

NAIRU, incomes policy and inflation

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Introduction

Italy has been one of the few industrialised countries resorting to incomes policies in the current decade. Starting from 1992, the previous wage indexation mechanism (the *scala mobile*) has been dismantled and the institutional framework of wage negotiation has been reshaped with the aim of strengthening the link of nominal wages to target inflation. Furthermore, the role of the incomes policy agreements has been pervasive as they have implied a continuous involvement of social partners in the implementation of economic policy (the so-called *concertazione*), particularly in the definition of the fiscal and social policy design.

Many observers have claimed that the typical target of traditional incomes policies has been attained, for a remarkable slowdown in wage and price inflation has been taking place since 1992 despite the inflationary impulses due to two episodes of sharp depreciation of the exchange rate (Figure 1).

However, no apparent progress has been made concerning labour market imbalances: in 1996 the unemployment rate exceeded by 4 percentage points the already high level – largely reflecting structural factors – inherited from the 1980s (Figure 2).

The rise in unemployment and the slowdown in GDP growth experienced since 1992 may have been more important than the incomes policy episode in moderating wage growth and inflation; more generally, economic policy and, in particular monetary policy, has become much more committed to price stability.

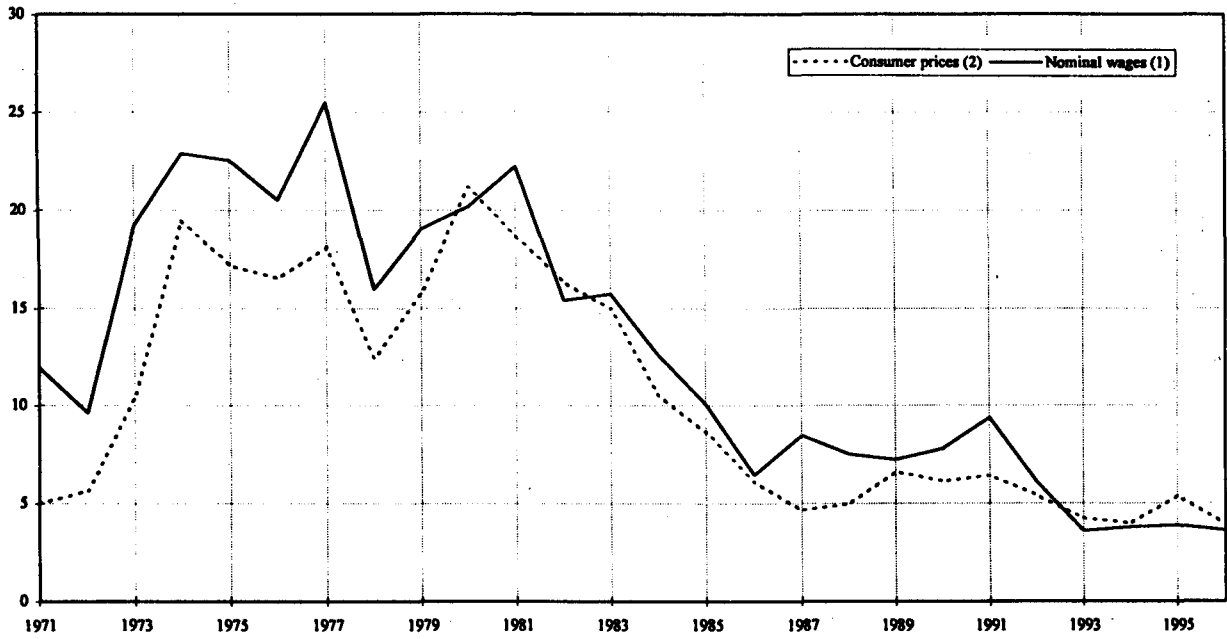
The various analytical issues raised by this experience may be summarised as follows:

- i) How important was the wage moderation engineered by the incomes policy framework in checking inflationary pressures?
- ii) Is there any evidence of a long-run change in the bargaining structure and the wage formation mechanism? In particular, are there signals that the new bargaining system may lead to a lower NAIRU? Are there implications for economic policy stemming from the changes in the dynamic adjustment of nominal wages to prices?
- iii) Is there any relationship between the incomes policy framework and other facets of the design of economic policy, namely the fiscal stance and the reshaping of labour market regulations and social policy institutions? In particular, has unions' involvement (the *concertazione*) favoured fiscal adjustment, providing the necessary consensus in a period of extreme political turmoil, or has it hindered the process of structural reforms?

Our answers to these sets of questions are preliminary and partial. First, we do not deal with the third, most difficult, set of questions. As far as the second question is concerned we provide only a partial answer. We analyse the possibility of structural breaks in the wage formation process using a standard Phillips-curve specification embodied in a large macroeconomic model (the Bank

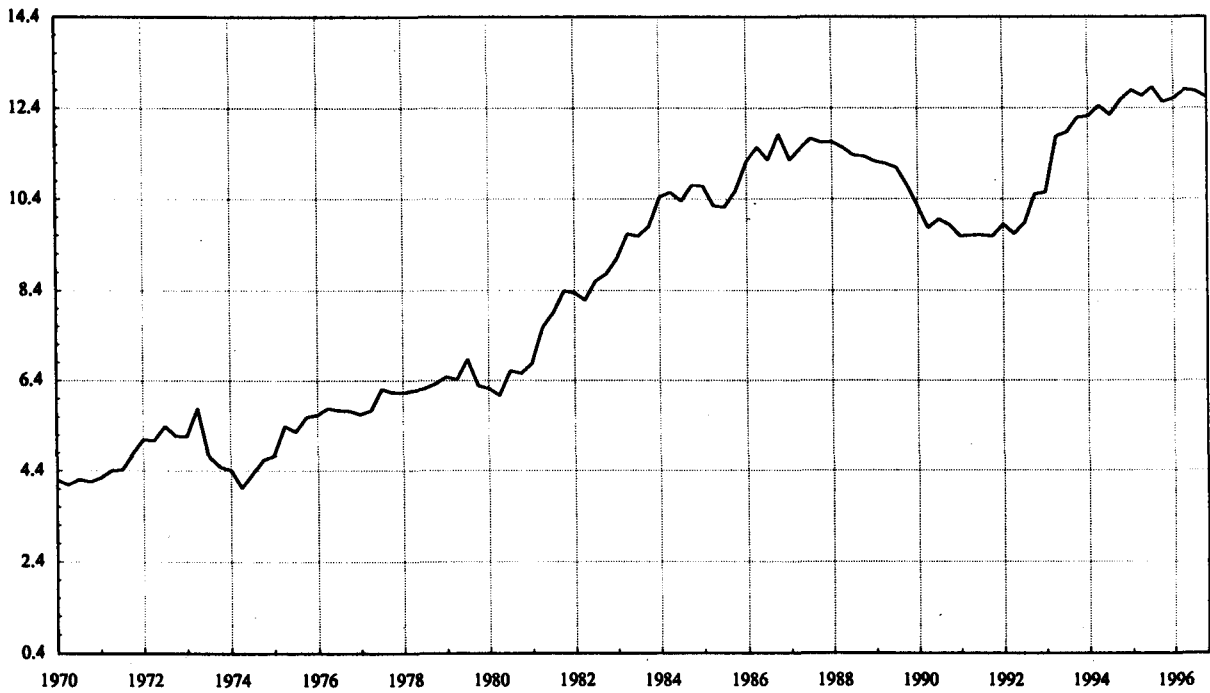
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Figure 1
Price and wage inflation
 Yearly percentage changes



¹ Per capita earnings in the non-farm non-energy private sector. ² Cost-of-living index.

Figure 2
Unemployment rate*
 Yearly percentage changes



* Including workers paid by the Wage Supplementation Fund. Data before 1992 were made compatible with the current definition (see Casavola (1994)).

of Italy quarterly model, henceforth the BIQM). We consider both the hints of shifts in the NAIRU implicitly included in the Phillips curve and the changes in the dynamic adjustment of wages to prices; moreover, embedding this equation into a large model we try to identify the overall² effects of the wage moderation episode. However, we believe that the specification of the labour market adopted in the BIQM is not the most suitable one for identifying the role of the structural factors highlighted in the literature, both for Italy and other industrialised countries, as determinants of the NAIRU (and of the sluggishness of the unemployment rate in returning to the NAIRU). We are currently working along this specific route, trying to identify a variable measure of the NAIRU.³

Two additional *caveats* must be stressed at the outset. First, our analysis of the structural break deriving from the reshaping of the bargaining system is an early evaluation, given that only few years have elapsed since the reform was agreed upon and many aspects of the new regime, if anything really new is emerging, have still to be defined. Moreover, our analysis is based on an aggregate wage equation which may not be the most suitable analytical tool for identifying the main features of the dynamic process of wage determination (which includes a wage-to-wage process on top of the wage-to-price adjustment).

The paper is organised along the following lines. In the next section we describe the Italian bargaining system. In Section 2 we focus on the recent incomes policy experience and the novelties it introduced into that system. We present in Section 3 a comprehensive econometric analysis of the stability of the wage equation included in the BIQM. Having identified some evidence of breaks, we try to characterise the new wage determination mechanism (Section 4), and to evaluate the overall macro effects of these changes resorting to simulations of the whole model (Section 5). Finally, we present some overall conclusions, focusing on the features of the new bargaining system that remain unsettled.

1. The Italian wage bargaining system

Two main issues have been emphasised in the Italian debate on wage setting: the effects on inflation persistence stemming from the automatic wage indexation mechanism (the *scala mobile*); the rigidity wages (both the average real wage and wage differentials) with respect to labour market unbalances.⁴

In the bargaining framework fully effective up to the end of 1991, wages resulted from the adding up of pay increases determined by the automatic indexation mechanism and the effects of

² As said, excluding the possible interactions between incomes policy and the fiscal stance.

³ In a related research project we are trying to identify and measure the long-run structural unemployment rate. On practical grounds we are implementing both simple S-VAR systems à la Blanchard-Quah, identifying the shocks to the NAIRU separately from demand and supply shocks which should have only temporary effects on unemployment, and a reduced-form specification for the unemployment rate including both cyclical and structural determinants of unemployment and, in particular, those related to the wage bargaining process. The analysis is carried out for a longer period, including both the fall of unemployment in the 1950s and its subsequent rise from the beginning of the 1970s. In the forthcoming paper we also plan to compare our procedure with the standard practice of looking directly at the unemployment-(accelerating) inflation trade-off popularised by Elmeskov (1993) and refined, among others, by Staiger, Stock and Watson (1996).

