wird beschrieben, wie sich die wichtigsten wirtschaftlichen Grössen in Italien von Jahre 1968 bis 1978 verhalten haben, mit besonderer Hinsicht auf die Staatsausgaben und die Netto und Bruttolöhne.

Im zweiten Teil wird mit Hilfe eines ökonomischen Modells der italienischen Wirtschaft geschätzt, wieviel die Defizite der öffentlichen Haushalte zur Inflation in Italien von Jahre 1973 bis 1978 beigetragen haben.

Das Modell enthält 31 endogene wirtschaftliche Grössen und ist in der Ausgabe von März 1981 der Zeitschrift « I.M.F. Staff Papers » ausführlich beschrieben. Die Haupteigenschaft des Modells ist die Annahme, dass die verschiedenen Märkte nicht ständig im Gleichgewicht sind.

Die Ausgaben der gesamten öffentlichen Haushalte werden in der Simulation auf derselben Höhe vom ersten Trimester 1973 gehalten. Es wird angenommen, dass das Geldvolumen gemäss einer « reaction function » der Zentralbank zum Teil angepasst wird. Zudem wird angenommen, dass der Unterschied zwischen den nominalen Arbeitskosten für die Industrie und die Löhne, die nach Zahlung von Steuern und Soziallasten in den Händen der Arbeiter bleiben, nicht steigt.

Damit wird gezeigt, dass die Politik der öffentlichen Haushalte zwischen 1973 und 1978 bewirkt hat, dass die jährliche Inflation fast um vier Prozentpunkte geringer gewesen wäre, als es der Fall war. Also wäre am Ende des Jahres 1978 das Niveau der Preise ungefähr um 22 Prozent geringer gewesen, als es tatsächlich war.

Das Bruttosozialprodukt wäre in den ersten 3 1/2 Jahren weniger gewachsen als es der Fall war, aber im Jahre 1977 wäre es viel mehr gewachsen, so dass schon vor Ende der Simulationsperiode das historische Niveau wieder erreicht worden wäre. Die Kosten der gesünderen Finanzpolitik werden deswegen vom Autor als relativ gering eingeschätzt.