⁴ For a general overview of the structural aspects of the inflationary process in Italy, including those related to the wage bargaining system, see Visco (1994). For a previous study using (an earlier vintage of) the BIQM for characterising the NAIRU see Bodo and Visco (1987); Gavosto et al. (1995) use the BIQM for examining the stability of the NAIRU. A survey of the last two decades of empirical specifications of the wage curve in Italy is in Sestito (1994). The aspect of the rigidity in the wage structure mostly emphasised is the one concerning the regional differentials (see Bodo and Sestito (1991), Faini (1995) and Casavola et al. (1995)).

two separate levels of bargaining. These were the national industry-level contracts lasting three years and bearing on almost every aspect of the wage structure and work organisation, and an additional company-level bargaining taking place mainly in large firms.

The indexation provision established an automatic link between the evolution of wages and past price changes, covering all employees. Such a mechanism strengthened workers' bargaining power, reinforcing real wage resistance to external shocks (e.g. the two oil shocks in 1973-74 and 1979) and changes in indirect taxation; moreover, it strengthened nominal inertia in wage growth, causing above all a strong persistence of the effects of exogenous inflationary shocks. During the 1980s, the functioning of the mechanism underwent a number of changes that lowered, over time, the degree of indexation and its compressing effects on wage differentials, and which were negotiated at the central level and were favoured by a more cooperative stance in labour relations. In the early 1980s, the actual elasticity to CPI guaranteed by the scheme was on average close to 0.8; adjustments were taking place quarterly and the mechanism produced a significant compression of differentials (the same absolute increase was granted to everybody).⁵ The degree of indexation was reduced between 1982 and 1984 through ad hoc modifications agreed to in centralised negotiations that involved the social partners and the Government (the so-called Tripartite Agreements). A new indexation clause was introduced in 1986: the degree of coverage with respect to CPI inflation was stabilised around 0.5-0.6, with a half-year adjustment lag and a milder compression of wage differentials.

The overwhelming role played by centralised elements (the indexation component and the industry-level settlements) is thought to have produced a wage structure characterised by a low degree of differentiation and flexibility.⁶ Wages were not allowed to adjust to movements in productivity or in relative labour demand occurring in specific segments of the labour market (in particular at the regional level). The absence of coordination between the different bargaining levels is deemed to have resulted in an inflationary bias, strengthened by the backward-looking indexation mechanism. National contracts were rather independent across industries, whereas a clear pattern of bargaining did not emerge and firm-level agreements established pay increases resulting in widespread wage drifts. Finally, the backward looking indexation (effective only vis-à-vis price rises) prolonged over time the effects of inflationary shocks. All in all, many observers have considered Italy as characterised, in the Calmfors-Driffil (1988) framework, by an intermediate degree of centralisation, with negative externalities arising from uncoordinated wage pressures and rigidities stemming from the lack of responsiveness to "local" market conditions.⁷

However, ideological and politically based motivations influencing the behaviour of the trade unions have acted as a centralising device. The political leadership of unions is thought to have sometimes enhanced policies of coordination and explicit wage moderation. By and large, these phases stemmed from situations characterised by economic turmoil calling for "emergency" interventions. A first episode was at the end of the 1970s, when a mild form of moderation in wage

⁵ Until the mid 1970s the absolute rises granted by the *scala mobile* were partly differentiated across sectors and pay levels; an agreement set in 1975 after bitter conflicts equalised (at the highest amount) the absolute rises. As a result, the actual degree of indexation for an average worker (in the manufacturing sector) rose from about 0.60 to about 0.90 in 1977; a small decline (to 0.80) took place in the following years as the mechanism did not take into account the drift in real wages. For details on the *scala mobile* mechanism see Banca d'Italia (1986). A reconstruction of the degree of indexation during the 1950s and 1960s is in Robotti (1973). An evaluation of the "optimality", in the classical sense of Gray (1976), is in De Stefanis (1995).

⁶ Formally, only firms belonging to the employers associations which signed the contracts are obliged to apply them to all their employees. In practice these are applied in the whole "regular" sector, both because the courts tend to refer to the national contracts in case of labour disputes and because several pieces of regulations prevent the eligibility for some incentives for firms that do not apply national-contract provisions. A proxy measure of coverage may, therefore, be obtained by considering the share of workers employed in the "regular" sector as defined in the national accounts.

⁷ See, for instance, CEC (1993) and Demekas (1995).

claims was introduced through an agreement involving the major unions.⁸ More troubled was the attempt made during 1982-84, as the biggest union finally withdrew from the incomes policy framework. In general, a more cooperative stance of unions is deemed to have emerged during the 1980s, as the phase of social conflicts that started in 1968-69 came to an end.

Probably the most important experience of coordination is the one that took place in 1992 and 1993 when wage setting was defined centrally by a sequence of agreements between the social partners, that ended with the introduction in July 1993 of a new mechanism of wage negotiation embodying incomes policy guidelines. The agreements were shaped by the growing concern about the deterioration of the economic situation. At the beginning of the 1990s, the effects of maintaining the exchange rate parities in the ERM, together with a growth in nominal wages higher than in the other European countries, were undermining the competitiveness of manufacturing firms. Consumer price inflation was fuelled by a still buoyant economic activity in the service sector and the other sheltered industries, favoured by the demand effects of a rising public debt. The perception of a risk of fiscal unsustainability was gradually emerging; in 1992 the lira was one of the first currencies being put under strong pressure when the ERM crisis started.

At the end of 1991, when employment was beginning to decline, a first agreement established a temporary freeze of the wage indexation mechanism. Then, in July 1992, the social partners agreed upon the complete dismantling of the *scala mobile* and suspended firm-level bargaining up to the end of 1993, in exchange for an across-the-board rise (a flat-rate bonus worth about 0.7% of the average monthly compensation) to be paid in January 1993. Notwithstanding the agreement, in the autumn of 1992 unprecedented economic and financial turmoil hit Italy. In September the lira was forced to leave the ERM; in December the devaluation reached 15%. The Government announced a very large fiscal package, including a reform of the pension system and a freeze of public sector wages; the budget package was approved in December. By that time the economy had entered a severe recession which aggravated employment losses.

The final agreement reached in July 1993 established the institutional features of a new bargaining framework aimed at introducing two main elements: a better coordination of the different components contributing to wage evolution and a pivotal role of future (target) inflation in shaping the development of nominal wages.

2. The new bargaining framework

The system established in July 1993 has maintained a two-tier configuration. The national industry-level contracts set the structure and evolution of wages (over a two-year horizon) as well as working conditions (with four-year validity).⁹ According to the general guidelines spelled out in the agreement, pay rises set by industry-level contracts should be "consistent" with the official inflation targets. Unexpected inflation does not result in automatic wage rises,¹⁰ but the differential between actual and target inflation in the past two years is one of the aspects to be considered at the renewal of sectoral wage settlements (taking into account terms-of-trade movements and the evolution of actual wages). In turn, the decentralised bargaining, which takes place mostly in large firms, should

⁸ For an analysis of the relationships between industrial reorganisation and changes in industrial relations in Italy since the 1970s, see Barca and Magnani (1989). Giavazzi and Spaventa (1989) compare the Italian and the UK experiences.

⁹ They also establish general guidelines by sector for firm-level negotiations; whether a specific firm is to be covered by decentralised bargaining still depends on local conditions, in particular unions' strength.

¹⁰ An indexation mechanism is maintained only in the case of a significant delay in the renewal of national contracts: three (six) months after expiration, the wage levels set by the old contract are increased by 30% (50%) of the target inflation rate.

aim at strengthening the flexibility of wages with respect to firms' performance, linking pay bonuses to specific productivity or profitability indicators.

Starting from the debate on corporatism, a large amount of literature has analysed the relationship between the bargaining structure and macroeconomic performance. Several aspects of the bargaining structure have been considered but the one most emphasised has been the degree of centralisation. Calmfors and Driffill (1988) have claimed that there is an hump-shaped relationship between the degree of centralisation and equilibrium unemployment. However, Calmfors (1993) has shown that several facets of a bargaining system may not be easily synthesised by a single variable meant to measure the degree of centralisation. For instance, decentralised bargaining units may be strongly coordinated through guidelines set at a central level, while formally centralised systems may have mixed features deriving from the effects of widespread wage drift and plant level bargaining. As argued by other authors (see Layard et al. (1991)), the Calmfors and Driffill hump-shaped relationship may reflect two separate factors: "coordination" and "unions' strength", respectively with negative and positive effect on the NAIRU and usually both positively correlated with the degree of centralisation. Even more important is the fact that the shape of the relationship between unemployment (and other macroeconomic performance indicators) and the degree of centralisation has not always been confirmed in the empirical studies which have followed.¹¹ Actually, this instability of the relationship may derive from the interaction between the bargaining structure and the nature of the shocks experienced by an economy: a centralised structure may be better suited to offset aggregate and undifferentiated shocks, while a more decentralised one may more promptly respond to "structural" and micro-based shocks. The empirical estimates may lead to robust results only if appropriate variables controlling for the nature of the shocks are introduced.

It is therefore not correct to analyse the changes determined by the new system by focusing uniquely on the degree of centralisation. A more complete analysis of its features is needed for understanding the possible effects of changes in the wage-setting procedures.¹²

A first element is related to the increase in coordination possibly arising from the link with target inflation, which should act as a common guideline for all sectors. Moreover, coordination might be strengthened if a clearer distinction emerges between the domains of industry and firm-level bargaining. What is not clear is whether the incomes policy agreements have led to relevant changes in the actual degree of coordination. Both in 1993-94 and in 1995-96, all national industry-level contracts have been settled with the inflation target set by the Government (see Irs (1997)) maintained as a reference. However, no trend towards a more synchronised structure has emerged. Moreover, the apparently strong coordination across bargaining units obtained so far might have been a temporary feature determined by the cooperative behaviour adopted by unions to deal with the "emergency" in the economic and political situation. Furthermore, the distinction between the domains of firm and industry-level bargaining is still an open issue.

As for other aspects of the sensitivity of real wages to labour market disequilibria, the overall effect of the changes brought about by the reform is even more difficult to evaluate. On the one hand, the framework established in the incomes policy agreements has been interpreted by some observers as a further step towards a more cooperative stance in industrial relations,¹³ possibly strengthening the effect of unemployment in moderating real wages.¹⁴ On the other hand, the

¹¹ See OECD (1997).

¹² An initial discussion of the possible novelties implied by the new bargaining framework is in Dell'Aringa (1995).

¹³ See, among others, Regini and Regalia (1996), in which the move towards a co-operative stance at the national level is viewed as only partly due to the emergency phase (the need for fiscal adjustment and the exchange rate crisis, on the one hand, and the crisis of the traditional political parties, on the other). The move has also been related to the co-operative experiences developed at the firm level during the 1980s.

¹⁴ As usual it is quite difficult to distinguish between changes in unions' preferences and variations in unions' power; an empirical evaluation for Italy has been presented in Checchi (1995).

centralisation of bargaining so far implicit in the implementation of the incomes policy agreements may impair the ability to produce the differentiation in the wage structure needed to counteract the labour market segmentation plaguing Italy.

An additional aspect to be considered is the abolition of the old indexation mechanism with its distortive effects (on wage differentials and on real wage rigidity with respect to changes in the terms of trade and indirect taxes).

All these changes may have an impact on the determination of labour market equilibrium, possibly resulting in a shift of the unemployment rate consistent with stable wage inflation (i.e. the NAIRU). The new system might also lead to a change in the dynamic pattern of the adjustment of wages to prices and, therefore, to a change in the inflationary process. The absence of indexation and the two-year horizon of the national contracts are likely to increase the inertia of nominal wages (in levels), slowing down the adjustment and increasing the weight of expected inflation in the determination of wages. For a given level of expected inflation, the short-run impact of inflationary shocks should be reduced. These shocks will somehow feed back later on, when re-negotiation occurs; in this sense the absence of indexation, coupled with a quite long duration of contracts (two years), may produce fluctuations in real wages unrelated to the fundamentals of the economy and a longer memory in the inflation process.

Assuming as a reference model the standard long-run vertical Phillips curve, the changes in the pattern of nominal adjustment should have no implications for the NAIRU. However, in the short run there might be "real" effects. In the theoretical literature, wage indexation is beneficial for disinflation because it implies that wage setters do not need to discount the risk of monetary shocks. The cost of disinflation is lessened, as the need for the monetary authorities to show their resolve by accentuating their restrictive stance¹⁵ is reduced. In the real world, wage indexation operates with lags, increasing the backwardness of wage and price adjustment; therefore, the speed of disinflation could slow down.¹⁶ In particular, the shift from an indexation mechanism based on past price changes to a framework where inflation targets play the pivotal role may lower the costs of disinflation.

The empirical analysis presented in the following sections is an attempt to provide an evaluation of the effects stemming from the incomes policy episode. This evaluation must be considered as preliminary because some crucial features of the new bargaining system are still unsettled and quite long lags characterise the adjustment to institutional changes. Furthermore, there is no analysis of the linkages between the incomes policy episode and the overall process of fiscal consolidation and social policy reform. On this issue, one argument sees the wage moderation and the fiscal adjustment so far implemented as strictly complementary, in that unions' cooperation provided the necessary consensus for implementing painful policies which could, otherwise, have resulted in costly social conflicts. An opposite argument is that the *concertazione* has rather been an obstacle to the fiscal adjustment process, because structural reforms have been watered down by the need to obtain unions' agreement, particularly in the social policy field (social security and labour market regulation). Indeed, to evaluate these aspects, the interplay between the behaviour and preferences of each social partner should be analysed in depth. These issues are well beyond the scope of this paper.

3. An empirical evaluation of the changes in aggregate wage behaviour

Many observers have deemed the reform in the wage bargaining mechanism as the main factor lying behind the overall decline in inflation since 1992, despite two episodes of sharp depreciation of the exchange rate.

¹⁵ For a more complete discussion on the interactions between monetary policy credibility and pricing behaviour, see Ball (1995).

¹⁶ See, for instance, Chanda et al. (1992).

Two types of evidence have been used so far to provide empirical tests of these hypotheses: careful evaluations of the pay rises established in the most important contracts agreed upon; econometric experiments looking at the stability of wage and price behaviour in the recent period.

Examples of the former are in ISCO (1997) and IRS (1997), where the rise in minimum contractual wages is compared to target inflation, which according to the July 1993 agreements had to act as a yardstick. While providing useful bits of information, this kind of exercise cannot identify the specific role of the new bargaining mechanism in shaping actual wage behaviour. In the long run real wage growth has to be related to productivity growth and the reference to target inflation has to be interpreted as a coordination mechanism, not as an automatic rule shaping the evolution of nominal wages.

The econometric experiments have mostly analysed the inflation performance which followed the 1992 ERM crisis. After the sharp devaluation of the lira, a substantial increase in inflation was commonly considered as a very likely outcome, given a weight of imports in domestic demand close to 0.2. The fact that, on the contrary, inflation slightly decreased, fluctuating around 4% in 1993, has been interpreted as evidence of a structural break in wage and price behaviour. The incomes policy agreements have been considered the main determinant of the better-than-expected inflation outcome, both directly as a source of wage moderation and indirectly through their possible effect on inflation expectations and price behaviour.¹⁷

Recently, several analyses based on the BIQM have cast serious doubts on the purport of the July 1993 agreement on the recent inflation. Two additional factors have been emphasised: the sharp fall in aggregate demand, brought about by the recession in Europe and the fiscal squeeze; the delay in the pass-through of the Lira devaluation to import prices.¹⁸ The former, in particular, can be considered as an alternative source of wage moderation.

Our experiment uses the BIQM analytical framework but differs from the aforementioned works in three respects. First, it takes advantage of the longer span of data now available. Secondly, it tries explicitly to identify the appearance of a new regime in wage behaviour, instead of relying uniquely on tests for generic structural breaks in the wage equation. It considers both hints of changes in the NAIRU and changes in the dynamic adjustment of prices to wages. Finally, it characterises the effects of the incomes policy agreements as a temporary deviation of wage behaviour from its long-run pattern that seems significant on economic grounds. This evaluation of the incomes policy effects is then used for simulations of the whole BIQM, the overall structure of which is described in the Appendix; such simulations allow us to disentangle the effects of the incomes policy from those due to other exogenous shocks, taking into account all possible feedbacks.

The wage equation we use is a Phillips curve,¹⁹ describing a disequilibrium adjustment process in the labour market: wage inflation depends on price inflation as well as on the rate of unemployment. Price inflation is measured both by expected (as measured by survey results) and realised inflation, with a long-run homogeneity restriction. The use of an explicit measure of expected inflation introduces some structure into the wage-to-price adjustment process instead of relying on a

¹⁷ The first channel is obvious. Concerning the second, Gavosto et al. (1994) suggest that firms, knowing that nominal wages of competitors were not reacting to the exchange rate devaluation, were more cautious in transmitting the exchange rate shocks to domestic prices. Moreover, it has been claimed that the dismissal of indexation made consumers more choosy. In a longer-term perspective, Pecchi and Piga (1997) argue that the absence of indexation widens the constituency of price stability supporters and strengthens the anti-inflationary resolve of economic policy.

¹⁸ Gavosto et al. (1995), analysing the BIQM, argue that there is not clear-cut evidence of structural breaks, as far as the pricing behaviour and the determination of wages and inflation expectations are concerned. Furthermore, Nicoletti-Altamari (1995), studying Italian survey data on expectations, finds strong evidence against the hypothesis of a change in the mechanism of expectation formation.

¹⁹ On the choice between the Phillips curve and the real wage equation, see Bean (1994) and Blanchard and Katz (1997).

distributed lag specification which would blur the distinction between the formation of inflationary expectations and the lagged responses to actual inflation;²⁰ unfortunately, our measure of expected inflation refers to a short-run horizon. Labour market tightness is measured by the rate of unemployment and by the degree of capacity utilisation, acting as a proxy for vacancies. An indirect measure of union power is introduced via the number of working hours lost due to strikes. As any standard Phillips curve, the equation does not allow for a direct response of wages to productivity growth.²¹

The specification includes also some additional factors which might lead to changes over time in the NAIRU:²² a proxy for the replacement ratio and the ratio of North-South unemployment rates. The former should increase wage pressures for a given level of unemployment;²³ the latter takes into account the claim that unemployment in the Northern regions is the main factor affecting the bargaining process (hence the variable should bear a negative sign).²⁴ After some experiments with several lags for the national unemployment rate, the final specification includes a 5 quarters moving average.²⁵

The adjustment of wages to prices has been refined considering the possibility of asymmetrical responses to positive and negative inflationary surprises. The initial specification was one where wages react to past inflation and the inflation expected for the current quarter, with a further catch-up term in case of divergence between expected and actual inflation. Some preliminary experiments showed an asymmetry in the effect of the catch-up variable, which was significant only in the case of positive unexpected inflation. This asymmetrical behaviour has been included in the final specification presented below.

The OLS estimates of the chosen specification are shown in Table 1. The results refer to a sample period ending in 1991, which is well before the incomes policy agreements.

The statistical properties of the model are satisfactory. The goodness of fit is surprisingly high, given that the estimated equation is in first differences and that the sample period is commonly thought to cover different bargaining regimes: the adjusted R squared is above 0.8 and the standard error of the regression is consistently below 1%. The LM test for autocorrelation confirms that this very simple specification captures quite well the dynamic properties of the endogenous variable, while the RESET test shows the validity of the linear specification. No sign of conditional or more general form of heteroskedasticity is present, suggesting that the OLS estimator is the best within the class of linear estimators, while the results of the Bera-Jarque test for normality ensure that the OLS estimator is not only robust but also efficient (conditional on the correctness of the exogeneity assumptions).

²⁰ In the BIQM, expectations are endogenised in a separate equation as a partly adaptive process with several additional variables taking into account cyclical and policy factors (see Visco (1984) and Nicoletti-Altimari (1995)).

²¹ Hence, it implies that a productivity slowdown (acceleration) would lead to higher (lower) price inflation, for a given wage increase, requiring higher (lower) unemployment to reconcile workers' and employers' claims.

²² We have chosen these variables on the basis of preliminary results emerging from a parallel research on the structural determinants of the NAIRU, currently under way. However, the results on the stability of the BIQM wage equation do not depend on the introduction of these additional variables.

²³ The replacement ratio is computed as the ratio between per-capita expenditure for unemployment benefits (including the benefits paid by the Wage Supplementation Fund and taking into account that only a minority of unemployed workers are covered by benefits schemes) and average per-capita earnings.

²⁴ In the specification search, we have examined several different measures of the North-South unemployment gap, always obtaining similar results. In the end, since our wage equation is embedded in a nation-wide econometric model, we have chosen a specification which includes both regional unemployment rates.

²⁵ This specification and the alternative one with only one term of unemployment are mostly equivalent. The former has been preferred because it produces a more regular wage growth pattern.

Table 1

Phillips curve
1973Q3-1991Q4

$\Delta w_t = -0.441 - 0.0027 \sum_{j=1}^4 u_{t-j} + \pi_{t-1} + 0.342(\pi_t^e - \pi_{t-1}) + 0.160 \left[(\pi_{t-2} - \pi_{t-2}^e) + \pi_{t-2} - \pi_{t-2}^e \right]$			
(-3.017)	(-3.296)	(2.495)	(-1.993)
$+ 0.111 \Delta str_t + 0.468 \left(\frac{CPU_t}{CPU_t + CPU_{t-1}} \right) + 0.247(\Delta RR_{t-1} + \Delta RR_{t-2}) - 0.275 \sum_{j=2}^6 \left(\Delta \frac{U_{t-j}^{CN}}{U_{t-j}^S} \right) + dummies$			
(2.378)	(3.171)	(1.533)	(-2.250)
$\bar{R}^2 = 0.845$			
		$\sigma_E = 0.0071$	DW = 2.40
Restriction test	:	F(1,61) = 3.54	[0.065]
Autocorrelation (1 - 4)	:	F(4,58) = 0.794	[0.534]
Heteroskedasticity (linear)	:	$\chi^2(11) = 8.052$	[0.708]
Heteroskedasticity (expon.)	:	$\chi^2(11) = 17.54$	[0.093]
Normality	:	$\chi^2(3) = 1.601$	[0.659]
Functional form	:	F(2,60) = 1.751	[0.182]
Chow test	:	F(20,82) = 2.008	[0.015]
Harvey's	:	t(61) = 0.989	[0.327]

Note: The variables are defined as follows: w , u and str represent the logarithm of the wage in the non-farm non-energy business sector, total unemployment rate and the number of working hours lost due to strikes, respectively; π denotes the inflation rate, π^e its expected value and $(\pi^e - \pi)$ the discrepancy between actual and expected inflation, or the catch-up term; CPU is the index of utilised capacity; RR the proxy for the benefit replacement ratio; U^{CN} refers to the unemployment rate in the Northern and Central regions and U^S to the one in the South.

All the variables introduced in addition to the unemployment and the price inflation terms are significant (marginally for the replacement ratio) only in differenced form. Hence they do not affect the estimate of the long-run NAIRU. However, their effect on wage pressures is not irrelevant. In particular, the rise in the North-South unemployment ratio plays a significant role in the second half of the 1980s by offsetting the downward pressure on wages of the ongoing rise in overall unemployment.

The long-run NAIRU implicit in the equation²⁶ is 7.7, as against an actual unemployment rate averaging 11.5 since 1991. Taken at its face value, the persistent and widening difference between actual unemployment and the NAIRU suggests either the presence of a restrictive stance of economic policy over a very long period or the existence of extremely long lags in the process of adjustment of unemployment to its "equilibrium" level. It is not unlikely that both hypotheses bear some element of

²⁶ The NAIRU has been computed assuming a quarterly rate of growth of productivity equal to 0.5% and applying the following formula:

$$NAIRU = \exp((\text{constants} - \text{productivity growth}) / \text{real rigidity})$$

where the term constants represent the sum of the intercept and of the coefficient of the relative degree of utilised capacity, which in steady state collapses to a constant equal to one, and real rigidity is the inverse of the coefficient of the unemployment rate. Note that since a unique value for productivity growth is used, a productivity slowdown that implies the NAIRU would be overestimated in the early part of the sample and underestimated in the later part.

truth. Since 1989, average output growth has remained approximately one percentage point per year lower than the OECD average (and also lower than in Continental Europe): this outcome could be traced back to the large fiscal adjustment packages introduced almost yearly and to the restrictive stance of monetary policy maintained throughout the period. In turn, there is plenty of evidence confirming the very slow adjustment in the labour market; a quite simple example is provided by the very small and delayed (with respect to the output cycle) reduction in unemployment experienced at the end of the 1980s.

Besides the usual caveat concerning the statistical precision of NAIRU, one has to keep in mind the already mentioned limitations of the Phillips-curve specification in identifying structural shifts in the NAIRU.

As far as the adjustment to prices is concerned, nominal wages react quite quickly, with an elasticity of about 0.7 with respect to one quarter lagged inflation, a value which is not far from the coverage with respect to increases in the cost of living provided, on average, by the automatic indexation mechanism; the elasticity with respect to expected inflation is about 0.3 and the homogeneity restriction is not rejected by the data. As already said, the catch-up mechanism implies that wages recover the purchasing power losses due to past unexpected inflation, while there is no effect when negative price surprises arise. This is a possible source of inflationary bias; however, in quantitative terms, the effect seems quite small (wages recover in two quarters only one third of their purchasing power losses).

The following step is to test whether the incomes policy agreements and the reshaping of the bargaining framework have significantly modified wage behaviour. To verify this hypothesis, a comprehensive check of the stability of the Phillips curve has been carried out, considering several pieces of evidence potentially able to detect different types of structural shifts in the wage equation.

As the timing of structural breaks cannot be established a priori²⁷ and the analysis of the stability of the wage equation over a longer time span is by itself of interest, it is convenient to start from a test aimed at detecting instability of a general form. The test performed here (suggested in Hansen (1992)), is approximately a Lagrange multiplier test of the null of constant parameters against the alternative that the parameters follow a martingale.²⁸ It has the advantage of being very simple to compute and of detecting the parameters responsible for the break, but it is not designed for determining the timing of the change if one has occurred. Table 2 presents the results of this test applied to the Phillips curve estimated over a sample period extended to 1996Q4, both for the most relevant coefficients and for the equation as a whole. By comparing each statistic with the critical values, this test does not support the view that the incomes policy episode and the 1993 reform represent fundamental innovations in the wage formation mechanism. None of the relevant parameters shows evidence of systematic changes and the equation itself seems stable.

As a further check, recursive estimates of the most relevant parameters of the Phillips curve were carried out²⁹ extending the sample to 1996, focusing on both the most important parameters and the implicit level of the NAIRU (Figure 3). There is evidence of a rather pronounced decline in the absolute value of the coefficient of the unemployment rate over the period 1982-86 and of a moderate rise afterwards, which seems more pronounced in the most recent period.

²⁷ The implementation of the incomes policy and the reform of the bargaining institutions are distributed over a wide span of time: the dismissal of the automatic indexation mechanism dates back to December 1991; the first round of wage contracts set according to the new bargaining framework took place in 1994; firm-level bargaining peaked in 1995-96 and the issue of the discrepancy between target and actual inflation produced a tough confrontation in the second half of 1996.

²⁸ The alternative incorporates simple structural breaks of unknown timing as well as random walk parameters. The more traditional CUSUM test was not deemed appropriate because, even though it aims at revealing instability of a general form, it is essentially a test to detect time variation in the intercept.

²⁹ The starting estimation covers a nine year period; the recursive estimates therefore start from 1983.

Notwithstanding some wiggling around in the constant term, most of these changes in the unemployment coefficient are mirrored by fluctuations in the NAIRU estimates, which rises by 1.5 percentage points (to about 7.5) during the 1982-86 period, fluctuates around that level until 1992 (while actual unemployment was trending upwards), falling to around 7.0 since then (with a further widening of the difference between the actual unemployment rate and its "natural" level).

Table 2
Hansen's stability tests

Constant	0.037
Unemployment rate	0.035
Lagged inflation rate	0.049
Expected inflation rate	0.082
Catch-up	0.034
Degree of utilised capacity	0.038
Stability of the regression	1.989

Note: The 5% critical value for the Hansen procedure is 0.470 for tests on the stability of a single coefficient and 2.96 for a regression with 12 explanatory variables.

While there seems to be a structural improvement in the labour market following the incomes policy episode, the high imprecision of this result has to be stressed. By applying the delta method,³⁰ it turns out that the 95% confidence interval around the point estimate of the NAIRU is slightly more than 2 percentage points. Hence, the fluctuations of the estimated variable are not large enough to reject the hypothesis of a constant NAIRU.

The parameters capturing the adjustment of wages to prices appear to be somewhat more variable over time. The elasticity of wages with respect to the one-quarter lagged price change declines from a high of 0.85 at the beginning of the 1980s to just above 0.6 ten years later and this evolution resembles the changes in the degree of indexation provided by the *scala mobile*. By the same token, the rather large swings of this parameter emerging in recent years could be the counterpart of the abolition of the *scala mobile* clause.

The most interesting results are provided by the Chow test for post-sample goodness of fit, applied to the 1992Q1-1996Q4 period. The analysis of the t-statistic for each one-step-ahead forecast error shows that only in one quarter out of 20 (namely 1995Q2) the error is significantly different from zero. Moreover, a closer look at the data indicates that the wage change for 1995Q2 is definitely an outlier (equal to -0.4%, representing the only in-sample decline in the nominal wage), due to the large *una tantum* payments awarded in several sectors at the very beginning of 1995; in fact, on purely statistical grounds, the low P-value of the Chow test can mostly be attributed to this outlier.

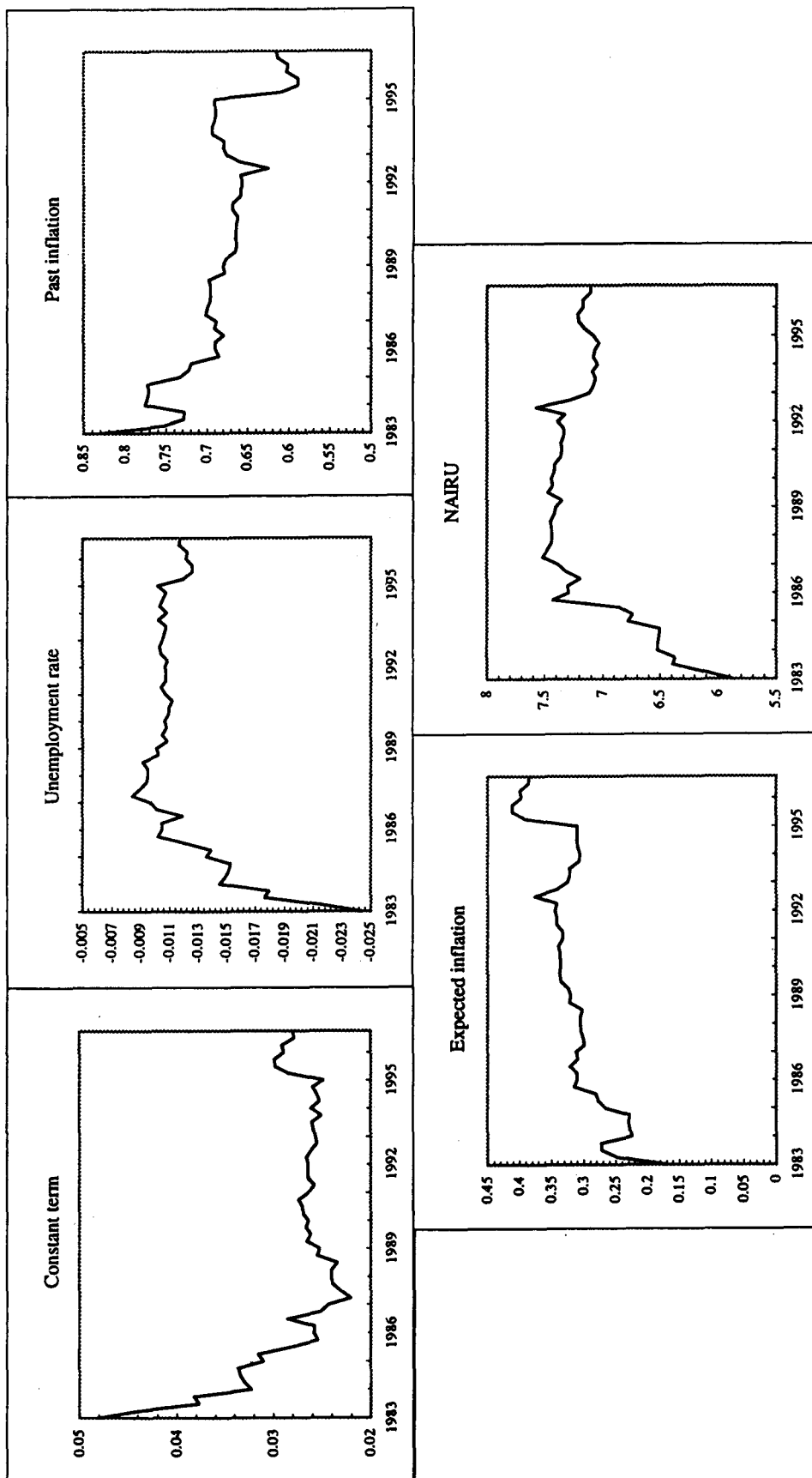
³⁰ The delta method for computing the standard errors of a function of estimated parameters can be simply summarised as follows. Let $F = F(\theta)$ be an $r \times 1$ vector function of the parameters θ of the model, and assume it is first-order differentiable. The estimate of F and its corresponding variance matrix are computed according to the formulae:

$$\hat{F} = F(\hat{\theta}) \quad \text{and} \quad \hat{V}(\hat{F}) = \hat{\sigma}^2 \left[\frac{\partial F(\theta)}{\partial \theta} \right]_{\theta=\hat{\theta}} \hat{V}(\hat{\theta}) \left[\frac{\partial F(\theta)}{\partial \theta} \right]'_{\theta=\hat{\theta}}$$

where $\hat{\theta}$ represents the maximum likelihood estimate of θ and $\hat{V}(\hat{\theta})$ a consistent estimator of its variance matrix. See also Rao (1973).

Figure 3

Recursive coefficients of the modified BIQM Phillips curve



However, it is possible to argue that errors which are not statistically significant may be significant in economic terms, given the lower inflation that has characterised the recent period: a 1% standard error in nominal wage growth is much more important in the recent period, with nominal wages growing at 3-4% per year, than in the 1980s, when they were growing at an average of 10%. Moreover, it has to be stressed that the forecasting errors show a rather systematic pattern: they are negligible in 1992 and, to a lesser extent, in 1993, become significantly negative during the 1994-95 period (actually peaking in 1995), and then reverse to positive values in 1996. Therefore, the equation estimated up to 1991Q4 appears to overestimate the wage evolution in 1993-95 and to underestimate it in 1996. According to this evidence the incomes policy would seem to have led to a temporary wage moderation, with a subsequent recovery of the real wage growth. This pattern fits quite well the standard picture of the incomes policy experiences since the 1960s.³¹

All in all, the empirical evidence gathered through the stability analysis of the Phillips curve can be summarised in three main findings. First, there is some weak evidence of a reduction in the NAIRU. However, because of the statistical imprecision of this result and the short period of time elapsed since the new bargaining system has been established, it is necessary to wait for additional evidence.

Secondly, there is stronger evidence hinting at quite relevant changes in the adjustment of wages to prices. This aspect, presumably related to the abolition of the old indexation mechanism and the new timing of the national-level contracts, will be further analysed in the next section.

Finally, there is a systematic pattern in the one-step-ahead wage forecasts errors, with an overestimation up to 1995 and a subsequent under-estimation. This characterisation suggests that, on top of any possible long-run changes in wage behaviour, the incomes policy episode may have played an autonomous role in the disinflation process. The fifth section will be devoted to measuring its effects.

4. A regime change in the adjustment of wages to prices?

In Section 2 it was argued that the absence of indexation and the two-year horizon of the national contracts could have increased the inertia of nominal wages (in levels), slowing down the nominal adjustment and raising the weight of expected inflation in the determination of nominal wages. The reduction of the short-run impact of inflationary shocks could have been associated with a longer feed back, producing a longer memory in the inflation process.

The empirical evidence from the stability analysis presented above somehow confirms this hypothesis. We now attempt to model explicitly the appearance of a new regime in the nominal wage adjustment, focusing on two aspects: the relative importance of expected and actual inflation and the quantitative size and length of the catch-up process.

A preliminary issue to be considered is that expected inflation (as actually measured by survey results) and target inflation (as fixed by the Government) may play different roles. In the long run, any sensible forward looking wage equation should include the expected inflation rate as the variable driving employers' and unions' behaviour. The targets fixed by the Government should play a role only insofar as they influence the private sector's expectations. A complete model should look at the interactions between target and expected inflation in affecting wages, but the brief period of time so far elapsed prevents an evaluation of their specific roles. In the short period considered here, the explicit reference to the inflation targets spelled out in the incomes policy agreements and the actual developments in wage bargaining suggest that the inflation targets may have been the reference variable for industry-level negotiations. Hence, the equation estimated in this section includes target

³¹ See Ulman and Flanagan (1971).

inflation, with a slightly better overall fit; the results obtained, however, are qualitatively robust to the alternative use of any of the two variables.

The following two-regime specification has been utilised:

$$\Delta w = (1 - a)\pi_{-1} + a\pi^e + b\left\{\left(\pi - \pi^e\right)_{t-i} + \left|\left(\pi - \pi^e\right)_{t-i}\right|\right\} / 2 + f(x) \quad (1)$$

$$\Delta w = (1 - a')\pi_{-1} + a'\pi^T + b'\left\{\sum\left[\left(\pi - \pi^T\right)_{t-i} + \left|\left(\pi - \pi^T\right)_{t-i}\right|\right]\right\} / 2 + f(x) \quad (2)$$

The first equation, already presented in the previous section, represents the behaviour prevailing in the 1970s and the 1980s, while the second picks up the new regime. Apart from the use of target inflation³² in the second regime and expected inflation in the first regime, the two specifications may differ in three aspects: the size of a and a' ; the size of b and b' ; the length of the catch-up process, identified through a standard specification search. Having chosen to focus on the features of nominal adjustment, the specification is such that it keeps the coefficient of the variables included in the $f(x)$ term (described in the previous section) constant over the whole sample period.

The OLS estimates are shown in Table 3. The sample period extends from 1973Q3 to 1996Q4. Given the results of the stability analysis presented above and the ongoing nature of the changes in the bargaining system (with a first agreement to dismantle the *scala mobile* in July 1992 and a final agreement twelve months later), the break between the two regimes has been set in the first quarter of 1993. This choice allows a four-year period for testing hypotheses about the second regime.

The overall performance of the equation is quite satisfactory. The statistical fit, whether measured by the adjusted R-square or by the standard error of the regression, is good; there are no signs of heteroskedasticity, functional form misspecification or non-normality; all in all, no sign of misspecification appears, but for some evidence of first-order autocorrelation. As far as the coefficients of unemployment and the other real variables are concerned, the results are very close to the ones already shown in Table 1. In contrast, the difference between the two regimes appears rather extreme as far as the nominal variables are concerned.

In the second regime, nominal wage changes seem to be shaped only by the inflation target.³³ There is a stronger and longer catch-up to past inflation surprises: the adjustment is completed in 18 months and the size of the estimated coefficient (around 1.4) shows an overcompensation of past positive differences between actual and target inflation. On qualitative grounds, these characteristics correspond quite well to the priors of a more forward looking behaviour in the short run, with longer-lasting effects of inflationary shocks. However, the point estimates look quite implausible. The absence of any short-run role of actual inflation might simply be a temporary feature, due to the emphasis on target inflation as a coordination device during an economic turmoil period (target inflation was deemed to define the "fair" wage growth)³⁴. The size of the catch-up effect might be picking up the normal surge in wage growth following a period of politically induced restraint.

More generally, the two caveats already mentioned have to be borne in mind: the absence of an explicit wage-to-wage spillover effect in the specification and, more important, the paucity of data allowing only a very preliminary evaluation.

³² On an annual basis, target inflation has been computed as a simple average of the values set by the Government one and two periods in advance. The quarterly series is obtained by using expected inflation as an indicator.

³³ The unit restriction on the coefficient of target inflation is not rejected by the data.

³⁴ As already said, the role of target inflation per se is uncertain in the long run.

Table 3
Two-regime Phillips curve
1973Q3-1996Q4

$\Delta w_t = -0.338 - 0.00238 \sum_{j=1}^4 u_{t-j} + \pi_{t-1} DUBF931 + 0.323(\pi_t^e - \pi_{t-1}) DUBF931$ <p style="text-align: center;">(-2.728) (-3.010) (2.373)</p> $+0.170 \left[(\pi_{t-2} - \pi_{t-2}^e) + \pi_{t-2} - \pi_{t-2}^e \right] DUBF931 + \pi_t^T (1 - DUBF931)$ <p style="text-align: center;">(2.050)</p> $+0.717 \sum_{j=2}^7 \left[(\pi_{t-j} - \pi_{t-j}^T) + \pi_{t-j} - \pi_{t-j}^T \right] (1 - DUBF931) + 0.009 \Delta str_t$ <p style="text-align: center;">(2.126) (2.182)</p> $+0.411 \left(\frac{CPU_t}{CPU_t + CPU_{t-1}} \right) + 0.284 (\Delta RR_{t-1} + \Delta RR_{t-2}) - 0.255 \sum_{j=2}^6 \left(\Delta \frac{U_{t-j}^{CN}}{U_{t-j}^S} \right) + dummies$ <p style="text-align: center;">(2.869) (1.779) (-2.263)</p>			
$\bar{R}^2 = 0.848$	$\sigma_\varepsilon = 0.0074$		DW = 2.46
Restrictions test :	F(2,79) =	1.926	[15.244]
Autocorrelation (1 - 4) :	F(4,77) =	1.371	[25.179]
Heteroskedasticity (linear) :	$\chi^2(12) =$	9.283	[67.858]
Heteroskedasticity (expon.):	$\chi^2(12) =$	21.059	[14.859]
Normality :	$\chi^2(3) =$	1.340	[51.173]
Functional form :	F(2, 79) =	1.491	[23.138]

Note: The variables are the ones already presented in Table 1. *DUBF931* is a dummy variable equal to 1 up to the first quarter of 1993 and π^T is the inflation target.

5. The overall effects of wage moderation: some counter-factual scenarios

The analysis carried out so far has shown some interesting sign of parameter shifts that can be related to the reform of the wage bargaining framework. However, the evidence about both the possible reduction in the NAIRU and the appearance of a new regime for the adjustment of nominal variables does not seem robust enough to provide a sound basis for a quantitative assessment of their effects.

Actually, following Sims (1980, 1982) and Cooley et al. (1984a, b) one might argue that genuine regime changes are rare, because agents with rational expectations know the options available to policy makers and form probability distributions over the range of possible policy stances. Thus, rather than changes in parameters, one has particular draws from probability distributions that have

already been integrated into the optimisation problems of individual agents.³⁵ In this section, an alternative approach which is more in line with the mentioned claims is, therefore, pursued. Using the evidence presented in Section 3 on the systematic pattern in the one-step-ahead forecasting errors of the wage equation, the incomes policy episode is characterised as a phase of wage moderation followed by a wage pick-up. The evaluation of the overall effects of this episode is then worked out resorting to simulations of the whole BIQM.

Various counterfactual experiments are performed to simulate the developments of the Italian economy as if the incomes policy episode had not occurred. The simulations extend from 1993 to 1997,³⁶ encompassing the period characterised by the effects of two sharp depreciations, the one related to the Autumn 1992 ERM crisis and the other suffered in the first half of 1995, mainly related to political instability.³⁷ The main goal of the analysis is to provide a quantitative assessment of the specific contribution of wage restraint due to incomes policies to counteract the large price shocks deriving from the exchange rate depreciations and to favour the disinflationary process since 1993.³⁸ Exogenous and policy variables, including monetary policy, are fixed at their historical values and the *ceteris paribus* assumption is extended to the residuals as well.³⁹ Only results since 1994 are presented, given both the lags that characterise the response of prices to wages and the small amount of wage moderation, as measured here, in 1993.

The component of wage restraint attributable to incomes policy is measured using the residuals of the Phillips curve. More specifically, the quantification is based on the assumption that the counterfactual absence of the incomes policy can be modelled by endogenising the Phillips curve estimated with pre-agreement data (i.e. the first regime of the previous section). According to this hypothesis, the one-step-ahead forecast errors should represent the amount of "wage moderation" engineered by the incomes policy agreement.

The experiment has been further refined using the weak evidence on the identification of a second regime in the wage equation to obtain a gauge of the "pure noise" component included in the forecast errors of the wage equation. The forecast errors of the second regime equation have been considered as an estimate of this component and treated as an add-factor in the simulations.⁴⁰ The overall procedure can be questioned because the estimates of the new regime are not entirely reliable, as already pointed out. However, the unreliability of the new regime refers more to its long-run

³⁵ In Sims' words: "Permanent shifts in regime are by definition rare events. If they occurred often, they would not be permanent [...] Normally policy actions are generated by a mechanism that, from the point of view of the public, forms a more or less stable stochastic process [...]. The historical record is likely to be especially valuable in projecting the effects of such actions. Radically new types of policy are likely to be, and ought to be, discounted because it is recognised that their effects are uncertain". For a detailed treatment of the theoretical and empirical issues concerning the Lucas critique and its impact on economic analysis, see Hoover (1995).

³⁶ Data for 1997 are based on Bank of Italy forecasts. Since we are not concerned with absolute values of forecasts but with comparative evaluations of counter-factual scenarios, this is unlikely to bias the results of the analysis.

³⁷ Since the BIQM is a non-linear model, the results of the experiments depend on initial conditions. By simulating over a period of radical changes, it is in principle possible to obtain biased outcomes. However the effects of non-linearities are second order and can be safely ignored in most cases.

³⁸ This means that we do not explicitly measure the effects of other aspects of economic policy. A survey of the 1980s experience on the interactions between the several facets of economic policy in the disinflation process can be found in Andersen (1994).

³⁹ Since the above simulations are counter-factual experiments rather than forecasting exercises, residuals which constrain endogenous variables to their historical levels can be computed. Unless they contribute to design alternative scenarios, they are treated as exogenous variables and left unchanged.

⁴⁰ This procedure has been utilised for the 1993-96 period while in 1997 the add-factor of the Phillips curve has been set to zero, given that the identification of a noise component would have been arbitrary.

properties than to its in-sample features, as shown by the fact that the residuals during 1993-96 resemble quite closely a white noise process.

The other equation used to identify the effect of the incomes policy episode is the equation for inflation expectations. The rationale for this choice is the possibility that the incomes policy episode has led to a change in certain features of the inflationary process, an hypothesis somehow supported by the evidence presented in the previous section.⁴¹ However, given the absence of a formal structural break in the equation included in the BIQM for endogenising inflation expectations,⁴² the intervention made here has been simply that of fixing at zero the add-factor of the equation, so as to neutralise any indirect effects of the incomes policy agreements. The third and final intervention has been on the ratio of public to private wages. Its steady decline since 1991 (with a large pick-up in 1996) has been considered as part of the incomes policy framework and therefore neutralised by holding that ratio constant at its average level for the 1986-92 period.

The first simulation, henceforth labelled "no wage moderation" scenario, aims at measuring the overall impact of the changes in wage setting, in terms of inflation, growth and public finances. In this scenario monetary policy is kept unchanged; i.e. it does not react to the inflationary impulses coming from wages. The definition adopted for an unchanged monetary policy is oversimplified, given that no exact feedback rule for monetary policy (with forward and/or backward elements) is introduced into the model. Given the actual features of monetary policy in the period following the Italian exit from the ERM in September 1992,⁴³ the real interest rate has been kept at its historical values, with the exchange rate reacting to the new scenario, taking on board the effects of the higher nominal interest rates.

One additional limitation of this procedure is the assumption of an exogenous risk premium on the domestic exchange rate, which is the component explaining most of the large swings in the exchange rate during the period under scrutiny: the lira exchange rate was very sensitive to news about public finance, with a worsening likely to impose a severe penalty on the default risk premium and thereby induce a weakening of the currency. Therefore, the results worked out in the "no wage moderation" scenario are likely to underestimate the actual impact of the wage moderation episode. This is because an unchanged stance of monetary policy (as measured by real interest rates), in the face of additional inflationary pressures arising from a stronger wage growth, could have been interpreted by financial markets as too relaxed. It could, then, have caused a further depreciation of the lira and fuelled inflation. To tackle this possibility a second counter-factual experiment, henceforth called "risk premium shock" scenario, has been run assuming that the increase in nominal interest rates is entirely transmitted to the risk premium and hence to the exchange rate.⁴⁴

Finally, a third experiment, labelled as "controlled inflation" scenario, considers the effects of the monetary authorities reacting to the ongoing inflationary pressures. It fully translates into output losses the additional inflationary pressures induced by the absence of wage moderation. In the experiment the overnight real interest rate is used as the policy instrument for targeting the yearly inflation rate over the whole period.⁴⁵

Table 4 shows the results, computed as differences with respect to the baseline simulation. In the first two scenarios, as expected, wage growth is higher than in the baseline. The

⁴¹ More generally it has been argued that the income policy episode was conducive to a strengthening of the culture of monetary stability, a change which should have been reflected in the process of expectations formation.

⁴² See Nicoletti-Altimari (1995).

⁴³ For a description of continuity and changes in monetary policy rules since 1992, see Passacantando (1996) and Visco (1995).

⁴⁴ Since a shock to the risk premium feeds back to inflation and nominal rates, its amount was computed by trial and error.

⁴⁵ The time path of the instrument was chosen so as to generate a smooth path for changes in the nominal interest rate.

difference widens quickly at the beginning of the period, peaking in 1995; later on there is a deceleration, and at the end of the simulation horizon (1997) wage growth becomes lower than the actual one. As a consequence, inflation, after having reacted more than in the baseline to the depreciations of 1992 and 1994-95, declines slightly less; at the end of the simulation period the deviation from the baseline tends to disappear, confirming the idea that the effects of the incomes policy agreements were temporary. The higher inflation affects GDP growth negatively, notwithstanding a moderate rebound at the end of the simulation period.

Table 4
Simulation results
Differences with respect to the baseline simulation

	"No wage moderation" scenario (A)				"Risk premium shocks" scenario (B)				"No wage moderation" scenario with targeted 1996-97 inflation (C)			
	1994	1995	1996	1997	1994	1995	1996	1997	1994	1995	1996	1997
Consumption deflator ¹	0.1	1.3	1.8	-0.1	0.3	1.5	2.6	0.8	0.0	0.0	0.0	0.0
Private sector wage growth ¹	0.7	4.0	1.3	-2.2	0.7	3.8	1.9	-1.3	0.4	2.8	-0.2	-2.1
GDP ¹	0.2	-0.2	-0.9	0.3	0.2	-0.1	-1.0	0.1	-0.1	-1.9	-1.1	2.6
Domestic households consumption ¹	0.5	0.0	-0.7	0.1	0.5	-0.1	-1.1	-0.3	0.1	-1.6	-0.2	3.4
Total investments ¹	0.5	-0.2	-2.3	-0.8	0.5	-0.2	-2.5	-1.3	-0.7	-5.8	-5.5	2.9
Total employment ¹	0.1	0.1	0.2	-0.1	0.1	0.1	-0.2	-0.1	0.1	-0.1	-0.3	0.0
Competitiveness of exports ¹	-0.2	-0.5	-1.1	1.4	-0.1	0.0	0.0	1.2	-1.5	-1.2	0.0	3.2
Current account balance to GDP (%) ²	-0.2	-0.3	-0.2	0.0	-0.2	-0.3	-0.2	0.1	-0.8	-0.3	0.7	0.6
Net indebtedness to GDP ratio (%) ²	0.7	1.0	2.1	2.9	0.7	1.0	2.2	3.3	1.4	4.3	6.5	4.3
Public debt to GDP ratio (%) ²	-0.2	-0.7	0.5	3.5	-0.3	-0.9	-0.3	2.5	0.8	6.7	13.5	14.7
Treasury bill rate ²	0.1	0.9	2.1	0.6	0.1	1.1	2.8	1.7	3.8	6.4	1.7	-2.9
Lira/DM ³	-0.1	-0.2	-0.4	2.3	0.1	1.0	1.7	3.0	-2.3	-2.8	-0.9	5.5

(A) Old regime, Phillips curve for the private sector wages; public sector wages linked to private ones; real interest rate equal to the baseline.

(B) As (A), but eliminating the effects of nominal interest rates on exchange rates.

(C) As (A), but with interest rates targeting annual inflation in 1996 and 1997.

¹ Differences between rates of change. ² Differences between levels. ³ Percentage differences between levels.

Looking in more detail at the first scenario, one can see that the additional inflation, as measured by the domestic consumption deflator, is nearly 1 percentage point (yearly average, 3.1 percentage points cumulated), reaching a maximum of 1.8 in 1996. This result turns out to be the balance of two contrasting effects: on the one hand, a higher wage inflation and, on the other hand, a temporary squeeze of firms' profit margins. The exchange rate only starts to depreciate (by 2.3%) at the end of the simulation horizon⁴⁶ and its immediate effects are partly offset by a 1% contraction in the pass-through. The higher inflation path negatively affects the level of economic activity (which by

⁴⁶ As already said, the ability to endogenise the exchange rate is quite limited. This is confirmed by the fact that most of its actual variation during the period is unexplained by the equation and appears as a residual, the path of which has been kept equal in all simulations but the second one.

itself helps to moderate inflationary pressures): in the final year GDP is 0.6% lower than in the baseline. The most important channel is the capital losses on financial wealth caused by the higher inflation, which depress disposable income and consumption.⁴⁷ Because of the greater interest payments, due to higher nominal interest rates, and, above all, the larger wage bill of the public sector implied by the assumption on the public to private wage ratio, net indebtedness over GDP diverges more and more from the baseline. Yet, the general government debt to GDP ratio is mostly unchanged or even falls at the beginning, thanks to the higher nominal GDP; only in the last two years of the simulation range does it start to grow at a very fast pace, exceeding by more than 3 percentage points the baseline value.

In the second scenario, all these effects are magnified by the higher responsiveness of the exchange rate to inflationary pressures: inflation is on average 1.3 percentage points higher than in the baseline (peaking at 2.6 percentage points in 1996); cumulated output losses reach 1.2%. Concerning public finances, the end-of-simulation indebtedness to GDP ratio is more than 3 percentage points higher than in the baseline; the deterioration in the debt to GDP ratio is partly offset by the surge in inflation, which erodes the stock of debt. At the end of the simulation period inflation still remains 1 percentage point higher than in the baseline and a further devaluation is taking place. Therefore, convergence has still to be achieved, implying that even this scenario may somehow understate the overall costs of the absence of wage moderation.

The public finance deterioration is magnified when a more restrictive monetary policy stance substitutes for wage moderation in curbing inflation. In the first three years, every component of aggregate demand slows down: the increase in the cost of capital freezes the recovery of investment and the rise in real interest rates induces households to postpone planned expenditure, which more than offsets the positive wealth effect of the lower inflation; the exchange rate appreciates and worsens the price competitiveness of exports. The fall in GDP and disposable income feeds back into demand and reinforces the contractionary effect of monetary policy. Also because of the higher interest on public debt, the debt to GDP ratio is nearly 15 percentage points higher than in the baseline, an outcome which might have jeopardised the fiscal adjustment process, feeding back to undermine the credibility of monetary policy in obtaining those inflation targets and in reducing, in 1997, the short-term interest rate.

Bearing in mind the fact that there is no reason to believe that the final year of the simulations represents an equilibrium outcome in both the baseline and the alternative scenarios, our results suggest that the temporary wage moderation engineered by the incomes policy agreements contributed quite significantly to disinflation, at the same time reducing the output and employment losses otherwise required. The alternative of an even tougher monetary policy would have been more costly in the short run and, because of its negative impact on public finances, might have lacked full credibility. The incomes policy agreements may, therefore, have provided a further contribution by strengthening the credibility of the disinflationary process.

⁴⁷ No significant contribution comes from the small competitiveness loss (export prices grow less than consumer prices and their rise tends to be offset by movements in the exchange rate). Furthermore, no positive impulse comes from the temporary redistribution of income in favour of labour since it is not relevant in determining aggregate household consumption. The usual accelerator mechanism drives down investment, amplifying the contractionary effect.

Conclusions

The role of incomes policy – while almost neglected in the recent experience of other industrial countries – is a central issue in the current debate on the Italian economic situation. Advocates of incomes policy have seen it as a central pillar of a new "stability culture", whose appearance is considered as essential for Italy's participation in the forthcoming EMU. Critics have emphasised the deleterious aspects of the *concertazione*, which may have blurred the distinction between the institutional roles of the Government and the social partners and, more substantively, could have distorted the structural features of the fiscal adjustment process.

In this paper we have focused on the direct linkages between the incomes policy episode, inflation and unemployment, neglecting the more general issues about its interactions with the fiscal adjustment process. In particular, the empirical analysis has aimed at measuring the specific relevance of the wage moderation episode, while considering whether there is any evidence of long-run changes in the NAIRU and in the features of the inflationary process deriving from the new bargaining framework. Our conclusions seem more balanced than those currently prevailing in the Italian debate.

We have found that the incomes policy agreements were conducive to a period of wage moderation, with some real wage pick-up later on, a quite standard characterisation of an incomes policy episode. This wage behaviour was important in counteracting the inflationary impulses stemming from two successive sharp devaluations and contributed to reducing inflation to levels not experienced in Italy since the second half of the 1960s. Depending on the different assumptions about the responsiveness of the exchange rate to the upsurge in domestic inflation, the absence of incomes policy would have pushed up consumer inflation by 2-3 percentage points in 1996 (with a cumulated 3-5 percentage points increase in the price level at the end of our simulation exercise, in 1997). Trying to obtain the same disinflation path without wage moderation would have asked for a much more restrictive monetary policy, whose impact on nominal GDP growth and interest payments would have jeopardised the consolidation of public finances (in terms of both net indebtedness and public debt to GDP ratios), putting at risk the credibility of (and the actual chance to reach) those inflation targets.

This contribution has to be considered of utmost relevance given the inflationary record of the Italian economy and the risk of undergoing an exchange rate crisis, thus feeding back an inflationary spiral. However, the evidence on long-run structural changes is less clear cut.

On both theoretical and empirical grounds we have found only weak evidence supporting the hypothesis of a reduction in the NAIRU associated with the new bargaining system. The small decline implicit in the Phillips curve estimates appears hardly significant from a statistical point of view; moreover, it is quite difficult to link it to the new bargaining system, given the multitude of factors which affect the NAIRU and the several facets of the new bargaining system which are still unsettled. Theoretically, it has been argued that the new system might lead to a reduction in the NAIRU through three channels: an increase in coordination in bargaining, a more cooperative stance by unions (more ready to internalise the implications of their behaviour), and the dismantling of the distortive aspects of the old indexation mechanism. However, only the third of these effects may be taken for granted (although its empirical relevance is less obvious). The second effect may be questioned in so far as the cooperative stance of unions may be insufficient to produce the differentiation in the wage structure, particularly along regional lines, which would be necessary to counteract the labour market segmentation plaguing Italy. Concerning coordination, no trend towards a more synchronised pattern has yet emerged and the apparent strong coordination across bargaining units so far obtained through the common reference to target inflation may be a temporary feature determined by the economic and political "emergency" situation experienced in Italy.

Actually, an important issue still unsettled in the bargaining system is the relationship between industry and firm-level bargaining. A shift towards an exclusively profit-sharing nature of the latter seems unlikely: firms' bonuses are increasingly important but they usually grant substantial wage rises almost irrespective of actual profitability, with limited variations over time. Insofar as the industry level contracts set wage rises tightly linked to target inflation, unions would be partly left

aside in the distribution of productivity gains in the large portion of firms where decentralised bargaining does not take place. This would gradually lead to far-reaching changes in the role and nature of Italian unions. In the opposite polar case where industry contracts would result in real wage increases in line with productivity gains, the room left for decentralised bargaining would remain quite limited and the usual inflationary bias due to the overlapping of two levels of bargaining could emerge. Whatever the advantages and disadvantages of national or firm-level negotiations acting as a pivot in wage setting, our assessment is that an equilibrium bargaining structure has still to emerge.⁴⁸

Qualitatively more clear-cut are the changes in the adjustment of wages to prices. We have argued that the absence of indexation and the two years horizon of the national contracts are likely to increase the inertia of nominal wages (in level terms), amplifying the weight of expected inflation in their determination. For a given level of expected inflation, the short-run impact of inflationary shocks should be reduced. These will somehow feed back later on, when renegotiation occurs. We have found some empirical evidence of this effect, even if its exact quantification based on the identification of a new regime in the Phillips curve appears somehow implausible.

Some ambiguities exist concerning the respective roles of target and expected inflation. The fact that the targets have been playing an effective role in driving nominal wages since 1993 is not something which may be taken for granted in the long run. To be effective on this respect, the inflation targets set by the Government must be credible to the parties involved in the negotiation, without becoming a matter of bargaining. Hence, the targets have to be a policy goal based on plausible forecasts. The independent role of the monetary authorities in warranting price stability is likely to have become more important for unions locked in by contracts with a long horizon.

Moreover, both the pros and the cons of a rise in nominal rigidity have to be considered. The pros have been emphasised by the recent experience: as said, the partial anchoring of nominal variables caused by the slow response of nominal wages to inflationary shocks played a crucial role in the disinflation obtained despite the two sharp depreciations. Among the cons one has to consider the possible fluctuations in real wages unrelated to the fundamentals of the economy; the longer memory in the inflationary process (the short-run impact of inflationary shocks is reduced and postponed, leading to later pick-ups in inflation); and the risk of frictions when renegotiation occurs.

The possible solutions to the issue of nominal rigidity are linked to the choice between firm and national level bargaining. If industry-level contracts maintain their central role, an evolution towards shorter-term wage settlements could counteract the "excessive" nominal wage rigidity. Conversely, a shift to a more widespread use of firm-level contracts should confine centralised bargaining to act only as a "safety net" for minimum wage and working conditions, in order to prevent the inflationary bias (and bitter conflicts) arising from the overlapping of two bargaining levels.

⁴⁸ See Sestito (1996).

Appendix: The BIQM model

General overview⁴⁹

In the BIQM, rather traditionally, a number of adjustment processes govern the short-run dynamics of the economy, with long-run behaviour consistent with a neo-classical model with exogenous growth. In the absence of shocks, when all adjustment processes have taken place and expectations are fulfilled – that is, in the long run – the model describes a full employment economy,⁵⁰ in which all real variables grow at the same rate, equal to the sum of the rates of growth of population and productivity. Output, employment and the capital stock are consistent with an aggregate production function; all relative prices are constant. Inflation is constant as well, and equals the exogenous rate of growth of foreign prices, assuming no changes in the nominal exchange rate. Money is neutral, but not super-neutral, and the model is dynamically stable.

The theoretical structure underlying the steady-state is also a traditional one. The supply sector can be thought of as being composed of producers who operate in a monopolistically competitive market for their output and are price-takers in the market for production factors, each producer being endowed with the same (Cobb-Douglas) constant returns to scale technology. Along a steady-state growth path, firms decide, in each period, the cost-minimising factor mix. The level of domestic activity is then set to generate, given factor demands, a non-accelerating-inflation rate of unemployment. Life-cycle consumers choose the desired addition to the real stock of total wealth. The latter must be consistent with the demand for new capital by the firms, the demand for net (real) foreign assets by both firms and consumers and the (real) addition to the stock of government debt. Given the latter, relative prices (the real interest rate, the real exchange rate and the real wage rate) are determined so as to achieve the required consistency. As consumers do not anticipate, in the computation of their life-time resources, the need for the government to satisfy a long-run solvency condition, the stock of government debt is perceived to be part of total wealth, and Ricardian equivalence does not hold.

The intrinsic dynamics of the long-run equilibrium, deriving from wealth and capital accumulation, combines with the dynamics coming from the short-run adjustment processes. The most important ones reflect the putty-clay nature of capital, the stickiness of prices and wages, the possibility that expectations differ from realised values, and the corresponding revision of both plans and expectations. As to expectations, the BIQM, to a large extent, makes use of survey data on actual expectations, namely for price and exchange rates changes. This allows the estimation of the model to be carried out without any need for arbitrary assumptions on the expectation formation mechanism.

The wage-price block

In the BIQM, aggregate demand deflators are given by weighted averages of the value added and import deflators, the weights being different case by case. Import deflators are essentially exogenous, being calculated by converting foreign prices into lire. The equation for the deflator of imported manufactures allows for the possibility that foreign firms, in order to defend their market shares, may price to market: the pass-through is modelled as a positive function of the Italian cycle as opposed to that of the rest of the world and as a negative function of the lira effective exchange rate. Exchange rates are endogenised through an uncovered interest rate parity, with exogenous risk premium and expectations of exchange rate changes modelled as functions of PPP, interest rate differentials and past forecast errors. The private sector value added deflator is determined within an oligopolistic competition framework: firms apply a mark-up over unit labour costs, the mark-up being

⁴⁹ A more detailed description is in Galli et al. (1990).

⁵⁰ Full employment means a level of production and employment consistent with a constant rate of growth of prices.

a function of competitiveness on both foreign and domestic markets and of demand pressures, as captured by the degree of capacity utilisation. In addition, the short-run mark-up is influenced by changes in the deflator of imported inputs and foreign firms' pass-through, the effect being asymmetric in both cases. Wages are modelled according to a wage-leadership scheme, with the private sector being the leader and the public, energy and agricultural sectors the followers; the private sector's wage dynamics is determined via a Phillips curve.

The aggregate demand block

While in the long run the process of capital accumulation determines the level of economic activity, in the short run the nature of the model is basically Keynesian, with output being demand determined and with typical situations of excess supply both in the goods and in the labour markets. Consumption of non-durables and durables are considered separately; the latter is modelled as a function of non-durables consumption, used as a proxy for permanent income, relative price and interest rates; the former is modelled according to the life-cycle theory, with disposable income and wealth both playing a role. Disposable income is computed in such a way as to take the Hicksian correction into account, with inflation having a negative influence through the capital losses on total financial wealth. Investment decisions are specified separately for machinery, structures and residential construction. Investment in machinery is designed within a putty-clay scheme, with delivery lags and expectation lags determining the dynamic structure. Foreign trade is modelled very much according to the usual hypotheses, with competitiveness and absorption as explanatory variables. Capacity utilisation, used as a non-price rationing variable, is found to have a significant effect on both.

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Comments on: "NAIRU, incomes policy and inflation"
by Silvia Fabiani, Alberto Locarno, Gian Paolo Oneto and Paolo Sestito

by Sean Craig

This paper examines the question of the extent to which the change in incomes policy in 1991 contributed to Italy's good inflation performance after the ERM crisis led to large lira devaluations. This change involved a shift from a backward looking indexation mechanism where wages were linked to past inflation to a forward looking mechanism where wage increases are tied to the governments forecast of inflation. The approach of the paper is to model this change in the indexation mechanism as a shift in the estimated coefficients of the Philips curve equation in the econometric model of the Bank of Italy (BOI). It does this in three steps:

- 1) it tests whether the existing Philips curve equation has remained stable during the period of structural change and, thus, can be used to perform out-of-sample simulations;
- 2) it estimates a version of the Philips curve in which the specification of the equation is modified to reflect the change in the indexation mechanism by using dummy variables to allow the estimated coefficient on inflation to change;
- 3) it uses simulations of the BOI quarterly model to calculate how much higher inflation would have been had the Philips curve not changed. In Essence, this exercise involves a comparison of the simulations of two version of the model: one with the old Philips curve and the other with the modified specification.

Turning first to the test for structural change, the authors cannot reject the hypothesis that the Philips curve equation was stable over the sample period. While this is an encouraging result, it should be noted that their test for structural stability has low power in their relatively small sample, as the authors acknowledge.

The modification of the Philips curve equation to incorporate the change in the indexation mechanism is an interesting innovation. Unfortunately, the estimated parameters intended to capture this effect are implausible, casting doubt on the usefulness of the results. As the authors note, this may be due in part to the small number of observations available since the change in indexation occurred. Another problem is that the authors do not test the restrictions implied by this modification. One simple but revealing test would be to test (using an F-test) the specification incorporating the restrictions against the one without them to see whether the restrictions are rejected.

The last issue addressed by the paper is the impact of this change in the indexation mechanism on the inflation process. The comparison of the simulation results for the model with and without the modified Philips curve shows a very large effect of the change in the indexation mechanism on inflation – in the absence of the structural change, inflation would have been almost 2 percentage points higher in 1996. One concern must be that the paper attributes too much of the substantial improvement in Italian inflation performance to the change in the indexation mechanism, Other important structural changes that occurred at the same time may have contributed. In particular, structural reforms made it easier for firms to reduce employment which, in turn, contributed to strong productivity growth. As a result, unit labour costs actually fell in 1994 and 1995, despite the acceleration in wage inflation that began in 1994. Clearly, this and other structural changes could have had an impact on the estimated coefficients.

In conclusion, the modification to the Philips curve equation is unlikely to be sufficient to be isolate the indexation channel from these other channels through which structural changes could influence the inflation process. In particular, the likely importance of the change in employment practices (and the resulting effect on productivity) suggest that it might be appropriate to allow for structural shifts in other equations in the BOI model in addition to the Philips curve. The authors have

developed and interesting approach to analysing the inflationary impact of structural shifts in labour markets, but they need to extend it to other sectors of the BOI model before they can adequately explain the dramatic improvement in Italian inflation performance following the structural reforms.